

**CITY OF KINGSTON  
WASTEWATER SYSTEM IMPROVEMENTS  
SEWER REHABILITATION PROJECT  
WW-PDC-3**

**Project Manual Including Contract,  
General Conditions, & Technical Specifications**

Prepared for

**The City of Kingston**

900 Waterford Place  
Kingston, TN 37763  
Contact: Kevin Hamilton  
Utility Director  
Office 865.376.2907

July 24, 2024



FOR INFORMATION CONCERNING THIS PROJECT CONTACT:

Aaron Crenshaw, P.E.  
2160 Lakeside Centre Way, Suite 201  
Knoxville, TN 37922  
Phone: 865.719.7171  
Email: [acrenshaw@ardurra.com](mailto:acrenshaw@ardurra.com)



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**GENERAL**

Non applicable division and section references have been omitted.  
 Recipients of Bidding Documents must consult the Table of Contents to determine the full scope of the work involved and to ensure that all pages of the Project Manual and Drawings have been included.  
 Neither the Owner nor the Design Engineer will be responsible for bids submitted that are based on incomplete Bidding Documents.

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**ADVERTISEMENT FOR BIDS**

This project is being supported with the American Rescue Plan Act, Coronavirus State and Local Recovery Fund grant funding. Therefore, certain restrictions and other federal requirements attach to this opportunity.

City of Kingston (Owner)

Separate sealed bids for Wastewater System Improvements Sewer Rehabilitation Project

will be received by City of Kingston at the

office of Mayor located at 900 Waterford Place, Kingston TN 37763

until 10 o'clock (X A.M.    P.M.,    S.T.    D.S.T.) September 5, 2024, and then at said office publicly opened and read aloud.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications, and Forms of Bid Bond, Performance and Payment Bond, and other contract documents may be examined at the following:

- (1) Ardurra Group, Inc., 2160 Lakeside Centre Way, Suite 201 Knoxville, TN 37922;
- (2) City of Kingston, 900 Waterford Place, Kingston, TN 37763;
- (3) Builders' Exchange of Tennessee, 300 Clark Street, Knoxville, TN 37921;
- and (4) Dodge Construction Network, www.dodgeprojectcenter.com, Customer Service 1-800-393-6343.

Copies may be obtained at the office of Ardurra Group, Inc.

2160 Lakeside Centre Way, Suite 201

located at Knoxville, TN 37922 upon payment of \$ 25.00

for each set. Any unsuccessful bidder, upon returning each set promptly and in good condition, will be refunded his payment, and any non-bidder upon so returning such a set will be refunded \$0.00.

The owner reserves the right to waive any informalities or to reject any or all bids.

Each bidder must deposit with his bid, security in the amount, form and subject to the conditions provided in the Information for Bidders.

All bidders must be licensed General Contractors as required by the Contractor's Licensing Act of 1994 of the General Assembly of the State of Tennessee, and qualified for the type of construction being bid upon.

The City of Kingston hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, sex, or national origin in consideration for an award. The City of Kingston is an Equal Opportunity Employer. Any contract that uses federal funds to pay for construction work is a "federally assisted construction contract" and must include the equal opportunity clause found in 2 C.F.R. Part 200, unless otherwise stated in 41 C.F.R. Part 60. We encourage all small and minority owned firms and women's business enterprises to participate. No bidder may withdraw his bid within (60) days after the actual date of the opening thereof.

No bidder may withdraw his bid within 60 days after the actual date of the opening thereof.

David Bolling, City Manager (Date) August 4, 2024

**SECTION 00 11 19  
REQUEST FOR BIDDER INFORMATION**

Questions regarding the project or the Bid Documents must be in writing as required by the Instruction to Bidders. Questions must be written either on this form and submitted either electronically or by mail to the address listed below. Upon timely receipt, if appropriate, an Addendum will then be issued to all persons who have received Bid Documents from the Owner.

Ardurra Group, Inc.  
2160 Lakeside Centre Way, Suite 201  
Knoxville, Tennessee 37922  
Attn: Aaron Crenshaw, P.E.  
Email: [acrenshaw@ardurra.com](mailto:acrenshaw@ardurra.com)

CITY OF KINGSTON  
WASTEWATER SYSTEM IMPROVEMENTS  
SEWER SYSTEM REHABILITATION PROJECT

BID DATE: \_\_\_\_\_

From: \_\_\_\_\_

Company: \_\_\_\_\_

Date: \_\_\_\_\_

CLARIFICATION IS NEEDED FOR THE FOLLOWING ITEMS:  
(List Specification Section, Paragraph, Drawing Number and/or Detail Number)

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End of Document

## INFORMATION FOR BIDDERS

1. Receipt and Opening of Bids:

The City of Kingston (herein called the "Owner"), invites bids on the form attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Owner at the office of 900 Waterford Place, Kingston TN 37763 until 10 o'clock )X A.M.     P.M.,     S.T.     D.S.T.) September 5, 2024, and then at said office publicly opened and read aloud. The envelopes containing the bids must be sealed,

Addressed to City of Kingston Attn: Haley Brown at 900 Waterford Place, Kingston TN 37763 and designated as bid for Wastewater System Improvements Sewer Rehabilitation Project.

The Owner may consider informal any bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all bids. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 60 days after the actual date of the opening thereof.

2. Preparation of Bid: Each bid must be submitted on the prescribed form. All blank spaces for bid prices must be filled in, in ink or typewritten, in both words and figures.

**Each bid must be submitted in a sealed envelope bearing on the outside the name of the bidder, his/her address, the name of the project for which the bid is submitted and all other information required by State law. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed as specified in the bid form.**

3. Subcontracts: The bidder is specifically advised that any person, for, or other party to whom it is proposed to award a subcontract under this contract must be acceptable to the owner after verification by the State of the current eligibility status.

4. Telegraphic Modification: Any bidder may modify his/her bid by telegraphic communication at any time prior to the scheduled closing time for receipt of bids provided such telegraphic communication is received by the Owner prior to the closing time, and, provided further, the Owner is satisfied that a written confirmation of the telegraphic modification over the signature of the bidder was mailed prior to the closing time. The telegraphic communication should not reveal the bid price but should provide the addition or subtraction or other modification so that the final pieces or terms will not be known by the Owner until the sealed bid is opened. If written confirmation is not received within two days from the closing time, no consideration will be given to the telegraphic modification.

5. Method of Bidding: The Owner invites bids for the following:  
Unit price bid.
  
6. Qualification of Bidder: The Owner may make such investigations as s/he deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the Owner all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the owner that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.
  
7. Bid Security: Each bid must be accompanied by cash, certified check of the bidder, or a bid bond prepared on the form of bid bond attached thereto, duly executed by the bidder as principal and having as surety thereon a surety company approved by the Owner, in the amount of 5% of the bid. Such cash, checks or bid bonds will be returned to all except the three lowest bidders within three days after the opening of bids, and the remaining cash, checks or bid bonds will be returned promptly after the Owner and the accepted bidder have executed the contract, or, if no award has been made within 60 days after the date of the opening of bids, upon demand of the bidder at any time thereafter, so long as s/he has not been notified of the acceptance of his/her bid.
  
8. Liquidated Damages for Failure to Enter into Contract: The successful bidder, upon his/her failure or refusal to execute and deliver the contract and bonds required within 10 days after s/he has received notice of the acceptance of his/her bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his/her bid.
  
9. Time of Completion and Liquidated Damages: Bidder must agree to commence work 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. Bidder must agree also to pay as liquidated damages, the sum of \$ 500.00 for each consecutive calendar day thereafter.
  
10. Condition of Work: Each bidder must inform him/herself fully of the conditions relating to the construction of the project and the employment of labor thereof. Failure to do so will not relieve a successful bidder of his/her obligation to furnish all material and labor necessary to carry out the provisions of his/her contract. Insofar as possible, the contractor, in carrying out the work, must employ such methods as will not cause any interruption of or interference with the work of any other contractor.
  
11. Addenda and Interpretations: No interpretation of the meaning of the plans, specifications or other pre-bid documents will be made to any bidder orally. Every request for such interpretation should be in writing addressed to

Aaron Crenshaw, P.E. at (acrenshaw@ardurra.com) and to be given consideration must be received at least five days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be mailed by certified mail with return receipt requested to all prospective bidders (at the respective addresses furnished for such purposes), not later than three days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his/her bid as submitted. All addenda so issued shall become part of the contract documents.

12. Security for Faithful Performance: Simultaneously with his/her delivery of the executed contract, the Contractor shall furnish a surety bond or bonds as security for faithful performance of this contract and for the payment of all persons performing labor on the project under this contract and furnishing materials in connection with this contract, as specified in the General Conditions included herein. The surety on such bond or bonds shall be a duly authorized surety company satisfactory to the Owner.
13. Power of Attorney: Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and effectively dated copy of their power of attorney.
14. Notice of Special Conditions: Attention is particularly called to those parts of the contract documents and specifications which deal with the following:
  - a. Inspection and testing of materials.
  - b. Insurance requirements.
  - c. Wage rates, if applicable.
  - d. States allowances.
15. Laws and Regulations: The bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.
16. Method of Award – Lowest Responsible Bidder: If at the time this contract is to be awarded, the lowest base bid submitted by a responsible bidder does not exceed the amount of funds then estimated by the Owner as available to finance the contract, the contract will be awarded on the base bid only. If such bid exceeds such amount, the Owner may reject all bids or may award the contract on the base bid combined with such deductible alternates applied in numerical order in which they are listed in the Form of Bid, as produces a net amount which is within the available funds.



17. Obligation of Bidder: At the time of the opening of bids each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the plans and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument or document shall in no way relieve any bidder from any obligation in respect of his/her bid.
18. Safety Standards and Accident Prevention: With respect to all work performed under this contract, the contractor shall:
- a. Comply with the safety standards provisions of applicable laws, building and construction codes and the “Manual of Accident Prevention in Construction” published by the Associated General Contractors of America, the requirements of the Occupational Safety and Health Act of 1970 (Public Law 91-596), and the requirements of Title 29 of the Code of Federal regulations, Section 1518 as published in the “Federal Register”, Volume 36, No. 75, Saturday, April 17, 1971.
  - b. Exercise every precaution at all times for the prevention of accidents and the protection of persons (including employees) and property.
  - c. Maintain at his/her office or other well known place at the job site, all articles necessary for giving first aid to the injured, and shall make standing arrangements for the immediate removal to a hospital or a doctor’s care of persons (including employees), who may be injured on the job site. In no case shall employees be permitted to work at a job site before the employer has made a standing arrangement for removal of injured persons to a hospital or a doctor’s care.
19. Drug-Free Workplace

Under the provisions of Tennessee Code Annotate §50-9-113 enacted by the General Assembly effective 2001, a) employers with five (5) or more employees who contract with either the state or a local government to provide construction services are required to submit an affidavit stating that they have a drug free workplace program that complies with Title 50, Chapter 9, in effect at the time of submission of a bid at least to the extent required of governmental entities. The statute imposes other requirements on the contractor, but the grantee’s responsibility is specifically limited in section (b) of the state as follows:

(b) A written affidavit by the principal officer of a covered employer provided to a local government at the time such bid or contract is submitted stating that the employer is in compliance with this section shall absolve the local government of all further responsibility under this section and any liability arising from the employer’s compliance or failure of compliance with the provisions of this section.

**SECTION 004100  
BID FORM**

Project:                               Wastewater System Improvements  
  Sewer Rehabilitation Project  
  900 Waterford Place  
  Kingston, Tennessee 37763

Bid Opening Date:

The undersigned Bidder proposes and agrees, if this bid is accepted, to enter into an agreement with the Owner in the form included in the bidding documents to perform all work as specified or indicated in the contract documents for the prices and within the time indicated in this bid and in accordance with the other terms and conditions of these documents.

The Bidder accepts all terms and conditions contained in the contract documents, including the furnishing of a bid security as called for in the bidding information. The bid will remain subject to acceptance for a period of 60 days after the bid opening or for a longer period of time if agreeable to both parties in writing.

In submitting this bid, the Bidder represents the following as set forth in the Agreement:

- A. Bidder has examined and carefully studied the contract documents, other related data referenced in the documents, and the following addenda, receipt of which is hereby acknowledged:

Addendum No. \_\_\_\_\_      Addendum Date \_\_\_\_\_

Addendum No. \_\_\_\_\_      Addendum Date \_\_\_\_\_

- B. Bidder has visited the site and become familiar with and is satisfied as to the general, local and site conditions that may affect cost(s), progress and the performance of the work;
- C. Bidder is familiar with and is satisfied as to all Federal, State and local laws and regulations that may affect cost(s), progress and the performance of work;
- D. Bidder has obtained and carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface features at or contiguous to the site including underground utilities.
- E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, exploration tests, studies and data concerning the conditions (surface and subsurface) at or contiguous to the Site which may affect cost, progress or performance of Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be used by the Bidder, including applying specific means, methods, techniques, sequences and procedures of construction expressly required by the contract documents to be used by the Bidder,

and safety precautions and programs incident thereto;

- F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the determination of this bid for the performance of the work at the price(s) and within the times and in accordance with the other terms and conditions of the contract documents;
- G. Bidder is aware of the general nature of the work to be performed by the Owner and others at the site that relates to the work as indicated in Section 01010, Summary of Work;
- H. Bidder has correlated the information known to the Bidder, information and observations obtained from visits to the site, reports and drawings identified in the contract documents, and all additional examinations, investigations, explorations, tests, studies and data with the contract documents;
- I. Bidder has given the Engineer written notice of all conflicts, errors, ambiguities or discrepancies that the Bidder has discovered in the contract documents, and the written resolution thereof by the Engineer is acceptable to the Bidder;
- J. The contract documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and the Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over the Owner.

The Bidder acknowledges and accepts the Owner's right to waive any and all bid requirements and formalities.

Bidder will complete the work in accordance with the contract documents for the following compensation:

**TOTAL BASE BID** \$ \_\_\_\_\_  
(Use Words \_\_\_\_\_)

Note: Unit prices for the following pay items must be provided by the bidder. These Bid Items are pay items for Work which may or may not be required during the course of the Contract. These unit prices are for changes in the work including changes necessitated by unforeseen site conditions requiring the addition of work beyond that included in the lump sum bid. These Bid Items only will be used at the sole discretion of the OWNER for changes in the Work.

All applicable taxes shall be included in Bid.

AWARD OF CONTRACT

It is the intent of the OWNER that the Contract will be awarded to the Bidder having proposed the lowest responsible bid within the amount of funds available to the OWNER. Deductive Alternatives and/or equipment substitutions may be used to reduce the cost to the extent necessary to come within the available funds. The Deductive Alternates, if used, are listed in order of priority.

Bidder agrees that the work will be complete and ready for final payment in accordance with the Agreement.

Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the work within the time specified in the Agreement. The terms used in this bid with the initial capital letters have the meanings indicated in the General Conditions and Supplementary Conditions.

Submitted on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

State of Tennessee Contractor License No. \_\_\_\_\_;

Classification \_\_\_\_\_; Expiration Date \_\_\_\_\_

Corporation Name: \_\_\_\_\_

State of Incorporation: \_\_\_\_\_

Type (Corporation, Partnership, Limited Liability Corporation): \_\_\_\_\_

By: \_\_\_\_\_

*(Signature of Authorized Agent - Attach Evidence of Authority)*

Name (Type or Print) \_\_\_\_\_ Title \_\_\_\_\_

(Corporate Seal, if applicable)

Attest \_\_\_\_\_

*(Signature of Corporate Secretary, if applicable)*

Business Address \_\_\_\_\_

Phone Number \_\_\_\_\_ Fax Number \_\_\_\_\_

Special Note: In the event of a joint Venture Submittal, each joint venturer must sign.

END OF SECTION

**UNIT PRICE SCHEDULE**

Item No.	Description	Est. Quan.	Unit	Bid Unit Price	Extended Bid Unit Price
1	<b>Mobilization</b>	1	LS	\$	\$
2	<b>Traffic Control - Plan and Implementation</b>	1	LS	\$	\$
3	<b>Pre-Construction Site Video Recording</b>	1	LS	\$	\$
4	<b>New 8" PVC Gravity Sewers (Paved Areas)</b>				
	a. 0'-6'	85	LF	\$	\$
	b. 6.1'-8'	106	LF	\$	\$
	c. 8.1'-10'	69	LF	\$	\$
5	<b>Cleaning Sanitary Sewers (6" and 8")</b>				
	a. Heavy	697	LF	\$	\$
6	<b>8" Diameter Point Repairs of Gravity Sewers in Paved Areas - Up to 5 Linear Foot Repair</b>				
	a. 6.1'-8'	1	Ea	\$	\$
	b. 8.1'-10'	1	Ea	\$	\$
7	<b>8" Diameter Point Repairs of Gravity Sewers in Unpaved Areas - Up to 5 Linear Foot Repair</b>				
	a. 0'-6'	2	Ea	\$	\$
8	<b>Pipe Lining - CIPP</b>				
	a. 8" Diameter Gravity Sewers	3,000	LF	\$	\$
9	<b>Sewer Flow Control</b>	1	LS	\$	\$
10	<b>Manhole Lining, 4-Foot Diameter</b>				
	a. Polymer	137	VF	\$	\$
<b>TOTAL OF ALL EXTENDED UNIT PRICE ITEMS LISTED ABOVE</b>					\$

*(Total, numbers)*

*Dollars*

*Total, words (transfer to bid form, page 3)*

**ALTERNATE NO. 1**

Item No.	Description	Est. Quan.	Unit	Bid Unit Price	Extended Bid Unit Price
10	<b>Manhole Lining, 4-Foot Diameter</b>				
	a. Polymer	29	VF	\$	\$
	b. Cementitious	108	VF	\$	\$
<b>TOTAL ALTERNATE NO. 1</b>					\$

*(Total, numbers)*

**BID BOND**

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

\_\_\_\_\_ as Principal, and \_\_\_\_\_ as

Surety, are hereby held and firmly bound unto \_\_\_\_\_

as Owner in the penal sum of \_\_\_\_\_ for the payment of

which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

The condition of the above obligation is such that whereas the Principal has submitted to

\_\_\_\_\_ a certain Bid, attached hereto and hereby made a

part hereof to enter into a contract in writing for the

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NOW, THEREFORE,

- (a) If said Bid shall be rejected, or in the alternate.
- (b) If said bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

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

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

\_\_\_\_\_(L.S.)  
(Principal)

\_\_\_\_\_  
(Surety)

SEAL

By: \_\_\_\_\_

SECTION 00 45 19  
NON-COLLUSION AFFIDAVIT

I certify that I have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise take any action in restraint of free competitive bidding in connection with this proposal or contract.

Signature by the bidder in that space provided below shall in addition be considered, and shall have the same legal effect, as the bidder's signature on the certifications set forth on Proposal Sheet 2. The signature below must be sworn to before a person authorized by the laws of a State to administer oaths.

\_\_\_\_\_  
Company

By: \_\_\_\_\_  
Title

\_\_\_\_\_  
Address

\_\_\_\_\_  
Address

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

On this the \_\_\_\_\_ day of \_\_\_\_\_, personally appeared before me \_\_\_\_\_ (name), to me personally known, who being duly sworn, did depose and say that he/she resides in \_\_\_\_\_ state of \_\_\_\_\_ and that he/she is the \_\_\_\_\_ of \_\_\_\_\_ described herein and which executed the above agreement and that he/she signed pursuant to proper authority and authorization.

END OF SECTION



## CERTIFICATION OF BIDDER REGARDING EQUAL EMPLOYMENT OPPORTUNITY

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the bidder has not filed a compliance report due under applicable instructions, such bidder shall be required to submit a compliance report within seven calendar days after bid opening. No contract shall be awarded unless such report is submitted.

### **Certification by Bidder**

Bidder/Firm: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.  Yes  No
2. Compliance reports were required to be filed in connection with such contract or subcontract.  Yes  No
3. Bidder has filed all compliance reports due under applicable instructions, including SF-100.  Yes  No  None Req.
4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended?  Yes  No

Bidder Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**CERTIFICATION BY PROPOSED SUBCONTRACTOR  
REGARDING EQUAL EMPLOYMENT OPPORTUNITY**

NAME OF PRIME CONTRACTOR: \_\_\_\_\_

PROJECT NUMBER: \_\_\_\_\_

This certification is required pursuant to Executive Order 11246 (30 F. R. 12319-25). The implementing rules and regulations provide that any bidder or prospective contractor, or any of their proposed subcontractors, shall state as an initial part of the bid or negotiations of the contract whether it has participated in any previous contract or subcontract subject to the equal opportunity clause; and, if so, whether it has filed all compliance reports due under applicable instructions.

Where the certification indicates that the subcontractor has not filed a compliance report due under applicable instructions, such subcontractor shall be required to submit a compliance report before the owner approves the subcontract or permits work to begin under the subcontract.

**SUBCONTRACTOR'S CERTIFICATION**

Subcontractor Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

- 1. Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.  Yes  No
- 2. Compliance reports were required to be filed in connection with such contract or subcontract.  Yes  No
- 3. Bidder has filed all compliance reports due under applicable instructions, including SF-100.  Yes  No  None Req.
- 4. Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended?  Yes  No

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**CERTIFICATION OF BIDDER REGARDING USE OF  
FEMALE/MINORITY SUBCONTRACTORS**

This certification is required for the contractor to demonstrate that when subcontractors are to be used on this project, an attempt will be made to utilize female/minority owned firms.

Documentation must be on file to show who has been contacted.

**Certification by Bidder**

Bidder/Firm: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

I, \_\_\_\_\_, certify that every attempt was made to utilize female/minority contractors on this project.

Bidder Name: \_\_\_\_\_

Title: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

**CERTIFICATE OF OWNER'S ATTORNEY**

I, the undersigned, \_\_\_\_\_, the duly authorized and  
acting legal representative of \_\_\_\_\_  
do hereby certify as follows:

I have examined the attached contract(s) and surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority do execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

Date: \_\_\_\_\_





**STATE OF TENNESSEE**

**BYRD ANTI-LOBBYING AMENDMENT CERTIFICATION**

Contractors who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352.

Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the awarding agency.

**APPENDIX A, 44 C.F.R. PART 18 – CERTIFICATION REGARDING LOBBYING – REQUIRED FOR CONTRACTS OVER \$100,000** *Certification for Contracts, Grants, Loans, and Cooperative Agreements*

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

- No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
- The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

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

The Contractor certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. Chap. 38, Administrative Remedies for False Claims and Statements, apply to this certification and disclosure, if any.

<b>Signature of Authorized Representative</b>	<b>Date</b>
<b>Printed Name and Title</b>	<b>Phone Number / Email Address</b>



**STATE OF TENNESSEE  
IRAN DIVESTMENT ACT CERTIFICATION**

<b>SUBJECT CONTRACT NUMBER(S):</b>	
<b>CONTRACTOR LEGAL ENTITY NAME:</b>	
<b>EDISON SUPPLIER IDENTIFICATION NUMBER:</b>	

The Iran Divestment Act, Tenn. Code Ann. § 12-12-101 et. seq. requires a person that attempts to contract with the state, including a contract renewal or assumption, to certify at the time the bid is submitted or the contract is entered into, renewed, or assigned, that the person or the assignee is not identified on a list created pursuant to § 12-12-106.

Currently, the list is available online at the following website: <https://www.tn.gov/generalservices/procurement/central-procurement-office--cpo-/library-/public-information-library.html>

The Contractor, identified above, certifies by signature below that it is not included on the list of persons created pursuant to Tenn. Code Ann. § 12-12-106 of the Iran Divestment Act.

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**CONTRACTOR SIGNATURE**

NOTICE: This certification MUST be signed by an individual with legal capacity to contractually bind the Contractor.

---

**PRINTED NAME AND TITLE OF SIGNATORY**

---

**DATE**



## ACKNOWLEDGEMENT REGARDING BIDDER SAM REGISTRATION

Contractors procured directly by grantees, sub-grantees, and/or sub-recipients of Coronavirus State and Local Fiscal Recovery Fund (SLFRF) and American Rescue Plan Act (ARPA) funds, are required to have an active registration in the System of Award Management (SAM). This document shall be completed and submitted as part of the bid proposal.

1. By submitting this proposal, the prospective bidder acknowledges that it must have an active SAM UEI (Unique Entity ID) to be awarded this contract and that without an active SAM UEI the bidder's proposal may be disallowed.
2. By submitting this proposal, the prospective bidder certifies neither it, its principals nor affiliates, is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
3. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that an erroneous certification was rendered, in addition to other remedies available to the Federal Government, the Department or agency with which this transaction originated may pursue available remedies.
4. Further, the prospective bidder shall provide immediate written notice to the person to which this proposal is submitted if at any time the Participant learns that this certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. By submitting this proposal, it is agreed that should the proposed covered transaction be entered into, the prospective bidder will not knowingly enter into any lower-tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction unless authorized by the agency with which this transaction originated.
6. It is further agreed that by submitting this proposal, the prospective bidder will include Certification of Subcontractor Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion without modification, in all lower-tier covered transactions and in all solicitations for lower-tier covered transactions.

Provide the following information as detailed in the prospective bidder's SAM registration:

Entity Name \_\_\_\_\_

Address \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

SAM Entity ID: \_\_\_\_\_ Expiration Date: \_\_\_\_\_

Active Exclusions:  Yes  No

## CERTIFICATION OF SUBCONTRACTOR REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND EXCLUSION

Subcontractors for projects that are funded in whole or in part by Coronavirus State and Local Fiscal Recovery Fund (SLFRF) and American Rescue Plan Act (ARPA) funds must provide information concerning the entity's debarment, suspension, ineligibility or exclusion status. This document shall be completed and provided to the prime contractor.

1. By signing and submitting this proposal, the prospective lower-tier participant certifies that neither it, its principals nor affiliates, is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency. Further, the Participant provides the certification set out below:
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that an erroneous certification was rendered, in addition to other remedies available to the Federal Government, the Department or agency with which this transaction originated may pursue available remedies.
3. Further, the Participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the Participant learns that this certification was erroneous when submitted or has become erroneously reason of changed circumstances.
4. By submitting this document, it is agreed that should the proposed covered transaction be entered into, the Participant will not knowingly enter into any lower-tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction unless authorized by the agency with which this transaction originated.

The subcontracting entity may satisfy the requirement of this document via one of the two options below:

### Option 1: SAM.gov Active Registration

Entity Name \_\_\_\_\_

Address \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

SAM Entity ID: \_\_\_\_\_ Expiration Date: \_\_\_\_\_

Active Exclusions:  Yes  No

### Option 2: Signed Certification

Entity Name \_\_\_\_\_

Address \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Entity Representative: \_\_\_\_\_ Title: \_\_\_\_\_

Signature \_\_\_\_\_



**STATE OF TENNESSEE  
NON-BOYCOTT OF ISRAEL CERTIFICATION**

The Bidder certifies that it is not currently engaged in, and will not for the duration of the contract engage in, a boycott of Israel as defined by Tenn. Code Ann. § 12-4-119. This provision shall not apply to contracts with a total value of less than two hundred fifty thousand dollars (\$250,000) or to contractors with less than ten (10) employees.

According to the law, a boycott of Israel means engaging in refusals to deal, terminating business activities, or other commercial actions that are intended to limit commercial relations with Israel, or companies doing business in or with Israel or authorized by, licensed by, or organized under the laws of the State of Israel to do business, or persons or entities doing business in Israel, when such actions are taken:

- 1) In compliance with, or adherence to, calls for a boycott of Israel, or
- 2) In a manner that discriminates on the basis of nationality, national origin, religion, or other unreasonable basis, and is not based on a valid business reason. Tenn. Code Ann. § 12-4-119.

<b>Signature of Authorized Representative</b>	<b>Date</b>
<b>Printed Name</b>	<b>Phone Number / Email Address</b>



**STATE OF TENNESSEE**  
**CERTIFICATION OF BIDDER REGARDING**  
**USE OF WOMEN/MINORITY SUBCONTRACTORS**  
***\*Construction Projects Only\****

This certification is required for the contractor to demonstrate that when subcontractors are to be used on this project, an attempt will be made to utilize women/minority owned firms.

Documentation must be on file to show who has been contacted.

- I certify that every attempt was made to utilize female/minority contractors on this project.
- I am unable to certify to the above statements. Explanation is attached.

<b>Signature of Authorized Representative</b>	<b>Date</b>
<b>Printed Name</b>	<b>Phone Number</b>
<b>Email Address</b>	<b>Address</b>

**DRUG-FREE WORKPLACE AFFIDAVIT**

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

The undersigned, principal officer of \_\_\_\_\_, an employer of five (5) or more employees contracting with \_\_\_\_\_ government to provide construction services, hereby states under oath as follows:

- 1. The undersigned is a principal officer of \_\_\_\_\_ (hereinafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.
- 2. The Company submits this Affidavit pursuant to T.C.A. § 50-9-113, which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title 50, Chapter 9, of the *Tennessee Code Annotated*.
- 3. The Company is in compliance with T.C.A. § 50-9-113.

Further affiant saith not.

\_\_\_\_\_  
Principal Officer

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

Before me personally appeared \_\_\_\_\_, with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that such person executed the foregoing affidavit for the purposes therein contained.

Witness my hand and seal at office this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Notary Public

My commission expires: \_\_\_\_\_

# Notice of Award

Dated \_\_\_\_\_

Project: <b>Wastewater System Improvements Sewer Rehabilitation Project</b>	Owner: City of Kingston	Owner's Contract No.: WW-PDC-1
Contract:		Engineer's Project No.:
Bidder:		
Bidder's Address: (send Certified Mail, Return Receipt Requested)		

You are notified that your Bid dated \_\_\_\_\_ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

(Indicate total Work, alternates or sections or Work awarded.)

The Contract Price of your Contract is \_\_\_\_\_  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_).

*(Insert appropriate data if Unit Prices are used. Change language for Cost-Plus contracts.)*

\_\_\_\_\_ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

\_\_\_\_\_ sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner [\_\_\_\_\_] fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), [and] General Conditions (Paragraph 5.01) [and Supplementary Conditions (Paragraph SC-5.01).]
3. Other conditions precedent:

\_\_\_\_\_

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

\_\_\_\_\_  
Owner

By: \_\_\_\_\_  
Authorized Signature

\_\_\_\_\_  
Title

Copy to Engineer

SECTION 005213

**AGREEMENT** (Contract)

THIS AGREEMENT, made this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between \_\_\_\_\_, herein called "Owner", acting herein through its \_\_\_\_\_, and \_\_\_\_\_ (a corporation) (a partnership) (an individual doing business as \_\_\_\_\_)

STRIKE OUT INAPPLICABLE TERMS

of \_\_\_\_\_, County of \_\_\_\_\_, and State of \_\_\_\_\_, hereinafter called "Contractor".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned, to be made and performed by the OWNER, the CONTRACTOR hereby agrees with the OWNER to commence and complete the construction described as follows:

hereinafter called the project, for the sum of \_\_\_\_\_

\_\_\_\_\_ Dollars (\$\_\_\_\_\_)

and all extra work in connection therewith, under the terms as stated in the General Conditions of the Contract; and at this (it's or their) own property cost and expense to furnish all the materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and other accessories and services necessary to complete the said project in accordance with the conditions and prices stated in the Proposal, the General Conditions, the plans, which include all maps, plats, blue prints, and other drawings and printed or written explanatory matter thereof, the specifications and contract documents therefore as prepared by \_\_\_\_\_, herein entitled the Architect/Engineer.

The Contractor hereby agrees to commence work under this contract on or before a date to be specified in a written "Notice to Proceed" of the Owner and to fully complete the project within \_\_\_\_\_ consecutive calendar days thereafter.

The OWNER agrees to pay the CONTRACTOR in current funds for the performance of the contract, subject to additions and deductions, as provided in the General Conditions of the Contract.

IN WITNESS WHEREOF, the parties to these presents have executed this contract in six (6) counterparts, each of which shall be deemed an original, in the year and day first above mentioned.

(Seal)  
ATTEST:

\_\_\_\_\_  
(Secretary) (Owner)  
\_\_\_\_\_  
(Witness) By: \_\_\_\_\_  
\_\_\_\_\_  
(Title)

(Seal)  
\_\_\_\_\_  
(Secretary) (Owner)  
\_\_\_\_\_  
(Witness) By: \_\_\_\_\_  
\_\_\_\_\_  
(Title)  
\_\_\_\_\_  
(Address and Zip Code)

NOTE: Secretary of the Owner should attest. If Contractor is a corporation, Secretary should attest.



# Notice to Proceed

Dated \_\_\_\_\_

Project: Wastewater System Improvements Sewer Rehabilitation Project	Owner: City of Kingston	Owner's Contract No.: WW-PDC-1
Contract:		Engineer's Project No.:

Contractor:

Contractor's Address: [send Certified Mail, Return Receipt Requested]

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You are notified that the Contract Times under the above contract will commence to run on \_\_\_\_\_. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the date of Substantial Completion is \_\_\_\_\_, and the date of readiness for final payment is \_\_\_\_\_ [(or) the number of days to achieve Substantial Completion is \_\_\_\_\_, and the number of days to achieve readiness for final payment is \_\_\_\_\_].

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must [add other requirements]:

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---

_____	_____
	Owner
_____	Given by:
	Authorized Signature
_____	_____
	Title
_____	_____
	Date

Copy to Engineer

SECTION 006113.13  
**PERFORMANCE BOND**

KNOW ALL MEN BY THESE PRESENTS, that

\_\_\_\_\_ (Name of Contractor)

\_\_\_\_\_ (Address of Contractor)

a \_\_\_\_\_, hereinafter called Contractor,  
(Corporation, Partnership, Individual or Joint Venture)

and \_\_\_\_\_ (Name of Surety)

\_\_\_\_\_ (Address of Surety)

hereinafter called Surety, are held and firmly bound unto

\_\_\_\_\_ (Name of Owner)

\_\_\_\_\_ (Address of Owner)

hereinafter called OWNER, in the penal sum of \_\_\_\_\_

\_\_\_\_\_ Dollars, \$(\_\_\_\_\_) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmed by these presents, this sum being in the amount of one hundred percent (100%) of the contract amount.

THE CONDITION OF THIS OBLIGATION is such that whereas, the contractor has entered into a certain contract with the OWNER, dated the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, a copy of which is hereto attached and made a part hereof for the construction of :

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NOW, THEREFORE, if the Contractor shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall full indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alternation or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in \_\_\_\_\_ counterparts  
(number)

each one of which shall be deemed an original, this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

ATTEST:

\_\_\_\_\_  
(Contractor) Corporate Official Contractor

(SEAL)

By: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Witness to Contractor

\_\_\_\_\_  
Address

\_\_\_\_\_

ATTEST:

_____	_____
Witness to Surety	Surety
_____	By: _____
Address	Attorney-in-Fact
_____	_____
	Address
	_____

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

BOND is not valid unless accompanied by Power of Attorney.

**IMPORTANT:** Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

SECTION 006113.16  
**PAYMENT BOND**

KNOW ALL MEN BY THESE PRESENTS, that

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
(Address of Contractor)

a \_\_\_\_\_, hereinafter call Contractor,  
(Corporation, Partnership, Individual or Joint Venture)

and

\_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

\_\_\_\_\_  
(Name of Owner)

\_\_\_\_\_  
(Address of Owner)

hereinafter called OWNER, in the penal sum of \_\_\_\_\_

\_\_\_\_\_ Dollars, \$(\_\_\_\_\_) in  
lawful money of the United States, for the payment of which sum well and truly to be  
made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these  
presents, this sum being in the amount of one hundred percent (100%) of the contract  
amount.

THE CONDITION OF THIS OBLIGATION is such that whereas, the contractor has  
entered into a certain contract with the OWNER, dated the \_\_\_\_ day of \_\_\_\_\_,  
20\_\_\_\_, a copy of which is hereto attached and made a part hereto fore the  
construction of:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NOW, THEREFORE, if the Contractor shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due to materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in \_\_\_\_\_ counterparts  
(number)

each one of which shall be deemed an original,

this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

ATTEST:

\_\_\_\_\_  
(Contractor) Corporate Official

\_\_\_\_\_  
Contractor

(SEAL)

By: \_\_\_\_\_

Title: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Witness to Contractor

\_\_\_\_\_  
Address

\_\_\_\_\_

ATTEST:

_____	_____
Witness to Surety	Surety
_____	By: _____
Address	Attorney-in-Fact
_____	_____
	Address
	_____

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

BOND is not valid unless accompanied by Power of Attorney.

**IMPORTANT:** Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the Project is located.

# Contractor's Application For Payment No. \_\_\_\_\_

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer)
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

## APPLICATION FOR PAYMENT

### Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE .....	\$	
2. Net change by Change Orders.....	\$	
3. CURRENT CONTRACT PRICE (Line 1 ± 2) .....	\$	
4. TOTAL COMPLETED AND STORED TO DATE (Column F on Progress Estimate) .....	\$	
5. RETAINAGE:		
a. ____ % x \$ _____ Work Completed .....	\$	
b. ____ % x \$ _____ Stored Material .....	\$	
c. Total Retainage (Line 5a + Line 5b) .....	\$	
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5c) .....	\$	
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application) .....	\$	
8. AMOUNT DUE THIS APPLICATION .....	\$	
9. BALANCE TO FINISH, PLUS RETAINAGE (Column G on Progress Estimate + Line 5 above).....	\$	

## CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is recommended by:	_____	_____
	(Engineer)	(Date)
Payment of:	\$ _____	(Line 8 or other - attach explanation of other amount)
is approved by:	_____	_____
	(Owner)	(Date)





# Stored Material Summary

# Contractor's Application

For (contract):					Application Number:				
Application Period:					Application Date:				
A	B	C	D		E		F		G
Invoice No.	Shop Drawing Transmittal No.	Materials Description	Stored Previously		Stored this Month		Incorporated in Work		Materials Remaining in Storage (\$) (D + E - F)
			Date (Month/Year)	Amount (\$)	Amount (\$)	Subtotal	Date (Month/Year)	Amount (\$)	
		Totals							

# Change Order No. \_\_\_\_\_

Date of Issuance: \_\_\_\_\_ Effective Date: \_\_\_\_\_

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:

**The Contract Documents are modified as follows upon execution of this Change Order:**

Description:  
\_\_\_\_\_  
\_\_\_\_\_

Attachments: (List documents supporting change):  
\_\_\_\_\_  
\_\_\_\_\_

<b>CHANGE IN CONTRACT PRICE:</b>	<b>CHANGE IN CONTRACT TIMES:</b>
Original Contract Price:  \$ _____	Original Contract Times: <input type="checkbox"/> Working days <input type="checkbox"/> Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____:  \$ _____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order:  \$ _____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order:  \$ _____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order:  \$ _____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____ Engineer (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____
Approved by Funding Agency (if applicable): _____		Date: _____

# Change Order Instructions

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## **A. GENERAL INFORMATION**

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

## **B. COMPLETING THE CHANGE ORDER FORM**

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

END OF SECTION 006363

SECTION 006516  
 CERTIFICATE OF SUBSTANTIAL COMPLETION

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:

**This [tentative] [definitive] Certificate of Substantial Completion applies to:**

- All Work under the Contract Documents:
  The following specified portions:

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\_\_\_\_\_ Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

**The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:**

- Amended Responsibilities
  Not Amended

Owner's Amended Responsibilities:

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Contractor's Amended Responsibilities:

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The following documents are attached to and made part of this Certificate:

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This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

SECTION 00 72 13

**GENERAL CONDITIONS**

CONTRACT AND CONTRACT DOCUMENTS

The project to be constructed and pursuant to this contract will be financed with assistance from Coronavirus State and Local Fiscal Recovery Fund (SLFRF) and American Rescue Plan Act (ARPA) and is subject to all applicable Federal laws and regulations.

The Plans, Specifications and Addenda, and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit or cast light on the interpretation of the provisions to which they refer.

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## GENERAL CONDITIONS

### ARTICLE 1--DEFINITIONS

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Wherever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

*Addenda* – Written or graphic instruments issued prior to the opening of Bids which clarify, correct or change the bidding documents or the Contract Documents.

*Agreement* – The written agreement between OWNER and CONTRACTOR covering the Work to be performed; other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

*Application for Payment* – The form accepted by ENGINEER which is to be used by CONTRACTOR in requesting progress or final payments and which is to include such supporting documentation as is required by the Contract Documents.

*Bid* – The offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

*Bonds* – Bid, performance and payment bonds and other instruments of security.

*Change Order* – A document recommended by ENGINEER, 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 Time, issued on or after the Effective Date of the Agreement.

*Contract Documents* – The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post-Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Bonds, these General Conditions, the Supplementary Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all amendments, modifications and supplements issued pursuant to paragraphs 3.4 and 3.5 on or after the Effective Date of the Agreement.

*Contract Price* – The moneys payable by OWNER to CONTRACTOR under the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).

*Contract Time* – The number of days (computed as provided in paragraph 17.2) or the date stated in the Agreement for the completion of the Work.

*CONTRACTOR* – The person, firm or corporation with whom OWNER has entered into the Agreement.

*Defective* – An adjective which when modifying the word Work refers to Work that is unsatisfactory, faulty or deficient, or does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or 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 14.8 or 14.10).

*Drawings* – The drawings which show the character and scope of the Work to be performed and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents.

*Effective Date of the Agreement* – The date indicated in the Agreement on which it becomes effective, but if no such date is indicated it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

*ENGINEER* – The person, firm or corporation named as such in the Agreement.

*Field Order* – A written order issued by ENGINEER which orders minor changes in the Work in accordance with paragraph 9.5 but which does not involve a change in the Contract Price or the Contract Time.

*General Requirements* – Sections of Division 1 of the Specifications.

*Laws and Regulations; Laws or Regulations* – Laws, rules, regulations, ordinances, codes and/or orders.

*Notice of Award* – The written notice by OWNER to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, OWNER will sign and deliver the Agreement.

*Notice to Proceed* – A written notice given by OWNER to CONTRACTOR (with a copy to ENGINEER) fixing the date on which the Contract Time will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

*OWNER* – The public body or authority, corporation, association, firm or person with whom CONTRACTOR has entered into the Agreement and for whom the Work is to be provided.

*Partial Utilization* – Placing a portion of the Work in service for the purpose for which it is intended (or a related purpose) before reaching Substantial Completion for all the Work.

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

*Resident Project Representative* – The authorized representative of ENGINEER who is assigned to the site or any part thereof.

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

*Specifications* – Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the Work and certain administrative details applicable thereto.

*Subcontractor* – An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the Work at the site.

*Substantial Completion* – The Work (or a specified part thereof) has progressed to the point where, in the opinion of ENGINEER as evidenced by ENGINEER's definitive certificate of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents so that the Work (or specified part) can be utilized for the purpose for which it is intended; or if there be no such certificate issued, when final payment is due in accordance with paragraph 14.13. The terms "substantially complete" and "substantially completed" as applied to any Work refer to Substantial Completion thereof.

*Supplementary Conditions* – The part of the Contract Documents which amends or supplements these General Conditions.

*Supplier* – A manufacturer, fabricator, supplier, distributor, materialman or vendor.

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

*Unit Price Work* – Work to be paid for on the basis of unit prices.

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

*Work Directive Change* – A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.22. A Work Directive Change may not change the Contract Price or the Contract Time, but is evidence that the parties expect that the change directed or documented by a Work Directive Change will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Time as provided in paragraph 10.2.

*Written Amendment* – A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly Work-related aspects of the Contract Documents.

## ARTICLE 2 – PRELIMINARY MATTERS

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### **Delivery of Bonds:**

2.1. When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER

such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

### **Copies of Documents:**

2.2. OWNER shall furnish to CONTRACTOR up to ten copies (unless otherwise specified in the Supplementary Conditions) of the Contract Documents as are reasonably necessary for the execution of the Work. Additional copies will be furnished, upon request, at the cost of reproduction.

### **Commencement of Contract Time; Notice to Proceed:**

2.3. The Contract Time will commence to run on the thirtieth day after the Effective Date of the Agreement, of, 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 thirty days after the Effective Date of the Agreement. In no event will the Contract Time commence to run later than the seventy-fifth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

### **Starting the Project:**

2.4. CONTRACTOR shall start to perform the Work on the date when the Contract Time commences to run, but no Work shall be done at the site prior to the date on which the Contract Time commences to run.

### **Before Starting Construction:**

2.5. Before undertaking each part of the Work, CONTRACTOR shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. CONTRACTOR shall promptly report in writing to ENGINEER any conflict, error or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from ENGINEER before proceeding with any Work affected thereby; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents, unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

2.6. Within ten days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), CONTRACTOR shall submit to ENGINEER for review:

2.6.1. an estimated progress schedule indicating the starting and completion dates of the various stages of the Work;

2.6.2. a preliminary schedule of Shop Drawing submissions; and

2.6.3. a preliminary schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work which will be confirmed in writing by CONTRACTOR at the time of submission.

2.7. Before any Work at the site is started, CONTRACTOR shall deliver to OWNER, with a copy to ENGINEER, certificates (and other evidence of insurance requested by OWNER) which

CONTRACTOR is required to purchase and maintain in accordance with paragraphs 5.3 and 5.4, and OWNER shall deliver to CONTRACTOR certificates (and other evidence of insurance requested by CONTRACTOR) which OWNER is required to purchase and maintain in accordance with paragraphs 5.6 and 5.7.

**Preconstruction Conference:**

2.8. Within twenty days after the Effective Date of the Agreement, but before CONTRACTOR starts the Work at the site, a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to discuss the schedules referred to in paragraph 2.6, to discuss procedures for handling Shop Drawings and other submittals and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work.

**Finalizing Schedules:**

2.9. At least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to finalize the schedules submitted in accordance with paragraph 2.6. The finalized progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within the Contract Time, but such acceptance will neither impose on ENGINEER responsibility for the progress or scheduling of the Work nor relieve CONTRACTOR from full responsibility thereof. The finalized schedule of Shop Drawing submissions will be acceptable to ENGINEER as providing a workable arrangement for processing the submissions. The finalized schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

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**Intent:**

3.1. The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2. 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. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result will be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe Work, materials or equipment such word shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the Laws or Regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or Laws or Regulations in effect at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or

ENGINEER, or any of their consultants, agents or employees from those set forth in the Contract Documents, nor shall it be effective to assign to ENGINEER, or any of ENGINEER's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provision of paragraph 9.15 or 9.16. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3. If, during the performance of the Work, CONTRACTOR finds a conflict, error or discrepancy in the Contract Documents, CONTRACTOR shall so report to ENGINEER in writing at once and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from ENGINEER; however, CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any conflict, error or discrepancy in the Contract Documents unless CONTRACTOR had actual knowledge thereof or should reasonably have known thereof.

**Amending and Supplementing Contract Documents:**

3.4. The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

3.4.1. a formal Written Amendment,

3.4.2. a Change Order (pursuant to paragraph 10.4), or

3.4.3. a Work Directive Change (pursuant to paragraph 10.1).

As indicated in paragraphs 11.2 and 12.1, Contract Price and Contract Time may only be changed by a Change Order or a Written Amendment.

3.5. In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

3.5.1. a Field Order (pursuant to paragraph 9.5),

3.5.2. ENGINEER's approval of a Shop Drawing or sample (pursuant to paragraphs 6.26 and 6.27), or

3.5.3. ENGINEER's written interpretation or clarification (pursuant to paragraph 9.4).

**Reuse of Documents:**

3.6. Neither CONTRACTOR nor any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER shall 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; and they shall not reuse any of them on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

ARTICLE 4—AVAILABILITY OF LANDS; PHYSICAL CONDITIONS; REFERENCE POINTS

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**Availability of Lands:**

4.1. OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR believes that any delay in OWNER's furnishing these lands, rights-of-way or easements entitles CONTRACTOR to an extension of the Contract Time, CONTRACTOR may make a claim therefor as provided in Article 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

**Physical Conditions:**

4.2.1. *Explorations and Reports:* Reference is made to the Supplementary Conditions for identification of those reports of explorations and tests of subsurface conditions at the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such reports, but not upon nontechnical data, interpretations or opinions contained therein or for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to subsurface conditions at the site.

4.2.2. *Existing Structures:* Reference is made to the Supplementary Conditions for identification of those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities referred to in paragraph 4.3) which are at or contiguous to the site that have been utilized by ENGINEER in preparation of the Contract Documents. CONTRACTOR may rely upon the accuracy of the technical data contained in such drawings, but not for the completeness thereof for CONTRACTOR's purposes. Except as indicated in the immediately preceding sentence and in paragraph 4.2.6, CONTRACTOR shall have full responsibility with respect to physical conditions in or relating to such structures.

4.2.3. *Report of Differing Conditions:* If CONTRACTOR believes that:

4.2.3.1. any technical data on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is inaccurate, or

4.2.3.2. any physical condition uncovered or revealed at the site differs materially from that indicated, reflected or referred to in the Contract Documents,

CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.22), notify OWNER and ENGINEER in writing about the inaccuracy or difference.

4.2.4. *ENGINEER's Review:* ENGINEER will promptly review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto and advise OWNER in writing (with a copy to CONTRACTOR) of ENGINEER's findings and conclusions.

4.2.5. *Possible Document Change:* If ENGINEER concludes that there is a material error in the Contract Documents or that

because of newly discovered conditions a change in the Contract Documents is required, a Work Directive Change or a Change Order will be issued as provided in Article 10 to reflect and document the consequences of the inaccuracy or difference.

4.2.6. *Possible Price and Time Adjustments:* In each such case, an increase or decrease in the Contract Price or an extension or shortening of the Contract Time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy or difference. If OWNER and CONTRACTOR are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in Articles 11 and 12.

**Physical Conditions – Underground Facilities:**

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

4.3.1.1. OWNER and ENGINEER shall not be responsible for the accuracy or completeness of any such information or data; and,

4.3.1.2. CONTRACTOR shall have full responsibility for reviewing and checking all such information and data, for locating all Underground Facilities shown or indicated in the Contract Documents, for coordination of the Work with the owners of such Underground Facilities during construction, for the safety and protection thereof as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work, the cost of all of which will be considered as having been included in the Contract Price.

4.3.2. *Not Shown or Indicated.* If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of, CONTRACTOR shall, promptly after becoming aware thereof and before performing any Work affected thereby (except in an emergency as permitted by paragraph 6.22), identify the owner of such Underground Facility and give written notice thereof to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility to determine the extent to which the Contract Documents should be modified to reflect and document the consequences of the existence of the Underground Facility, and the Contract Documents will be amended or supplemented to the extent necessary. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and which CONTRACTOR could not reasonably have been expected to be aware of. If the parties are unable to agree as to the amount or length thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

**Reference Points:**

4.4. 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 (unless otherwise specified in the General Requirements),

shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point 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 by professionally qualified personnel.

## ARTICLE 5—BONDS AND INSURANCE

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### **Performance and Other Bonds:**

5.1. CONTRACTOR shall furnish performance and payment Bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all CONTRACTOR's obligations under the Contract Documents. These Bonds shall remain in effect at least until one year after the date when final payment becomes due, except as otherwise provided by Law or Regulation or by the Contract Documents. CONTRACTOR shall also furnish such other Bonds as are required by the Supplementary Conditions. All Bonds shall be in the forms prescribed by Law or Regulation or by the Contract Documents and be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of the authority to act.

5.2. If the surety on any Bond furnished by CONTRACTOR is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of paragraph 5.1, CONTRACTOR shall within five days thereafter substitute another Bond and Surety, both of which must be acceptable to OWNER.

### **Contractor's Liability Insurance:**

5.3. CONTRACTOR shall purchase and maintain such comprehensive general liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from CONTRACTOR's performance and furnishing of the Work and CONTRACTOR's other obligations under the Contract Documents, whether it is to be performed or furnished by CONTRACTOR, by any Subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work, or by anyone for those acts any of them may be liable:

5.3.1. Claims under workers' or workmen's compensation, disability benefits and other similar employee benefit acts;

5.3.2. Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;

5.3.3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;

5.3.4. Claims for damages insured by personal injury liability coverage which are subordinated (a) by any person as a result of an offense directly or indirectly related to

the employment of such person by CONTRACTOR, or (b) by any other person for any other reason;

5.3.5. Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;

5.3.6. Claims arising out of operation of Laws or Regulations for damages because of bodily injury or death of any person or for damage to property; and

5.3.7. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

The insurance required by this paragraph 5.3 shall include the specific coverages and be written for not less than the limits of liability and coverages provided in the Supplementary Conditions, or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained (or the certificates or other evidence thereof) shall contain a provision or endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER and ENGINEER by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing *defective* Work in accordance with paragraph 13.12. In addition, CONTRACTOR shall maintain such completed operations insurance for at least two years after final payment and furnish OWNER with evidence of continuation of such insurance at final payment and one year thereafter.

### **Contractual Liability Insurance:**

5.4. The comprehensive general liability insurance required by paragraph 5.3 will include contractual liability insurance applicable to CONTRACTOR's obligations under paragraphs 6.30 and 6.31.

### **Owner's Liability Insurance:**

5.5. OWNER shall be responsible for purchasing and maintaining OWNER's own liability insurance and, at OWNER's option, may purchase and maintain such insurance as will protect OWNER against claims which may arise from operations under the Contract Documents.

### **Property Insurance:**

5.6. Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insureds or additional insured parties, shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in the Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other

professionals). If not covered under the "all risk" insurance or otherwise provided in the Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment.

5.7. OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER and ENGINEER's consultants in the Work, all of whom shall be listed as insured or additional insured parties.

5.8. All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty days' prior written notice has been given to CONTRACTOR by certified mail and will contain waiver provisions in accordance with paragraph 5.11.2.

5.9. OWNER shall not be responsible for purchasing and maintaining any property insurance to protect the interests of CONTRACTOR, Subcontractors or others in the Work to the extent of any deductible amounts that are provided in the Supplementary Conditions. The risk of loss within the deductible amount, will be borne by CONTRACTOR, Subcontractor or others suffering any such loss and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

5.10. If CONTRACTOR requests in writing that other special insurance be included in the property insurance policy, OWNER shall, if possible, include such insurance, and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment. Prior to commencement of the Work at the site, OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

#### **Waiver of Rights:**

5.11.1. OWNER and CONTRACTOR waive all rights against each other for all losses and damages caused by any of the perils covered by the policies of insurance provided in response to paragraphs 5.6 and 5.7 and any other property insurance applicable to the Work, and also waive all such rights against the Subcontractors, ENGINEER, ENGINEER's consultants and all other parties named as insureds in such policies for losses and damages so caused. As required in paragraph 6.11, each subcontract between CONTRACTOR and a Subcontractor will contain similar waiver provisions by the Subcontractor in favor of OWNER, CONTRACTOR, ENGINEER, ENGINEER's consultants and all other parties named as insureds. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

5.11.2. OWNER and CONTRACTOR intend that any policies provided in response to paragraphs 5.6 and 5.7 shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall 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 of the parties named as insureds or additional insureds, and

if the insurers require separate waiver forms to be signed by ENGINEER or ENGINEER's consultant OWNER will obtain the same, and if such waiver forms are required of any Subcontractor, CONTRACTOR will obtain the same.

#### **Receipt and Application of Proceeds:**

5.12. Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with OWNER and made payable to OWNER as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13. OWNER shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.13. OWNER as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to OWNER's exercise of this power. If such objection is made, OWNER as trustee shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If required in writing by any party in interest, OWNER as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of such duties.

#### **Acceptance of Insurance:**

5.14. If OWNER has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by CONTRACTOR in accordance with paragraphs 5.3 and 5.4 on the basis of its not complying with the Contract Documents, OWNER shall notify CONTRACTOR in writing thereof within ten days of the date of delivery of such certificates to OWNER in accordance with paragraph 2.7. If CONTRACTOR has any objection to the coverage afforded by or other provisions of the policies of insurance required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 on the basis of their not complying with the Contract Documents, CONTRACTOR shall notify OWNER in writing thereof within ten days of the date of delivery of such certificates to CONTRACTOR in accordance with paragraph 2.7. OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided by each as the other may reasonably request. Failure by OWNER or CONTRACTOR to give any such notice of objection within the time provided shall constitute acceptance of such insurance purchased by the other as complying with the Contract Documents.

#### **Partial Utilization – Property Insurance:**

5.15. If OWNER finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, such use or occupancy may be accomplished in accordance with paragraph 14.10; provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be cancelled or lapse on account of any such partial use or occupancy.

## ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

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### ***Supervision and Superintendence:***

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

6.2. CONTRACTOR shall keep on the Work at all times during its progress a competent resident superintendent, who shall not be replaced without written notice to OWNER and ENGINEER except under extraordinary circumstances. The superintendent will be CONTRACTOR’s representative at the site and shall have authority to act on behalf of CONTRACTOR. All communications given to the superintendent shall be as binding as if given to CONTRACTOR.

### ***Labor, Materials and Equipment:***

6.3. 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 at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons or the Work or property at the site or adjacent thereto, and except as otherwise indicated in the Contract Documents, all work at the site shall be performed during regular working hours, and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER’s written consent given after prior written notice to ENGINEER.

6.4. Unless otherwise specified in the General Requirements, CONTRACTOR shall furnish and assume full responsibility for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.5. All materials and equipment shall be of good quality and new, except as otherwise provided in the Contract Documents. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instruction of the applicable Supplier except as otherwise provided in the Contract Documents; but no provision of any such instructions will be effective as assign to ENGINEER, or any of ENGINEER’s consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

### ***Adjusting Progress Schedule:***

6.6. CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

### ***Substitutes or “Or-Equal” Items:***

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

6.7.2. If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, CONTRACTOR may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to ENGINEER, if CONTRACTOR submits sufficient information to allow ENGINEER to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in paragraph 6.7.1 as applied by ENGINEER and as may be supplemented in the General Requirements.

6.7.3. ENGINEER will be allowed a reasonable time within which to evaluate each proposed substitute. ENGINEER will be the sole judge of acceptability, and no substitute will be ordered, installed or utilized without ENGINEER’s prior written acceptance which will be evidenced by either a Change Order or an approved Shop



Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any substitute. ENGINEER will record time required by ENGINEER and ENGINEER's consultants in evaluating substitutions proposed by CONTRACTOR and in making changes in the Contract Documents occasioned thereby. Whether or not ENGINEER accepts a proposed substitute, CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's consultants for evaluating each proposed substitute.

**Concerning Subcontractors, Suppliers and Others:**

6.8.1. CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization (including those acceptable to OWNER and ENGINEER as indicated in paragraph 6.8.2), whether initially or as a substitute, against whom OWNER or ENGINEER may have reasonable objection. CONTRACTOR shall not be required to employ any Subcontractor, Supplier or other person or organization to furnish or perform any of the Work against whom CONTRACTOR has reasonable objection.

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

6.9. CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create any contractual relationship between OWNER or ENGINEER any such Subcontractor, Supplier or other person or organization, not shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.10. The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

6.11. All Work performed for CONTRACTOR by a Subcontractor will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER and contains waiver provisions as required by paragraph 5.11. CONTRACTOR shall pay each Subcontractor a just share of any insurance moneys received by CONTRACTOR on account of losses under policies issued pursuant to paragraphs 5.6 and 5.7.

**Patent Fees and Royalties:**

6.12. CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of 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 shall be disclosed by OWNER in the Contract Documents. CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and anyone directly or indirectly employed by either of them from and against all claims, damages, losses and expenses (including attorney's fees and court and arbitration costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any inventions, design, process, product or device not specified in the Contract Documents, and shall defend all such claims in connection with any alleged infringement of such rights.

**Permits:**

6.13. Unless otherwise provided in the Supplementary Conditions, CONTRACTOR shall obtain and pay for all construction permits and licenses. 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 opening of Bids, or if there are no Bids on the Effective Date of the Agreement, CONTRACTOR shall pay all charges of utility owners for connections to the Work, and OWNER shall pay all charges of such utility owners for capital costs related thereto such as plant investment fees.

**Laws and Regulations:**

6.14.1. CONTRACTOR shall give all notices and comply with all Laws and Regulations applicable to furnishing and performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither OWNER nor ENGINEER shall be responsible for monitoring CONTRACTOR's compliance with any Laws or Regulations.

6.14.2. If CONTRACTOR observes that the Specifications or Drawings are at variance with any Laws or Regulations, CONTRACTOR shall give ENGINEER prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated in paragraph 3.4. If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to such Laws or Regulations, and without such notice to ENGINEER, CONTRACTOR shall bear all costs arising therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with such Laws and Regulations.

**Taxes:**

6.15. 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.

**Use of Premises:**

6.16. CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of

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

6.17. During the progress of the Work, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by OWNER. CONTRACTOR shall restore to original condition all property not designated for alteration by the Contract Documents.

6.18. 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 property to stresses or pressures that will endanger it.

**Record Documents:**

6.19. CONTRACTOR shall maintain in a safe place at the site one record copy of all Drawings, Specifications, Addenda, Written Amendments, Change Orders, Work Directive Changes, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.4) in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all approved Shop Drawings will be available to ENGINEER for reference. Upon completion of the Work, these record documents, samples and Shop Drawings will be delivered to ENGINEER for OWNER.

**Safety and Protection:**

6.20. CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

6.20.1. all employees on the Work and other persons and organizations who may be affected thereby:

6.20.2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

6.20.3. other property at the site or adjacent thereto, including trees, shrubs, laws, walks, pavements, roadways, structures, utilities and Underground Facilities not designated for removal, relocation or replacement in the course of construction.

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (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 either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of CONTRACTOR). CONTRACTOR's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.21. CONTRACTOR shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be CONTRACTOR's superintendent unless otherwise designated in writing by CONTRACTOR to OWNER.

#### ***Emergencies:***

6.22. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from ENGINEER or OWNER, is obligated to act to prevent threatened 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 thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken in response to an emergency, a Work Directive Change or Change Order will be issued to document the consequences of the changes or variations.

#### ***Shop Drawings and Samples:***

6.23. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, CONTRACTOR shall submit to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawing submissions (see paragraph 2.9), or for other appropriate action if so indicated in the Supplementary Conditions, five copies (unless otherwise specified in the General Requirements) of all Shop Drawings, which will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission. All submissions will be identified as ENGINEER may require. The data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable ENGINEER to review the information as required.

6.24. CONTRACTOR shall also submit to ENGINEER for review and approval with such promptness as to cause no delay in Work, all samples required by the Contract Documents. All samples will have been checked by and accompanied by a specific written indication that CONTRACTOR has satisfied CONTRACTOR's responsibilities under the Contract Documents with respect to the review of the submission and will be identified clearly as to material, Supplier, pertinent data such as catalog numbers and the use for which intended.

6.25.1. Before submission of each Shop Drawing or sample CONTRACTOR shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each Shop Drawing or sample with other Shop Drawings and samples and with the requirements of the Work and the Contract Documents.

6.25.2. At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to ENGINEER for review and approval of each such variation.

6.26. ENGINEER will review and approve with reasonable promptness Shop Drawings and samples, but ENGINEER's review and approval will be only for conformance with the design concept of the Project and for compliance with the information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. 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.

6.27. ENGINEER's review and approval of Shop Drawings or samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.2 and ENGINEER has given written

approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of paragraph 6.25.1.

6.28. Where a Shop Drawing or sample is required by the Specifications, any related Work performed prior to ENGINEER's review and approval of the pertinent submission will be the sole expense and responsibility of CONTRACTOR.

**Continuing the Work:**

6.29. CONTRACTOR shall carry on the Work and adhere to the progress schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by paragraph 15.5 or as CONTRACTOR and OWNER may otherwise agree in writing.

**Indemnification:**

6.30. To the fullest extent permitted by Laws and Regulations CONTRACTOR shall indemnify and hold harmless OWNER and ENGINEER and their consultants, agents and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder or arises by or is imposed by Law and Regulations regardless of the negligence of any such party.

6.31. In any and all claims against OWNER or ENGINEER or any of their consultants, agents or employees by any employee of CONTRACTOR, any Subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 6.30 shall 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 or other person or organization under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

6.32. The obligations of CONTRACTOR under paragraph 6.30 shall not extend to the liability of ENGINEER, ENGINEER's consultants, agents or employees arising out of the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications.

ARTICLE 7 – OTHER WORK

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**Related Work at Site:**

7.1. OWNER may perform other work related to the Project at the site by OWNER's own forces, have other work performed by utility owners or let other direct contracts therefor which shall contain General Conditions similar to these. If the fact that such other work is to be performed was not noted in the Contract Documents, written notice thereof will be given to CONTRACTOR prior to starting any such other work; and, if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

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

7.3. If any part of CONTRACTOR's Work depends for proper execution or results upon the work of any such other contractor or utility owner (or OWNER), CONTRACTOR shall inspect and promptly report to ENGINEER in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. CONTRACTOR's failure so to report will constitute an acceptance of the other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in the other work.

**Coordination:**

7.4. If OWNER contracts with others for the performance of other work on the Project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified in the Supplementary Conditions, and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided, in the Supplementary Conditions. Unless otherwise provided in the Supplementary Conditions, neither OWNER nor ENGINEER shall have any authority or responsibility in respect of such coordination.

## ARTICLE 8 – OWNER’S RESPONSIBILITIES

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8.1. OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2. In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER. Any dispute in connection with such appointment shall be subject to arbitration.

8.3. OWNER shall furnish the data required of OWNER under the Contract Documents promptly and shall make payments to CONTRACTOR promptly after they are due as provided in paragraphs 14.4 and 14.13.

8.4. OWNER’s duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in paragraphs 4.1 and 4.4. Paragraph 4.2 refers to OWNER’s identifying and making available to CONTRACTOR copies of reports of explorations and tests of subsurface conditions at the site and in existing structures which have been utilized by ENGINEER in preparing the Drawings and Specifications.

8.5. OWNER’s responsibilities in respect of purchasing and maintaining liability and property insurance are set forth in paragraph 5.5 through 5.8.

8.6. OWNER is obligated to execute Change Orders as indicated in paragraph 10.4.

8.7. OWNER’s responsibility in respect of certain inspections, tests and approvals is set forth in paragraph 13.4.

8.8. In connection with OWNER’s right to stop Work or suspend Work, see paragraphs 13.10 and 15.1. Paragraph 15.2 deals with OWNER’s right to terminate services of CONTRACTOR under certain circumstances.

## ARTICLE 9 – ENGINEER’S STATUS DURING CONSTRUCTION

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### **Owner’s Representative:**

9.1. 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 Documents and shall not be extended without written consent of OWNER and ENGINEER.

### **Visits to Site:**

9.2. ENGINEER will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections 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 to the Contract Documents. On the basis of such visits and on-site observations as an experienced and

qualified design professional, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defects and deficiencies in the Work.

### **Project Representative:**

9.3. If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in observing the performance of the Work. The duties, responsibilities and limitations of authority of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions. If OWNER designates another agent to represent OWNER at the site who is not ENGINEER’s agent or employee, the duties, responsibilities and limitations of authority of such other person will be as provided in the Supplementary Conditions.

### **Clarifications and Interpretations:**

9.4. ENGINEER will issue with reasonable promptness such written clarifications or interpretations of the requirements of the Contract Documents (in the form of drawings or otherwise) as ENGINEER may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If CONTRACTOR believes that a written clarification or interpretation justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or Article 12.

### **Authorized Variations in Work:**

9.5. ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER, and also on CONTRACTOR who shall perform the Work involved promptly. If CONTRACTOR believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time and the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Article 11 or 12.

### **Rejecting Defective Work:**

9.6. ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be *defective*, and will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed.

### **Shop Drawings, Change Orders and Payments:**

9.7. In connection with ENGINEER’s responsibility for Shop Drawings and samples, see paragraphs 6.23 through 6.29 inclusive.

9.8. In connection with ENGINEER’s responsibilities as to Change Orders, see Articles 10, 11 and 12.

9.9. In connection with ENGINEER’s responsibilities in respect of Applications for Payment, etc., see Article 14.

### **Determination for Unit Price:**

9.10. ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR 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 decisions thereon will be final and binding upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other party to the Agreement and to ENGINEER written notice of intention to appeal from such a decision.

**Decisions on Disputes:**

9.11. ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Time will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph, which ENGINEER will render in writing within a reasonable time. Written notice of each such claim, dispute and other matter will be delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the occurrence of the event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after such occurrence unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim.

9.12. When functioning as interpreter and judge under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 and 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter.

**Limitations on ENGINEER's Responsibilities:**

9.13. Neither ENGINEER's authority to act under this Article 9 or elsewhere in the Contract Documents nor any decision made by ENGINEER in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, or any other person or organization performing any of the Work, or to any surety for any of them.

9.14. Wherever in the Contract Documents the terms "as ordered", "as directed", "as required", "as allowed", "as approved", or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate the Work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.15 or 9.16.

9.15. ENGINEER will not be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

9.16. ENGINEER will not be responsible for the acts or omissions of CONTRACTOR or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

ARTICLE 10 – CHANGES IN THE WORK

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10.1. Without invalidating the Agreement and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work; these will be authorized by a Written Amendment, a Change Order, or a Work Directive Change. Upon receipt of any such document, CONTRACTOR shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

10.2. If OWNER and CONTRACTOR are unable to agree as to the extent, if any, of an increase or decrease in the Contract Price or an extension or shortening of the Contract Time that should be allowed as a result of a Work Directive Change, a claim may be made therefor as provided in Article 11 or Article 12.

10.3. CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Time with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.4. and 3.5, except in the case of an emergency as provided in paragraph 6.22 and except in the case of uncovering Work as provided in paragraph 13.9.

10.4. OWNER and CONTRACTOR shall execute appropriate Change Orders (or Written Amendments) covering:

10.4.1. changes in the Work which are ordered by OWNER pursuant to paragraph 10.1, are required because of acceptance of *defective* Work under paragraph 13.13 or correcting *defective* Work under paragraph 13.14, or are agreed to by the parties;

10.4.2. changes in the Contract Price or Contract Time which are agreed to by the parties; and

10.4.3. changes in the Contract Price or Contract Time which embody the substance of any written decision rendered by ENGINEER pursuant to paragraph 9.11;

provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal. CONTRACTOR shall carry on the Work and adhere to the progress schedule as provided in paragraph 6.29.

10.5. If notice 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 Time) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

## ARTICLE 11 – CHANGE OF CONTRACT PRICE

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11.1. The Contract Price constitutes the total compensation (subject to authorized adjustments) payable to CONTRACTOR for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by CONTRACTOR shall be at his expense without change in the Contract Price.

11.2. The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an increase or decrease in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the amount claimed covers all known amounts (direct, indirect and consequential) to which the claimant is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3. The value of any Work covered by a Change Order or of any claim for an increase or decrease in the Contract Price shall be determined in one of the following ways:

11.3.1. Where the Work involved is covered by unit prices contained in the Contract Documents, by application of unit prices to the quantities of the items involved (subject to the provisions of paragraphs 11.9.1 through 11.9.3, inclusive).

11.3.2. By mutual acceptance of a lump sum (which may include an allowance for overhead and profit not necessarily in accordance with paragraph 11.6.2.1).

11.3.3. On the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's Fee for overhead and profit (determined as provided in paragraphs 11.6 and 11.7).

### **Cost of the Work:**

11.4. The term Cost of the Work means the sum of all costs necessarily incurred and paid by CONTRACTOR in the proper performance of the Work. Except as otherwise may be agreed to in writing by OWNER, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items and shall not include any of the costs itemized in paragraph 11.5:

11.4.1. 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. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. Such employees shall include

superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by OWNER.

11.4.2. 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 shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3. Payments made by CONTRACTOR to the Subcontractors for Work performed by Subcontractors. If required by OWNER, CONTRACTOR shall obtain competitive bids from Subcontractors acceptable to CONTRACTOR and shall deliver such bids to OWNER who will then determine, with the advice of ENGINEER, which bids will be accepted. If a 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 shall be determined in the same manner as CONTRACTOR's Cost of the Work. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

11.4.4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys and accountants) employed for services specifically related to the Work.

11.4.5. Supplemental costs including the following:

11.4.5.1. The proportion of necessary transportation, travel and subsistence expenses of CONTRACTOR's employees incurred in discharge of duties connected with the Work.

11.4.5.2. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office and temporary facilities at the site and hand tools not owned by the workers, 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.

11.4.5.3. Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof—all in accordance with terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

11.4.5.4. Sales, consumer, use or similar taxes related to the Work, and for which CONTRACTOR is liable, imposed by Laws and Regulations.

11.4.5.5. 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.

11.4.5.6. Losses and damages (and related expenses), not compensated by insurance or otherwise, to the Work or otherwise sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they 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 shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's Fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

11.4.5.7. The cost of utilities, fuel and sanitary facilities at the site.

11.4.5.8. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the Work.

11.4.5.9. Cost of premiums for additional Bonds and insurance required because of changes in the Work and premiums for property insurance coverage within the limits of the deductible amounts established by OWNER in accordance with paragraph 5.9.

11.5. The term Cost of the Work shall not include any of the following:

11.5.1. Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), 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 a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4-all of which are to be considered administrative costs covered by the CONTRACTOR's Fee.

11.5.2. Expenses of CONTRACTOR's principal and branch offices other than CONTRACTOR's office at the site.

11.5.3. Any of CONTRACTOR's capital expenses, including interest on CONTRACTOR's capital employed for the Work and charges against CONTRACTOR for delinquent payments.

11.5.4. Cost of premiums for all Bonds and for all insurance whether or not CONTRACTOR is required by the Contract Documents to purchase and maintain the same (except for the cost of premiums covered by sub-paragraph 11.4.5.9 above).

11.5.5. 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.

11.5.6. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.4.

**Contractor's Fee:**

11.6. The CONTRACTOR's Fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:

11.6.1. a mutually acceptable fixed fee; or if none can be agreed upon.

(This space was left blank intentionally).

11.7. Whenever the cost of any Work is to be determined pursuant to paragraph 11.4 or 11.5, CONTRACTOR will submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

**Cash Allowances:**

11.8. 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 done by such Subcontractors or Suppliers and for such sums within the limit of the allowances as may be acceptable to ENGINEER, CONTRACTOR agrees that:

11.8.1. The 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

11.8.2. CONTRACTOR's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the Contract Price and not in the allowances. No demand for additional payment on account of any thereof will be valid.

Prior to final payment, an appropriate Change Order will be issued as recommended by ENGINEER to reflect actual amounts due CONTRACTOR on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

**Unit Price Work:**



11.9.1. 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 established unit prices for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. 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. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with Paragraph 9.10.

11.9.2. 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.

11.9.3. Where the quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement and there is no corresponding adjustment with respect to any other item of Work and if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof, CONTRACTOR may make a claim for an increase in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the amount of any such increase.

## ARTICLE 12 – CHANGE OF CONTRACT TIME

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12.1. The Contract Time may only be changed by a Change Order or a Written Amendment. Any claim for an extension or shortening of the Contract Time shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Time shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Time will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2. The Contract Time will be extended in an amount equal to time lost due to delays beyond the control of CONTRACTOR if a claim is made therefor as provided in paragraph 12.1. Such delays shall include, but not be limited to, acts or neglect by OWNER or others performing additional work as contemplated by Article 7, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

12.3. All time limits stated in the Contract Documents are of the essence of the Agreement. The provisions of this Article 12 shall not exclude recovery for damages (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) for delay by either party.

## ARTICLE 13 – WARRANTY AND GUARANTEE; TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

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### **Warranty and Guarantee:**

13.1. CONTRACTOR warrants and guarantees to OWNER and ENGINEER that all Work will be in accordance with the Contract Documents and will not be *defective*. Prompt notice of all defects shall be given to CONTRACTOR. All *defective* Work, whether or not in place, may be rejected, corrected or accepted as provided in this Article 13.

### **Access to Work:**

13.2. ENGINEER and ENGINEER's representatives, other representatives of OWNER, testing agencies and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide proper and safe conditions for such access.

### **Tests and Inspections:**

13.3. CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals.

13.4. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) to specifically be inspected, tested or approved. CONTRACTOR shall assume full responsibility therefor, pay all costs in connection therewith and furnish ENGINEER the required certificates of inspection, testing or approval. CONTRACTOR shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with OWNER's or ENGINEER's acceptance of a Supplier of materials or equipment proposed to be incorporated in the Work, or of materials or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work. The cost of all inspections, tests and approvals in addition to the above which are required by the Contract Documents shall be paid by OWNER (unless otherwise specified).

13.5. All inspections, tests or approvals other than those required by Laws or Regulations of any public body having jurisdiction shall be performed by organizations acceptable to OWNER and CONTRACTOR (or by ENGINEER if so specified).

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

13.7. Neither observations by ENGINEER nor inspections, tests or approvals by other shall relieve CONTRACTOR from CONTRACTOR's obligations to perform the Work in accordance with the Contract Documents.

#### **Uncovering Work:**

13.8. If any Work is covered contrary to the written request of ENGINEER, it must, if requested by ENGINEER, be uncovered for ENGINEER's observation and replaced at CONTRACTOR's expense.

13.9. If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by others, 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, furnishing all necessary labor, material and equipment. If it is found that such Work is *defective*, CONTRACTOR shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction, (including but not limited to fees and charges of engineers, architects, attorneys and other professionals), and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in Article 11. If, however, such Work is not found to be *defective*, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefor as provided in Articles 11 and 12.

#### **Owner May Stop the Work:**

13.10. If the Work is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, 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 shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any other party.

#### **Correction or Removal of Defective Work:**

13.11. If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with *nondefective* Work. CONTRACTOR shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby.

#### **One Year Correction Period:**

13.12. If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be *defective*, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions, either correct such *defective* Work, or, if it has been rejected by OWNER, remove it from the site and replace it with *nondefective* Work. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the *defective* Work corrected or the rejected Work removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineer, architects, attorneys and other professionals) will be paid by CONTRACTOR. 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 or by Written Amendments.

#### **Acceptance of Defective Work:**

13.13. If, instead of requiring correction or removal and replacement of *defective* Work, OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so, CONTRACTOR shall bear all direct, indirect and consequential costs attributable to OWNER's evaluation of and determination to accept such *defective* Work (such costs to be approved by ENGINEER as to reasonableness and to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

#### **OWNER May Correct Defective Work:**

13.14. If CONTRACTOR fails within a reasonable time after written notice of ENGINEER to proceed to correct and to correct *defective* Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven days' written notice to CONTRACTOR, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, OWNER may include CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, OWNER's representatives, agents and employees such access to the site as may be necessary to enable OWNER to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of OWNER in exercising such rights and remedies will be charged against CONTRACTOR in an amount approved as to reasonableness by ENGINEER, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefor as provided in Article 11. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's *defective* Work, CONTRACTOR shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

#### ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

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##### ***Schedule of Values:***

14.1. The schedule of values established as provided in paragraph 2.9 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to ENGINEER. Progress payments on account of Unit Price Work will be based on the number of units completed.

##### ***Application for Progress Payment:***

14.2. At least twenty days before each progress payment is scheduled (but not 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. 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 shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter in these General Conditions referred to as "Liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

##### ***CONTRACTOR's Warranty of Title:***

14.3. CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER no later than the time of payment free and clear of all Liens.

##### ***Review of Applications for Progress Payment:***

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14.5. ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of the Work in progress as an experienced and qualified design professional and on ENGINEER's review of the Application for Payment and the accompanying data and schedules that the Work has progressed to the point indicated; that, to the best of ENGINEER's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation); and that CONTRACTOR is entitled to payment of the amount recommended. However, by recommending any such payment ENGINEER will not thereby be deemed to have represented that exhaustive or continuous on-site inspections have been made to

check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or OWNER to withhold payment to CONTRACTOR.

14.6. ENGINEER's recommendation of final payment will constitute an additional representation by ENGINEER to OWNER that the conditions precedent to CONTRACTOR's being entitled to final payment as set forth in paragraph 14.13 have been fulfilled.

14.7. ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make such representations to OWNER. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

14.7.1. the Work is *defective*, or completed Work has been damaged requiring correction or replacement,

14.7.2. the Contract Price has been reduced by Written Amendment or Change Order;

14.7.3. OWNER has been required to correct *defective* Work or complete Work in accordance with paragraph 13.14, or

14.7.4. of ENGINEER's actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.9 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work or Liens have been filed in connection with the Work or there are other items entitling OWNER to a set-off against the amount recommended, but OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action.

**Substantial Completion:**

14.8. 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 (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, 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. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons

therefor. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

14.9. OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER shall allow CONTRACTOR reasonable access to complete or correct items on the tentative list.

**Partial Utilization:**

14.10. Use by OWNER of any finished 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 useable part of the Work that can be used by OWNER without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1. OWNER at any time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees, CONTRACTOR will certify to OWNER and ENGINEER that said part of the Work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. 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 paragraphs 14.8 and 14.9 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.

14.10.2. OWNER may at any time request CONTRACTOR in writing to permit OWNER to take over operation of any such part of the Work although it is not substantially complete. A copy of such request will be sent to ENGINEER and within a reasonable time thereafter OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If CONTRACTOR does not object in writing to OWNER and ENGINEER that

such part of the Work is not ready for separate operation by OWNER, ENGINEER will finalize the list of items to be completed or corrected and will deliver such list to OWNER and CONTRACTOR together with a written recommendation as to the division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work which will become binding upon OWNER and CONTRACTOR at the time when OWNER takes over such operation (unless they shall have otherwise agreed in writing and so informed ENGINEER). During such operation and prior to Substantial Completion of such part of the Work, OWNER shall allow CONTRACTOR reasonable access to complete or correct items on said list and to complete other related Work.

14.10.3. No occupancy or separate operation of part of the Work will be accomplished prior to compliance with the requirements of paragraph 5.15 in respect of property insurance.

***Final Inspection:***

14.11. Upon written notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, ENGINEER will 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 is incomplete or *defective*. CONTRACTOR shall immediately take sure measures as are necessary to remedy such deficiencies.

***Final Application for Payment:***

14.12. After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents-all as required by the Contract Documents, and after ENGINEER has indicated that the Work is acceptable (subject to the provisions of paragraph 14.16), CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied by all documentation called for in the Contract Documents, together with complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu thereof and as approved by OWNER, CONTRACTOR may furnish receipts or releases in full; an affidavit of CONTRACTOR that the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment.

***Final Payment and Acceptance:***

14.13. 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 – all as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. Thereupon ENGINEER will give written notice to OWNER and CONTRACTOR that the Work

is acceptable subject to the provisions of paragraph 14.16. Otherwise, ENGINEER will return the Application 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. Thirty days after presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance, and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

14.14. If, through no fault of CONTRACTOR, final completion of the Work is significantly delayed and if ENGINEER so confirms, OWNER shall, upon receipt of CONTRACTOR's final Application for Payment and recommendation of ENGINEER, and without terminating the Agreement, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by OWNER for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if Bonds have been furnished as required in paragraph 5.1, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by CONTRACTOR to ENGINEER with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

***Contractor's Continuing Obligation:***

14.15. CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by ENGINEER, nor the issuance of a certificate of Substantial Completion, nor any payment by OWNER to CONTRACTOR under the Contract Documents, nor any use or occupancy of the Work or any part thereof by OWNER, nor any act of acceptance by OWNER nor any failure to do so, nor any review and approval of a Shop Drawing or sample submission, nor the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13, nor any correction of *defective* Work by OWNER will constitute an acceptance of Work not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents (except as provided in paragraph 14.16).

***Waiver of Claims:***

14.16. The making and acceptance of final payment will constitute:

14.16.1. a waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from *defective* Work appearing after final inspection pursuant to paragraph 14.11 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein; however, it will not constitute a waiver by OWNER of any rights in respect of CONTRACTOR's continuing obligations under the Contract Documents; and

14.16.2. a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND  
TERMINATION

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**Owner May Suspend Work:**

15.1. OWNER may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to CONTRACTOR and ENGINEER which will fix the date on which Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if CONTRACTOR makes an approved claim therefor as provided in Articles 11 and 12.

**Owner May Terminate:**

15.2. Upon the occurrence of any one or more of the following events:

15.2.1. if CONTRACTOR commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if CONTRACTOR takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

15.2.2. if a petition is filed against CONTRACTOR under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against CONTRACTOR under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

15.2.3. if CONTRACTOR makes a general assignment for the benefit of creditors;

15.2.4. if a trustee, receiver, custodian or agent of CONTRACTOR is appointed under applicable law or under contract, whose appointment or authority to take charge of property of CONTRACTOR is for the purpose of enforcing a Lien against such property or for the purpose of general administration of such property for the benefit of CONTRACTOR's creditors;

15.2.5. if CONTRACTOR admits in writing an inability to pay its debts generally as they become due;

15.2.6. if CONTRACTOR persistently fails 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 established under paragraph 2.9 as revised from time to time);

15.2.7. if CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.8. if CONTRACTOR disregards the authority of ENGINEER; or

15.2.9. if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if there be one) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to

CONTRACTOR for trespass or conversion), 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 finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Price exceeds the direct, indirect and consequential costs of completing the Work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) such excess will be paid to CONTRACTOR. If such costs exceed such unpaid balance, CONTRACTOR shall pay the difference to OWNER. Such costs incurred by OWNER will be approved as to reasonableness by ENGINEER and incorporated in a Change Order, but when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3. 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. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4. Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate the Agreement. In such case, CONTRACTOR shall be paid for all Work executed and any expense sustained plus reasonable termination expenses, which will include, but not be limited to, direct indirect and consequential costs (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs).

**Contractor May Stop Work or Terminate:**

15.5. If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted, or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written to OWNER and ENGINEER, terminate the Agreement and recover from OWNER payment for all Work executed and any expense sustained plus reasonable termination expenses. In addition and in lieu of terminating the Agreement, if ENGINEER has failed to act on an Application for Payment or OWNER has failed to make any payment as aforesaid. CONTRACTOR may upon seven days' written notice to OWNER and ENGINEER stop the Work until payment of all amounts then due. The provisions of this paragraph shall not relieve CONTRACTOR of the obligations under paragraph 6.29 to carry on the Work in accordance with the progress schedule and without delay during disputes and disagreements with OWNER.

**ARTICLE 16 – ARBITRATION**

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16.1. All claims, disputes and other matters in question between OWNER and CONTRACTOR arising out of, or relating to the Contract Documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 14.16) will be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining subject to the limitations of this Article 16. This agreement so to

arbitrate and any other agreement or consent to arbitrate entered into in accordance herewith as provided in this Article 16 will be specifically enforceable under the prevailing law of any court having jurisdiction.

16.2. No demand for arbitration of any claim, dispute or other matter that is required to be referred to ENGINEER initially for decision in accordance with paragraph 9.11 will be made until the earlier of (a) the date on which ENGINEER has rendered a decision or (b) the tenth day after the parties have presented their evidence to ENGINEER if a written decision has not been rendered by ENGINEER before that date. No demand for arbitration of any such claim, dispute or other matter will be made later than thirty days after the date on which ENGINEER has rendered a written decision in respect thereof in accordance with paragraph 9.11; and the failure to demand arbitration within said thirty days' period shall result in ENGINEER's decision being final and binding upon OWNER and CONTRACTOR. If ENGINEER renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede the arbitration proceedings, except where the decision is acceptable to the parties concerned. No demand for arbitration of any written decision of ENGINEER rendered in accordance with paragraph 9.10 will be made later than ten days after the party making such demand has delivered written notice of intention to appeal as provided in paragraph 9.10.

16.3. Notice of the demand for arbitration will be filed in writing with the other party to the Agreement and with the American Arbitration Association, and a copy will be sent to ENGINEER for information. The demand for arbitration will be made within the thirty-day or ten-day period specified in paragraph 16.2 as applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

16.4. No arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder or in any other manner any other person or entity (including ENGINEER, ENGINEER's agents, employees or consultants) who is not a party to this contract unless:

16.4.1. the inclusion of such other person or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration,

16.4.2. such other person 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, and

16.4.3. the written consent of the other person or entity sought to be included and of OWNER and CONTRACTOR has been obtained for such inclusion, which consent shall make specific reference to this paragraph; but no such consent shall constitute consent to arbitration of any dispute not specifically described in such consent or to arbitration with any party not specifically identified in such consent.

16.5. The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and will not be subject to modification or appeal except to the extent permitted by Sections 10 and 11 of the Federal Arbitration Act (9 U.S.C. §§ 10,11).

## ARTICLE 17 – MISCELLANEOUS

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### ***Giving Notice:***

17.1. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

### ***Computation of Time:***

17.2.1. When any period of time is referred to in the Contract Documents 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.

17.2.2. A calendar day of twenty-four hours measured from midnight to the next midnight shall constitute a day.

### ***General:***

17.3. Should OWNER or CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of the other party or of any of the other party's employees or agents or others for whose acts the other party is legally liable, claim will be made in writing to the other party within a reasonable time of the first observance of such injury or damage. The provisions of this paragraph 17.3 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or repose.

17.4. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.30, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and

ENGINEER thereunder, 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 Documents, and 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. All representatives, warranties and guarantees made in the Contract Documents will survive final payment and termination or completion of the Agreement.



SECTION 007300  
SUPPLEMENTARY CONDITIONS

**\*Note:** The Supplementary Conditions are numbered to conform to the numbering system of the General Conditions. Where a numbered article is omitted from these Supplementary Conditions, that article of the General Conditions is taken as complete.

**ARTICLE 1 - DEFINITIONS**

The Owner, the Contractor, and the Engineer are those mentioned as such in the Agreement. They are treated through the contract documents as if each were of the singular number and masculine gender.

Written notice shall be deemed to have been duly served if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent by registered mail to the last business address known to him who give the notice.

The term "Subcontractor", as employed herein, includes only those having a direct contract with the Contractor; and it includes one who furnishes material worked to a special design according to the drawings and specifications of this work, but does not include one who merely furnishes material not so worked.

**ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, AND REUSE**

3.01 The Contract Documents are complementary; what is called for by one is as binding as if called for by all. If there is a conflict between Plans and Specifications, the Contractor shall notify the Owner immediately for clarification.

3.03 No oral agreement or conversation with any officer, agent, or employee of the Owner, either before or after execution of this Contract, shall affect or modify any of the terms of obligations contained in any of the documents comprising said Contract.

**ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS**

4.05 The Owner will provide reference point information (if available) that was used as a part of the design. This information will be listed on the Plans. Additional field surveys needed to establish or re-establish reference points for construction is the responsibility of the Contractor and will be considered a part of laying out the Work.

**ARTICLE 5 – BONDS AND INSURANCE**

5.03 Proof of Carriage of Insurance: The Contractor shall furnish the Owner with certificates showing the type, amount, class of operations covered, effective dates, and dates of expiration of policies. Such certificates shall also contain substantially the following statement: "The insurance covered by this certificate will not be canceled or materially altered except after thirty (30) days written notice has been received by the Owner."

5.04 Contractor' Liability Insurance

*Contractor's General Liability and Automobile Liability Insurance:* The Contractor will furnish the Owner with proof of insurance coverage under a general liability insurance policy and an automobile liability insurance policy, both of which shall be of the comprehensive form. The insurance shall protect the insured from claims for damages because of bodily injury, including accidental death, and from claims for property damage, including loss of use resulting therefrom. This insurance shall include the specific coverages and be written for not less than the limits set out below. The Contractor shall furnish an Owner's protective policy similar to that specified herein.

General Liability:

▪ Each occurrence	\$1,000,000
▪ Damage to rented premises (Ea occurrence)	\$1,000,000
▪ Medical expenses (Any one person)	\$10,000
▪ Personal & adv injury	\$1,000,000
▪ General aggregate	\$2,000,000
▪ Products – Comp/OP Agg	\$2,000,000

Automobile Liability (including any auto, all owned autos, hired, and non-owned):

▪ Combined single limit (Ea accident)	\$1,000,000
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Excess/Umbrella Liability

▪ Each occurrence	\$5,000,000
▪ Aggregate	\$5,000,000

Workers Compensation & Employers' Liability

▪ E.L. each accident	\$1,000,000
▪ E.L. Disease – ea employee	\$1,000,000
▪ E.L. disease – policy limit	\$1,000,000

Equipment Floater

▪ Lsd/Rntd	\$800,000
▪ Deductible	\$1,000

*Subcontractor's General Liability and Automobile Liability Insurance:* The Contractor shall either (1) require each of his Subcontractors to procure and maintain during the life of their subagreement, insurance as specified in Articles 5.03 and 5.04 of these Supplementary Conditions; or (2) insure the activities of his subcontractors in his own insurance policy.

*Contractor's and Subcontractor's Insurance:* The Contractor shall not commence work under this Contract until he has obtained all insurance required and such insurance has been approved by the Owner. Nor shall the Contractor allow any subcontractor to commence work on his subcontract until the insurance required of the subcontractor has been so obtained and approved.

5.06 Property Insurance: Insurance listed under Section 5.06 of the Standard Conditions of the Contract shall be purchased and maintained by the Contractor, not the Owner.

## **ARTICLE 6 –CONTRACTOR’S RESPONSIBILITIES**

6.13 Protection of Lives and Health: In accordance with generally accepted construction practices, the Contractor will be solely and completely responsible for conditions at the job site, including the safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.

## **ARTICLE 9 –RESIDENT PROJECT REPRESENTATIVE**

9.01 Project Representation/General: Resident Project Representative (RPR) is the Owner's employee or agent at the Site, who will act as directed by and under the supervision of the Owner and will confer with the Owner regarding RPR's actions. RPR's dealings in matters pertaining to the on-site work shall in general be with the Owner and Contractor, keeping the Owner advised as necessary. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of the Contractor.

9.02 Duties and Responsibilities of RPR shall include:

- A. Schedules. Review the progress schedule, the schedule of Shop Drawings and sample submittals and schedule of values prepared by the Contractor; and consult with the Owner concerning acceptability.
- B. Conferences and Meetings. Attend meetings with the Contractor, such as preconstruction conferences, progress meetings, job conferences and other project related meetings and prepare and circulate copies of minutes thereof.
- C. Liaison.
  - 1. Serve as the Owner's liaison with the Contractor, working principally through the Contractor's superintendent; and assist in understanding the intent of the Contract Documents; and assist the Owner in serving as the Owner's liaison with the Contractor when the Contractor's operations affect the Owner's on-site operations.
  - 2. Assist in obtaining from the Owner additional details or information, when required for proper execution of the Work.
- D. Shop Drawings and Samples.
  - 1. Record date of receipt of Shop Drawings and samples.
  - 2. Receive samples that are furnished at the Site by the Contractor, and notify the Owner of availability of samples for examination.
  - 3. Advise the Owner and Contractor of the commencement of any work requiring a Shop Drawing or sample if the Owner has not approved the submittal.
- E. Review of Work, Rejection of Defective Work, Inspections, and Tests.
  - 1. Conduct on-site observations of the Work in progress to assist the Owner in determining if the Work is, in general, proceeding in accordance with the Contract Documents.
  - 2. Report to the Owner whenever the RPR believes that any work is unsatisfactory, faulty, or defective or does not conform to the Contract Documents or has been damaged or does not meet the requirements of any inspections, test, or approval required to be made; and advise the Owner of work that the RPR believes should be

- corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
3. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate personnel, and that the Contractor maintains adequate records thereof; and observe, record, and report to the Owner appropriate details relative to the test procedures and start-ups.
  4. Accompany visiting inspectors representing public or other agencies having jurisdiction over the project; record the outcome of these inspections; and report to the Owner.
- F. Interpretation of Contract Documents. Report to the Owner when clarifications and interpretations of the Contract Documents are needed and transmit to the Contractor clarifications and interpretations as issued by the Owner.
- G. Modifications. Consider and evaluate the Contractor's suggestions for modifications in the drawings or specifications and report with the RPR's recommendations to the Owner. Transmit to the Contractor decisions as issued by the Owner.
- H. Records.
1. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples, reproductions of original Contract Documents including all Work Change Directives, Addenda, Change Orders, Field Orders, and additional Drawings issued subsequent to the execution of the Agreement, Owner's clarifications and interpretations of the Contract Documents, progress reports, and other project related documents.
  2. Keep a diary or log book recording Contractor hours on the job site, weather conditions, data relative to questions of Work Change Directives, Change Orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general and specific observations in more detail, as in the case of observing test procedures; and send copies to the Owner.
  3. Record names, addresses and telephone number of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
- I. Reports.
1. Furnish the Owner as required with periodic reports of the progress of the Work and of the Contractor's compliance with the approved progress schedule, schedule of Shop Drawings and sample submittals.
  2. Consult with the Owner in advance of scheduled major tests, inspections, or start of important phases of the work
  3. Draft proposed Change Orders and work directive changes, obtaining backup material from the Contractor and recommend to the Owner Change Orders, Work Change Directives, and Field Orders.
  4. Report immediately to the Owner's safety representative upon the occurrence of any accident.
- J. Payment Requests. Review Applications for Payment with the Contractor for compliance with the established procedure for their submission and forward with recommendations to the Owner, noting particularly the relationship of the payment requested to the

schedule of values, Work completed and materials and equipment delivered at the Site but not incorporated in the Work.

- K. Certificates, Maintenance and Operation Manuals. During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by the Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to the Owner for review and forwarding to the Owner prior to final payment for the Work.
- L. Completion.
  - 1. Before the Owner issues a Certificate of Substantial Completion, submit to the Contractor a list of items requiring completion or correction.
  - 2. Conduct final inspection in the company of the Owner and Contractor, and prepare a final list of items to be completed or corrected.
  - 3. Observe that all items on final list have been completed or corrected and make recommendations to the Owner concerning acceptance.

9.03 Limitations of Authority. The RPR shall not:

- A. Authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by the Owner.
- B. Exceed limitations of the Owner's authority as set forth in the Contract Documents.
- C. Undertake any of the responsibilities of the Contractor, Subcontractors, or the Contractor's superintendent.
- D. Advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advice or directions are specifically required by the Contract Documents.
- E. Advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.
- F. Accept Shop Drawings or sample submittals from anyone other than the Owner or the Owner's appointed Representative.
- G. Authorize the Owner to occupy the project in whole or in part.
- H. Participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by the Owner.

**ARTICLE 10 – CHANGES IN THE WORK**

10.05 The Contractor, in connection with any proposal he makes shall furnish a price breakdown, itemized as required by the Owner. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, subcontract, and overhead costs, as well as

profit, and shall cover all work involved in the change order, whether such work was deleted, added or changed. Any amount claimed for subcontracts shall be supported by a similar price breakdown. Additionally, the proposal shall include justification for any time extension requests made.

#### **ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION**

14.02 After review by the Owner's representative of the Contractor's estimate, the Owner will make payment to the Contractor promptly and retain only such amounts as may be justified by specific circumstances. The amount due will be determined by the completed work and materials stored onsite less previous payments.

Retained amounts shall be limited to the following:

- The Owner shall retain five percent (5%) of the amount of each estimate until final completion and acceptance of all work covered by the contract. The Owner, at any time after ninety-five percent (95%) of the work has been completed, may reduce retainage to zero percent (0%) provided the Owner finds that satisfactory progress is being made.
- The Owner may accept securities negotiable without recourse, condition, or restrictions; a release or retainage bond; or an irrevocable letter of credit provided by the Contractor in lieu of all or part of the cash retainage.

#### 14.06 Final Completion

The Owner will not issue final payment on this project until:

- The Owner has made a final inspection of the project site and accepted all Work, including those items on the punch list.
- The Contractor has submitted a letter certifying a one-year warranty on all Work from the date of acceptance by the Owner.
- The Contractor has submitted the necessary close out documents including the release of liens (evidence of payment), affidavit of payment of debts, and consent of surety to final payment.

END OF SECTION

## State and Local Fiscal Recovery Funds (SLRF) Supplemental Conditions for Contracts

### Equal Employment Opportunity

Any contract that uses federal funds to pay for construction work is a “federally assisted construction contract” and must include the equal opportunity clause found in 2 C.F.R. Part 200, unless otherwise stated in 41 C.F.R. Part 60. This contract provision is required for all procurements that meet the definition of a “federally assisted construction contract.”

During the performance of this contract, the contractor agrees as follows:

- (1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.
- (3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.
- (4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and

applicants for employment.

- (5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law. (8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through
- (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: Provided, that if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause



as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

### Davis-Bacon Act

U.S. Treasury exercised its federal authority outlining the requirements for water infrastructure projects executed using ARP funds. Therefore, the requirements for prevailing wages and rates slightly differs from the standards of Davis-Bacon. Individual projects less than \$10 million dollars are not required to provide certification that prevailing wages and rates were followed. Individual projects of \$10 million dollars or more require certification like Davis-Bacon and are outlined below. Please note that any project using other funding sources, like Community Development Block Grants or SRF loans, are subject to requirements for those programs. When combining funding sources on a single and complete project or phase, other funding program requirements may trump the requirements for the use of ARP funds. We recommend Grantees and Project Owners discuss project requirements with TDEC when leveraging ARP funds with other funding programs to ensure all applicable rules and regulations are followed.

#### **Individual Water Infrastructure Projects of \$10 million dollars or more**

- (1) A recipient may provide a certification that, for the relevant project, all laborers and mechanics employed by contractors and subcontractors in the performance of such project are paid wages at rates not less than those prevailing, as determined by the U.S. Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code (commonly known as the “Davis-Bacon Act”), for the corresponding classes of laborers and mechanics employed on projects of a character similar to the contract work in the civil subdivision of the State (or the District of Columbia) in which the work is to be performed, or by the appropriate State entity pursuant to a corollary State prevailing-wage-in-construction law (commonly known as “baby Davis-Bacon Acts”). If such certification is not provided, a recipient must provide a project employment and local impact report detailing:
  - a. The number of employees of contractors and sub-contractors working on the project;
  - b. The number of employees on the project hired directly and hired through a third party;
  - c. The wages and benefits of workers on the project by classification; and
  - d. Whether those wages are at rates less than those prevailing. 19 Recipients must maintain sufficient records to substantiate this information upon request.
  
- (2) A recipient may provide a certification that a project includes a project labor agreement, meaning a pre-hire collective bargaining agreement consistent with section 8(f) of the National Labor Relations Act (29 U.S.C. 158(f)). If the recipient does not provide such certification, the recipient must provide a project workforce continuity plan, detailing:
  - a. How the recipient will ensure the project has ready access to a sufficient supply of appropriately skilled and unskilled labor to ensure high-quality construction throughout the life of the project, including a description of any required professional certifications and/or in-house training;
  - b. How the recipient will minimize risks of labor disputes and disruptions that would jeopardize timeliness and cost-effectiveness of the project;

- c. How the recipient will provide a safe and healthy workplace that avoids delays and costs associated with workplace illnesses, injuries, and fatalities, including descriptions of safety training, certification, and/or licensure requirements for all relevant workers (e.g., OSHA 10, OSHA 30);
  - d. Whether workers on the project will receive wages and benefits that will secure an appropriately skilled workforce in the context of the local or regional labor market; and
  - e. Whether the project has completed a project labor agreement.
- (3) Whether the project prioritizes local hires.
- (4) Whether the project has a Community Benefit Agreement, with a description of any such agreement.
- a. All transactions regarding this contract shall be done in compliance with the Davis-Bacon Act (40 U.S.C. 3141- 3144, and 3146-3148) and the requirements of 29C.F.R. pt. 5 as may be applicable. The contractor shall comply with 40 U.S.C. 3141-3144, and 3146-3148 and the requirements of 29 C.F.R. pt. 5 as applicable.
  - b. Contractors are required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor.
  - c. Additionally, contractors are required to pay wages not less than once a week.

#### Copeland Anti-Kickback Act

The Copeland "Anti-Kickback" Act prohibits workers on construction contracts from giving up wages that they are owed. This requirement applies to all contracts for construction or repair work above \$2,000 in situations where the Davis-Bacon Act also applies.

- a. Contractor. The contractor shall comply with 18 U.S.C. § 874, 40 U.S.C. § 3145, and the requirements of 29 C.F.R. pt. 3 as may be applicable, which are incorporated by reference into this contract.
- b. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clause above and a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of these contract clauses.
- c. Breach. A breach of the contract clauses above may be grounds for termination of the contract, and for debarment as a contractor and subcontractor as provided in 29 C.F.R. § 5.12."

#### Contract Work Hours and Safety Standards Act

Where applicable, all contracts awarded by the non-Federal entity in excess of \$100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. §§ 3702 and 3704, as supplemented by Department of Labor regulations at 29 C.F.R. Part 5. See 2 C.F.R. Part 200, Appendix II(E). Each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours.

#### **Compliance with the Contract Work Hours and Safety Standards Act.**

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

worked in excess of forty hours in such workweek.

- (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the t \$27 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.
- (3) Withholding for unpaid wages and liquidated damages. The (write in the name of the Federal agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.
- (4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

#### Clean Air Act and Federal Water Pollution Control Act

For contracts over \$150,000, contracts must contain a provision requiring contractors to comply with the Clean Air Act and the Federal Water Pollution Control Act. If applicable, contracts must contain a provision that requires the contractor to agree to comply with all applicable standards, orders, or regulations issued pursuant to the Clean Air Act (42 U.S.C. §§ 7401-7671q.) and the Federal Water Pollution Control Act as amended (33 U.S.C. §§ 1251-1387).

#### Clean Air Act

- (1) The contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. § 7401 et seq
- (2) The contractor agrees to report each violation to the (name of subrecipient entering into the contract) and understands and agrees that the (name of the subrecipient entering into the contract) will, in turn, report each violation as required to assure notification to Treasury, and the appropriate Environmental Protection Agency Regional Office.
- (3) The contractor agrees to include these requirements in each subcontract exceeding \$150,000

### **Federal Water Pollution Control Act**

- (1) The contractor agrees to comply with all applicable standards, orders, or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 ets eq.
- (2) The contractor agrees to report each violation to the (name of the subrecipient entering into the contract) and understands and agrees that the (name of the subrecipient entering into the contract) will, in turn, report each violation as required to assure notification to the Treasury, and the appropriate Environmental Protection Agency Regional Office.
- (3) The contractor agrees to include these requirements in each subcontract exceeding \$150,000

### **Debarment and Suspension**

Non-federal entities, contractors and subcontractors are subject to debarment and suspension regulations. These regulations restrict awards, subawards, and contracts with certain parties that are debarred, suspended, or otherwise excluded from or ineligible for participation in Federal assistance programs and activities. In general, an "excluded" party cannot receive a Federal grant award or a contract within the meaning of a "covered transaction," to include subawards and subcontracts. The debarment and suspension clause is required for all contracts and subcontracts for \$25,000 or more, all contracts that require the consent of an official of a federal agency, and all contracts for federally required audit services.

### **Suspension and Debarment**

- (1) This contract is a covered transaction for purposes of 2 C.F.R. pt. 180 and 2 C.F.R. pt. 3000. As such, the contractor is required to verify that none of the contractor's principals (defined at 2 C.F.R. § 180.995) or its affiliates (defined at 2 C.F.R. § 180.905) are excluded (defined at 2 C.F.R. § 180.940) or disqualified (defined at 2 C.F.R. § 180.935).
- (2) The contractor must comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, and must include a requirement to comply with these regulations in any lower tier covered transaction it enters into.
- (3) This certification is a material representation of fact relied upon by (insert name of recipient/subrecipient/applicant). If it is later determined that the contractor did not comply with 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C, in addition to remedies available to (insert name of recipient/subrecipient/applicant), the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment.
- (4) The bidder or proposer agrees to comply with the requirements of 2 C.F.R. pt. 180, subpart C and 2 C.F.R. pt. 3000, subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

### **Byrd Anti-Lobbying Amendment**

Contractors that apply or bid for a contract of \$100,000 or more under a federal grant must file the required certification. This is also applicable to subcontractors of more than \$100,000, must include a contract provision prohibiting the use of federal appropriated funds to influence officers or employees of the federal government. Contractors that apply or bid for a contract for more than \$100,000 must also file the required certification regarding lobbying.

Contractors who apply or bid for an award of \$100,000 or more shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, officer or employee of Congress, or an employee of a Member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. § 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient who in turn will forward the certification(s) to the awarding agency.

#### Procurement of Recovered Materials

A non-Federal entity that is a state agency or agency of a political subdivision of a state and its contractors must comply with section 6002 of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 CFR part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition, where the purchase price of the item exceeds \$10,000 or the value of the quantity acquired during the preceding fiscal year exceeded \$10,000; procuring solid waste management services in a manner that maximizes energy and resource recovery; and establishing an affirmative procurement program for procurement of recovered materials identified in the EPA guidelines.

“In the performance of this contract, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired competitively within a timeframe providing for compliance with the contract performance schedule; meeting contract performance requirements; or at a reasonable price. Information about this requirement, along with the list of EPA-designated items, is available at [EPA's Comprehensive Procurement Guidelines webpage](#).

The Contractor also agrees to comply with all other applicable requirements of Section 6002 of the Solid Waste Disposal Act.”

#### Domestic Preference for Procurement

As appropriate, and to the extent consistent with law, NFEs should, to the greatest extent practicable under a federal award, provide a preference for the purchase, acquisition, or use of goods, products or materials produced in the United States. This includes, but is not limited to, iron, aluminum, steel, cement, and other manufactured products.

“Domestic Preference for Procurements

As appropriate, and to the extent consistent with law, the contractor should, to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States. This includes, but is not limited to iron, aluminum, steel, cement, and other manufactured products.

For purposes of this clause:

Produced in the United States means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States. Manufactured products mean items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.”

### Access to Records

NFEs and their contractors and subcontractors must give the Department of Treasury and other authorized representatives access to records associated with their awards during the federally required record retention period and as long as the records are retained.

The following access to records requirements apply to this contract:

(1) The Contractor agrees to provide (insert name of state agency or local or Indian tribal government), (insert name of recipient), Treasury, the Comptroller General of the United States, or any of their authorized representatives access to any books, documents, papers, and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts, and transcriptions.

(2) The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

(3) The Contractor agrees to provide the Treasury or authorized representatives access to construction or other work sites pertaining to the work being completed under the contract.

### Contract Changes or Modifications

To be eligible for ARP SLFRF assistance under the non-Federal entity's Treasury grant or cooperative agreement, the cost of the change, modification, change order, or constructive change must be allowable, allocable, within the scope of its grant or cooperative agreement, and reasonable for the completion of project scope.

### Compliance with Federal Law, Regulations and Executive Orders

The recipient and its contractors are required to comply with all Federal laws, regulations, and executive orders.

"This is an acknowledgement that Treasury ARP SLFRF financial assistance will be used to fund all or a portion of the contract. The contractor will comply with all applicable Federal law, regulations, executive orders, Treasury policies, procedures, and directives."

### Program Fraud and False or Fraudulent Statements or Related Acts

Recipients must comply with the requirements of The False Claims Act (31 U.S.C. §§ 3729-3733) which prohibits the submission of false or fraudulent claims for payment to the federal government. It is that the non-Federal entity include a provision in its contract that the contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to its actions pertaining to the contract.

"The Contractor acknowledges that 31 U.S.C. Chap. 38 (Administrative Remedies for False Claims and Statements) applies to the Contractor's actions pertaining to this contract."

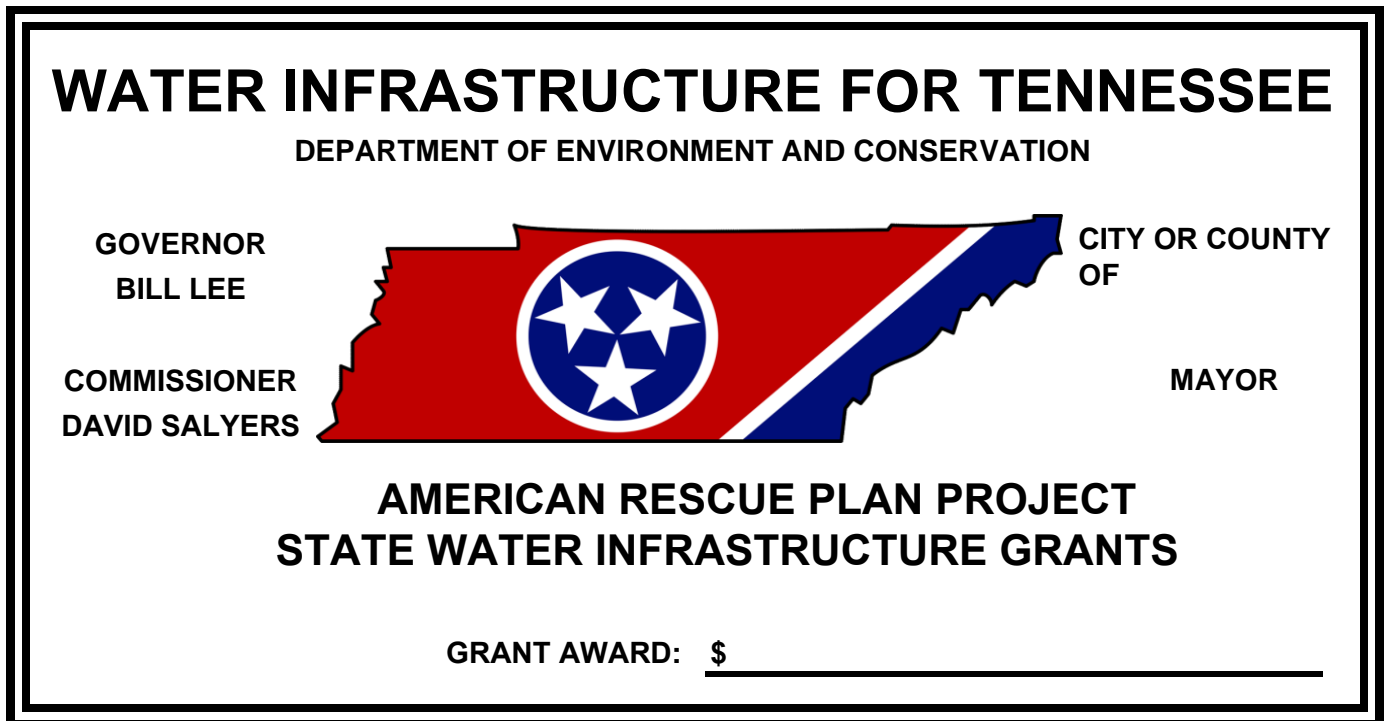
SECTION 007700

STATE WATER INFRASTRUCTURE GRANTS

IDENTIFICATION SIGN

All plans and specifications for each project approved shall contain provisions for requiring the general contractor to provide identification signs. The signs shall conform to the following basic features:

1. The following diagram shall be used as a design:



2. The sign shall be a 4'0" X 8'0" sheet of exterior grade plywood and shall be built so as to remain erected during the entire construction phase of the project.
3. The background of both sides shall be white. The lettering shall be black and shall be large enough to take advantage of the full size of the plywood. The stars shall be white set on a blue field and surrounded by a white ring placed inside a state map in red with a stripe of white and blue on the right side. The sign shall be bordered by a one-inch blue stripe.



**SECTION 011100  
SUMMARY OF WORK**

**PART 1        GENERAL**

1.01    TITLE OF WORK AND TYPE OF CONTRACT

- A.     Title of Work: Wastewater System Improvements – Sewer Rehabilitation Project
- B.     Type of Contract: Contract amount shall be based on lump sum and unit price bids.

1.02    RELATED REQUIREMENTS

- A.     Section 00 52 13 - Agreement.
- B.     Section 00 72 13 - General Conditions.
- C.     Section 00 73 00 – Supplementary Conditions.
- D.     Section 01 52 00 – Construction Facilities and Temporary Controls.

1.03    WORK COVERED BY CONTRACT DOCUMENTS

- A.     Work of this Contract includes the installation/execution of the following:

Sewer Rehabilitation Project includes the following items of work:

- Bypass Pump Around (as needed)
- Light and Heavy Cleaning
- Rehabilitation by Cured-In-Place Pipe Liner
- Manhole Rehabilitation
- Point Repairs
- Open Cut Replacement

- B.     The work shall include all related appurtenances as indicated in the design plans and specifications.

1.04    CONSTRUCTION SEQUENCE AND CONSTRAINTS

- A.     Perform work in a manner that is least disruptive to the Owner’s operations. Refer to Section 01 52 00, Construction Facilities and Temporary Controls regarding temporary controls.
- B.     Standard working hours shall be from 7:00 AM to 5:00 PM Monday through Friday, and no work shall be performed without the OWNER or OWNER’S representative on site. Any work required outside of these standard hours shall be submitted in writing as a request to the Engineer documenting the work planned to be performed and the reason(s) for the overtime work.

- C. Contractor's employees and subcontractors shall be limited to the specific locations on the site where project work is to be performed. All other areas of the plant site are off limits.
- D. Access to the project site shall be via the existing gravel driveway.
- E. The Owner or the Owner's construction representative shall be on-site when work is occurring.

1.05 CONTRACTOR USE OF PREMISES

- A. Coordinate use of premises under direct supervision of the designated representative to the Owner.
- B. Assume full responsibility for protection and safekeeping of products and materials stored on the site under this Contract.
- C. Obtain and pay for use of additional storage or work areas needed for operations under this Contract.
- D. All materials removed during construction (such as existing sewer pipe, asphalt spoil material, etc.) shall be properly disposed by the Contractor.

**PART 2 PRODUCTS**

- A. Not Applicable

**PART 3 EXECUTION**

- A. Not Applicable

**END OF SECTION**

**SECTION 012200  
MEASUREMENT AND PAYMENT**

1. GENERAL

1.01 SUMMARY

- A. The Unit Price Work shall include CONTRACTOR provided labor, materials, equipment, overhead, profit, insurance, incidentals, etc. to cover the finished work of several kinds called for. Cost of all applicable taxes, permits, etc. shall be included in the cost of construction of this project. Even though an item of the Work is included in the Contract Documents, if it is not both covered herein and specifically itemized on the Unit Price Schedule of Section 00300, Bid Form, payment for it shall not be separately made. Such work shall be considered a necessary part of or incidental to its related Work. The CONTRACTOR shall be paid only for quantities installed and approved by the OWNER.
- B. Applications for payment shall be submitted in accordance with the General Conditions, Supplementary Conditions, and the Agreement. Cost of all applicable taxes, permits, etc., shall be included in the cost of construction of the Project.

1.02 MEASUREMENT

- A. General: Measuring, and metering devices used to measure quantity of materials for the Work shall be suitable for purpose intended and conform to tolerances and specifications as specified in National Institute of Standards and Technology, Handbook 44.
- B. Where measurement of quantities depends on elevation of existing ground, elevations obtained during construction will be compared with those shown on Drawings. Variations of 1 foot or less will be ignored, and profiles shown on Drawings will be used for determining quantities.
- C. Units of measure shown on Unit Price Schedule included with Bid Form shall be as follows, unless specified otherwise.

Item	Method of Measurement
AC	Acre—Field Measure by OWNER
CY	Cubic Yard—Field Measure in-place by OWNER within limits specified or shown
EA	Each—Field Count by OWNER
LF	Linear Foot—Horizontal Field Measure by OWNER
LS	Lump Sum—by OWNER
SF	Square Foot – Field Measure by OWNER
SY	Square Yard—Field Measure by OWNER

Item	Method of Measurement
VF	Vertical Feet—Field Measure by OWNER
WK	Week—by OWNER

D. Definitions:

1. Cubic Yard (CY): Field measured and calculated by OWNER. In-place yards prior to excavation or after placement and compaction. Measured to the nearest 0.5 foot, calculated in cubic feet, converted to cubic yards, and rounded to the nearest cubic yard.
2. Each (EA): Field counted by the OWNER as installed and accepted.
3. Linear Foot (LF): Field measured horizontally by the OWNER. Measured centerline to centerline of manhole or fitting. Manhole diameter and fitting length shall be included in the linear measurement.
  - a. Depth for Linear Foot:
    - 1) If the calculated depth exactly equals a number in two consecutive depths, i.e. 6, 8, 10, it shall be assumed that the lower depth category shall be used for calculating payment.
    - 2) Manhole, Drop Manhole, Conflict Manhole, and Manhole Removal: Distance measured from manhole rim to lowest pipe invert.
    - 3) Gravity Sewers: Average distance between manholes measured from manhole rim to lowest pipe invert for the specific sewer reach under consideration.
    - 4) Force Mains: Average distance between surface grade and pipe invert measured at 100-foot intervals along the pipe route between pipe elbows 45 degrees or greater.
    - 5) Backfill, Native and Stone: Average distance between surface grade and the top of the pipe envelope (12-inch cover over the pipe) measured between manholes for gravity sewers and 100-foot increments for force mains.
4. Lump Sum (LS): Field verified by OWNER.
5. Square Foot (SF): Field measured and calculated by OWNER. Measurement shall be horizontal distances measured to the nearest 0.1 foot and calculated to the nearest square foot.
6. Square Yard (SY): Field measured and calculated by OWNER. Measurement shall be horizontal distances measured to the nearest 0.5 foot, calculated in square feet, converted to square yards, and rounded to the nearest square yard by the OWNER.
7. Vertical Foot (VF): Field measured by OWNER in accordance with Paragraph D.4.a.2, above.
8. Week (WK): Field determined by OWNER as seven consecutive 24-hour days, rounded to the nearest week. A 1-day allowance for equipment set up and relocation shall be allowed. Multiple location times shall be added together to determine total time in weeks.

1.03 STORED MATERIALS AND EQUIPMENT

- A. No applications shall be processed by Owner which includes amounts for stored materials.

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Owner shall not pay Contractor for stored materials.

1. For unit price contracts or components Contractor's application for payment shall be based upon installed units identified on the bid form.
2. For lump sum price contracts or components Contractor's application for payment shall be based upon approved schedule of values.

#### 1.04 ITEMS NOT CONSIDERED AS PAY ITEMS

- A. Unless explicitly stated in this Contract Document, the following items are not considered as pay items:
  1. Unclassified Excavation (Section 312300)
  2. Sanitary Sewers – Air Testing Guidelines (Section 333100)
  3. Trenching, Backfilling and Compacting – Concrete Encasement (Section 312333)
- B. Unclassified excavation for utilities is not a pay item unless explicitly stated in this Contract Document. Unclassified excavation shall be considered and designated a necessary part of the construction for trench depths as defined by the individual unit price for the line installation and as required by the Project Drawings. Unit prices bid for utilities with which unclassified excavation is connected shall be full compensation for this item.
- C. Rock Excavation is not a pay item unless explicitly stated in this Contract Document. Rock excavation shall be considered and designated a necessary part of the construction, and unit prices bid for items which rock excavation is connected shall be full compensation for this item.
- D. Payment will not be made for rejected or unused products. Payment will not be made for the following:
  1. Loading, hauling, and disposing of rejected material.
  2. Quantities of material wasted or disposed of in manner not called for under Contract Documents.
  3. Rejected loads of material, including material rejected after it has been placed by reason of failure of Contractor to conform to provisions of Contract Documents.
  4. Material not unloaded from transporting vehicle.
- E. Site Cleanup is not a separate pay item unless explicitly stated in this Contract Document. It includes the equipment, material, and labor to maintain the Site on a daily and weekly basis in a clean environment, removing debris, unused material, cleaning, raking, general restoration of disturbed areas to a condition equal to or better than prior to construction. All debris and material shall be removed from the Site and properly disposed of offsite in an approved permitted manner. Site Cleanup is not a pay item and shall be considered and designated a necessary part of the construction and unit prices bid for utilities which unclassified excavation is connected shall be full compensation for this item.

1.05 BID ITEM PAYMENT

- A. Payment for unit price items covers all the labor, materials, overhead, and services necessary to furnish and install the following items.
- B. Payment for the bid items will be as follows:

Pay Item No. 1 - Mobilization to the job site is a lump sum pay item. Onetime cost to include all CONTRACTOR- incurred mobilization costs associated with such site. Demobilization is not a pay item and shall be considered a necessary part of the work and the cost of such included herein. If the CONTRACTOR had to pull all men and equipment off the job at the request of the OWNER and subsequently had to re-mobilize then he would be paid the lump sum price for mobilization a second time.

Pay Item No. 2 - Traffic Control – Plan and Implementation is a lump sum pay item once the CONTRACTOR has received back from OWNER all approved traffic control plans, as required for Work, which have been prepared, and stamped by a registered professional engineer and submitted to OWNER for approval. Item includes temporary facilities, maintenance, relocation, removal, personnel, police officers, signage, and routine coordination with permitting agencies. Item also include installation, maintenance, relocation, and removal of temporary controls, as required by traffic permits. Payments for this lump sum item will be made based on percentage of work complete for the entire project.

Pay Item No. 3 - Pre-Construction Site Video Recording is a lump sum pay item. Video recording shall include all materials, equipment, and labor to record the project areas.

Pay Item No(s). 4 a. - c. - Gravity Sewer Pipe, PVC, 8 Inches, Paved are linear foot unit price items. Unit price items include trench excavation, dewatering if needed, pipe material as shown on the Unit Price Schedule, pipe zone material, stone backfill, compaction, testing, and inspection. See Section 312300 Unclassified Excavation; Section 312333, Trenching Backfilling & Compaction; and Section 333100, Sanitary Sewers.

Pay Item No. 5 a. - Pipe Heavy Cleaning is a linear foot unit price pay item. Unit price items include mechanical cleaning required when high-velocity cleaning is not effective. See Section 330130.41, Sewer Cleaning.

Pay Item No. 6 a. - b. - Point Repair in Roadway is a unit price pay item. Unit price item includes excavation, pipe removal, disposal, pipe bedding, pipe installation, and compacted backfill, either as shown on Construction Drawings or as directed by OWNER.

Pay Item No. 7 a. - Point Repair in Unpaved Areas is a unit price pay item. Unit price item includes excavation, pipe removal, disposal, pipe bedding, pipe installation, and compacted backfill, either as shown on Construction Drawings or as directed by OWNER.

Pay Item No. 8 - Pipe Lining, CIPP is a linear foot unit price pay item. Unit price item includes pre- and post-CCTV inspections, high-velocity cleaning, lining, installing, curing,

cutting out to connections, required testing (excluding laboratory testing), end sealing, and debris collection and disposal and is paid per linear foot.

Pay Item No. 9 - Sewer Flow Control is a lump sum pay item. Lump sum price bid for sewer flow control shall be full compensation for this item and includes sewer dams, bypass pumps with standby units, fuel, maintenance, operation, supervision, suction and discharge piping. Payments for this lump sum item will be made based on percentage of work complete for the entire project. See Section 330130.10, Sewer Flow Control.

Pay Item No(s). 10 a. - Manhole Lining, Polymer Lining are vertical foot unit price pay item. Unit prices bid for this item shall be per each vertical foot of manhole rehabilitated based on manhole diameter. This shall also include vacuum testing, flow control or bypassing if necessary, internal plugging of inactive connections, and horizontally adjusting frame to allow for 48-inch diameter clear opening and subsequent realignment or reinstalling of existing frame and cover unless otherwise specified. If replacement of manhole frames and covers with watertight frames and covers and installation of lid plugs are required, they will be listed as separate pay items in this section. See Section 330130.81, Manhole Rehabilitation.

Pay Item No(s). 10 b. - Manhole Lining, 1-Inch Thick Cementitious Lining are vertical foot unit price pay item. Unit prices bid for this item shall be per each vertical foot of manhole rehabilitated based on manhole diameter. This shall also include vacuum testing, flow control or bypassing if necessary, internal plugging of inactive connections, and horizontally adjusting frame to allow for 48-inch diameter clear opening and subsequent realignment or reinstalling of existing frame and cover unless otherwise specified. If replacement of manhole frames and covers with watertight frames and covers and installation of lid plugs are required, they will be listed as separate pay items in this section. See Section 330130.81, Manhole Rehabilitation.

2. PRODUCTS

A. Not Applicable

3. EXECUTION

A. Not Applicable

END OF SECTION

**SECTION 013216**  
**CONSTRUCTION PROGRESS SCHEDULES**

**PART 1        GENERAL**

**1.01    SUBMITTALS**

**A.        Informational Submittals:**

1.        Preliminary Progress Schedule: Submit at least 7 days prior to preconstruction conference.
2.        Detailed Progress Schedule:
  - a.        Submit initial Detailed Progress Schedule within **60** days after Effective Date of the Agreement.
  - b.        Submit an Updated Progress Schedule at each update, in accordance with Section 1.03 Detailed Progress Schedule.
3.        Submit with Each Progress Schedule Submission:
  - a.        Contractor's certification that Progress Schedule submission is actual schedule being utilized for execution of the Work.
  - b.        Progress Schedule: One legible copy.
  - c.        Narrative Progress Report: Same number of copies as specified for Progress Schedule.
4.        Prior to final payment, submit a final Updated Progress Schedule.

**1.02    PRELIMINARY PROGRESS SCHEDULE**

- A.        In addition to basic requirements outlined in General Conditions, show a detailed schedule, beginning with Notice to Proceed, for minimum duration of 90 days, and a summary of balance of Project through Final Completion.
- B.        Show activities including, but not limited to, the following:
  1.        Notice to Proceed.
  2.        Permits.
  3.        Submittals, with review time. Contractor may use Schedule of Submittals specified in Section 01 33 00, Submittals and Substitutions.
  4.        Early procurement activities for long lead equipment and materials.
  5.        Initial Site work.
  6.        Earthwork.
  7.        Specified Work sequences and construction constraints.
  8.        Contract Milestone and Completion Dates.
  9.        Major structural, mechanical, equipment, electrical, architectural, and instrumentation and control Work.

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10. System startup summary.
  11. Project close-out summary.
  12. Demobilization summary.
- C. Update Preliminary Progress Schedule monthly; as part of progress payment process. Failure to do so may result in the Owner withholding all or part of the monthly progress payment until the Preliminary Progress Schedule is updated in a manner acceptable to Engineer.
- D. Format: In accordance with Article 1.04, Progress Schedule—Bar Chart.

#### 1.03 DETAILED PROGRESS SCHEDULE

- A. In addition to requirements of General Conditions, submit Detailed Progress Schedule beginning with Notice to Proceed and continuing through Final Completion.
- B. Show the duration and sequences of activities required for complete performance of the Work reflecting means and methods chosen by Contractor.
- C. When accepted by Engineer, Detailed Progress Schedule will replace Preliminary Progress Schedule and become Baseline Schedule. Subsequent revisions will be considered as Updated Progress Schedules.
- D. Format: In accordance with Article 1.04, Progress Schedule—Bar Chart.
- E. Update monthly to reflect actual progress and occurrences to date, including weather delays.

#### 1.04 PROGRESS SCHEDULE—BAR CHART

- A. General: Comprehensive bar chart schedule, generally as outlined in Associated General Contractors of America (AGC) 580, "Construction Project Planning and Scheduling Guidelines." If a conflict occurs between the AGC publication and this Specification, this Specification shall govern.
- B. Format:
1. Unless otherwise approved, white paper, 11-inch by 17-inch sheet size.
  2. Title Block: Show name of project and Owner, date submitted, revision or update number, and name of scheduler.
  3. Identify horizontally, across the top of the schedule, the time frame by year, month, and day.
  4. Identify each activity with a unique number and a brief description of the Work associated with that activity.
  5. Legend: Describe standard and special symbols used.
- C. Contents: Identify, in chronological order, those activities reasonably required to complete the Work, including as applicable, but not limited to:

1. Obtaining permits, submittals for early product procurement, and long lead time items.
2. Mobilization and other preliminary activities.
3. Initial Site work.
4. Specified Work sequences, constraints, and Milestones, including Substantial Completion date(s).
5. Subcontract Work.
6. Major equipment design, fabrication, factory testing, and delivery dates.
7. Delivery dates for Owner-furnished products, as specified in Section 01010, Summary of Work.
8. Sitework.
9. Concrete Work.
10. Structural steel Work.
11. Architectural features Work.
12. Conveying systems Work.
13. Equipment Work.
14. Mechanical Work.
15. Electrical Work.
16. Instrumentation and control Work.
17. Interfaces with Owner-furnished equipment.
18. Other important Work for each major facility.
19. Equipment and system startup and test activities.
20. Project closeout and cleanup.
21. Demobilization.

#### 1.05 PROGRESS OF THE WORK

- A. Updated Progress Schedule shall reflect:
  1. Progress of Work to within 5 working days prior to submission.
  2. Approved changes in Work scope and activities modified since submission.
  3. Delays in Submittals or resubmittals, deliveries, or Work.
  4. Adjusted or modified sequences of Work.
  5. Other identifiable changes.
  6. Revised projections of progress and completion.
  7. Report of changed logic.
- B. Produce detailed subschedules during Project, upon request of Owner or Engineer, to further define critical portions of the Work such as facility shutdowns.
- C. If Contractor fails to complete activity by its latest scheduled completion date and this Failure is anticipated to extend Contract Times (or Milestones), Contractor shall, within 7 days of such failure, submit a written statement as to how Contractor intends to correct nonperformance and return to acceptable current Progress Schedule. Actions by Contractor to complete the Work within Contract Times (or Milestones) will not be justification for adjustment to Contract Price or Contract Times.

D. Owner may order Contractor to increase plant, equipment, labor force or working hours if Contractor fails to:

1. Complete a Milestone activity by its completion date.
2. Satisfactorily execute Work as necessary to prevent delay to overall completion of Project, at no additional cost to Owner.

#### 1.06 NARRATIVE PROGRESS REPORT

A. Format:

1. Organize same as Progress Schedule.
2. Identify, on a cover letter, reporting period, date submitted, and name of author of report.

B. Contents:

1. Number of days worked over the period, work force on hand, construction equipment on hand (including utility vehicles such as pickup trucks, maintenance vehicles, stake trucks).
2. General progress of Work, including a listing of activities started and completed over the reporting period, mobilization/demobilization of subcontractors, and major milestones achieved.
3. Contractor's plan for management of Site (e.g., lay down and staging areas, construction traffic), utilization of construction equipment, buildup of trade labor, and identification of potential Contract changes.
4. Identification of new activities and sequences as a result of executed Contract changes.
5. Documentation of weather conditions over the reporting period, and any resulting impacts to the work.
6. Description of actual or potential delays, including related causes, and the steps taken or anticipated to mitigate their impact.
7. Changes to activity logic.
8. Changes to the critical path.
9. Identification of, and accompanying reason for, any activities added or deleted since the last report.
10. Steps taken to recover the schedule from Contractor-caused delays.

#### 1.07 SCHEDULE ACCEPTANCE

A. Engineer's acceptance will demonstrate agreement that:

1. Proposed schedule is accepted with respect to:
  - a. Contract Times, including Final Completion and all intermediate Milestones are within the specified times.
  - b. Specified Work sequences and constraints are shown as specified.

- c. Specified Owner-furnished Equipment or Material arrival dates, or range of dates, are included.
- d. Access restrictions are accurately reflected.
- e. Startup and testing times are as specified.
- f. Submittal review times are as specified.
- g. Startup testing duration is as specified and timing is acceptable.

2. In all other respects, Engineer's acceptance of Contractor's schedule indicates that, in Engineer's judgement, schedule represents reasonable plan for constructing Project in accordance with the Contract Documents. Engineer's review will not make any change in Contract requirements. Lack of comment on any aspect of schedule that is not in accordance with the Contract Documents will not thereby indicate acceptance of that change, unless Contractor has explicitly called the nonconformance to Engineer's attention in submittal. Schedule remains Contractor's responsibility and Contractor retains responsibility for performing all activities, for activity durations, and for activity sequences required to construct Project in accordance with the Contract Documents.

**B. Unacceptable Preliminary Progress Schedule:**

- 1. Make requested corrections; resubmit within 10 days.
- 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process, during which time Contractor shall update schedule on a monthly basis to reflect actual progress and occurrences to date.

**C. Unacceptable Detailed Progress Schedule:**

- 1. Make requested corrections; resubmit within 10 days.
- 2. Until acceptable to Engineer as Baseline Progress Schedule, continue review and revision process.

**D. Narrative Report:** All changes to activity duration and sequences, including addition or deletion of activities subsequent to Engineer's acceptance of Baseline Progress Schedule, shall be delineated in Narrative Report current with proposed Updated Progress Schedule.

**PART 2 PRODUCTS**

A. Not Applicable

**PART 3 EXECUTION**

A. Not Applicable

**END OF SECTION**

#

**SECTION 013226  
WEATHER DELAYS**

**PART 1        GENERAL**

1.01    REQUIREMENTS INCLUDED

- A.     Standards set for weather delays.
- B.     Procedures for claim submittals.

1.02    RELATED REQUIREMENTS

- A.     Document 00 72 13 – General Conditions, Article 12.

1.03    EXTENSION OF CONTRACT TIME

- A.     If the basis exists for an extension of time in accordance with Article 12 of the General Conditions, then an extension of time on the basis of weather may be granted only for the number of weather delay days in excess of the number of weather days listed as the Standard Baseline for that month.

1.04.1   STANDARD BASELINE FOR AVERAGE CLIMATIC RANGE

- A.     The Standard Baseline shall be regarded as the normal and anticipated number of calendar days for each month during which construction activity shall be expected to be prevented and suspended by cause of adverse weather. Suspension of construction activity for the number of days each month as listed in the Standard Baseline is to be included in the work and not eligible for an extension of the contract time.
- B.     The Standard Baseline is as follows:

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
12	11	13	11	11	10	10	9	8	8	10	11

1.05    ADVERSE WEATHER AND WEATHER DELAY DAYS

- A.     Adverse weather is defined as the occurrence of one or more of the following conditions which prevents only exterior construction activity or access to the site within a 24-hour period:
  - 1.     Precipitation (rain, snow, or ice) in excess of one-tenth inch (0.10”) liquid measure.
  - 2.     Temperatures which do not rise above 32 degrees F by 10:00 AM.
  - 3.     Standing snow in excess of one inch (1.00”).
- B.     Adverse weather may include, if appropriate, “dry-out” or “mud” days when all of the following conditions are met:
  - 1.     For rain above the Standard Baseline.

2. Only if there is a hindrance to site access or site work, such as excavation, backfill, and footings.
  3. At a rate no greater than 1 make-up day for each day or consecutive days of rain beyond the Standard Baseline that total 1.0 inch or more, liquid measure, unless specifically recommended otherwise by the Engineer.
- C. A weather delay day may be counted only if adverse weather prevents work on the project for 50 percent or more of the Contractor's scheduled work day, including a weekend day or holiday if the Contractor has scheduled construction activity that day.

**1.06 DOCUMENTATION AND SUBMITTALS**

- A. Maintain Daily Jobsite Work Log showing which and to what extent construction activities have been affected by weather on a monthly basis.
- B. Maintain a rain gauge, thermometer, and clock at the jobsite. Keep daily records of precipitation, temperature, and the time of each occurrence throughout the project.
- C. Use the Standard Baseline data provided in this section when documenting actual delays due to weather in excess of the average.
- D. Organize claim and documentation to facilitate evaluation on a basis of calendar month periods, and submit in accordance with the procedures for claims established in Article 12 of the General Conditions.
- E. If an extension of the contract time is appropriate, it shall be implemented in accordance with the provisions of Article 12 of the General Conditions.
- F. No extra cost will be incurred by the Owner for any extra time increase to the Contract.

**PART 2 PRODUCTS**

- A. Not Applicable

**PART 3 EXECUTION**

- A. Not Applicable

#

**SECTION 013300  
SUBMITTALS AND SUBSTITUTIONS**

**PART 1        GENERAL**

1.01    SUMMARY

A.      Work Included

1.      Wherever possible throughout the contract documents, the minimum acceptable quality of workmanship and materials has been defined by a manufacturer's name and catalogue number, reference to recognized industry and government standards, or description of required attributes and performance.
2.      To ensure that the specified products are furnished and installed in accordance with the design intent, procedures have been established for advance submittal of design data and for their review by the Engineer.
3.      Make all submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements.

B.      Related Work Described Elsewhere

1.      Individual requirements for submittals are described in other pertinent sections of these specifications.

1.02    SUBMITTALS

A.      Identification of Submittals

1.      General: Consecutively number all submittals.
2.      Internal Identification: On at least the first page of each copy of each submittal, clearly indicate the submittal number in which the item was included.
3.      Resubmittals: When material is resubmitted for any reason, transmit under a new letter of transmittal utilizing the original submittal number followed by an A, B, C, etc., depending on the number of resubmittals of the original submittal required.

B.      Shop Drawings and Coordination of Drawings

1.      Deliver or mail all submittals to:

Ardurra Group, Inc.  
2160 Lakeside Centre Way, Suite 201  
Knoxville, Tennessee 37922

Attention: Aaron Crenshaw, P.E.  
Email: [acrenshaw@ardurra.com](mailto:acrenshaw@ardurra.com)  
Telephone: (865) 251-5070

2. Before issuance of Certificate of Payment for Final Payment, deliver to the Design Engineer:
  - a. Waivers of Lien
  - b. Affidavit of payment of debts and claims
  - c. Consent of surety company to final payment
  - d. Written guarantees and warranties
  - e. Marked-up record set of drawings showing every alteration or change from the original drawings and specifications
  - f. All certificates of compliance, as a condition of acceptance of the work.
3. Make submittals in strict accordance with the provisions of this section.

#### 1.03 QUALITY ASSURANCE

##### A. Coordination of Submittals

1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted and verify that each item and the submittal for it conforms in all respects with the requirements of the bidding instruments.
2. Shop drawings and submittals shall bear the stamp of approval of the Contractor as evidence that this coordination has been performed.

#### 1.04 SUBMITTAL SCHEDULE

##### A. Timing Of Submittals

1. General:
  - a. Make all submittals far enough in advance of scheduled dates for installation to provide all time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.
  - b. Submit shop drawings in accordance with the approved schedule of shop drawing submittals.



2. Engineer's Review Time: In scheduling, allow at least 20 calendar days for review by the Engineer following his receipt of the submittal.
3. Delays: Delays caused by tardiness in receipt of submittals will not be an acceptable basis for extension of the contract completion date.

#### 1.05 SUBSTITUTIONS

##### A. Approval Required

1. The contract is based on the standards of quality established in the contract documents.
2. All products proposed for use, including those specified by required attributes and performance shall require approval by the Engineer before being incorporated into the work.
3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the Engineer.

##### B. "Or Equal"

1. Where the phrase "or equal", "or approved equal", or "approved substitute" occurs in the contract documents do not assume that materials, equipment, or methods will be approved as equal unless the item has been specifically approved for this work by the Engineer.
2. The decision of the Engineer shall be final.
3. See pertinent portions of the contract documents for additional information relating to substitutions.
4. Where equipment, materials, or methods do not specify "or equal", "or approved equal", or "approved substitute", substitutions may be submitted by the Contractor in accordance with this section.

#### **PART 2 PRODUCTS**

- A. Not Applicable

#### **PART 3 EXECUTION**

- A. Not Applicable

**END OF SECTION**

**SECTION 013513  
SPECIAL PROJECT PROCEDURES**

**PART 1           GENERAL**

1.01   ACCESS TO PROJECT

- A.     The project shall be accessible at all times to representatives of the Tennessee Department of Environment and Conservation; Tennessee Department of Transportation; TVA; Grainger County; and any other state, local, or federal regulatory agencies.

1.02   SMOKING AND FIRE PRECAUTIONS

- A.     No smoking, fire, or use of any fire- or explosion-producing tools or equipment will be permitted on the properties of oil companies or other concerns prohibiting same on their premises or at any locations where such may endanger said premises or the current operations thereon.

1.03   MANUFACTURERS' QUALIFICATIONS

- A.     The manufacturers of all materials and equipment used must be reputable and regularly engaged in the manufacture of the particular material or equipment for the use and service to which it will be subjected.

1.04   CONTRACTOR SHALL PAY FOR ALL LABORATORY INSPECTION SERVICE

- A.     All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by the Contractor and approved by the Owner. Pay for all laboratory inspection services as a part of the Contract. Submit all material test reports to the Owner in triplicate.

1.05   COMPLIANCE WITH STATE AND LOCAL LAWS

- A.     Comply with all applicable requirements of state and local laws and ordinances to the extent that such requirements do not conflict with federal laws or regulations.

1.06   PROTECTION OF PUBLIC AND PRIVATE PROPERTY

- A.     Take special care in working areas to protect public and private property. The Contractor shall replace or repair at his own expense any damaged water pipes, power and communication lines, or other public utilities, roads, curbs, gutters, sidewalks, drain pipes, sewer drainage ditches, and all plantings, including grass or sod on the site of the work. Leave the site in original or better condition after all cleanup work has been done.

1.07   MARKERS

- A.     Preserve all USGS, TVA, State of Tennessee, and private markers; do not remove or disturb any such markers without prior approval from the Owner. Any removal and replacement of such markers shall be at the expense of the Contractor.

#### 1.08 PAVEMENT REPAIR AND/OR REPLACEMENT

- A. The repair and/or replacement of all publicly or privately owned pavement shall be a part of this Contract and shall be repaired (pavements, driveways, walks, parking areas, shoulders, crushed stone or gravel streets and roads, etc.).
- B. Whenever pipe trenches are cut across or along existing pavement or shoulders, backfill same and restore traffic over the cuts as quickly as possible by constructing a temporary six-inch (6") surface of crushed stone. Add material and otherwise maintain such surface until the permanent pavement is restored or until the entire project is accepted.

#### 1.09 APPROVED CHEMICALS

- A. All chemicals used during project construction or furnished for project operation, whether herbicide, pesticide, disinfectant, polymer, reactant, or of other classification, must show approval of either EPA or USDA. The use of all such chemicals and the disposal of residues shall be in strict conformance with instructions.

#### 1.10 DRAWINGS OF RECORD

- A. The Contractor shall provide and keep up-to-date a complete record set of record drawing prints, which shall be corrected daily to show every change, and the approved shop drawings. Keep this set of prints at the job site and use only as a record set. This shall not be construed as authorization for the Contractor to make changes in the approved layout without definite instructions in each case. The Contractor shall turn the set over to the Owner upon completion of the project.
- B. The drawings of record shall indicate the Contractor's name, address, phone number, the project manager's name, and the dates of the project.
- C. The final pay application will not be processed until sufficient drawings of record are provided by the Contractor.

#### 1.11 PRESERVATION OF EXISTING VEGETATION

- A. The Contractor shall take reasonable care during construction to avoid damage to vegetation. Where the area to be excavated is occupied by trees, brush, or other uncultivated vegetable growth, clear such growth from the area, and dispose of it in a satisfactory manner. Leave undisturbed any trees, cultivated shrubs, flowers, etc., situated within public rights-of-way and/or easements through private property but not located directly within excavation limits.
- B. The Contractor shall transplant small ornamental trees, cultivated shrubs, flowers, etc., located directly within excavation limits so they may be replaced during property restoration operations. Do not remove or disturb any tree larger than 6 inches in diameter without the permission of the Engineer. Take special precautions (including the provision of barricades and the temporary tying back of shrubbery and tree branches) for the protection and preservation of such objects throughout all stages of construction; the Contractor will be held liable for any damage that may result to said objects from excavation or

construction operations. Trim any limbs or branches of trees broken during construction operations with a clean cut, and paint with an approved tree pruning compound. Treat tree trunks receiving damage from equipment with a tree dressing.

- C. Temporary soil deposits, concrete block or wash, solvents, or any supplies or materials shall not be placed within the drip line of trees. All such materials shall be removed from the area as soon as possible.

#### 1.12 UTILITIES

- A. The Contractor is to contact the Owner of all underground utilities before beginning construction in the area. Carefully protect from damage all utilities in the vicinity of the work at all times. If it is necessary to repair, remove, and/or replace any such utility in order to complete the work properly, do so in compliance with the rules and regulations of the particular utility involved. Any such work shall be considered incidental to the construction or repairs of utility lines, and no additional payment will be allowed.

#### 1.13 PRECONSTRUCTION SURVEY

- A. The Contractor shall video tape existing site prior to construction. Document existing damage to structures and slopes located along on project site. Preconstruction survey shall be considered incidental to the project, and no additional payment will be allowed.

#### 1.14 PROTECTION OF LIVES AND HEALTH

- A. In accordance with generally accepted construction practices, the Contractor will be solely and completely responsible for conditions at the job site, including the safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours.
- B. The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). The duty of the Design Engineer to conduct construction review of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site, nor to relieve the Contractor of his obligation to conduct comprehensive inspection of the work sufficient to ensure conformance with the intent of the contract documents.
- C. During construction, the Contractor shall construct, and at all times maintain, satisfactory and substantial temporary fencing, safety fencing, chain link fencing, solid fencing railing, barricades and/or steel plates as applicable, at all excavations, obstructions, or other hazards in streets, sidewalks and walkways. All such barriers shall have adequate painted or flagged markings and warning lights as necessary or required for safety.

#### 1.15 WASTEWATER BYPASSING

- A. Pump-Around-Pumping of wastewater flows within the existing sanitary sewer shown is the Contractor's responsibility. Provide pumps, discharge pipe work, protective pipe bridging measures, safety measures, etc., to convey wastewater around a sanitary sewer segment.

The Contractor shall provide spare equipment, fuel, manpower, safety measures, etc., as necessary to insure the project has 24-hour protection against failure of bypass pump measures. Any discharge, and corresponding penalties, to surface water conveyances, backup of wastewater into customer facilities, or damages to customer operations are the Contractor's responsibility.

- B. The discharge of wastewater into the waters of the State, ditches, natural ponds, roads, or the ground is strictly prohibited. The Owner will issue a Stop Work Order if wastewater discharges to the ground and no Work will be performed until the activity ceases and the Engineer is confident the Contractor will not discharge wastewater to the ground. All costs to the Contractor due to a Stop Work Order for this activity will be incurred by the Contractor.

1.16 CONTRACT WORKING HOURS

- C. All work at the site shall be performed during regular working hours (7:00 a.m. to 5:00 p.m.) and the Contractor, including all their subcontractors, will not be permitted to work overtime on Saturday, Sunday or any legal holiday without the Owner's written consent given after prior notice to the Engineer.

1.17 FINAL GUARANTY/WARRANTY

- A. All work shall be and is guaranteed by the Contractor for a period of one (1) year from the date of final acceptance of all Work by the Owner. Within the warranty periods, the Contractor shall promptly, upon receipt of notice from the Owner, make repair or changes to materials, equipment, or workmanship that is inferior, defected, or not in accordance with the terms of the Contract. If the Contractor, after notice, fails within 10 days to proceed to comply with the terms of the warranty, the Owner may have the defects corrected and the Contractor and his surety shall be liable for all expenses incurred.

**PART 2 PRODUCTS**

- A. Not Applicable

**PART 3 EXECUTION**

- A. Not Applicable

**END OF SECTION**

**SECTION 014000**  
**QUALITY REQUIREMENTS**

**PART 1        GENERAL**

1.01    REQUIREMENTS INCLUDED

- A.    General Quality Control.
  - 1.    Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality.
  
- B.    Workmanship.
  - 1.    Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
  - 2.    Perform work by persons qualified to produce workmanship of specified quality.
  - 3.    Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.
  
- B.    Manufacturers' Instructions.
  - 1.    Comply with instructions in full detail, including each step in sequence. Should instructions conflict with contract documents, request clarification from Engineer before proceeding.
  
- C.    Manufacturers' Certificates.
  - 1.    When required by individual specifications section, submit manufacturers' certificate, in duplicate, that products meet or exceed specified requirements.
  
- D.    Manufacturers' Field Services.
  - 1.    When specified in respective specification sections, require supplier or manufacturer to provide qualified personnel to observe field conditions; conditions of surfaces and installation; quality of workmanship; start-up of equipment; test, adjust, and balance of equipment; and as applicable, to make appropriate recommendations.
  - 2.    A representative shall submit a written report to Owner listing observations and recommendations.

E. Testing Laboratory Services.

1. Owner shall employ and pay for services of an Independent Testing Laboratory to perform inspections, tests, and other services required by individual specification sections.
2. Services will be performed in accordance with requirements of governing authorities and with specified standards.
3. Reports will be submitted to Owner in duplicate giving observations and results of tests, indicating compliance or non-compliance with specified standards and with contract documents.
4. Contractor shall cooperate with testing laboratory personnel, furnish tools, samples of materials, design mix, equipment, storage, and assistance as requested.
  - a. Notify Owner and testing laboratory 24 hours prior to expected time for operations requiring testing services.
  - b. Make arrangements with testing laboratory and pay for additional samples and tests for Contractors' convenience.

**PART 2 PRODUCTS**

A. Not Applicable

**PART 3 EXECUTION**

A. Not Applicable

**END OF SECTION**

**SECTION 014219**  
**REFERENCE STANDARDS**

**PART 1            GENERAL**

1.01 Meet the requirements and recommendations of all Standards, Institutes, Associations, etc., referred to throughout these documents and specifications as if they were fully reproduced herein. Unless otherwise noted, the latest editions shall apply.

1.02 ABBREVIATIONS

AAMA	Architectural Aluminum Manufacturers' Association
AASHTO	American Association of State Highway and Transportation Officials
ABMA	American Boiler Manufacturers' Association
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturers' Association
AGA	American Gas Association
AGC	Association of General Contractors
AGMA	American Gear Manufacturers' Association
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
APA	American Plywood Association
API	American Petroleum Institute
ARI	Air Conditioning and Refrigeration Institute
ASA	American Standards Association
ASAE	American Society of Automotive Engineers
ASC	Association of Specialty Contractors
ASCII	American Standard Code for Information Interchange
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPB	American Wood Preservers Bureau
AWPI	American Wood Preservers Institute
AWS	American Welding Society
AWWA	American Water Works Association
BIA	Brick Institute of America
CMAA	Crane Manufacturer's Association of America
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards
CSI	Construction Specifications Institute
EPA	Environmental Protection Agency

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FAA	Federal Aviation Administration
FGMA	Flat Glass Marketing Association
FM	Associated Factory Mutual Laboratories
FS	Federal Specifications
IEEE	Institute of Electrical and Electronic Engineers
IRI	Industrial Risk Insurors
ISA	Instrument Society of America
JIC	Joint Industrial Council
MBMA	Metal Building Manufacturers' Association
MMA	Monorail Manufacturers' Association
NAAMM	National Association of Architectural Metal Manufacturers
NBS	National Bureau of Standards
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association or National Forest Products Association
NKCA	National Kitchen Cabinet Association
NPT	National Pipe Thread
NRCA	National Roofing Contractors' Association
NSF	National Sanitation Foundation
NSWMA	National Solid Waste Manufacturers' Association
NWMA	National Woodwork Manufacturing Association
OSHA	Occupational Safety and Health Administration
PPI	Plastics Pipe Institute
RIS	Redwood Inspection Service
SAE	Society of Automotive Engineers
SBCC	Standard Building Code Congress
SDI	Steel Deck Institute
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPII	Southern Pine Inspection Institute
SSBC	Southern Standard Building Code
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
TDOT	Tennessee Department of Transportation
TIMA	Thermal Insulation Manufacturers' Association
UL	Underwriters' Laboratories
USG	United States Gypsum
WCLIB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association

**PART 2**            **PRODUCTS**  
A.                    Not Applicable

**PART 3**            **EXECUTION**  
A.                    Not Applicable

**END OF SECTION**

**SECTION 015200  
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

**PART 1        GENERAL**

1.01    REQUIREMENTS INCLUDED

- A.     Sanitary Facilities
- B.     Electricity, Lighting
- C.     Water
- D.     Barriers
- E.     Security
- F.     Temporary Controls
- G.     Protection of Installed Work
- H.     Water Control
- I.     Cleaning During Construction
- J.     Field Offices and Sheds
- K.     Removal of Construction Facilities and Temporary Controls

1.02    RELATED REQUIREMENTS

- A.     Section 01 11 00 - Summary of Work: Abandoned materials, storage, and Contractor's use of premises.
- B.     Section 01 74 00 - Cleaning.
- C.     Owner's facilities can not be used by any of the contractor's or subcontractor's employees.

1.03    SANITARY FACILITIES

- A.     Provide and maintain required temporary facilities and enclosures for job personnel that:
  - 1.     Are weather tight, clean, and sanitary.
  - 2.     Are provided with either natural light and ventilation or artificial light and mechanical ventilation.
  - 3.     Are provided with toilet tissue in a suitable holder.
  - 4.     Comply with applicable legal and health requirements.

- B. Remove temporary toilet facilities when work is complete.

#### 1.04 ELECTRICITY, LIGHTING

- A. Connect to existing service, provide branch wiring and distribution boxes located to allow service and lighting by means of construction-type power cords.
  - 1. Make arrangements for, pay deposits on, and install the poles, wiring, switches, outlets, and other electrical equipment necessary.
  - 2. Pay for current used during construction period.
- B. Provide lighting for construction operations.
- C. Existing and permanent lighting may be used during construction. Maintain lighting and make routine repairs. Replace all lamps of all light fixtures used during construction at final inspection and give used lamps to the Owner for stock.
- D. Remove temporary electrical equipment when construction is completed.

#### 1.05 WATER

- A. Provide service required for construction operations. Extend branch piping with outlets located so that water is available by use of hoses. Connect to existing facilities; extend branch piping with outlets located so that water is available by use of hoses.
  - 1. Make arrangements for, pay deposits on, and install the piping and equipment necessary.
- B. Remove temporary water facilities when construction is completed. Water will be paid for by the Owner, for standard, reasonable, project-related use only.

#### 1.06 BARRIERS

- A. Provide as required to prevent public entry to construction areas, to provide for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.
- C. Provide barriers adjacent to areas of excavation to protect against vehicular traffic.

#### 1.07 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with Owner's security program.

#### 1.08 TEMPORARY CONTROLS

- A. Coordinate, schedule, and perform work to cause the least practical interference with the public, fire protection service, public utility service, and Owner's operations. Coordinate all connections, cut-ins, alterations, or other interruption with designated representative of the Owner or utility service. Notify the representative 48 hours in advance and cooperate with him in minimizing the interruptions.
- B. Comply with the local requirements of EPA, the health department, or other regulatory requirement for construction operations relating to noise, pest, rodent, dust, and pollution controls.

#### 1.09 PROTECTION OF INSTALLED WORK

- A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- B. Prohibit traffic and storage on lawn and landscaped areas.

#### 1.10 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide and operate pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

#### 1.11 CLEANING DURING CONSTRUCTION

- A. Construction cleaning shall be as specified in Section 01 74 00.

#### 1.12 FIELD OFFICES AND SHEDS

- A. Offices: The Contractor shall provide offices for himself and the Engineer, which shall:
  - 1. Be located in an area approved by the Engineer.
  - 2. Consist of weather-tight buildings or trailers of adequate size.
  - 3. Engineer's space shall be 10 feet x 10 feet (minimum) and shall contain a desk or table, drawing rack, file, chair, and telephone.
  - 4. Be provided with lights, heat, cooling, and ventilation.
  - 5. Be provided with a means of being locked and provide keys to the Engineer for their office.

6. Be maintained in a clean, neat and orderly manner, as determined by the Engineer.

B. Storage Sheds for Tools, Materials, and Equipment: Weather-tight, with heat and ventilation for Products requiring controlled conditions, with adequate space for organized storage and access, and lighting for inspection of stored materials.

1.13 REMOVAL OF CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of 2 feet; grade site as indicated. Restore existing facilities used during construction to specified, or to original, condition.

1.14 PAYMENT

A. No separate payment will be made for the materials, work, equipment, labor, etc., required herein for Construction Facilities and Temporary Controls. Include the costs thereof in the lump sum price on the Bid Form.

**PART 2 PRODUCTS**

A. Not Applicable

**PART 3 EXECUTION**

A. Not Applicable

**END OF SECTION**

**SECTION 015713**  
**TEMPORARY EROSION AND SEDIMENT CONTROL**

**PART 1 GENERAL**

1.01 SUMMARY

- A. This work shall consist of erosion control on all cut and fill operations, excavation, backfill, or other construction activities within the limits of the construction site, within any temporary or permanent easements, and within any borrow site used during the period of construction. The protection of these sites shall continue throughout the construction period regardless of weather conditions.
- B. While formally identified as erosion control activities, this work encompasses that necessary to ensure that construction activities do not temporarily or permanently harm the waters of the State of Tennessee, nor properties of the Owner, nor adjoining owners.
- C. These activities, over which neither the Owner nor the Engineer has control during the bidding process, are related to the means and methods the Contractor uses to pursue the work and as such cannot be predicted in advance. For this reason, the Contractor must be solely responsible for conforming to related local, State, and Federal requirements.

**PART 2 PRODUCTS**

2.01 MATERIALS

- A. Materials, installation, and maintenance of erosion and pollution control structures shall be in accordance with the Drawings and the "Tennessee Erosion and Sediment Control Handbook" (Tennessee Department of Environment and Conservation, latest edition).

**PART 3 EXECUTION**

3.01 GENERAL

- A. The temporary erosion and pollution control provisions shown on the drawings are considered the minimum necessary, with the final design, implementation, and maintenance being the responsibility of the Contractor.
- B. Install temporary sediment traps where appropriate. Construct and maintain in accordance with the requirements of Tennessee Erosion and Sediment Control Handbook. Muddy water collected in sediment traps shall be held until it is at least as clear as the upstream water before it is discharged to surface waters. Discharge

through a pipe or lined channel so that the discharge does not cause erosion and sedimentation.

- C. Install temporary diversion berms or diversion channels as necessary to divert storm water from running onto the disturbed areas and to divert runoff from disturbed areas to the temporary sediment traps.
- D. Apply temporary seeding whenever grading operations are temporarily halted for over 14 days and final grading of exposed surfaces is to be completed within one year. Apply temporary seeding to soil stockpiles.

**END OF SECTION**

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**SECTION 016000  
MATERIAL AND EQUIPMENT**

**PART 1        GENERAL**

1.01    REQUIREMENTS INCLUDED

- A.     Products.
- B.     Transportation and Handling.
- C.     Storage and Protection.
- D.     Product Options.
- E.     Products List.
- F.     Substitutions.
- G.     Systems Demonstration.

1.02    QUALITY ASSURANCE

- A.     Approval Required
  - 1.     The contract is based on the standards of quality established in the contract documents.
  - 2.     All products proposed for use, including those specified by required attributes and performance, shall require approval by the Owner before being incorporated into the work.
  - 3.     Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the Owner.

1.03    PRODUCTS

- A.     Products include material, equipment, and systems.
- B.     Comply with specifications and referenced standards as minimum requirements.
- C.     Components required to be supplied in quantity within a specification section shall be the same, and shall be interchangeable.

1.04    TRANSPORTATION AND HANDLING

- A.     Transport products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.



- B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.
- C. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

#### 1.05 STORAGE AND PROTECTION

- A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions. Store mechanical and electrical equipment in a controlled environment as recommended by the manufacturer.
- B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
- C. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.
- D. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged and are maintained under required conditions.

#### 1.06 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not specifically named.

#### 1.07 PRODUCTS LIST

- A. Under provisions of Section 01 33 00-Submittals and Substitutions, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

## 1.08 SUBSTITUTIONS

- A. During bidding period, the Owner will govern times for submitting requests for substitutions under requirements specified in this section.
- B. Concurrent with submission of product list, the Owner will consider requests from Contractor for substitutions. Subsequently, substitutions will be considered only when a product becomes unavailable due to no fault of Contractor. Confirmation of unavailable products must be in writing and certified by the manufacturer that the product is no longer available.
- C. Submit separate request for each substitution. Document each request with complete data substantiating compliance of proposed substitution with contract documents.
- D. Request for substitution constitutes a representation that Contractor:
  - 1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
  - 2. Will provide the same warranty for substitution as for specified product.
  - 3. Will coordinate installation and make other changes which may be required for work to be complete in all respects.
  - 4. Waives claims for additional costs which may subsequently become apparent.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals. Separate written request must be submitted for any proposed substitutions or deviation from the contract documents.
- F. Owner will determine acceptability of proposed substitution, and the Engineer will notify Contractor of acceptance or rejection in writing within a reasonable time.
- G. Substitute products shall not be ordered or installed without written acceptance.
- H. Only one request for substitution will be considered for each product. When substitution is not accepted, provide specified product.
- I. Engineer will determine acceptability of substitutions.

## 1.09 SUBMITTAL PROCEDURES

- A. Engineer will review Contractor's requests for substitutions with reasonable promptness.
- B. During the bidding period, Engineer will record acceptable substitutions in Addenda.
- C. Upon proper submission, Engineer will notify Contractor, in writing, of decision to accept or reject requested substitution within 15 days.

- D. For accepted products, submit shop drawings, product data, and samples under provisions of Section 01 33 00 - Submittals and Substitutions.

1.10 SYSTEMS DEMONSTRATION

- A. Prior to final inspection, demonstrate operation of each system to the Owner.
- B. Instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

**PART 2 PRODUCTS**

- A. Not Applicable

**PART 3 EXECUTION**

- A. Not Applicable

**END OF SECTION**

**SECTION 017123  
FIELD ENGINEERING**

**PART 1        GENERAL**

1.01    REQUIREMENTS INCLUDED

- A.      Contractor shall provide field engineering services and establish grades, lines, and levels, by use of recognized survey practices.
- B.      Control datum for survey is established by Owner-provided survey.

**PART 2        PRODUCTS**

- A.      Not Applicable

**PART 3        EXECUTION**

3.01    INSPECTION

- A.      Verify locations of survey control points prior to starting work. Promptly notify Owner of any discrepancies discovered.

3.02    SURVEY REFERENCE POINTS

- A.      Protect survey control points prior to starting site work; preserve permanent reference points during construction. Make no changes without prior written notice to Owner.
- B.      Promptly report to Owner the loss or destruction of any reference point or relocation required because of changes in grades or other reasons. Replace dislocated survey control points based on original survey control.
- C.      The Contractor shall preserve all USGS, TVA, State of Tennessee, and private markers; do not remove or disturb any such markers without prior approval from the Owner. Any removal and replacement of such markers shall be at the expense of the Contractor. The re-establishment of these markers shall be performed by a surveyor licensed by the State of Tennessee, with a letter indicating the completion of work.

3.03    STAKING

- A.      The Contractor shall be responsible for staking the project and preparing cut sheets as needed.

3.04    TESTING

- B.      Testing services required during construction will be provided by Owner.

**END OF SECTION**

**SECTION 017400  
CLEANING**

**PART 1        GENERAL**

1.01    DESCRIPTION

- A.    Work Included: Throughout the construction period, maintain the site in a standard of cleanliness as described in this section.
  - 1.    Site generated garbage will be cleaned and removed daily.
- B.    Related Work Described Elsewhere: In addition to standards described in this section, comply with all requirements for cleaning up as described in other sections of these specifications.

1.02    QUALITY ASSURANCE

- A.    Inspection: Conduct inspection daily, and more often if necessary, to verify that requirements for cleanliness are being met.
- B.    Codes and Standards: In addition to the standards described in this section, comply with all pertinent requirements of government agencies having jurisdiction.

**PART 2        PRODUCTS**

2.01    CLEANING MATERIALS AND EQUIPMENT

- A.    Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

**PART 3        EXECUTION**

3.01    PROGRESS CLEANING

- A.    General:
  - 1.    Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
  - 2.    Do not allow the accumulation of scrap, debris, waste material, and other items not required for the construction of this work.
  - 3.    At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
  - 4.    Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology.
- B.    Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service all arrangements to meet the requirements of paragraph 3.01.A.1, above.
3. Maintain the site in a neat and orderly condition at all times.

### 3.02 FINAL CLEANING

- A. Definition: Except as otherwise specifically provided, "clean" (for the purpose of all paragraphs under paragraph 3.02) shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. General: Prior to the completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described under paragraph 3.01, above.
- C. Site: Unless otherwise specifically directed by the Owner, broom clean all paved areas on the site and all public paved areas directly adjacent to the site. Completely remove all resultant debris.
- D. Timing: Schedule final cleaning as approved by the Owner to accept a completely clean project.

**END OF SECTION**

**SECTION 017700  
CONTRACT CLOSEOUT**

**PART 1        GENERAL**

1.01    REQUIREMENTS INCLUDED

- A.     Closeout Procedures
- B.     Final Cleaning
- C.     Project Record Documents
- D.     Operation and Maintenance Data
- E.     Warranties and Bonds
- F.     Spare Parts and Maintenance Materials

1.02    RELATED REQUIREMENTS

- A.     Document 00 72 13 - General Conditions: Fiscal provisions, legal submittals, and other administrative requirements.

1.03    CLOSEOUT PROCEDURES

- A.     Comply with procedures stated in General Conditions of the contract and procedures specified in this section for issuance of Certificate of Final Completion.
- B.     Owner will occupy designated portion of Project for the purpose of installation of Owner furnished equipment, or conduct of business, under provision stated in Certificate of Substantial Completion.
- C.     When Contractor considers work has reached final completion, submit written certification that contract documents have been reviewed, work has been inspected, and that work is complete in accordance with contract documents and ready for Engineer observation.
- D.     In addition to submittals required by the conditions of the contract, provide submittals required by governing authorities and submit a final statement of accounting, giving total adjusted Contract Sum, previous payments, and sum remaining due.
- E.     Owner will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.04    FINAL COMPLETION

- A. The final inspection at the job site will be done by the Engineer once the following items are received from the General Contractor:
  - 1. A letter stating that a qualified person authorized by the General Contractor has fully reviewed the Contract Documents and inspected the work and that they both agree.
  - 2. A letter stating that the work is complete and in accordance with the Contract Documents and ready for final inspection.
  - 3. Work has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial Completion have been corrected.
  - 4. Equipment and systems have been tested, adjusted, and balanced and are fully operational.
  - 5. Operation of systems has been demonstrated to Owner's personnel.
  - 6. A letter stating that the Project Record Documents are complete and be provided to the Owner before final inspection.
  - 7. Work is complete and ready for final inspection.
- B. Should Engineer inspection find work incomplete, he will promptly notify Contractor in writing listing observed deficiencies.
- C. Contractor shall remedy deficiencies and send a second certification of final completion.
- D. When Engineer finds work is complete, he will consider closeout submittals.

#### 1.05 CLOSEOUT SUBMITTALS

- A. Before issuance of Certificate of Payment for Final Payment, deliver to the Owner the following:
  - 1. Project Record Documents:
    - a. Store documents separate from those used for construction.
    - b. Keep documents current. Do not permanently conceal any work until required information has been recorded.
    - c. At contract closeout, submit documents with transmittal letter containing date, project title, Contractor's name and address, list of documents, and signature of Contractor.
  - 2. Closeout Documents - Volume One
    - a. Submit two sets bound in 8-1/2- by 11-inch locking three-ring side binder with durable plastic covers, minimum 1/2 inch larger than thickness of contents, of the following:
      - 1) Directory listing names, addresses, and telephone numbers of the Owner and Contractor.
      - 2) Directory listing names, addresses, and telephone numbers of subcontractors and suppliers.
      - 3) Contractor's letter that is notarized providing 1-year warranty.



- 4) Letter certifying that all materials used comply with the specifications.
- 5) Evidence of Payment and Release of Liens and Waivers of Lien in accordance with conditions of the Contract.
- 6) Consent of Surety to Final Payment.

3. Make submittals in strict accordance with the provisions of this section.

#### 1.06 STATEMENT OF ADJUSTMENT OF ACCOUNTS

A. Submit final statement reflecting adjustments to Contract Sum indicating:

1. Original Contract Sum
2. Previous Change Orders
3. Changes Under Unit Prices
4. Deductions for Uncorrected Work
5. Deductions for Liquidated Damages
6. Other Adjustments to Contract Sum
7. Total Contract Sum as Adjusted
8. Previous Payments
9. Sum Remaining Due

B. Engineer will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by change orders.

#### 1.07 APPLICATION FOR FINAL PAYMENT

A. Submit application for final payment in accordance with provisions of Conditions of the contract.

#### **PART 2 PRODUCTS**

A. Not Applicable

#### **PART 3 EXECUTION**

A. Not Applicable

**END OF SECTION**

**SECTION 017839  
PROJECT RECORD DOCUMENTS**

**PART 1        GENERAL**

1.01    REQUIREMENTS INCLUDED

- A.     Maintenance of Record Documents and Samples.
- B.     Submittal of Record Documents and Samples.

1.02    RELATED REQUIREMENTS

- A.     Document 00 72 13 - General Conditions: Documents at the site.
- B.     Section 01 33 00 - Submittals and Substitutions: Shop drawings, product data, and samples.
- C.     Individual Specifications Sections: Manufacturer's certificates and certificates of inspection.

1.03    MAINTENANCE OF DOCUMENTS AND SAMPLES

- A.     In addition to requirements in General Conditions, maintain at the site for Owner one record copy of:
  - 1.     Contract Drawings.
  - 2.     Specifications.
  - 3.     Addenda.
  - 4.     Change Orders and other modifications to the Contract.
  - 5.     Reviewed shop drawings, product data, and samples.
  - 6.     Field test records.
  - 7.     Inspection certificates.
  - 8.     Manufacturer's certificates.
- B.     Maintain Record Documents in a clean, dry, and legible condition. Do not use Record Documents for construction purposes.
- C.     Keep Record Documents and samples available for inspection by Owner.

1.04    RECORDING

- A.     Record information concurrently with construction progress. Do not conceal any work until required information is recorded by Contractor and verified by Engineer.
- B.     Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction, including:
  - 1.     Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.

2. Field changes of dimension and detail.
3. Changes made by modifications.
4. Details not on original contract drawings.
5. References to related shop drawings and modifications.

C. Specifications: Legibly mark each item to record actual construction, including:

1. Manufacturer, trade name, and catalog number of each product actually installed, particularly optional items and substitute items.
2. Changes made by addenda and modifications.

#### 1.05 SUBMITTALS

A. At Contract closeout, deliver Record Documents and samples to Engineer.

B. Transmit with cover letter in duplicate, listing:

1. Date.
2. Project title and number.
3. Contractor's name, address, and telephone number.
4. Number and title of each Record Document.
5. Signature of Contractor or authorized representative.

#### **PART 2 PRODUCTS**

A. Not Applicable

#### **PART 3 EXECUTION**

A. Not Applicable

**END OF SECTION**

**SECTION 311100  
CLEARING AND GRUBBING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This work consists of clearing, grubbing, removing, and disposing of all debris and of all vegetation that are within the designated construction areas, except for such objects that the Owner designates to remain. The work shall also include preserving and protecting from injury or defacement all vegetation and objects designated to remain.

**PART 2 PRODUCTS**

- A. Not Applicable.

**PART 3 EXECUTION**

**3.01 GENERAL**

- A. Clear the entire construction area of all weeds, brush, briars, bushes, trees, stumps, and other protruding obstructions not designated to remain.
- B. Perform all clearing and grubbing operations in accordance with the applicable provisions for erosion control as shown on the drawings. The Contractor is responsible for locating disposal sites and for obtaining all related permits from site property owner and any agency having jurisdiction.
- C. The Contractor is solely responsible for the removal, hauling, and disposal of waste material. Completely dispose of all materials resulting from clearing and grubbing off the site, all at the Contractor's expense. The Owner shall not be liable for the improper disposal of waste material.
- D. Secure in writing any approval from a property Owner desiring disposal of debris on their private property.

End of Section

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**SECTION 02221  
UNCLASSIFIED EXCAVATION FOR UTILITIES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. All excavation for this project is considered UNCLASSIFIED.
- B. The work called for by this section shall consist of clearing and grubbing, loosening, loading, removing, and disposing of, in the specified manner, all wet and dry materials (including rock) encountered that must be removed for construction purposes; furnishing, placing, and maintaining all sheeting, shoring, bracing, and timbering necessary for the proper protection and safety of the work, the workmen, the public, and adjacent property and improvements; the dewatering of trenches and other excavations; the preparation of satisfactory pipe beds; the backfilling and tamping of trenches, foundations, and other structures; the preparation of fills and embankments; the removal of unsuitable material from outside the normal limits of excavation and, where ordered by the Owner, their replacement with suitable materials; and all other grading or excavation work incidental to or necessary for the work. This work shall be performed as specified below.

**1.02 RELATED SECTIONS**

- A. Section 02110 – Clearing and Grubbing
- B. Section 02611 – Trenching, Backfilling, and Compacting
- C. Section 02930 - Seeding

**PART 2 PRODUCTS**

- A. Not Applicable

**PART 3 EXECUTION**

**3.01 PREPARATION OF THE SITE**

- A. Before starting construction, remove from the work site all vegetable growth (except as hereinafter excluded), debris, and/or other objectionable matter as well as any buildings and/or other structures that the drawings and/or the Owner specifically indicate are to be removed. Dispose of this refuse material in a manner acceptable to the Owner.
- B. In certain areas it may be desirable for existing trees, shrubs, or other vegetation on the site to be preserved for the permanent landscape. Such vegetation may be shown on the drawings, specifically listed in the specifications, marked on the site, or identified by the Owner. In no case damage or remove such growth without written permission from the Owner.
- C. If the area to be excavated is occupied by trees, brush, or other vegetable growth, clear such growth and grub the excavated area, and remove all large roots to a depth of not less than 2 feet below the

bottom of the proposed construction. Dispose of the growth removed in a manner satisfactory to the Owner. Fill all holes or cavities created during this work that extend below the subgrade elevation with suitable material and compact to the same density as the surrounding material.

- D. Trees, cultivated shrubs, etc., that are situated within public rights-of-way and/or construction easements through private property but not directly within the excavation area shall remain undisturbed unless it is necessary to remove them so that the work can be performed safely and unless their removal is specifically ordered by the Owner. Take special precautions to protect and preserve such growth throughout all stages of the construction.
- E. Preparation of the site shall be considered an integral part of the excavation and one for which no separate payment shall be allowed.

### **3.02 UNSUITABLE MATERIALS**

- A. Wherever muck, quicksand, soft clay, swampy ground, or other material unsuitable for foundations, subgrade, pipe laying, or backfilling is encountered, remove it and continue excavation until suitable material is encountered. The material removed shall be disposed of in the manner described below. Then refill the areas excavated for this reason with 1- to 2-inch sized crushed stone up to the level of the lines, grades, and/or cross sections shown on the drawings. The top 6 inches of this refill shall be Class A, Grade D aggregate crushed stone for bedding.

### **3.03 ROCKS AND BOULDERS**

- A. Should rock be encountered in the excavation, remove it by blasting or otherwise. Where blasts are made, cover the excavation with enough excavation material and/or timber or steel matting to prevent danger to life and property. The Contractor shall secure, at his own expense, all permits required by law for blasting operations and the additional hazard insurance required. Observe all applicable laws and ordinances pertaining to blasting operations.
- B. Excavate rock over the horizontal limits of excavation and to a depth of not less than 6 inches below the outside bottom of pipe up to 30 inches in diameter and not less than 12 inches below the outside bottom of larger pipes if rock extends to such depth. Then backfill the space below grade with Class A, Grade D aggregate or other approved material, tamp to the proper grade, and make ready for construction. For monolithic concrete sewers or culverts and for structures, excavate rock to the outside bottom of the structure or sewer.

### **3.04 DISPOSAL OF MATERIALS**

- A. Whenever practicable, all materials removed by excavation that are suitable for backfilling pipe trenches or for other purposes shown on the drawings or directed by the Owner shall be used for these purposes. Any materials not so used shall be considered waste materials and disposed of at the Contractor's expense.
- B. Waste materials may be deposited in spoil areas at locations approved by the Owner. Do not leave in unsightly piles but instead spread in uniform layers, neatly level, and shape to drain. Seed as specified in Section 02930 - Seeding.

- C. Once any part of the work is completed, properly dispose of all surplus or unused materials (including waste materials) left within the construction limits of that work. Leave the surface of the work in a neat, workmanlike condition, as described below.
- D. The disposal of waste materials shall be considered an integral part of the excavation work and one for which no separate payment shall be allowed.

### **3.05 EXCAVATION FOR TRENCHES, MANHOLES, AND STRUCTURES**

- A. Unclassified excavation for pipelines shall consist of the excavation necessary for the construction of water, sewer, and other pipes and their appurtenances (including manholes, inlets, outlets, headwalls, collars, concrete saddles, and pipe protection) that are called for by the drawings. It shall include clearing and grubbing where necessary, backfilling and tamping pipe trenches and around structures, and disposing of waste materials; all of which shall conform to the applicable provisions set forth elsewhere in these specifications.
- B. The Contractor may, if he chooses, use a motor-powered trenching machine. If he does; however, he shall be fully responsible for the preservation or repair of existing utilities.
- C. Unless the construction of lines by tunneling, jacking, or boring is called for by the drawings or specifically authorized by the Owner, make excavation for pipelines in open cut and true to the lines and grades shown on the drawings or established by the Owner on the ground. Cut the banks of trenches between vertical parallel planes equidistant from the pipe centerline. The horizontal distance between the vertical planes (or, if sheeting is used, between the inside faces of that sheeting) shall vary with the size of the pipe to be installed, but shall not be more than the distance specified in Section 02611 Part 3.02 E. 2. When approved in writing by the Owner, the banks of trenches from the ground surface down to a depth not closer than 1 foot above the top of the pipe may be excavated to nonvertical and nonparallel planes, provided the excavation below that depth is made with vertical and parallel sides equidistant from the pipe centerline in accordance with the width requirements outlined above. Any cut made in excess of the maximum width shall be at the expense of the Contractor and may be cause for the Owner to require that stronger pipe and/or a higher class of bedding be used at no cost to the Owner.
- D. For rigid pipe, shape the bottom of all trenches to provide uniform bearing for the bottom of the pipe barrel. Pipe bedding shall be thoroughly and completely tamped before backfilling. Bedding for DIP used shall consist of 6-inch envelope of Class A, Grade D aggregate up to the centerline of the pipe. Pipe bedding shall be thoroughly and completely tamped before backfilling.
- E. Excavate bell holes for bell and spigot pipe at proper intervals so that the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper jointing of the pipe. Do not excavate bell holes more than two joints ahead of pipe laying.
- F. Excavation for manholes, inlets, and other incidental structures shall not be greater in horizontal area than that required to allow a 2-foot clearance between the outer surface of the structure and the walls of the adjacent excavation or of the sheeting used to protect it. The bottom of the excavation shall be true to the required shape and elevation shown on the drawings. No earth backfilling will be permitted under manholes, inlets, headwalls, or similar structures. Should the Contractor excavate below the elevations shown or specified, he shall, at his own expense, fill the void with either concrete or granular material approved by the Engineer.

- G. Do not excavate pipe trenches more than 200 feet ahead of the pipe laying. Perform all work so as to cause the least possible inconvenience to the public. Construct temporary bridges or crossings when and where the Owner deems necessary to maintain vehicular or pedestrian traffic.
- H. In all cases where materials are deposited along open trenches, place them so that in the event of rain or surcharge loading from such deposits no damage will result to the work and/or to adjacent property.
- I. Excavation for manholes and other structures may be performed with nonvertical banks except beneath pavements or adjoining existing improvements. Do not permit the horizontal area of the excavation to exceed that required to allow a 2-foot clearance between the outer surface of the structure and the banks of the excavation or the sheeting used to protect the embankments. The bottom of the excavation shall be true to the required shape and elevation shown on the drawings.

### **3.06 THE DEWATERING OF EXCAVATION**

- A. Provide and keep in operation enough suitable pumping equipment whenever necessary or whenever directed to do so by the Engineer. Give special attention to excavations for those structures that, prior to proper backfilling, are subject to flotation from hydrostatic uplift.
- B. All water pump or drained from the work shall be disposed of in a manner satisfactory to the Engineer without damage to adjacent property or other areas.
- C. If necessary, due to the volume of water containing sediment, or due to the location of pumping activities, construct a sediment trap (structure) to pump ground water into until sediment is no longer being removed with the water. Sediment shall not be discharged to the waters of the State.

### **3.07 BORROW EXCAVATION**

- A. Whenever the backfill of excavated areas or the placement of embankments requires more material that is available from authorized excavations or whenever backfill material from such excavations is unsuitable, then obtain additional materials from other sources. This may require the opening of borrow pits at points accessible to the work. In such cases, make suitable arrangements with the property owner and pay all incidental costs, including any royalties, for the use of the borrowed material. Before a borrow pit is opened, the quality and suitability of its material shall be approved by the Engineer. All state and local regulation

concerning borrow pits, drainage, and erosion control shall be strictly followed.

- B. Excavate borrow pits in such a way that the remaining surfaces and slopes are reasonably smooth and that adequate drainage is provided over the entire area. Construct drainage ditches wherever necessary to provide outlets for water to the nearest natural channel, thus preventing the formation of pools in the pit area. Leave the sides of borrow pit cuts at a maximum slope of 2:1 unless otherwise directed by the Engineer.
- C. Properly clear and grub borrow pits. Remove all objectionable matter from the borrow pit material before placing it in the backfill.



- D. The taking of materials from borrow pits for use in the construction of backfill, fills, or embankments shall be considered an incidental part of the work. No separate payment shall be made for this.

### **3.08 BACKFILLING**

- A. Begin backfilling after the line construction is completed and then inspected and approved by the Engineer. On each side of the line, from the top of the bedding material as specified in Paragraph B., the backfill material shall consist either of fine, loose earth like sandy soil or loam or of granular material that is free from clods, vegetable matter, debris, stone, and/or other objectionable materials and that has a size of no more than 2 inches. Place this backfill simultaneously on either side of the pipe in even layers that before compaction are no more than 6-inches deep. Thoroughly and completely tamp each layer into place before placing additional layers. Backfill shall, at locations beneath concrete and asphalt driveways, roadways, sidewalks, parking areas, etc. or within three feet of pavement, consist of No. 57 crushed stone aggregate. Use of aggregate backfill shall be at the direction of the Engineer.
- B. For all site piping used, install No. 57 crushed stone bedding in a 6-inch envelope on all sides of the pipe to be compacted as outlined in Paragraph A. Then add the remaining backfill as described in the previous paragraph.
- C. At locations beneath or closely adjacent to pavement or at locations of improvements subject to damage by displacement, tamp and thoroughly compact the backfill in layers that, before compaction, are 6 inches deep. In other areas, the backfill for the upper portion of the trenches may be placed without tamping but shall be compacted to a density equivalent to that of adjacent earth material as determined by laboratory tests. Use special care to prevent the operation of backfilling equipment from causing any damage to the pipe.
- D. If earth material for backfill is, in the opinion of the Engineer, too dry to allow thorough compaction, then add enough water so that the backfill can be properly compacted. Do not place earth material that the Engineer considers too wet or otherwise unsuitable.
- E. Wherever excavation has been made within easements across private property, the top 1 foot of backfill material shall consist of fine loose earth free from large clods, vegetable matter, debris, stone, and/or other objectionable materials. Top soil shall be placed a minimum of 6 inches on top of this backfill material.
- F. Wherever trenches have been cut across or along existing pavement, temporarily pave the backfill of such trenches by placing Class A, Grade D crushed stone as the top 12 inches of the backfill. Maintain this temporary pavement either until the permanent pavement is restored or until the project is accepted by the Owner. On heavy-traveled roadways, cold mix or leveling course binder 2 inches thick shall be installed and maintained until permanent pavement is installed.
- G. Conduct backfilling around manholes, inlets, outfalls, and/or structures in the same manner as specified above for pipelines except that even greater care is necessary to prevent damage to the utility structure.
- H. Wherever pipes have diameters of 15 inches or less, do not use power-operated tampers to tamp that portion of the backfill around the pipe within 1 foot above the pipe.

- I. Perform backfilling so as not to disturb or damage any pipe and/or structure against which the backfill is being placed. If any pipe or structure is damaged and/or displaced during backfilling, open up the backfill and make whatever repairs are necessary, whenever directed to do so by the Engineer.
- J. Backfilling and clean-up operations shall closely follow pipe laying. Failure to comply with this provision will result in the Owner's requiring that the Contractor's other activities be suspended until backfilling and clean-up operations catch up with pipe laying.
- K. Compaction Requirements: Under buildings and two times the depth of pipe beyond, and under roads and two times the depth beyond the shoulder, compact to 100-percent of the standard proctor density at 2% less than the optimal moisture content as determined by AASHTO T99 Method D.

### **3.09 MAINTENANCE**

- A. Seed and mulch and maintain in good condition all excavated areas, trenches, fills, embankments, and channels until final acceptance by the Engineer.
- B. Maintain trench backfill at the approximate level of the original ground surface by periodically adding backfill material wherever necessary and whenever directed to do so by the Engineer. Continue such maintenance until final acceptance of the project or until the Engineer issues a written release.

### **3.10 SLOPES**

- A. Neatly trim all open cut slopes and finish to conform either with the slope lines shown on the drawings or the directions of the Engineer. Leave the finished surfaces of bottom and sides in reasonably smooth and uniform planes like those normally obtainable with hand tools, though the Contractor will not be required to use hand methods if he is able to obtain the required degree of evenness with mechanical equipment. Conduct grading operations so that material is not removed or loosened beyond the required slope.

End of Section

**SECTION 312333  
TRENCHING, BACKFILLING, AND COMPACTING**

**PART 1 GENERAL**

**1.01 RELATED WORK**

- A. Section 015713 – Temporary Erosion and Sediment Control
- B. Section 017123 – Field Engineering
- C. Section 312300 – Unclassified Excavation
- D. Section 333100 – Sanitary Sewers and Appurtenances (Gravity)
- E. Section 329219 – Seeding

**1.02 JOB CONDITIONS**

- A. Provide for uninterrupted surface water flow during the work. Provide means whereby storm water can be uninterrupted in existing gutters and surface drains, or temporary drains.
- B. All pipe shall be installed in a dry trench. No extra compensation shall be allowed for trench dewatering.
- C. Immediately notify the Engineer of any unexpected subsurface or other unforeseen conditions. Discontinue work in area until Engineer provides notification to resume work.
- D. Existing utilities, poles, service lines, fences, structures, trees, shrubs, or other improvements encountered during the construction, whether above or below ground, shall be protected by the Contractor. Any item damaged or removed by the Contractor shall be repaired or replaced at the Contractor's expense to at least its original condition and to the satisfaction of the Owner. It shall be the Contractor's responsibility to locate any existing utilities in the path of construction.
- E. Adjacent structures which may be damaged by excavation work shall be underpinned or supported by other means.
- F. Excavations shall be protected by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave in or loose dirt from falling into excavation.

**1.03 PERMITS**

- A. Permits shall be obtained from authorities having jurisdiction prior to any explosives being brought to the site. The Contractor shall be responsible for providing such insurance that is required to hold the Owner harmless from any claims that may arise due to blasting operations at the site. The minimum insurance requirement will be that which is outlined in the General Conditions.
- B. All conditions set forth in the Corps of Engineers 404 Permit and Tennessee Valley Authority 26A Permit (if applicable) shall be strictly adhered to. The Owner shall obtain the appropriate permit.

**1.04 QUALITY ASSURANCE**

- A. Adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for the proper performance of the work in this section shall be used.
- B. Equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner shall be used.

**PART 2 PRODUCTS**

**2.01 SANITARY SEWERS**

**A. BEDDING MATERIAL**

- 1. Angular gravel, crushed gravel, or crushed limestone meeting the following gradation requirements set forth in ASTM 33 shall be used:

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>
1"	100
3/4"	90 - 100
1/2"	20 - 55
3/8"	0 - 15
#4	0 - 5

- 2. Shall be used for bedding, haunching, and initial backfill of PVC pipe.
- 3. Shall be used for bedding and haunching of Ductile Iron Pipe.
- 4. Frozen materials shall not be used.

**B. BACKFILL MATERIALS**

- 1. Material excavated from the trench, free from large stones (any dimension greater than two (2") inches), clods, debris, or frozen lumps shall be used:
  - a. For final backfill of PVC pipe.
  - b. For initial and final backfill of Ductile Iron Pipe.

**C. CRUSHED STONE BACKFILL MATERIAL: UNDER ROADS OR AREAS TO BE PAVED**

- 1. Shall be used for final backfill for all pipe under roads and in areas indicated as future roads on the drawings.
- 2. Material shall be approved by the Engineer.

**2.02 WATER LINES**

**A. BEDDING MATERIALS**

- 1. Angular gravel, crushed gravel, or crushed limestone, meeting the following gradation

requirements set forth in ASTM 33:

<u>SIEVE SIZE</u>	<u>PERCENT PASSING</u>
1"	100
3/4"	90 - 100
1/2"	20 - 55
3/8"	0 - 15
#4	0 - 5

- a. Shall be used for bedding, haunching, and initial backfill of PVC and HDPE pipe.
  - b. Shall be used for bedding and haunching of Ductile Iron Pipe.
2. Suitable materials excavated from the trench, free from large stones (any dimension greater than two inches), clods, debris, or frozen lumps may be used for bedding and haunching of water lines outside of paved areas with approval of Owner or Engineer.

**B. BACKFILL MATERIALS**

1. Material excavated from the trench, free from large stones (any dimension greater than two (2") inches), clods, debris, or frozen lumps shall be used:
  - a. For final backfill of PVC and HDPE pipe outside of paved areas.
  - b. For initial and final backfill of Ductile Iron Pipe outside of paved areas.
2. Borrow materials previously approved by the Engineer may be used for backfill material if suitable material is not available from trench.
3. Frozen materials shall not be used.

**C. CRUSHED STONE MATERIAL SHALL BE USED AS FOLLOWS:**

1. On road crossings where open cut crossings are made, crushed stone shall be used for bedding, haunching, and backfill. (See Standard Details).
2. In areas where rock excavation is required for installation of pipe, crushed stone shall be used for bedding, haunching, and initial backfill.
3. In other areas as directed by the Owner or Engineer and not otherwise required by the Contract Documents, crushed stone shall be replaced at a cost per ton previously agreed by the Owner and Contractor. The quantity of excavation work anticipated to be placed with crushed stone shall be mutually agreed to by the Contractor and the Engineer before excavation.

**D. TOPSOIL**

1. The final six inches of trench in non-paved areas shall be backfilled with topsoil and finished with crown. See Section 02612, Finish Grading for topsoil specification.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Line and grade for trench shall be established.
- B. Location of all underground utilities, existing and proposed shall be located.
- C. Location of existing sewer laterals, manholes and service connections shall be located prior to commencement of trenching.
- D. Location of existing water services, meters, and appurtenances shall be located prior to commencement of trenching.

### **3.02 PERFORMANCE**

- A. All earthwork and trenching operations shall comply with the requirements of OSHA Construction Standards for the construction industry (29 CFR part 1926).
- B. Unless otherwise shown on the drawings or required by the specifications or authorized by the Engineer, all work shall be done in open, vertical trenches. Any sheeting driven below the level of the top of the pipe shall not be disturbed or removed. The responsibility for assessing the need for sheeting and analyzing the stresses induced shall be the total responsibility of the Contractor.
  - 1. Trench sheeting left in place shall be backfilled to a level of 12 inches above the top of the pipe. It shall then be cut off and the upper portion removed.
  - 2. Sheeting for structures shall be left in place until backfill has been brought to a level of 12 inches above the top of the bottom footing. It shall then be cut off and removed.
- C. Clearing, including removal of surfacing and pavement, shall be done as necessary to carry on the construction in the proper manner. Material shall be removed only to minimum width necessary to allow adequate construction area. Concrete and asphalt shall be saw cut.
- D. Trenches shall be excavated to such depth as required by the drawings. Trenches for sewer lines shall be excavated to such depth as required to provide a minimum of 30 inches cover in all directions from the pipe wall, unless otherwise indicated.
- E. Trench Width:
  - 1. Minimum Trench Width
    - a. Outside Diameter Less than 4-inches: trench 4-inches greater on each side of the pipe.
    - b. Outside Diameter 4-inches to 12-inches: trench 6-inches greater on each side of the pipe.
    - c. Outside Diameter 12-inches to 24-inches: trench 8-inches greater on each side of the pipe.
  - 2. Maximum Trench Width shall not be greater than the minimum trench width plus 8-inches nor greater than the minimum width required in order to insert the smallest trench box appropriate for the pipe installation.

- F. If rock is encountered in the trench, it shall be excavated in a manner approved by the Owner and as specified below:
1. No separate payment for trench rock excavation will be made. Trench excavation shall be considered unclassified.
  2. Trench shall be undercut one foot where rock is in the trench and backfilled with crushed stone.
  3. Drilling and blasting operations shall be conducted with due regard for the safety of persons and property in the vicinity and in strict conformity with requirements of all ordinances, laws, and regulations governing blasting and the use of explosives. Rock excavation near existing pipelines or other structures shall be conducted with the utmost of care to avoid damage.
  4. All drilling, blasting, and use of explosives shall be in strict accordance with OSHA standards for the construction industry (29 CFR part 1926).
- G. Excavated material suitable for backfilling shall be stockpiled no closer than 2 feet from the edge of the trench and shall not obstruct crosswalks, sidewalks, or street intersections, and shall not cause unreasonable interference with travel on the streets by occupants of adjacent property. Gutters and other drainage facilities shall not be obstructed. Free access shall also be maintained to fire hydrants, mailboxes, sewer and water manholes, gas meters, or other municipal facilities.

### **3.03 BEDDING, HAUNCHING, AND BACKFILLING**

- A. Pipe shall be installed as shown on the drawings.
- B. Bedding shall be shaped and compacted utilizing a vibratory compactor in order to firmly integrate the bedding material into the subgrade resulting in a firm, unyielding, consolidated bedding surface to provide uniform bearing of the pipe. Bell holes shall be excavated to allow for unobstructed assembly of the joint. Bell holes shall be made as small as practical. After the joint has been made, bell holes shall be filled with bedding material.
- C. After pipe is jointed and aligned, haunching material shall be installed and compacted to 60 percent relative density, ASTM D2049. Ensure material is worked under the haunch of the pipe to provide adequate side support. Precautions shall be taken to prevent movement of the pipe during placement and compaction of haunching material.
- D. Initial backfill shall be hand placed and compacted to provide cover over the pipe as detailed. Pipe shall be protected from large particles of backfill material.
- E. Balance of backfill shall be placed by a method which will not damage or displace the pipe, nor cause bridging action in the trench. Backfill material shall be compacted with earthmoving equipment as material is placed so that excessive settlement of the trench material will not occur. Material shall be neatly mounded over the trench. Trench and settled areas shall be maintained as they occur. Finish grade shall be completed to eliminate uneven areas.
- F. Where pavement is to be placed over the backfilled trench as indicated on the drawings, the backfill shall be crushed stone under the full trench depth. Under future roads, compaction will be required up to within one foot of existing grade with remaining one foot backfill as per paragraph 3.03. E. above.

- G. See Section 02221, Unclassified Excavation for Utilities for additional requirements.

**3.04 CREEK AND DITCH CROSSINGS**

- A. Construct pipe encasement as shown on typical details. Concrete shall be placed in the dry. Concrete: ASTM C94, 2500 psi, at twenty-eight (28) days.
- B. Construction methods that will minimize siltation and erosion shall be utilized.
- C. All backfill shall be granular material as specified for embedment material or crusher run stone.
- D. Clean up, grading, seeding, and other restoration work shall begin immediately and exposed areas shall not remain unprotected for more than seven (7) days.

**3.05 TEST FOR DISPLACEMENT OF SEWERS**

- A. A check of sewer pipe shall be made to determine whether displacement has occurred after the trench has been backfilled to above the pipe and has been compacted as specified.
- B. A light shall be flashed between manholes or between locations of manholes with a flash light or sun reflecting mirror.
- C. If the pipe line shows poor alignment, displaced pipes, or any other defects, defects shall be corrected to the specified conditions at no additional cost to the Owner.

**3.06 TESTING OF BACKFILL**

- A. A testing laboratory or the Owner shall verify compaction of the bedding and haunching material after placement and compaction.

End of Section



**SECTION 320117  
PAVEMENT REPAIR**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. The work specified by this section shall consist of repairing or replacing all damaged pavement, whether public or private. Dirt shoulders, roads, streets, drives, and walks are to be restored to their original condition as an incidental part of the installation of utilities. Repair damaged base on either side of a trench wherever necessary. Trim the oxidation surface to neat lines outside of the trench wall and repave the entire area as specified below and as shown on the drawings or on the standard drawings.
- B. Both these specifications and the drawings make reference to the current edition of the standard specifications of the Tennessee Department of Transportation (TDOT). Even though the weather limitations, construction methods, and materials specifications contained in the TDOT specifications may not be explicitly repeated in these specifications, they shall, wherever applicable to the work called for by this section, be considered as implied and therefore adhered to. However, the various subsections "Basis for Payment" contained in the TDOT specifications shall not be considered applicable. Refer to other sections for work related to that covered by this section.
- C. All pavement repair work must meet the requirements of the Roane County Highway Department, Rockwood Street Department, and/or all other local agencies having jurisdiction over the roadway being repaired. Where Roane County Highway Department and/or Rockwood Street Department requirements differ from the specifications herein, the more stringent of the two shall be used.

**PART 2 PRODUCTS**

- A. Mineral Aggregate Base: Type A Base, Grading D crushed stone (TDOT Specification Section 303);
- B. Bituminous Prime Coats: cutback asphalt, Grade RC-250, or material emulsified asphalt, Grade AE-P (TDOT Specification Section 402);
- C. Aggregate For Cover Material: Size 7, 8 or 78 (TDOT Specification Section 402) ;
- D. Tack Coat: Grade AE-3 (TDOT Specification Section 403);
- E. Bituminous Plant Mix Base (Hot Mix): Grading A, B, B (modified), or C, AS or CW, as directed by the Engineer (TDOT Specification Section 307);
- F. Asphaltic Concrete Surface: Grading D or E as specified (TDOT Specification Section 411).

## **PART 3 EXECUTION**

### **3.01 SUBGRADE**

- A. Before any base material is installed, compact the subgrade of the area to be paved to 95 percent of optimum density as determined by ASTM D698 (Standard Proctor).
- B. The backfill material shall contain no topsoil or organic matter. For all areas where subgrade has been prepared, test for uniformity of support by driving a loaded dump truck at a speed of 2 to 3 mph over the entire surface. Make further improvements on all areas that show a deflection of 1 inch or more. When completed, the finished subgrade shall be hard, smooth, stable, and constructed in reasonably close conformance with the lines and grades that existed prior to beginning construction.
- C. When a base course is compacted, cut back the surface course of the existing pavement a minimum of 1 foot beyond the limit of the joint between the old and new base course or as shown on the standard drawings. Take special care to ensure good compaction of the new base course at the joint. Apply and compact the surface to conform to the existing pavement so that it will have no surface irregularity.

### **3.02 BASE**

- A. Install a mineral aggregate base of the type specified above in accordance with TDOT specifications. The maximum compacted thickness of any one layer shall be 6 inches and the total thickness of the base shall be that indicated by the standard drawings or as shown on the plans.

### **3.03 SEAL COAT SURFACE**

- A. Uniformly apply a bituminous prime coat of either emulsified asphalt, Grade AE-P, or cutback asphalt, Grade RC-250, over the entire width of the area to be surfaced at a rate of 0.3 gallons/square yard. Immediately after application, uniformly cover the entire area with Size 7 crushed stone chips at a rate of 12 pounds/square yard.
- B. Pavement repairs/replacements shall be thermally bonded with existing asphalt edges.

### **3.04 ASPHALTIC CONCRETE BINDER**

- A. Apply a bituminous prime coat of emulsified asphalt, Grade AE-P, or cutback asphalt, Grade RC-250, at a rate of 0.38 to 0.42 gallons/square yard. Take care to prevent the bituminous material's splashing on exposed faces of curbs and gutters, walls, walks, trees, etc. If such splashing does occur, remove it immediately. After the prime coat has been properly cured, apply an asphaltic concrete binder to the thickness shown on the standard drawings or the plans.
- B. Carefully place the material to avoid segregation of the mix. Broadcasting of the material will not be permitted. Remove any lumps that do not readily break down.

### **3.05 ASPHALTIC CONCRETE SURFACE**

- A. If the asphaltic concrete surface course is to be placed directly on the mineral aggregate base, place a bituminous prime coat as described above. If, however, the surface course is to be placed on a binder course, then apply a bituminous tack coat of the sort specified above under PRODUCTS at a rate of 0.05 to 0.10 gallons/square yard. Take care to prevent the bituminous material's splashing on exposed faces of curbs, gutters, walls, walks, trees, etc. If such splashing does occur, remove it immediately. After the prime or tack coat has been properly cured, apply the asphaltic concrete to the thickness shown on the drawings or standard drawings. Apply the surface course as described above for the binder course.

### **3.06 SMOOTHNESS**

- A. The finished surfaces shall conform to the lines and grades that existed prior to construction. No deviations, variations, or irregularities exceeding 1/4 inch in any direction when tested with a 12-foot straightedge will be permitted in the finished work, nor will any depressions that will not drain. Correct all such defects.

### **3.07 SAMPLING AND TESTING**

- A. Submit to the Owner test reports made by an independent testing laboratory on the crushed stone aggregate, bituminous materials, and asphaltic concrete design mixes, and obtain his approval of these reports before starting paving operations.
- B. Tests shall be made on the completed elements of the pavement to ascertain the compacted thickness of the base and surface courses. If sections with deficient thicknesses are found, the full section for a reasonable distance on each side of the deficiency shall be refused. Remove and reinstall all such sections. Patch all test holes in connection with thickness tests.
- C. When making surface tests, furnish one man to mark all surface defects for corrections.

End of Section

**SECTION 329219  
SEEDING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This work shall consist of supplying and placing soil additives, seed, and mulch as specified on prepared ground in accordance with the Plans and these Specifications. All non-construction areas that show signs of excessive erosion and all newly graded earthen areas that are not to be paved, stabilized, or sodded, shall be seeded unless otherwise indicated on the Plans or as directed by the Engineer.

**1.02 RELATED SECTIONS**

- A. Section 02221 – Unclassified Excavation for Utilities

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Grass Seed: Use a drought tolerant hybrid Kentucky 31 Fescue (Jaguar, Lancer, Rebel II, Falcon II, etc.). Supplement with an annual rye or other appropriate mixture to assure stabilization during the winter season. Furnish seed in new bags or bags that are sound and not mended; no “below standard” seed accepted.
- B. Fertilizer: Use a slow-release starter fertilizer in standard containers that are clearly marked with name, weight, and guaranteed analysis of the contents and that ensure proper protection in transportation and handling; and in compliance with all local, state, and federal fertilizer laws.
- C. Lime: Use lime containing a minimum of 85% calcium carbonate and magnesium carbonate, 85% of which passes a No. 10 mesh sieve.
- D. Mulch: Stalks of rye, oats, wheat, or other approved grain crops properly cured prior to baling, air dried, and reasonably free of noxious weeds and weed seeds or other material detrimental to plant growth.

**PART 3 EXECUTION**

**3.01 GENERAL**

- A. Before starting seeding operations on any area, final dressing and placing of topsoil shall have been completed in accordance with the applicable Specifications. Seed, fertilize, lime, and mulch within 30 days of attainment of finish grade.

- B. Apply temporary seeding whenever grading operations are temporarily halted for over 14 days and final grading of exposed surfaces is to be completed within one year. Also apply temporary seeding to soil stockpiles.

### **3.02 PREPARATION**

- A. Each area to be seeded shall be scarified, disked, harrowed, raked or otherwise worked until it has been loosened and pulverized to a depth of not less than 2 inches and brought to the lines and grades indicated on the Plans or directed by the Engineer. This operation shall be performed only when the soil is in a tillable and workable condition.
- B. Apply fertilizer at the rate of 1 pound of nitrogen per 1,000 square feet, and lime at the rate of 50 pounds per 1,000 square feet, shall be uniformly incorporated in the soil for a depth of approximately 1 inch. Fertilizer need not be incorporated in the soil as specified above when mixed with seed in water and applied with power sprayer equipment. Do not apply lime without a soil test.

### **3.03 SEEDING**

- A. Seed shall be sown as soon as preparation of the seed bed has been completed. It shall be sown uniformly by means of a rotary seeder, hydraulic equipment, or other satisfactory means. Seed shall be sown at the rate of 6 to 8 pounds per 1,000 square feet.
- B. No seeding shall be done during windy weather or when the ground surface is frozen, wet or otherwise non-tillable.
- C. When seeding during February 1 through April 1 and October 1 through November 30, add an additional 3 pounds per 1000 square feet of annual rye grass. No seeding shall be performed during December and January unless otherwise permitted.

### **3.04 MULCHING**

- A. When the mulching material is hay or straw, it shall be spread evenly over the seeded area at an approximate rate of 2 bales (100 pounds minimum) per 1,000 square feet for straw and 150 pounds per 1,000 square feet for hay immediately following the seeding operations. The Engineer depending on the texture and condition of the mulch material and the characteristics of the area seeded may vary this rate.

### **3.05 MAINTANENCE**

- A. All seeded areas shall be cared for properly to the Engineer's satisfaction until acceptance of the work. Areas, which have been previously seeded and mulched in accordance with this Section, but which, have been damaged or failed to successfully establish an acceptable stand of grasses shall be repaired as directed by the Engineer. All material and labor required to repair seeded areas made necessary by negligence on a part of the Contractor will be furnished by the Contractor at no cost.

- B. If within 60 days of the planting less than 50% is successful, rework the ground, re-fertilize, reseed, and re-mulch.

**3.06 CLEANUP AND PROTECTION**

- A. After the completion of seeding, the area shall be cleaned of all rubbish, excess material, and any other items that will mar the appearance of the projects as in accordance with the General Specifications.

End of Section

**SECTION 330130.10  
SEWER FLOW CONTROL**

**PART 1 GENERAL**

**1.01 SCOPE**

- A. The Work to be performed includes the reduction or elimination of flow in a downstream sewer to a level adequate for proper inspection, rehabilitation, or replacement according to the Specifications and the Standard Drawings herein.

**1.02 PERFORMANCE REQUIREMENTS**

- A. It is essential to the operation of the existing sewerage system and a requirement that there is no interruption in the flow of sewage throughout the duration of the Project, continuity of sewer service must be maintained at all times.
- B. Provide, maintain, and operate temporary facilities such as dams, plugs, pumping equipment, pipes, conduits, and necessary power to intercept sewage flow before it reaches the area of Work.
- C. Properly size all equipment, components, and appurtenances to maintain sewer flow around Work area in a manner that will not cause surcharging of sewers, damage to sewers, and that will protect public and private property from discharge or damage.
- D. Any discharge of sewage including discharges into the construction trench shall not be permitted.

**1.03 SUBMITTALS**

- A. Action Submittals:
  - 1. Flow Control Plan: Submit at least 48 hours prior to controlling flows. Include, as a minimum, the following:
    - a. Estimate of peak amount of flow to be controlled for each flow control setup
    - b. Detailed procedures for handling peak estimated flow
    - c. Schedule
    - d. Drawing of plug, bypass pump, and pipeline locations
    - e. Listing of equipment
      - 1) Bypass pump sizes, capacities, number of each size to be onsite, and power requirements including standby equipment
      - 2) Bypass pipeline sizes and material types
    - f. Sewer user notification plan

- g. Operation plan
  - h. Emergency procedures
  - i. Completed Bypass Pumping Checklist
- B. Informational Submittals
- 1. Permits to locate and operate flow control system

#### **1.04 QUALITY ASSURANCE**

- A. Qualifications:
- 1. Flow Control System Designer: For bypassing of sewer lines larger than 12 inches, Professional Engineer experienced in the design of bypass pumping systems.

### **PART 2 PRODUCTS**

#### **2.01 FLOW CONTROL SYSTEM**

- A. General:
- 1. Provide adequate capacity and size to handle existing flows plus additional flows that may occur during periods of rainstorm. Estimate peak amount of flow to be bypassed and provide bypass flow capacity of at least 125 percent of peak flow estimate.
- B. Plugs:
- 1. Provide with taps for connection of pressure gauges and air hoses, and flow-through capability.
  - 2. Pipe Diameters 24 inches and Smaller: Use mechanical plugs with rubber gaskets or pneumatic plugs with rubber boots.
  - 3. Pipe Diameters Larger than 24 inches:
    - a. Use inflatable bag stoppers made in two or more pieces.
- C. Piping:
- 1. Material:



a. High-Density Polyethylene (HDPE):

- 1) In accordance with ASTM D3350.
- 2) Minimum wall thickness conforming to SDR 32.5
- 3) Joints: Butt-fusion welded.

b. Ductile Iron Discharge Piping:

- 1) AWWA C151/A21.51, Centrifugally cast, Grade 60-42-10 iron.
- 2) Joints: Rubber gasketed push-on in accordance with AWWA C111/21.11.
- 3) Fittings: In accordance with AWWA C110/A21.20.

c. Flexible Discharge Pipe:

- 1) Small diameter flexible pipe may be used for low pressure and low flow conditions from 8-inch and smaller gravity sewer lines, as approved by the OWNER.
2. Leak free.
3. Pressure rating at least 1.5 times the operating pressure.
4. May reuse for subsequent flow bypass pumping system placements. OWNER, at their sole direction, shall have the right to reject sections deemed unserviceable.

D. Bypass Pumps:

1. Fully automatic, self-priming units that do not require use of foot valves or vacuum pumps in priming system.
2. Solids handling design with ability to pump minimum 3-inch diameter solids.
3. Able to run dry for long periods of time to accommodate cyclical nature of flows.
4. Equipped to minimize noise. Noise levels shall not exceed 86 dBA at a distance of 50 feet from the source and, if more stringent, comply with all local noise ordinances.
5. Standby Pump: One of each size to be available onsite.

E. Electric Power Generators

1. Be able to simultaneously start and run all electric powered pumps required for the flow to be controlled.

2. Equipped to minimize noise. Noise levels shall not exceed 86 dBA at a distance of 50 feet from the source and, if more stringent, comply with all local noise ordinances.
3. Shall include automatic transfer switch if the flow control system is to operate unattended.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Notify OWNER at least 48 hours prior to implementing flow control system.
- B. Operate and maintain flow control system 24 hours per day, 7 days per week, including holidays, as required, to control flow.
- C. Take all necessary precautions to ensure no private or public properties are subjected to a sewage backup or spill. CONTRACTOR shall be solely responsible for all cleanup, damages, and resultant fines in the event of a backup or spill. In the event of a backup or spill, CONTRACTOR shall immediately notify the OWNER and begin clean-up operations.
- D. When depth of flow in a pipe section is above the maximum depth specified for inspection, or testing, reduce flow by plugging, diverting, or pumping flow around Work area.
- E. Except at pipe sags, depth of flow during television inspection and joint testing shall not exceed the requirements of Section 02541, Sewer Television Inspection.
- F. Eliminate all flow from sewer manhole-to-manhole segments during point repairs, service connection rehabilitation, manhole construction, and sewer pipe replacement or lining within that segment.
- G. If flow reaches peak estimated flow that flow control system was designed for, stop all Work that requires flow control, secure work area, and restore flow in sewer until flow recedes.
- H. After the Work is completed, return flow to replaced sewer and remove temporary equipment.

### **3.02 PLUGGING OR BLOCKING**

- A. Flow control may consist of blocking flow with mechanical or pneumatic plugs if only a small amount of flow needs to be controlled and adequate storage is available. Plugging or blocking of flow must be pre-approved by the OWNER.
- B. Use primary and secondary plugs for each flow control location.
- C. When blocking flow is no longer needed for performance and acceptance of the Work, remove plugs in a manner that permits sewage flow to slowly return to normal without surcharging or causing other major disturbances downstream.

- D. Remove temporary plugs at end of each working day and restore normal flow. If downstream work is not or cannot be completed during the workday provide, operate, and maintain bypass pumping system.
- E. Use bypass pumping if the Work cannot be scheduled at a time when flow is low or completed during low flow period.

### **3.03 BYPASS PUMPING**

- A. When blocking flow in upstream sewers is not appropriate or allowed by the OWNER, use flow bypass pumping for reducing flow below the maximum depth or completely bypassing flow.
- B. Design, furnish, install, and maintain all power, primary and standby pumps, appurtenances, tanks, and trucks, and bypass piping required to maintain existing flows and services.
- C. The CONTRACTOR shall obtain approval and secure all permits for placement of temporary bypass pumping system and pipeline within public right-of-way.
- D. Site Verification:
  - 1. Locate existing utilities in area of bypass pipelines.
  - 2. Bypass Pipeline Location:
    - a. Minimize disturbance of existing utilities
    - b. Confine bypass discharge pipeline within public rights-of-way or temporary construction area and permanent easement
    - c. When bypass pipeline crosses local streets and private driveways, place bypass pipeline in trench and cover with temporary pavement.
    - d. Installation of bypass pipelines is prohibited in riparian/wetland areas unless approved by OWNER.
- E. Flow bypass shall be done in such a manner that will not damage private or public property, or create a nuisance or public menace. Pumped sewage shall be in an enclosed pipe that is adequately protected from traffic, and shall be redirected into sanitary sewer system or alternatively into an enclosed tank for hauling to the wastewater treatment plant. Dumping or free flow of sewage on private or public property, gutters, streets, sidewalks, or into storm sewers is prohibited.
- F. The CONTRACTOR shall equip pump engines with noise suppression devices to keep pump noise to a minimum and comply with applicable noise ordinances.

### **3.04 SERVICE LATERAL BY-PASSING**

- A. When it is necessary to temporarily disconnect a service lateral the CONTRACTOR shall do so in accordance with Section 02532, Sanitary Sewer (Gravity)
- B. Disconnected sewer service lateral connections shall be accommodated by bypass pumping or containment from time of disconnection to time of reconnection. This shall be accomplished by a mechanical pump and manifold system or by storage system such as a bladder tank system. The storage system shall be capable of holding adequate sewage from each sewer service connection for period of 24 hours. Each storage system shall be emptied or pumped during each 24-hour period and properly disposed of in accordance with TDEC requirements.
- C. CONTRACTOR shall monitor status of flow and storage and pump disconnected laterals more frequently where flows exceed the storage capacity of the lateral or bladder tank system.
- D. CONTRACTOR shall adhere to the listed performance requirements herein, see Performance Requirements above.

### **3.05 FIELD QUALITY CONTROL AND MAINTENANCE**

- A. Test: CONTRACTOR shall perform a leakage pressure test of the bypass pumping discharge piping using clean water prior to actual operation. Prior to operation, test each section of discharge piping with maximum pressure equal to 1.5 times the maximum operating pressure of system. OWNER shall be given 24 hours' notice prior to testing.
- B. Inspection: CONTRACTOR shall inspect bypass-pumping system every 2 hours to ensure that system is working correctly.
- C. Maintenance Service: CONTRACTOR shall ensure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.

### **3.06 CLEANING**

- A. Before bypass pumping system is broken down, and moved to next section or removed at the completion of the Work, discharge sewage remaining in bypass discharge pipeline and pumping equipment to working sewer. Sewage shall not be spilled or discharged to the ground or environment.
- B. Disturbed Areas: Upon completion of bypass pumping operation, clean disturbed areas and restore to condition, including pavement restoration, at least equal to that which existed prior to start of the Work.

End of Section

**SECTION 330130.11  
TELEVISION INSPECTION OF SEWERS**

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. The Work covered by this section includes furnishing all labor, equipment, and materials required to clean and inspect the designated sanitary sewer lines specified.
  
- B. Closed-circuit television inspection of sanitary sewers as follows:
  - 1. TV inspection on all lines proposed for rehabilitation, including root control chemical application, under this Contract, shall be performed where no videotape of the sewer is available from OWNER.
  - 2. TV inspection of line segments specified for chemical root removal, shall be required to confirm cleaning and location of service connections. TV inspection shall also be required to confirm the need for mechanical root removal and to determine its location.
  - 3. CONTRACTOR shall use the Television Inspection Form and Rehabilitation Tables approved by OWNER prior to beginning of any inspection.
  - 4. Digital videos, data, photos shall be delivered to the OWNER with an external hard drive which will be returned to the CONTRACTOR.

**1.02 SUBMITTALS**

- A. Action Submittals: Catalog and manufacturer's data sheets for television equipment.
  
- B. Informational Submittals:
  - 1. References: Contact names and telephone numbers.
  - 2. List of staff and equipment to be used on Project.
  - 3. Crew chief qualifications.
  - 4. Traffic control plan.
  - 5. Look-ahead inspection schedules, minimum of 7 days in advance of the Work.
  - 6. Initial first days' CCTV digital videos and inspection logs within 24 hours of start of CCTV inspection.
  - 7. Certification that staff to be used for the Work is properly trained in confined space entry and hazardous atmospheres.
  - 8. Training and inspection plan, 7 days prior to manual inspection.
  - 9. Final report.

**1.03 QUALITY ASSURANCE**

- A. Qualifications:
  - 1. CONTRACTOR: Performed work successfully for at least three other projects, within last 5 years, with pipe lengths and pipe diameters similar to this Project.
  - 2. Crew Chief: Minimum of 5 years' experience on projects similar to this Project and experienced using proposed equipment for this Project.
  
- B. Pre-startup Meeting: At least 5 days prior to beginning CCTV inspection work, schedule with OWNER

to review proposed sewer flow bypassing plan, traffic control plans, and inspection methods.

- C. Submit digital videos, photos and logs for quality review and comment to OWNER within 24 hours after the first days' work is completed. Submit tapes and logs on a routine basis within 7 days after completing each tape. Picture quality and definition shall be to the satisfaction of OWNER. Inspection equipment that fails to produce satisfactory inspection quality shall be removed.

### **1.03 NOTIFICATIONS**

- A. Notify OWNER:
  - 1. A minimum of 5 days prior to the anticipated commencement of inspections in any one area and 24 hours in advance of actual start.
  - 2. When obstruction, restricting flow in pipeline, is discovered.
  - 3. If depth of flow in pipeline exceeds 33 percent of pipe diameter.
  - 4. If conditions for CCTV inspection are found to be unsafe or impractical.
  - 5. Pipe configuration in field is different than shown on maps. Notification shall include diagram clearly indicating location of structure in relation to immediately adjacent structures.

## **PART 2 PRODUCTS**

### **2.01 TELEVISION INSPECTION EQUIPMENT**

- A. CONTRACTOR shall provide a mobile vehicle with video monitoring equipment specifically compatible with the camera equipment being used. The equipment shall include dual video recorders, dual monitors, and picture capture capability. The vehicle shall be large enough to accommodate at least three people at any time for viewing of the monitor. OWNER shall have unrestricted access to observe the television screen and all other operations at all times.
- B. The basic equipment for use in cleaning and inspection operations shall consist of hydraulically propelled or mechanical cleaning equipment and a self-propelled full color television inspection camera with footage meter, pan, and tilt functions.
- C. The television camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear color picture of the entire periphery of the pipe. The camera shall be capable of a 360-degree viewing area. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 500-line resolution picture. Backup camera shall be available on the Project Site. The camera shall be operative in 100 percent humidity conditions. Camera shall be operative in a hazardous and corrosive environment.
- D. The camera, television monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of OWNER.
- E. The television inspection equipment shall have an accurate footage counter that shall display on the monitor the exact distance of the camera from the centerline of the starting manhole.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Prior to televising, CONTRACTOR shall thoroughly clean the pipelines of debris, grease, roots, sediment, broken pipe, or other obstructions that could retard the movement of the television camera. Precautions shall be taken to protect the sewer lines being cleaned from damage by the cleaning equipment.
- B. Immediately after cleaning, the sewer line section shall be visually inspected by means of closed-circuit television to determine the condition of the line and to locate existing service connections. The inspection will be done one manhole section at a time and the flow in the section being inspected will be suitably controlled as specified. (See Section 02542, Sewer Flow Control).
- C. All internal pipe damage shall be photographed in color by CONTRACTOR utilizing picture capture equipment, and shall be clearly labeled as to date, each number, footage, and type of defect. The photographs shall be the property of OWNER.

### **3.02 TELEVISION INSPECTION**

- A. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer line section condition. In no case will the television camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line.
- B. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be set up between the two manholes of the section being inspected to ensure good communications between members of the crew.
- C. The importance of accurate distance measurements is emphasized. Measurement for location of defects shall be above ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device, and the accuracy shall be satisfactory to OWNER.
- D. The camera height shall be adjusted such that the camera lens is always centered in the pipe being televised.
- E. Lighting system shall be adequate for quality pictures. A reflector in front of the camera may be required to enhance lighting in black pipe.

### **3.03 PASSAGE OF TV CAMERA**

- A. There may be occasions during the TV inspection of a sewer line section, when the camera will be unable to pass an obstruction even though flow is continuing. CONTRACTOR shall televise the line section from the other direction in order to obtain a "full" video of this line section. Whenever such condition arises, OWNER shall be notified to determine if a point repair is necessary. No additional payment shall be made for reverse set-ups required due to an obstruction.
- B. TV videos shall be submitted in one continuous section from manhole to manhole, and not in

broken pieces, unless specifically approved by OWNER.

- C. When the camera is being pulled from the “other end” and a second repair location is encountered away from the first repair/obstruction location, OWNER shall be notified and allowed to review the TV DVD at the Site in a timely manner. Obtain OWNER’s permission to make the two point repairs. No downtime shall be allowed.
- D. If the two point repairs are allowed and completed, CONTRACTOR shall again proceed to re-televiser the sewer line section. Generally, up to 20 feet of the line from each of the ends of the two point repairs may be lamped or physically inspected at the Site, to verify the condition of the line without further TV.
- E. OWNER makes no guarantee that all of the sanitary sewer mains proposed to be TV inspected after the cleaning, are clear for the passage of the camera set-up. The equipment, tools and method(s) used for securing the passage of the camera are to be at the discretion of CONTRACTOR, with the approval of OWNER. The decision to repair or not to repair a location shall always be made by OWNER.
- F. If cleaning of an entire section cannot be successfully performed from one manhole, the equipment shall be reset on the other manhole and cleaning again attempted. If again, successful cleaning cannot be performed or the equipment fails to traverse the entire pipeline section, it will be assumed a major blockage exists and the cleaning effort shall be terminated only at the direction of OWNER.
- G. During all sewer-cleaning operations, satisfactory precautions shall be taken to protect the sewer lines from damage that might be inflicted by the improper use of cleaning equipment. Whenever hydraulically-propelled cleaning tools, which depend on water pressure to provide their cleaning force or any tools which retard the flow of water in the sewer line are used, precautions shall be taken to ensure that the water pressure created does not cause any damage to or flooding of public or private property being served by the sewer section involved.
- H. Roots shall be removed in the sections where root intrusion is a problem. Special precautions should be exercised during the cleaning operation to assure complete removal of visible roots from the joint area. Any visible roots that may impact rehabilitation efforts shall be removed. Procedures may include the use of mechanical devices such as rodding machines, expanding root cutters and porcupines, and hydraulic procedures such as high-pressure jet cleaners.
- I. To aid in the removal of roots and at the option of CONTRACTOR, sewer sections that have root intrusion may be treated with a OWNER -approved herbicide. The application of the herbicide to the roots shall be done in strict accordance with the manufacturer’s recommendations and specifications in such a manner to preclude any damage to the surrounding vegetation. CONTRACTOR shall replace any damaged vegetation so designated by OWNER, at no additional cost to OWNER. All safety precautions as recommended by the manufacturer shall be strictly adhered to concerning handling and application of the herbicide.
- J. CONTRACTOR, after cleaning a section of pipe, shall utilize the television camera to inspect the main. No line shall be considered cleaned until OWNER approves.
- K. The television camera shall be moved through the line in either direction at a uniform rate, stopping



when necessary to insure proper documentation of the sewer's condition, but in no case shall the television camera travel at a speed greater than 30 feet per minute.

- L. The television camera shall travel through the lines using its own power. The pictures taken of the entire inside periphery of the pipe shall be clear and visible. Picture quality and definition shall be to the satisfaction of OWNER, and if unsatisfactory, the equipment shall be removed and no payment made for the unsatisfactory inspection.
- M. At all service laterals the camera shall be stopped and panned to such an angle that an internal view of the service lateral is available to determine if the lateral is active or dead or plugged. Where other pipe deficiencies are noted, the camera shall be stopped to observe the condition, record information and take photographs. Any service lateral or deficiency observed in the sewer line shall be photographed and described on the photograph.

### **3.04 FLOW CONTROL**

- A. TV inspection shall be done one sewer line section at a time, and the flow in the section being televised shall be suitably controlled. The depth of wastewater flow shall not exceed that shown below:
  - 6" – 10" Pipe: 20% of pipe's diameter
  - 12" -24" Pipe: 25% of pipe's diameter
  - Over 24" Pipe: 30% of pipe's diameter
- B. When the depth of flow in the section being worked is above the maximum allowable for the television inspection, the flow shall be reduced to allowable levels by performing the inspection during minimum flow hours, with diversion pumping or by pulling camera with swab or a high velocity jet nozzle, as approved by OWNER.
- C. No separate payment shall be made for sewer flow control.
- D. CONTRACTOR shall not be allowed to float the camera unless permitted by OWNER.
- E. When flow in a sewer line is plugged, blocked, or bypassed; sufficient precautions must be taken to protect the sewer lines from damage that might result from sewer surcharging. Further, precautions must be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved.

### **3.05 DOCUMENTATION**

- A. CONTRACTOR shall submit in electronic format digital videos, photos, and evaluation reports, to OWNER for review. OWNER's review and comment period may require up to 10 working days from the date of submittal.
- B. The digital video shall be recorded at Standard Play and each digital video segment information entered in the software as required under Article Basic Module (1) – Survey/Logging Report.
- C. If digital videos are of such poor quality that OWNER is unable to evaluate the condition of the sanitary sewer main, locate the sewer service connections, or verify the cleaning CONTRACTOR shall be required to re-televiser the sanitary sewer and provide new digital videos of good quality, at no

additional cost to OWNER.

- D. All digital videos will become the property of OWNER.
- E. Digital videos exhibiting poor and unacceptable quality shall be re-televised by the Contractor at no cost to the Owner. Camera distortions, inadequate lighting, dirty lens or blurred/hazy picture will be cause for rejection of the Work and the Owner is under no obligation to pay for poor quality videos.

### **3.06 SURVEY/LOGGING REPORT**

- A. The software's core module shall be capable of providing complete survey reports and be PACP (Pipeline Assessment and Certification Program) certified by NASSCO.
- B. There shall be PACP Complaint codes pre-programmed and grouped by PACP Groups.
- C. The software shall be capable of customization with the ability to modify or add to the pipeline condition and group them for ease of use.
- D. The footage reading from the camera equipment shall be automatically entered into the Survey Log through RS232 cable and shall directly correspond to the noted defect location throughout the pipe graphic and tabular reports generated.
- E. The inspection and reporting software program shall be menu-driven and shall have a complete on-screen help file.
- F. Drop-down boxes shall be utilized to quickly reference common information such as defects, pipe materials, survey purpose, locations, pipe usage, etc.
- G. The browser screen shall allow quick viewing of:
  - 1. Sequential survey/segment as setup number (automatic input by software).
  - 2. User-selected categories.
  - 3. Up-stream and down-stream manhole numbers.
  - 4. Street name.
  - 5. Pipe segment details.
  - 6. Drainage basin number.
- H. All relevant pipe segment information shall be entered prior to the actual survey. The below listed minimum pipe details must be supplied in the software for proper system management. The graphic and tabular survey reports generated shall include the following information:
  - 1. Pipe diameter.
  - 2. Starting manhole number.
  - 3. Ending manhole number.
  - 4. Starting manhole depth.
  - 5. Ending manhole depth.
  - 6. Direction of survey.
  - 7. Pre-clean (y/n).
  - 8. Total surveyed length.

9. Pipe material.
  10. Pipe section length.
  11. Pipe shape.
  12. Road name.
  13. Address or place name.
  14. Work Order number.
  15. Video CD number.
  16. Engineering drawing number.
  17. Purpose of survey.
  18. Pipe age (year of construction).
  19. Inspection of survey date.
- I. The CCTV software shall maintain a database of underground pipe and manhole assets. The database(s) shall have structure similar to the one referencing pipe usage (i.e., sanitary storm drainage, etc.) sections (i.e., projects, areas, or quadrants). Surveys shall include a method of pipe segment numbering and a chronological survey set-up numbering system.
  - J. The basic module database shall have the means to sort in ascending and descending order according to date, pipe segment, reference number, road name, manhole number(s), observed footage, pipe materials, pipe diameters, work order numbers, etc. A filtering system shall also be made available.
  - K. The basic module software shall have search capabilities in order to find information about past surveys located in the database(s).
  - L. A summary paragraph shall be made available for a conclusive pipe segment assessment.
  - M. The graphical reports shall print in color for quick glance referencing of the defect category. The color-coding scheme shall allow for quick reference as to the quality of service, structural, hydraulic, and constructional defects within a particular survey.
  - N. A scoring system incorporated in the software will assist the user/management personnel in making proper assessment of pipe conditions. Scoring is to be based upon defect severity entered by the operator.
  - O. All surveys shall contain the Quality Assurance person's name and certification.
  - P. A Site sketch feature shall also be supplied so that a drawing or sketch shall indicate special details or locations about a particular set-up Site.
  - Q. The software shall also have the capability to import and export survey results in a variety of industry standard formats.

### **3.07 SUMMARY REPORTING**

- A. Summary reports compiling data from multiple inspections shall be available. Such reports shall indicate individual survey results in tabular form and list (sort) surveys based on a user-defined

description field.

- B. Defect report shall be programmable to list specific defects observed with corresponding footage, starting and ending manhole number, structural pipe defects (i.e., cracks, offsets, defective laterals, collapsed pipe, etc.) and service-oriented defects (i.e., roots, grease, obstructions, infiltration, etc.).
- C. A drainage schedule report shall include starting and ending manhole numbers, depths, pipe material, total survey length, and pipe diameter.
- D. The grading scores report shall summarize the manhole numbers, pipe material, pipe diameter, and the grade scores for each survey with totals.
- E. Service and structural aspect scoring reports are to list the pipe segment, reference number, total observed length, number of defects, and total score with reference to the condition of the total pipe, average of the pipe, total defects, and average of defects.
- F. Section summary reports are to be made available so that all surveys within a section are listed showing purpose of inspection, date, work order numbers, manholes, road names, and total lengths.
- G. All software shall be compatible with OWNER's current system.

### **3.08 EVALUATION REPORTS**

- A. Each video shall be accompanied by a TV inspection report, which shall be a written/narrated log of all pipe defects, sags, service connection locations and conditions, etc., recorded on a footage basis. Report shall be provided in an electronic (computer usable) format that is transferable to a Microsoft Access database.
- B. The pipe defects shall include separate codes for the following: Radial Cracks, Longitudinal Cracks, Misaligned Joints, Broken Joints, Root Intrusion, Laterals, and Infiltration. The size/length of the defect shall be reported. The beginning of all sags of the pipe, the length that is underwater as well as where the camera pulls out of the sag shall be reported. The clock position of each service connection and the condition shall be reported. The condition of each service connection will include the distance protruding when appropriate and the type. All other information required for analysis such as degrees of deterioration, deformation or collapsed pipe shall be reported. All reports and/or submittals shall adhere to Pipeline Assessment Certification Program (PACP) Standards.
- C. This log shall also identify the section being televised, flow and camera direction, type of pipe, pipe condition, weather conditions, type of surface cover, or any other information required by OWNER.
- D. OWNER may provide CONTRACTOR a log form that utilizes codes for the above-mentioned defects.
- E. At the end of the Project CONTRACTOR shall provide a summary listing of all videos provided under this Project.

End of Section

**SECTION 330130.41  
SEWER CLEANING**

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. This section covers the Cleaning of sewers to remove all debris, solids, sand, grease, grit, roots, etc. from the sewers and manholes to improve pipe flow, facilitate television inspection for sewer evaluation, for proper application of root control chemical, or as required for other specified rehabilitation.
- B. The Work covered by this section includes furnishing all labor, equipment, and materials required to clean and inspect sanitary sewer lines as specified.

**1.02 SUBMITTALS**

- A. Action Submittals: Catalog and manufacturer's data sheets for cleaning equipment.
- B. Informational Submittals:
  - 1. Sample of the finished picture from the picture capture system.
  - 2. Equipment manufacturer's operational manual and guidelines.
  - 3. Liquid Waste Manifest.

**PART 2 PRODUCTS**

**2.01 EQUIPMENT**

- A. Sewer Television Equipment shall be in compliance with Section 330330.11, Television Inspection of Sewers.
- B. Hydraulically-Propelled Equipment: The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to insure removal of grease. If sewer cleaning balls or other equipment, which cannot be collapsed, is used, special precautions to prevent flooding of the sewers and public or private property shall be taken.
- C. Cleaning:
  - 1. All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines designated to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor and produce at least 2,000 psi pressure. The gun shall be capable of producing flows from a fine spray to a solid stream.

2. Sewer line cleaning equipment shall be a combination of high-velocity (hydro-cleaning) jet and vacuum system, truck-mounted for mobility and ease of operation. The hydro-cleaning equipment for sewer lines shall include a minimum 1,000-gallon water storage tank, auxiliary engines and pumps, and include a minimum of 600 feet of 1-1/4-inch I.D. high-pressure hose on a power driven hose reel. Pump nozzle combinations shall be capable of producing water flow rates up to 120 gpm, and a minimum of 60 gpm at a working pressure up to 2,000 psi. The vacuum system shall be a positive displacement blower with a minimum of 4,200 cfm at 15 inches of mercury. OWNER must approve any variations to this pumping rate, in advance.
  3. A working pressure gauge shall be used on the discharge of all high-pressure water pumps.
  4. CONTRACTOR shall use in addition to conventional nozzles, a nozzle which directs the cleaning force to the bottom of the pipe for sewers 18-inch and larger.
- D. Heavy Cleaning: Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat-treated steel. To ensure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

## **PART 3 EXECUTION**

### **3.01 GENERAL**

- A. Prior to the start of any Work under this Project, CONTRACTOR shall make available to OWNER all equipment that is to be utilized in the execution of this contract. OWNER will hold a preconstruction conference at which the sequence of work, methods, inspection, and monitoring requirements and debris disposal shall be discussed.
- B. When sewer flow depth is greater than 25 percent, flow depth shall be decreased by plugging or bypass pumping. Plugs shall be designed to pass any desired portion of sewage flow. If bypass pumping is required, CONTRACTOR shall provide all necessary equipment, manpower, and expertise. CONTRACTOR shall be responsible for all damage to public or private property resulting from these operations.
- C. Designated sanitary sewers and manholes shall be cleaned using mechanical hydraulically propelled or high velocity sewer cleaning equipment. The cleaning process shall remove all grease, roots, sand, silt, solids, rags, debris, etc. from each sewer segment, including the manhole(s).
- D. Selection of cleaning equipment and the method for cleaning shall be based on the condition of the sanitary sewer mains at the time Work commences and will be subject to OWNER's approval.
- E. All cleaning equipment and devices shall be operated by experienced personnel.
- F. Satisfactory precautions shall be taken to protect the sanitary sewer mains and manholes from damage that might be inflicted by the improper use of the cleaning process or equipment. Any

damage done to a sewer by CONTRACTOR shall be repaired by the CONTRACTOR at no additional cost to and to the satisfaction of the OWNER.

- G. Cleaning shall also include the initial manhole wall washing by high-pressure water jet.
- H. CONTRACTOR, when instructed by OWNER, will be required to demonstrate the performance capabilities of the cleaning equipment proposed for use on the Project. If the results obtained by the proposed sanitary sewer cleaning equipment or attachments are not satisfactory, CONTRACTOR shall use different equipment/attachments, as required, to meet Specifications. More than one type of equipment/attachments may be required at a location.
- I. When hydraulic or high velocity cleaning equipment is used, a suitable sand trap, weir, dam, or suction shall be constructed in the downstream manhole in such a manner that all the solids and debris are trapped for removal.
- J. If water backups a lateral and enters a building or residence during cleaning, the CONTRACTOR shall notify the OWNER of the occurrence. It is the CONTRACTOR's responsibility to clean any backups which occur. If prior knowledge of backups is available, the CONTRACTOR shall take measures to prevent another backup from occurring (i.e., plugging the lateral) before cleaning.
- K. Cleaning operations shall be performed with the flow direction of the sewer, that is, from the upstream manhole towards the downstream manhole. Any damage that occurs from sewer backups resulting from cleaning activities shall be the Contractor's responsibility and shall be repaired/resolved at the Contractor's expense.

### **3.02 HYDRAULIC CLEANING**

- A. Prior to televising, CONTRACTOR shall thoroughly clean the pipelines of debris, grease, roots, sediment, broken pipe, or other obstructions that could retard the movement of the television camera. Precautions shall be taken to protect the sewer lines being cleaned from damage by the cleaning equipment.
- B. Hydraulically propelled devices, which require a head of water to operate, must utilize a collapsible dam. The dam must be easily collapsible to prevent damage to the sewer, property, etc.
- C. When using hydraulically propelled devices, precautions shall be taken to insure that the water pressure created does not cause damage or flooding to public or private property.
- D. CONTRACTOR shall not increase the hydraulic gradient of the sanitary sewers beyond the elevation that could cause overflow of sewage into area waterways or into structures.

### **3.03 HIGH-VELOCITY CLEANING**

- A. CONTRACTOR shall operate the equipment so that the pressurized nozzle continues to move at all times.
- B. The pressure nozzle shall be turned off or water pressure be reduced anytime the hose is held or delayed in order to prevent damage to the line. In heavy debris the step cleaning method should be used.

### **3.04 MECHANICAL CLEANING**

- A. Mechanical cleaning, in addition to normal cleaning when required by ENGINEER, shall be approved equipment and accessories driven by power winching devices.
- B. All equipment and devices shall be operated by experienced operators in an effort to prevent pipe damage during the cleaning process.
- C. Buckets, scrappers, scooters, porcupines, kites, heavy duty brushes, metal pigs and other debris removing equipment/accessories shall be used as appropriate and necessary in the field, in conjunction with the approved power machine(s).
- D. The use of cleaning devices such as rods, metal pigs, porcupines, root saws, snakes, scooters, sewer balls, kites and other approved equipment, in conjunction with hand winching device, and/or, gas, electric rod propelled devices, shall be considered normal cleaning equipment.

### **3.05 WATER USAGE**

- A. Any and all OWNER water used by CONTRACTOR shall be from a metered supply with an approved backflow device to protect the water supply. All metered water shall be paid for by CONTRACTOR to OWNER through the regular billing system.
- B. CONTRACTOR shall be responsible for obtaining transient water meter(s) from OWNER, which shall be installed on the trucks or at fire hydrant(s). All related charges for the set-up shall be considered incidental to the cleaning of the existing sanitary sewer mains.
- C. CONTRACTOR shall be responsible for preventing contamination of the potable water system. CONTRACTOR when drawing water from a public hydrant shall use a backflow preventer and/or an eighteen (18) inch air gap.
- D. No fire hydrant shall be obstructed or used when there is a fire in the area.
- E. It shall be CONTRACTOR's responsibility to obtain approval to use OWNER'S fire hydrants.
- F. CONTRACTOR shall remove the water meter(s)/piping etc. from all fire hydrants at the end of each working day.

### **3.06 REMOVAL AND DISPOSAL OF DEBRIS**

- A. All materials removed from the sewer lines during cleaning operations shall be trapped and removed from the system at the downstream manhole of the section being cleaned. All materials shall be disposed of in compliance with all applicable laws and regulations and in a manner approved by OWNER.
- B. Passing of debris from upstream manhole section to downstream manhole section will not be allowed.
- C. All debris from the manholes shall be loaded into an enclosed container that is permitted by OWNER and the Tennessee Department of Environment and Conservation (TDEC) for liquid waste



hauling.

- D. All solids or semi-solids resulting from the cleaning operations shall be removed from the site at the end of each workday and disposed of at a landfill at the Contractor's expense.
- E. CONTRACTOR shall pay landfill-tipping fee and is responsible for all permits required.
- F. CONTRACTOR shall not be allowed to accumulate debris, and/or liquid waste, sludge, etc. on the site except in totally enclosed containers approved by ENGINEER.
- G. All waste shall be hauled to the disposal site by a transporter, which is arranged for by CONTRACTOR and holds a valid Liquid Waste Transporter Permit.
- H. CONTRACTOR shall submit and maintain a "Liquid Waste Manifest" as per OWNER and TDEC requirements. OWNER'S and TDEC's copies of the completed manifest shall be sent to ENGINEER within 24 hours after the disposal of the waste materials.
- I. Under no circumstances shall sewage or solids removed in the cleaning process be dumped onto streets or into ditches, catch basins, storm drains, sanitary sewer manholes, cleanouts, or dumps.

End of Section

**SECTION 330130.72  
CURED-IN-PLACE PIPE LINING**

**PART 1 GENERAL**

**1.01 SCOPE**

- A. Rehabilitation of existing gravity sanitary sewer lines by the Cured-in-Place Pipe (CIPP) process.
- B. The CIPP process is defined as the reconstruction of gravity sewer pipe by the installation of polyester or an epoxy vinylester, thermosetting resin, vacuum impregnated flexible polyester felt fiber tube, having an impermeable inner surface. The resin-impregnated tube is formed to the host pipe by means of a water column. Curing is accomplished by circulating hot water throughout the length of the tube in accordance with the specified curing schedule supplied by the resin manufacturer. The CIPP shall extend the full length of the pipe reach being rehabilitated and shall provide a structurally sound, impermeable, jointless, and close fitting pipe that when cured is mechanically bonded to the host pipe.

**1.02 REFERENCES**

- A. The following is a list of standards that may be referenced in this Section:
  - 1. ASTM International (ASTM):
    - a. D543, Standard Practices for Evaluating Resistance of Plastics to Chemical Reagents.
    - b. D790, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
    - c. D3839, Standard Guide for Underground Installation of Fiberglass (Glass-Fiber Reinforced Thermosetting-Resin) Pipe.
    - d. F1216, Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.
  - 2. National Association of Sewer Service Companies (NASSCO): Recommended Specification Guidelines for Sewer Collection System Rehabilitation.

**1.03 DESIGN CRITERIA**

- A. Design liner thickness upon the following criteria:
  - 1. Pipes considered to be fully deteriorated.

2. Pipes subjected to full soil load with applicable live load and with water table at the top of the ground. Under pavement, live load shall include AASHTO HS20-44 Truck Loading in each pavement lane.
  3. Minimum Ovality of Pipe: 3 percent of circumference.
  4. Design calculations shall be based upon Appendix X1 of ASTM F1216 with a Factor of Safety of 2.
  5. Pipe Thickness:
    - a. Pipe 10 inches in Diameter or Less: Rounded to the next higher multiple of 0.5 mm, with a minimum thickness of 6 mm.
    - b. Pipe Greater than 10 inches in Diameter: Rounded to the next higher multiple of 0.5 mm, with a minimum thickness of 7.5 mm.
  6. Creep Retention: Not less than 50 percent.
  7. Poisson's Ratio: 0.3.
  8. Enhancement Factor:  $K = 7$ .
  9. Liner shall be watertight.
- B. Provide analysis of design criteria and calculations for liner thickness to OWNER for approval. OWNER may vary liner thickness for same size sewer depending upon field condition of pipes or depths.

#### **1.04 SUBMITTALS**

- A. Action Submittals: Product data.
- B. Informational Submittals:
  1. Design calculations.
  2. Manufacturer's installation instructions and procedures. Furnish information, essentially in the same format as below, or give details of the procedure and the steps to be followed for the installation of the CIPP, even if the process is named in the Specification.
    - a. Wet Out.
    - b. Insertion.
    - c. Curing.
    - d. Cool Down.
    - e. Finished Pipe.
  3. "Wet out" schedule.

4. Installer's statement of qualifications.
5. Manufacturer's Certificate of Compliance certifying compliance with the applicable specifications and standards.
6. Certified copies of test reports of factory tests required by the applicable standards and this Section.
7. DVD of CCTV inspection.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Keep products safe from damage. Promptly remove damaged products from Site. Replace damaged products with undamaged products.
- B. Maintain resin-impregnated tubes in refrigerated truck trailers at a temperature below 45 degrees F to prevent premature curing. Prior to beginning inversion, no portion of the resin-impregnated liner shall be subjected to sunlight or ultraviolet radiation. Resin-impregnated tubes with signs of premature curing shall not be installed and shall be removed from the Project Site.

**1.06 SPECIAL GUARANTEE**

- A. Provide manufacturer's extended guarantee or warranty, with Owner named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of the Owner, removal and replacement of Work specified in this Specification section found defective during a period of 5 years after the date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work shall be as specified in the General Conditions.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Resin: Unless otherwise specified, CONTRACTOR shall furnish a general purpose, unsaturated, polyester or thermosetting vinylester resin and catalyst system compatible with the reconstruction inversion process that provides the cured physical strengths and properties specified herein.

Physical Characteristic	Minimum Values	Test Method
Flexural Strength	4,500 psi	ASTM D790 mod.
Modulus of Elasticity	250,000 psi	ASTM D790 mod.

- B. Resins shall be shipped directly to the wet-out facility from the resin manufacturer and shall be one of the following:

1. Reichhold; PolyLite #33420 or DION 9800-20 or approved equal.
  2. Interplastic Corporation; #COR72-AA-455HV or #CORVE8190 or approved equal.
  3. Ashland Specialty Chemical Company; #AROPOL MR12018 or HETRON Q6405 or approved equal.
  4. AOC; 701, Vipel; L704NET-11, or Vipel; L704AAP-12 or approved equal.
- C. PET resins, resin fillers, resin additives, and resin enhancement agents are prohibited. Only neat resins are acceptable. Old resins and reworked resins are prohibited, regardless of whether or not they are mixed with new resin.
- D. Tube:
1. In accordance with ASTM F1216.
  2. Liner tube shall consist of layers of flexible nonwoven polyester felt.
  3. Sewage-contact inside layer of tube shall be coated with an impermeable material compatible with resin and felt.
  4. Manufacturers:
    - a. Applied Felt or approved equal.
    - b. Insituform Technologies or approved equal.
    - c. Liner Products or approved equal.
- E. Catalysts:
1. Primary catalyst shall not exceed 1 percent of the resin by volume.
  2. Secondary catalyst shall not exceed 1/2 percent of the resin by volume.
  3. Catalysts shall be:
    - a. Primary Catalyst: Akzo; Perkadox 16 or Norox 600 or approved equal.
    - b. Secondary Catalyst: Akzo; Trigonox C or Norox TBPB or approved equal.

## **2.02 ACCESSORIES**

- A. Hydrophilic Rubber Joint Seal: Greenstreak, Inc.; Hydrotite or approved equal.
- B. PVC Saddle Tees: Solvent welded type for 8-inch CIPP sewer main connection. Tee shall fit the existing pipe and have an integral 6-inch branch connection with gasket. The saddle shall

include two stainless steel straps. Saddle tees shall meet the requirements of ASTM D3034 and ASTM F477.

- C. Coupling: Flexible PVC coupler, 3/8-inch thick, with multiple sealing ribs and stainless steel T-bolt clamps as manufactured by Fernco, Inc. or approved equal.

### **PART 3 EXECUTION**

#### **4.01 PRE-INSTALLATION PREPARATIONS**

- A. Complete the following activities, unless approved otherwise by OWNER:
  1. Safety: Perform operations in accordance with applicable OSHA Standards. Particular attention shall be paid to those safety requirements involving work on an elevated platform and entry into a confined space.
  2. Pre-Insertion Cleaning: Rewash, reclean and ready existing sewer pipe immediately before the pre-insertion television inspection.
  3. Pre-Insertion CCTV Inspection: Inspect sewer pipe before insertion of resin impregnated tube to ensure pipe is clean and existing pipe conditions are acceptable for lining. Provide a DVD of the CCTV inspection.
  4. Dye Testing: Where sewer line segments may contain abandoned services, CONTRACTOR may be directed to perform dye testing to determine if the services are live and require re-instatement.
  5. Bypassing Sewage: Reference Section 02542, Sewer Flow Control.
  6. Line Obstructions: If pre-insertion video CCTV inspection reveals an obstruction in the existing pipe (such as heavy solids, dropped joints, protruding service taps or collapsed pipe which may prevent completion of the inversion process), that cannot be removed by sewer cleaning equipment, then a point repair using flexible coupling may be made with the approval of OWNER.

#### **4.02 PRIVATE SERVICE LATERAL SHUTDOWN**

- A. Notify OWNER at least 1 week prior to the shutdown when it is necessary to shutdown a private service line while Work is in progress and before the service lines are reconnected.
- B. Notify building occupants regarding service lateral disconnection by placing a door hanger approved by the OWNER. Place door hangers 3 days prior to disconnection.
- C. When a service lateral will be disconnected from the main for more than 1 day, lateral shall be positively drained or pumped a minimum of once every 24 hours. Monitor status of flow and storage. Pump lateral more frequently where flows exceed the storage capacity of the lateral or temporary storage as may be provided by CONTRACTOR.

- D. Temporarily restore services in uncompleted sections during non-work hours.
- E. Notify building occupants when Work is complete and full uninterrupted service restored.
- F. No service is to remain shutdown for more than a period of 8 hours, unless CONTRACTOR provides substitute services for the residents. If the service is to be shutdown for more than 8 hours and CONTRACTOR cannot provide substitute services, then CONTRACTOR shall provide temporary living quarters (i.e., hotel) for the resident at no additional cost to OWNER or the resident. Temporary living quarters shall be approved by OWNER and coordinated through OWNER's Customer Support Representative.
- G. Maintain commercial sewer services while businesses are open. No sewage from the services or main line shall be allowed to be discharged on the ground or in waterways. Holding pits or tanks are not allowed unless permitted by TDEC.

#### **4.03 INSTALLATION PROCEDURES**

- A. Liner shall be water cured only. Steam curing is prohibited.
  - 1. Curing Time: 3 hours minimum.
  - 2. Minimum interface temperature between liner and tube shall be 120 degrees F.
  - 3. Water Temperature: 180 degrees F minimum.
- B. The finished CIPP shall:
  - 1. Be continuous over entire length from manhole to manhole and be free from visual defects such as foreign inclusions, dry spots, keel, boat hull, pinholes, wrinkles, and other deformities.
  - 2. When passing through or terminating in a manhole shall be carefully cut out in a shape and manner approved by OWNER.
  - 3. Annular space between existing pipe and the CIPP shall be sealed.
  - 4. Meet leakage requirements of pressure test as specified in Section 02532, Sanitary Sewers.
- C. OWNER requires a continuous, uniform liner for a pipeline section. OWNER will not allow intermediate excavation for new manhole.

#### **4.04 SEALING AND BENCHES IN MANHOLE**

- A. CIPP shall make a tight fitting seal with existing pipe(s) in manhole. For CIPP that is installed continuous through manhole, the top half of the pipe shall be neatly cut off and not broken or sheared off at least 2 inches away from wall. The channel in the manhole shall be a smooth continuation of the pipe(s) and shall be merged with other pipes or channels, if any. Channel cross-section shall be U-shaped.

- B. At each pipe opening into manhole, hydrophilic rubber joint seal shall be bonded with adhesive to the host sewer pipe or to the opening in the manhole barrel to hold it in place during inversion. Seal shall be Insignia™ End Seal Sleeve as manufactured by LMK Enterprises or approved equal.
- C. Seal CIPP and existing pipe in manhole as stated above before proceeding on to next manhole section. Manholes shall be individually inspected for liner cut-offs, benches, and sealing of liner annular space.

#### **4.05 SERVICE REINSTATEMENTS**

- A. The exact location and number of service connections shall be determined from CCTV. Field locate existing service connections. Perform service cut outs at active service connections immediately after liner has cured. Initial internal service cut outs shall be made to the lesser of a 6-inch diameter opening or 90 percent of the original diameter of the connection. If the service cannot be replaced through excavation, internally reinstate the service to 100 percent of original opening, and provide a smooth opening with no ragged edges. Services shall not be reconnected from abandoned or vacant lots, unless directed otherwise by OWNER. Restore and correct missed or faulty reconnections as well as damage caused to property owners for not reconnecting the services soon enough or for not giving notice to the owners. Services which are reconnected to rehabilitated liner shall be shown on “as-built drawings” with the distance from the nearest downstream manhole.

#### **4.06 SERVICE CONNECTION BY EXCAVATION**

- A. Excavate existing active service connections. Disconnect at joints and existing sewer (now the carrier pipe for the liner) and remove to expose the liner to the extent necessary. Do not damage liner pipe or allow to normalize to ambient temperature and cool down before 6-inch diameter hole is drilled out. Coat cut out hole in liner with approved resin/epoxy that will cure at the ambient temperature.
- B. Install PVC saddle tee with gasketed PVC connection for the new sewer service lateral over the cut out. Saddle shall be a one-piece saddle attached to the liner with epoxy and equipped with a neoprene gasket so that a complete seal is accomplished when the strap-on saddle is tightened with two stainless steel bands; one on each side. The stub-out attached to the saddle shall protrude into liner a distance equal to the wall thickness of liner.
- C. Replace sewer service laterals per Section 02532, Sanitary Sewers (Gravity).

#### **4.07 TESTING FOR ACCEPTANCE**

- A. Sampling and Measuring: One minimum 12-inch long restrained pipe section shall be cut from the cured liner. Measurements of sample thickness will be taken by OWNER from four locations on each section. The average thickness of the measurements shall be equal to or greater than the required design thickness.



- B. Laboratory Testing: One sample shall be sent to an independent laboratory and tested for modulus of elasticity and flexural strength. Preparation and testing standards shall be performed in accordance with the approved submittals. Failure of any test can be grounds for rejection of the CIPP liner. At the direction of OWNER, a second sample shall be tested.
- C. Destructive Testing: In cases where test results of samples from the 12-inch long pipe section are lower than required values, at the direction of OWNER, CONTRACTOR shall cut samples from liner along length of pipe. The size and shape of the samples shall be determined by OWNER. The CONTRACTOR shall repair the CIPP liner and host pipe at no additional cost to OWNER. Failure of the thickness test shall be grounds for rejection for the CIPP liner.
- D. Resin Sampling: "Wet-out" facility resin mixing equipment shall have a valve downstream of the mixing functions and immediately upstream of the application of the mixed resin to the tube where OWNER can draw resin samples. CONTRACTOR's batch mix facilities, if any, shall provide for sampling of the mixed batch. Submitted "wet-out" schedule cannot be modified without 24-hour notice to OWNER. Resin samples shall be drawn at times determined by OWNER. The OWNER drawing the samples will arrive unannounced and shall be afforded immediate access to the equipment.
- E. CCTV shall be as specified in Section 02541, Sewer Television Inspection. Televising shall be done after service connections have been made, unless required earlier by OWNER. Provide CCTV DVD's after liner has been installed in existing sewer pipe.
- F. Low-pressure air test as specified in Section 02532, Sanitary Sewers, shall be required after liner has been installed in existing sewer pipe and service lateral connections have been completed.
- G. No visible leak around liner at manhole connections will be allowed.
- H. Correct failed liner or liner deemed unacceptable by OWNER as a result of the post-video inspection or test reports for structural values and thickness.
  1. Remedy shall be defined as shown in the following table and shall be based upon lowest test in each test category. Where pipe replacement is required, payment shall be made in full for the cured-in-place pipe. No payment will be made to construct a new sewer segment.

<b>PIPE CORRECTION</b>			
<b>TEST</b>	<b>REQ'D VALUE</b>	<b>TEST RESULT</b>	<b>REMEDY</b>
Flexural Strength	4,500 psi	4,300 to 4,490 psi	10% Unit Price Reduction
	4,500 psi	4,100 to 4,290 psi	30% Unit Price Reduction
	4,500 psi	Less than 4,100 psi	Pipe Replacement
Flexural Modulus	250,000 psi	238,000 to 249,000 psi	10% Unit Price Reduction

<b>PIPE CORRECTION</b>			
<b>TEST</b>	<b>REQ'D VALUE</b>	<b>TEST RESULT</b>	<b>REMEDY</b>
	250,000 psi	225,000 to 237,900 psi	30% Unit Price Reduction
	250,000 psi	Less than 225,000 psi	Pipe Replacement
Thickness	6.0 mm	5.7 to 5.9 mm	10% Unit Price Reduction
	6.0 mm	5.4 to 5.6 mm	30% Unit Price Reduction
	6.0 mm	Less than 5.4 mm	Pipe Replacement
	7.5 mm	7.1 to 7.4 mm	10% Unit Price Reduction
	7.5 mm	6.7 to 7.1 mm	30% Unit Price Reduction
	7.5 mm	Less than 6.7 mm	Pipe Replacement

End of Section

**SECTION 330130.81  
MANHOLE REHABILITATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Rehabilitation of physically deteriorated, leaking or structurally unsound sanitary sewer manholes by polymer applied coatings (either epoxy or polyurethane). Sprayroq, Raven, SpectraShield, and OBIC (or Engineer approved equal) products are the only approved polymer-based coating methods.
- B. The repair and sealing of the manhole base, invert, walls, corbel/cone and chimney of brick, block or precast manholes.
- C. Reinstallation or replacement of manhole frames and cover for grade adjustment, frame alignment, poor condition, or for inflow elimination as specified in paragraph 3.05.
- D. The installation of manhole to frame (chimney) seals, as specified in paragraph 3.06.
- E. Inspection and testing of the various types of work to ensure compliance.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Perform work needed to make manholes structurally sound, improve flow, prevent entrance of inflow or groundwater, prevent entrance of soil or debris, and provide protection against corrosion.
- B. Contractor's personnel involved in installation of materials: Certified by manufacturer that they have successfully completed training in handling, applying and finishing materials used.
- C. Contractor: Inspecting pre-rehabilitation work, rehabilitation operation, and post-rehabilitation work.
- D. Manufacturer's Product Support
  - 1. Through the Contractor, manufacturers of wall sealing, coating or lining systems shall submit to the Engineer for review and approval a detailed description of the proposed rehabilitation process. Describe surface preparation, independent laboratory test results, mix design procedures and methods of controlling uniform thickness.
  - 2. A representative employed by the manufacturer and/or the liner system shall be a company that specializes in the design, manufacture, or installation of corrosion protection systems for manholes. Applicator shall be completely trained in leak repair, surface preparation, and corrosion protection materials application for manholes. Corrosion protection materials/products shall be suitable for installation in a severe hydrogen sulfide environment without any deterioration to the liner. Representative

shall be named and available for consultation by telephone during business hours and on site upon 48 hours notice.

### **1.03 SUBMITTALS**

- A. Product Data: Submit product data for both repair materials to be lined and the lining product, including surface preparation instructions, application instructions, and cure times from manufacturer.
- B. Installer Qualifications: Installers of liners and wall repair systems shall submit qualifications to the Engineer at least 14 days prior to start of any material application. Submittal shall consist of:
  - 1. Manufacturer's approved equipment list, by name and model number for application of product and contractor's equipment list showing approved equipment available for use in product application.
  - 2. List of contractor's personnel who have satisfactorily completed manufacturer's training in product application within previous two years. Include date of certification for each person.
  - 3. Five (5) recent references of contractors indicating successful application of the lining product specified herein, applied by spray application within the municipal wastewater environment.
- C. Work Procedures: Submit confined space entry and flow diversion and/or bypass plans as necessary to perform the specified work.
- D. Progress Photographs:
  - 1. After cleaning and preparing each manhole, submit either 3"x5" color photographs or digital photographs of manhole's interior walls for review by the Engineer. The Engineer may inspect the manhole before giving approval to begin lining.
  - 2. After liner installation of each manhole, submit a minimum of three additional 3"x 5" color photographs or digital photographs to show final condition of rehabilitated manhole.
  - 3. Provide photographs of sufficient quality and clarity so that interior condition can be readily determined by the Engineer.
  - 4. Annotate each photograph. Give date, manhole number, material used, and appropriate remarks either on the back using permanent ink, or in a corresponding electronic file.

### **1.04 PROJECT CONDITIONS**

- A. Contractor shall conform with all local, state, and federal regulations.
- B. Manholes Containing Mechanical or Electrical Equipment:

1. Contract Drawings may not show locations of flow monitoring equipment. If a manhole contains any mechanical hardware or electrical flow monitoring equipment, immediately notify the Engineer.
2. Reschedule work in such manholes until equipment has been removed by Owner and further instructions are given.
3. Do not subject manholes with mechanical hardware or electrical equipment to diversion/bypass pumping.
4. Damage to installed equipment, due to negligence of Contractor, will be repaired by Owner and cost of repairs charged to Contractor.

C. Field Location of Manholes, Cleanouts and Inlets:

1. Contractor is responsible for locating and uncovering all manholes and cleanouts in lines being rehabilitated. If difficulty is encountered in locating a manhole or clean-out covered by ground or pavement, notify the Engineer and await instructions.
2. Manholes may be located within project limits which are not part of the system being rehabilitated. Properly identify manholes before starting cleaning and sealing operations.

**1.05 SALVAGE**

- A. Manhole covers, frames, and adjusting rings from abandoned manholes and inlets remain the property of the Owner. Deliver salvaged items to locations designated by the Engineer.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

A. General

1. The materials used shall be designed, manufactured and intended for sewer manhole rehabilitation and the specific application in which they are used. The materials shall have a proven history of performance in sewer manhole rehabilitation. The materials shall be delivered to the job site in original unopened packages and clearly labeled with the manufacturer's identification and printed instructions. All materials shall be stored and handled in accordance with recommendations of the manufacturer. All materials shall be mixed and applied in accordance with the manufacturer's written instructions.
2. The installer shall warrant and save harmless the Owner and his Engineer against all claims for patent infringement and any loss thereof.

3. The Contractor shall handle and store all material and shall dispose of all wastes in accordance with applicable regulations.
  4. Each lining system shall be designed for application over wet (but not active running water) surfaces without degradation of the final product and the bond between the product and the manhole surfaces.
- B. Stopping active leaks in concrete and masonry manholes:
1. A chemical or hydraulic sealant designed for use in field sealing of ground water. Product shall be formulated for topcoating with the specified coating products. Product shall be approved by owner/engineer prior to installation.
- C. Patching, repointing, filling, and repairing nonleaking holes, cracks, and spalls in concrete and masonry manholes:
1. 100% solids, solvent – free epoxy grout specifically formulated for topcoating with the specified coating products.
  2. Factory blended, rapid setting, high early strength, fiber reinforced, non-shrink repair mortar that can be trowelled or pneumatically spray applied may be approved if specifically formulated to be suitable for topcoating with the specified coating products.
- D. Spray applied Epoxy Coating for manholes:
1. The material sprayed onto the surface of the manhole shall be a 100% solids, solvent-free, ultra high-build two or three part epoxy system.
  2. A monolithic liner shall be formed which covers all manhole surfaces and shall have the following physical properties:

Minimum thickness	250 mils
Adhesion to Concrete ASTM D4541	Substrate (concrete) failure
Working time at 70 degrees F	min. 30 minutes
Initial set time at 70 degrees F	17 hours
- E. Spray applied Polyurethane Coating for manholes:
1. The material sprayed onto the surface of the manhole shall be a 100% solids, volatile organic compounds (VOC) free, two part polyurethane lining.
  2. A monolithic liner shall be formed which covers all manhole surfaces and shall have the following physical properties:

Minimum thickness	100 mils
Tensile strength (ASTM D638)	min. 2,700 psi

- F. Manhole frames and covers.
  - 1. Standard and non-traffic bearing watertight frames and covers shall be as per RWSG standards.
  - 2. Watertight frames and covers shall be installed in easement areas.
- G. Manhole to frame seal.
  - 1. Frame-to-chimney seals shall be installed as specified by written manufacturer's instructions.

### **PART 3 EXECUTION**

#### **3.01 REHABILITATION OF MANHOLE STRUCTURES**

- A. General Procedures:
  - 1. Safety: The Contractor shall perform all work in strict accordance with all applicable OSHA standards. Particular attention is drawn to those safety requirements regarding confined space entry. Provide barricades, warning lights and signs for excavations.
  - 2. Cleaning: All concrete and masonry surfaces to be rehabilitated shall be clean. All grease, oil, laitance, coating, loose bricks, mortar, unsound concrete and other foreign materials shall be completely removed. Water blasting utilizing a 210 degree steam unit and proper nozzles shall be the primary method of cleaning; however, other methods such as wet or dry sandblasting, acid wash, concrete cleaners, degreasers or mechanical means may be required to properly clean the surface. All surfaces on which these methods are used shall be thoroughly rinsed, scrubbed, and neutralized to remove cleaning agents and their reactant products. Debris resulting from cleaning shall be removed from the manhole and not allowed to be carried downstream.
  - 3. Stopping Infiltration: After surface preparation and prior to the application of linings and coatings, infiltration shall be stopped either by plugging or chemical grout sealing as specified above.
  - 4. Patching: All large holes or voids around steps, joints or pipes, all spalled areas and all holes caused by missing or cracked brick shall be patched and all missing mortar repointed using a non-shrink patching mortar or grout as specified above. All cracked or disintegrated material shall be removed from the area to be patched or repointed, exposing a sound sub-base. All cracks not subject to movement and greater than 1/16-inch in width shall be routed out to a minimum width and depth of 1/8-inch and patched with non-shrink patching mortar or grout.
  - 5. Maintaining waste water flows: The Contractor shall be responsible for maintaining sewer flows in accordance with bypass pumping requirements.

6. Remove all loose grout and rubble from existing channel. Rebuild channel if required by reshaping, repairing slope of shelves or benches. Work shall include aligning inflow and outflow ports in such a manner as to prevent the deposition of solids at the transition point. All inverts shall follow the grades of the pipe entering the manhole. Changes in direction of the sewer and entering branch or branches shall have a true curve as large a radius as the size of the manhole will permit, but will be shaped to allow easy entrance of maintenance equipment including buckets, T.V. camera, etc.
7. Manhole steps: Existing manhole steps shall be cut and removed and not replaced after rehabilitation.
8. Each lining system shall be installed in accordance with the manufacturer's recommendation to withstand a groundwater pressure of at least 15 feet above the manhole bench.

### **3.03 SPRAY APPLIED EPOXY COATING**

- A. The material shall be spray applied to a minimum uniform dry film thickness of 250 mils to insure all cracks, crevices, and voids are filled and a somewhat smooth surface remains. The material shall be a two or three part 100% solid, corrosion resistant epoxy coating that can be applied to dry or wet surfaces. The proposed coating system shall be a Raven, Sauereisen, or approved equal.
- B. The primer system shall be familiar to Raven, Sauereisen, or approved equal.
- C. The proposed system shall be 100% solids by volume and shall contain no volatile organic compounds (VOC's).
- D. Epoxy manhole liner manufacturer shall warrant against failure for a period of 10 years. "Failure" will be deemed to have occurred if the protective lining fails to (a) prevent the internal deterioration or corrosion of the structure, (b) protect the substrate and environment from contamination by effluent, or (c) prevent groundwater infiltration. If any such failure occurs within 10 years of initial completion of work on a structure, the damage will be repaired to restore the lining at no cost to the Owner within 60 days after written notification of the failure. "Failure" does not include damage resulting from mechanical or chemical abuse or act of God. Mechanical or chemical abuse means exposing the lined surfaces of the structure to any mechanical force or chemical substance not customarily present or used in connection with structures of the type involved. There are no warranties express or implied other than those specifically stated in this section 3.04 D. Any liability for consequential and incidental damages is expressly disclaimed. Liability is limited to and shall not exceed the purchase price paid.

### **3.04 SPRAY POLYURETHANE COATING**

- A. The material shall be spray applied to a minimum uniform dry film thickness of 100 mils to insure all cracks, crevices, and voids are filled and a somewhat smooth surface remains. The material shall be a two-part 100% solid, corrosion resistant polyurethane coating that can be applied to dry or wet surfaces. The material shall be light in color. The proposed coating system shall be Sprayroq, Spectrashield, OBIC, or approved equal.



- B. The primer system shall be familiar to Sprayroq, Spectrashield, OBIC, or approved equal.
- C. The proposed system shall be 100% solids by volume and shall contain no volatile organic compounds (VOC's).
- D. Polyurethane manhole liner manufacturer shall warrant against failure for a period of 10 years. "Failure" will be deemed to have occurred if the protective lining fails to (a) prevent the internal deterioration or corrosion of the structure, (b) protect the substrate and environment from contamination by effluent, or (c) prevent groundwater infiltration. If any such failure occurs within 10 years of initial completion of work on a structure, the damage will be repaired to restore the lining at no cost to the Owner within 60 days after written notification of the failure. "Failure" does not include damage resulting from mechanical or chemical abuse or act of God. Mechanical or chemical abuse means exposing the lined surfaces of the structure to any mechanical force or chemical substance not customarily present or used in connection with structures of the type involved. There are no warranties express or implied other than those specifically stated in this section 3.04 D. Any liability for consequential and incidental damages is expressly disclaimed. Liability is limited to and shall not exceed the purchase price paid.

### **3.05 MANHOLE FRAME AND COVER REINSTALLATION OR REPLACEMENT**

- A. The Contractor shall remove the existing manhole frame and cover and, if they are not being reused, dispose of them as directed by the Engineer. It shall be the responsibility of the Contractor, at no additional cost to the Owner, to repair any damage to the chimney or corbel caused by the removal of the existing manhole frame.
- B. If the manhole frame is to be raised, a sufficient number of new precast concrete grade rings or brick shall be installed to enable the frame and cover to meet the new grade. The manhole cover may also be raised to meet the grade by installing an approved steel or iron manhole adjusting ring in the top of the existing manhole frame.
- C. The frame and adjustment rings shall be set in a bed of Butyl Mastic Sealant.
- D. Existing frames and covers that are to be reused shall be thoroughly cleaned before reinstallation. The Contractor shall then install the new or reused frames so that the top of the covers are at the required grade.

### **3.06 MANHOLE TO FRAME SEAL**

- A. Manhole to frame seals shall be installed as specified in the Bid Form.
- B. Internal double pleated elastomeric sleeve shall be mechanically attached to and sealed against the manhole frame and chimney with internal expanding bands.
- C. The inside diameter of both the base of the manhole frame and the chimney or cone/corbel section shall be accurately measured as recommended by the manufacturer to obtain the proper size and shape of the seal.

- E. The contact surfaces for the sleeve shall be circular, clean, reasonably smooth, and free of loose material and excessive voids. If the masonry surface is rough or irregular and will not provide an effective seal, it shall be smoothed with mortar. A bed of butyl rubber caulk shall be applied to the sealing surface of the sleeve to fill minor irregularities in the masonry surface. After the sleeve has been placed in proper position, the bands are positioned and individually tightened or expanded as required to provide a watertight seal. Detailed installation instructions shall be in accordance with the manufacturer's instructions.

### **3.07 MANHOLE REHABILITATION ACCEPTANCE**

- A. Per manufacturer specifications, spark or holiday testing may be required to ensure a continuous pinhole-free lining. Manhole must pass manufacturer specified test for work to be accepted by the Engineer.
- B. After the manhole rehabilitation work has been completed, the manhole shall be visually inspected during high groundwater by the Contractor in the presence of the Engineer and the work shall be accepted if found satisfactory to the Engineer. No evidence of visible leaks shall be allowed. In addition, at the Owner's request, the Contractor may be required within one year to visually inspect the manholes that were rehabilitated. Any work that has become defective within the one year period shall be redone by the Contractor at no additional expense to the Owner.

### **3.08 MANHOLE VACUUM TESTING**

- A. Manholes shall be tested upon completion of the rehabilitation work as specified.
- B. The CONTRACTOR shall provide all labor and equipment for vacuum and holiday testing.
- C. All manholes are to be vacuum tested following rehabilitation. The ring and lid casting assembly shall be installed prior to testing. The testing equipment shall consist of a gasoline powered vacuum pump with sufficient vacuum hose length and a test head of proper size to fit the inside opening of the manhole. The test head shall be equipped with an inflatable rubber bladder to effect the seal to the manhole, an air pressure gauge, and a safety valve for filling the bladder, a 30-inch Hg liquid-filled vacuum gauge, a double air exhaust manifold with quarter turn ball valves, three bolt-on feet, and a bridge assembly with height adjustment rod.
- D. The Contractor shall plug all pipe openings, taking care to securely brace the plugs and the pipe. The plugs shall be placed a minimum of 6" beyond the manhole wall.
- E. With the vacuum tester in place, inflate the compression band to effect a seal between the vacuum base and the structure. Connect the vacuum pump to the outlet port with the valve open and evacuate the manhole to 10" Hg (0.3 bar), which is equivalent to approximately 5 PSIG back pressure.
- F. Close vacuum inlet/outlet ball valve, disconnect the vacuum pump, and monitor the vacuum for the specified time period. If the vacuum does not drop in excess of 1" Hg over the specified time period, the manhole is considered acceptable and passes the test. If the manhole fails the test, identify the leaking areas by removing the head assembly, coating the interior surfaces of

the manhole with a soap and water solution, and repeating the vacuum test for approximately thirty seconds. Once the leaks have been identified, complete all necessary repairs by sealing the leaks on the outside of the manhole to the satisfaction of the OWNER, and repeat test procedures until satisfactory results are obtained.

VACUUM TEST TIMETABLE			
Manhole Diameter - Inches			
Depth - Feet	48"	60"	72"
4'	10 sec.	13 sec.	16 sec.
8'	20 sec.	26 sec.	32 sec.
12'	30 sec.	39 sec.	48 sec.
16'	40 sec.	52 sec.	64 sec.
20'	50 sec.	65 sec.	80 sec.
24'	60 sec.	78 sec.	96 sec.
*	5.0 sec.	6.5 sec.	8.0 sec.
* Add extra testing time, "T", for each additional 2 foot depth. (The values listed above have been extrapolated for ASTM designation C924-85.)			

- G. The OWNER reserves the right to reject any and all manholes that do not pass vacuum testing requirements, and replacement shall be at the CONTRACTOR'S expense. A significant number of leaks on a single manhole, or a significant number of manholes leaking shall be considered as a basis for rejection and replacement of manholes.

End of Section

**SECTION 333100  
SANITARY SEWERS AND APPURTENANCES (GRAVITY)**

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. Furnishing and installation of sanitary sewerage systems.

**1.02 RELATED SECTIONS**

- A. Section 015200 - Construction Facilities and Temporary Controls
- B. Section 015713 – Temporary Erosion and Sediment Control
- C. Section 017400 - Cleaning
- D. Section 311100 – Clearing and Grubbing
- E. Section 312333 – Trenching, Backfilling, and Compacting
- F. Section 330130.10 – Sewer Flow Control

**1.03 SUBMITTALS**

- A. Submittals shall be submitted as specified in Section 01302, Submittals and Substitutions promptly and in accordance with approved schedule, in such a sequence that no delay to the work, or to the work of other Contractors is caused.
- B. Product data shall be submitted as required.
- C. Submit certification signed by manufacturer and Contractor that pipe, fittings, manholes, castings, and appurtenances meet specification requirements.
- D. Submit electronic copies of required documents.

**1.04 QUALITY ASSURANCE**

- A. The Contractor shall install and test lines, fittings, valves and appurtenances in accordance with regulations issued by the Tennessee Department of Environment and Conservation and the Owner.
- B. The Contractor shall disinfect all potable water lines, fittings, valves and appurtenances in accordance with regulations issued by the Tennessee Department of Environment and Conservation.
- C. Adequate numbers of skilled workmen, who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this section shall be used.

- D. Use equipment adequate in size, capacity and numbers to accomplish the work in a timely manner.
- E. PVC piping shall be stored to protect from long term exposure to direct sun light and shall be stacked in suitable support systems to prevent buckling and deformation.
- F. Immediately prior to lowering pipe or fittings into the trench, each length of pipe and each component shall have the interior and mating surfaces cleaned of all dirt and foreign material.
- G. Carefully examine each pipe and fitting for cracks and other defects while suspended above the trench immediately before installation.

#### **1.05 REFERENCES**

- A. ASTM A48 - Gray Iron Casting
- B. ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and sewer pipe
- C. ASTM C425 - Compression Joints for Vitrified Clay Pipe and Fittings
- D. ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
- E. ASTM C478 - Pre-Cast Reinforced Concrete Manhole Sections
- F. ASTM C890 - Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.
- G. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
- H. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
- I. ASTM D3034 - Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
- J. ASTM D3212 - Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
- K. AWWA C111 - Rubber Gasket Joints for Cast-Iron and Ductile-Iron Pressure Pipe and Fittings
- L. AWWA C151 - Ductile-Iron Pipe Centrifugally Cast, in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
- M. ASTM D-1248 - High Density Polyethylene Pipe
- N. National Precast Concrete Association: Quality Control Manual for Precast Concrete Plants.

#### **1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Product Delivery, Storage and handling shall be in strict accordance with the manufacturer's recommendations using the best available methods to prevent damage to materials and

components.

- B. All material shall be stored to protect from long term exposure to direct sun light and shall be stacked in suitable support systems to prevent buckling and deformation.
- C. Protect ductile iron pipe from damage to coating and lining.
- D. All types of pipe shall be handled using canvas or nylon slings. If a forklift is to come in direct contact with HDPE pipe, the forks shall be padded. HDPE pipe shall be stored in a manner, which minimizes crushing or bending. HDPE pipe should lay flat and be stacked no higher than 84 inches. HDPE pipe coils shall not be stored in a vertical position. HDPE pipe shall be transported and stored so that it does not come in contact with debris or materials that could cause damage to the pipe.
- E. Limit stacking of pipe to a height that will not cause deformation of bottom layers of pipes under anticipated temperature conditions. Space supports at widths as not to allow deformation of pipe at point of contact with support or between supports.
- F. Interior of pipe and fittings shall be cleaned of dirt and other foreign material immediately prior to lowering into the trench.
- G. Carefully examine each pipe and fitting for cracks and other defects while suspended above the trench immediately before installation.

#### **1.07 JOB CONDITIONS**

- A. All Work in streets and roadways shall be conducted in strict accordance with provisions of Section 01570, Work Zone Traffic Control.
- B. Whenever pipe laying is not actively in progress, open ends of all installed pipe and fittings shall be fitted with a watertight plug.
- C. Separation of Sewers and Water Mains:
  - 1. Parallel Installation of Sewers and Water Mains
    - a. Whenever possible the sewer shall be installed at least 10 feet. horizontally from water mains, the distance measured from edge to edge.
    - b. If local conditions prevent a horizontal separation of 10 feet, the sewer shall be installed in a separate trench so that the top of the sewer pipe is at least 18 inches below the bottom of the water main.
    - c. If neither of these conditions can be met the sewer shall be constructed of push-on or mechanical joint ductile-iron pipe, and the pipe pressure tested to assure watertightness prior to backfilling.
  - 2. Crossing of Sewers and Water Mains:
    - a. Whenever possible the sewer main shall be installed below the water main so that the

minimum distance between the outside of the sewer pipe and the outside of the water pipe is at least 18 inches. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints.

- b. If local conditions prevent this separation, the sewer shall be constructed of push-on or mechanical joint ductile-iron pipe, and the pipe pressure tested to assure watertightness prior to backfilling.
  - c. Where the water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main.
- D. Sewage flow must be maintained in the existing sewers. Whenever pipe laying progresses to a point where this flow must be interrupted, the Contractor shall plug the sewer upstream of the construction and provide pump bypassing to the downstream manhole in accordance with Section 02542, Sewer Flow Control. All downstream pipes, manholes and appurtenances must be tested and determined to be acceptable to the Owner and the Engineer to receive sewage flow. Bypassing of raw sewage to the surface will not be permitted. Contractor shall notify the Owner, his field representative and/or other appropriate authorities and receive written permission prior to proceeding with bypassing. When working in areas where interruption of sewer flow may occur, the Contractor shall have at the site the necessary pumps, lines and all other equipment in readiness to provide pump bypassing.
- E. Contractor shall provide screen or other means approved by the Owner's representative to minimize gravel, mud, and other construction debris from entering sanitary sewer system. Screen shall be checked, maintained, and cleaned by Contractor daily, and shall be located closely downstream of the current construction activities under the direction of the Owner's representative. Relocate screen as necessary with construction activities.
- F. Contractor shall plan his Work and arrange his Work schedules to minimize the length of time sewer service is interrupted.

## **PART 2 PRODUCTS**

### **2.01 POLYVINYL CHLORIDE PIPE AND FITTINGS FOR GRAVITY SEWERS**

- A. Manufactured from virgin, National Sanitation Foundation (NSF) approved resin conforming to ASTM D-1784.
- B. Unless otherwise specified, all PVC pipe and fittings shall conform to ASTM D-3034 and have a Standard Dimension Ratio (SDR) of 35.
- C. The gaskets used for joining PVC sewer pipe shall conform to ASTM F-477.
- D. All PVC gravity sewer pipe shall be clearly marked with the manufacturer's name, nominal diameter, SDR, ASTM D-3034, and NSF approval seal.
- E. Gravity sewers greater than 12-inches in diameter shall be ductile iron pipe. Gravity sewers 12-inches or less in diameter shall be either ductile iron pipe or PVC.

## **2.02 DUCTILE IRON PIPE AND FITTINGS**

### **A. Pipe:**

1. Manufactured in accordance with ANSI A-21.50 (AWWA C-151) and ANSI A-21.10 (AWWA C-110).
2. A cement lining meeting the requirements of ANSI 21.4 (AWWA C-104).
3. A minimum of 1 mil thick bituminous coating on the outside surface.
4. Clearly marked with manufacturer's name, D.I. or Ductile, weight, class or nominal thickness, and casting period.
5. Ductile iron pipe shall be Class 350 for pipe sizes 3-inch through 12-inch and Class 250 for pipe sizes 14-inch and larger.
6. Unless otherwise specified or shown on the Contract Documents, provide Ceramic Epoxy Lining for ductile iron pipe as follows:
  - a) 40-mils dry film thickness lining, consisting of amine cured novalac epoxy containing at least 20 percent by volume quartz pigment manufactured under the name of Protecto 401 or approved equal.
  - b) Line interior of bell and exterior of spigot in joint sealing areas with 6 mils to 10 mils of specified lining.

### **B. Fittings.**

1. Fittings 4"-24": Pressure rated at 350 psi.
2. Fittings 30"-36: Pressure rated at 250 psi.
3. Joints meeting the requirements of ANSI A-21.11 (AWWA C-111).
4. If specified or required by Owner, ceramic epoxy lining in accordance with 2.02 A. 6. above.

## **2.03 CONCRETE MATERIALS**

- A. Standard Cement Concrete mix with a minimum 28-day compressive strength of 2,500 psi.

## **2.04 CASTING FOR FRAME AND COVERS**

- A. Gray iron, Class 30 unless otherwise specified, meeting AASHTO M-108.
- B. Cleaned and coated with bituminous paint that will produce an acceptable finish that is not affected by exposure to hot or cold weather.
- C. Rings and covers for use on watertight manholes shall be machined smooth uniform bearing that



will provide a watertight seal.

- D. Frame and cover shall be capable of supporting 16,000 pounds wheel load, combined weight shall be as shown in the Project Details.
- E. Cover shall have concealed pickhole.
- F. The words SANITARY SEWER shall be cast into the cover.
- G. Horizontal and vertical mating surfaces shall be machined.

## **2.05 PRECAST MANHOLES**

- A. AASHTO M-199 SR or ASTM C-478.
- B. Openings shall be provided for the required number and size pipes and shall be marked to insure installation at proper locations.
- C. Lift loops shall be ASTM A416 steel strand. Lifting loops made from deformed bars are not allowed.
- D. Flexible Joint Sealant Roping and Sealant Sheets (joint seals) shall be butyl rubber based conforming to Federal Specification SS-S-210A, AASHTO M-198, Type B - Butyl Rubber and as follows: maximum of 1% volatile matter and suitable for application temperatures between 10 and 100 degrees F. Material shall be RV-30 as manufactured by RuVan Inc., ConSeal CS-212, or approved equal, with a minimum cross section of 1-¼ inches for roping and sheets with minimum dimensions of 1/8 inch thick by 12 inches wide.
- E. Epoxy Gels for interior patching of wall penetrations when used as approved by the Engineer shall be a 2-component, solvent-free, moisture-insensitive, high modulus, high-strength, structural epoxy paste adhesive meeting ASTM C-881, Type I and II, Grade 3, Class B and C, Epoxy Resin Adhesive.
- F. Precast Component Fabrication and Manufacture shall be as described in the following paragraph:
  - 1. Precast Manufacturing shall be in conformance with ASTM C478. Wall and inside slab finishes resulting from casting against forms standard for the industry shall be acceptable. Exterior slab surfaces shall have a float finish. Small surface holes, normal color variations, normal form joint marks, and minor depressions, chips and spalls will be tolerated. Dimensional tolerances shall be those set forth in the appropriate References and specified below.
  - 2. Joint Surfaces between Bases, Risers and Cones shall be manufactured to the joint surface design and tolerance requirements of ASTM C361. The maximum slope of the vertical surface shall be 2 degrees. The maximum annular space at the base of the joint shall be 0.10 inch. The minimum height of the joint shall be 4 inches.
  - 3. Lift Inserts and Holes shall be sized for a precision fit with the lift devices, shall comply with OSHA 1926.704, and shall not penetrate through the manhole wall.
  - 4. Step Holes: Step holes shall be cast or drilled in the Bases, Risers and cones to provide a

uniform step spacing of 16 inches. Cast step holes shall be tapered to match the taper of the steps.

- G. Precast Base Sections shall be cast monolithically without construction joints or with an approved galvanized or PVC waterstop in the cold joint between the base slab and the walls. The bottom step in base sections shall be a maximum of 26 inches from the top of the base slab. The width of the base extensions on Extended Base Manholes shall be no less than the base slab thickness.
- H. Precast Riser Sections shall have a minimum lay length of 16 inches.
- I. Precast Concentric and Eccentric Cone Sections shall have an inside diameter at the top of 27 inches. The width of the top ledge shall be no less than the wall thickness required for the cone section. Concentric cones shall be used only for Shallow Manholes.
- J. Precast Transition Cone Sections shall provide an eccentric transition from 60 inch and larger manholes to 48-inch diameter risers, cones and flat slab top sections. The minimum slope angle for the cone wall shall be 45 degrees.
- K. Precast Transition Top Sections shall provide an eccentric transition from 60-inch and larger manholes to 48-inch diameter risers, cones and flat slab top sections. Transition Top sections shall be furnished with vents as shown on the manhole details. The maximum amount of fill over the transition top section shall be 20 feet. Transition Tops shall not be used in areas subject to vehicle traffic.
- L. Precast Flat Slab Top Sections shall have an inside diameter at the top of 27 inches and shall be designed for HS-20 traffic loadings as defined in ASTM C890. Items to be cast into Special Flat Slab Tops shall be sized to fit within the manhole ID and the top and bottom surfaces.
- M. Standard Manhole Adjustment Rings (EPP) are specified in paragraph 2.10. Precast Grade Rings used to adjust ring and covers to finished grade will only be allowed in special circumstances and upon receiving prior approval from The Owner or Owner's Representative. No more than 11 vertical inches of grade rings will be allowed per manhole. Grade Rings shall conform to ASTM C478 and shall be no less than 4 inches in height.
- N. Precast Inverts shall meet the following requirements.
  - 1. Pipe openings shall provide clearance for pipe projecting a minimum of 2 inches inside the manhole. The height of the transition from the pipe opening to the invert trough shall be equal to  $\frac{1}{2}$  of the Opening ID minus Pipe ID, plus or minus  $\frac{1}{4}$ -inch. The crown of small I.D. pipe shall be no lower than the crown of the outlet pipe. When the fall between the inlet and the outlet holes is greater than 4 inches, the inlet end of the trough shall be below the inlet pipe invert and aligned horizontally within 1 inch.
  - 2. Invert Troughs shall be formed and finished to provide a consistent slope from the pipe outlet to the inlets up to 4 inches of fall. The minimum fall shall be 1 inch. The minimum outside bending radius from influent to effluent shall be 1.5 times the pipe I.D. A  $\frac{1}{2}$ -inch radius shall be provided at the intersection of 2 or more channels. The minimum concrete thickness from the bottom of the trough to the bottom of the base shall be 7 inches.

3. Invert Benches shall have a float finish with a uniform 2-½ inch slope, plus or minus 1 inch, from the high point at the manhole wall to the low point at edge of invert trough. A ¼- inch radius shall be provided at the edge of the bench and trough.
  4. Depressions, high spots, voids, chips, or fractured over ¼-inch in diameter or depth shall be filled with a sand cement paste and finished to a texture reasonably consistent with that of the formed surface.
- O. Precast Components and grade rings shall be sealed around the external perimeter as follows:
1. External Seals shall consist of a polyethylene backed flat butyl rubber sheet no less than 1/8-inch thick and 12 inches wide centered on the outside perimeter of the joint. Material to be RV-40-PW (or approved equal) as manufactured by RuVan, Inc.
  2. Internal Seals shall consist of a plastic backed butyl rubber rope no less than 14 feet long and having a cross-sectional area no less than the annular space times the height of the joint or 1¼ inches, whichever is greater.
- P. Lifting devices for handling Precast Components shall be provided by the Precast Manufacturer and shall comply with OSHA Standard 1926.704.
- Q. New “wet-cast” manholes shall have a waterproofing protection admixture added during the batching process. Admixture shall be XYPEX ADMIX C-1000R or approved equal and admixture dosage shall be in strict accordance with written manufacturer’s recommendations.
- R. Coatings
1. The exterior surface of all new "dry-cast" manholes shall be coated with a minimum of one (1) coat of specified material. The coating shall be applied by the manhole manufacturer, and applied and cured in strict accordance with the coating manufacturer's requirements.
  2. Coating and sealing material shall be:
    - DRYCON Water proofing/sealer (grey in color) as manufactured by IPA Systems, Inc. or approved equal
    - PRECO Waterproofing/sealer (grey in color) as manufactured by FOSROC PRECO Industries, Ltd. or approved equal
  3. Coating is not required for manholes which are manufactured utilizing the "wet-cast" method.
- S. All precast components shall be manufactured at a plant certified by the National Pre-cast Concrete Association’s Plant Certification Program prior to and during the production of products for this project.
- T. Manhole Liner: For manholes receiving flow from low pressure sewer and force mains (and one manhole downstream), provide aromatic polyurea coating as manufactured by "OBIC" or approved equal. Application to be provided by a Manufacturer-Certified Contractor.

## **2.06 MANHOLE STEPS**

- A. Steps shall be provided in Bases, Risers, Cones, Transition Cones, and Transition Top sections aligned vertically on 16-inch centers. Steps shall be secured to the wall with a compression fit in tapered holes or cast in place. Steps shall not be vibrated or driven into freshly cast concrete or grouted in place. The steps shall be Copolymer Polypropylene Plastic reinforced with a ½" diameter grade 60 bar and have serrated tread and tall end lugs. Step pullout strength shall be 2000 lbs. minimum when tested according to ASTM C497.

## **2.07 PIPE ENTRANCE COUPLINGS FOR MANHOLES**

- A. Pipe to Manhole Connectors shall conform to ASTM C923, and to ASTM C-425 for Pipe Diameters 12 inches and smaller. The location of the pipe connectors shall vary from the location shown on the Project Plans no more than ½ inch vertically and 5 degrees horizontally. Provide for control of the OD to within the tolerances of the connector on flexible pipes larger than 12 inches.
- B. Rigid cement or synthetic type grouts are not acceptable as a seal between the manhole and entry pipe.
- C. The manhole entrance coupling with the entry pipe shall be fitted with a Pipe to Manhole Connector, "A-Lok" or approved equal.
- D. Other specially designed flexible products such as "KOR-N-SEAL" (or approved equal) may be approved for use in adding a pipe entrance to an installed manhole and for other uses where available and where materials meet the requirements of ASTM C-425.
- E. All PVC/HDPE pipe connections to existing brick manholes shall be made with GPK PVC Manhole Adapters (or approved equal) (also known as "sand collars") with an external abrasive silica layer or approved equal.

## **2.08 INSIDE DROP ASSEMBLY (REHABILITATED MANHOLES)**

- A. The drop bowl assembly shall be hand fabricated from marine grade fiberglass, and shall be Reliner "A" Drop Bowl or approved equal.
- B. Drop pipe shall be 6-inch SDR 35 PVC pipe for 8-inch gravity sewer. Refer to Standard Detail for additional drop pipe size requirements.
- C. Flexible connector to connect drop bowl to drop pipe shall be Fernco Series 1056 or approved equal.
- D. Clamping brackets for securing 6-inch drop pipe to manhole shall be 304 stainless steel. All fasteners shall be 18-8 stainless steel in accordance with manufacturer's recommendations.

## **2.09 PIPE REPAIR COUPLINGS**

- A. Flexible Couplings:

1. Designed to join sewer pipes of the same or different material or sizes. Flexible couplings shall fit over the end of plain end or spigot pipe to form a positive seal against infiltration and exfiltration in non-pressure applications. Flexible couplings shall flex with normal earth movement to maintain integrity of seal. Use of flexible couplings shall be at the OWNER's discretion.
  2. For repairing PVC pipe, coupling shall be manufactured from elastomeric polyvinyl chloride (PVC) which is unaffected by soil conditions and resistant to chemical, ultraviolet rays, and normal sewer gases. The PVC material shall contain bactericide and fungicide to inhibit growth of bacteria and fungus. The PVC material shall be 55 minimum to 65 maximum Shore A durometer hardness. Couplings shall conform to the applicable parts of ASTM C443, ASTM C425, ASTM C564, and ASTM D1869.
  3. For repairing materials other than PCV pipe and/or different pipe materials, flexible coupling shall be 5000 Series Strong Back RC coupling as manufactured by Fernco, or approved equal, and shall be supplied with a 0.012-inch stainless steel shield and molded-in bushing, and two corrosion resistant Series 316 stainless steel clamps, which when tightened to 60 inch-pounds torque, seal the joint.
  4. Approved and listed by all of the following code agencies: SBCCI (Southern Building Code Congress International, Inc.), BOCA (Building Officials & Code Administrators International, Inc.), IAPMO (International Association of Plumbing and Mechanical Officials), and CSA (Canadian Standards Association).
- B. HDPE Couplings: Electro-fusion couplings meeting the same requirements as HDPE pipe.

#### **2.10 MANHOLE GRADE ADJUSTING RINGS**

- A. Grade Adjustment Rings shall be manufactured from Expanded Polypropylene (EPP), black 5000 series meeting ASTM D3575 and ASTM D4819-13. The rings shall be manufactured using a high compression molding process to produce a finished density of 120 g/l (7.5 pcf) and shall be PRO-RING™ by “Cretex Specialty Products” or approved equal.
- B. Design Requirements: The grade adjustment rings shall be designed to allow final adjustment of the frame and cover to the grade established by the Owner or on the project drawings. Also, the rings shall be designed to accommodate flat or sloping surfaces to within approximately ¼-inch to ½-inch of the specified final elevation. The grade adjustment system shall have a minimum fifty-year design life.
- C. Performance Requirements: The grade adjustment rings shall be capable of supporting the minimum requirements of AASHTO M-306, H-25 and HS-25, be UV stable and be resistant to chemicals and corrosion commonly associated with the sanitary sewer environment.
- D. “Grade” adjustment rings may contain either an upper and lower keyway (tongue and groove) for vertical alignment and/or an adhesive trench on the underside with a flat top.
- E. “Finish” or “Flat” rings may have either a keyway (groove) on the underside for vertical alignment and/or an adhesive trench with a flat upper surface. These rings shall be available in heights (thicknesses) which will allow final adjustment of the frame and cover to within ¼-inch to ½-inch of

the specified final elevation.

- F. "Angle" rings may have either an upper and lower keyway (tongue and groove) for vertical alignment and/or an adhesive trench on the underside. When required, the "Angle" ring or rings shall allow final adjustment of the frame and cover to within ¼-inch to ½-inch of the specified final elevation.
- G. Adhesive/Sealant: Any adhesive or sealant used for watertight installation of the manhole grade adjustment rings shall be M-1 Structural Adhesive/Sealant or approved equal meeting the following specifications:
  - 1. ASTM C-920, Type S, Grade NS, Class 25, Uses NT, T, M, G, A, and O
  - 2. Federal Specification TT-S-00230-C, Type II, Class A
  - 3. Corps of Engineers CRD-C-541, Type II, Class A
  - 4. Canadian Standards Board CAN 19, 13-M82
  - 5. AAMA 802.3-08 Type II, AAMA 803.3-08 Type I, and AAMA 805.2-08 Group C
- H. Repair Mortar, if required, shall be a one component, quick set, high strength, non-shrink, polymer modified cementitious patching mortar, which has been formulated for vertical or overhead use meeting the requirements of ASTM C-109 for Compressive Strength, C-348 and C-78 for Flexural Strength and C-882 for Slant Shear Bond Strength. Repair mortar shall not contain any chlorides, gypsums, plasters, iron particles, aluminum powder or gas-forming agents, nor shall it promote the corrosion of any steel that it may come in contact with. Repair mortar shall be Octocrete as manufactured by "IPA Systems" or approved equal.
- I. Cementitious Grout, if required, shall be a pre-mixed, non-metallic, high strength, non-shrink grout which meets the requirements of ASTM C-191 and C-827 as well as CRD-C-588 and C-621. When mixed to a mortar or "plastic" consistency, it shall have a minimum one-day and 28-day compressive strength of 6,000 and 9,000 psi respectively. Cementitious grout shall be PennGrout as manufactured by "IPA Systems" or approved equal.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Install barriers, signs and other devices to identify and protect areas the construction site and all adjacent areas.
- B. Protect and maintain all benchmarks and other survey points.
- C. Protect and maintain all pipe, manholes and other material and equipment not scheduled for replacement, and/or all pipe and equipment scheduled for operation during the construction period of the new components. Repair or replacement of all damaged items shall be at the Contractors expense.
- D. Prior to laying pipe, prepare a suitable bedding according to Section 02221, Unclassified Excavation for Utilities.

- E. Before placing pipe in the trench, field inspect for cracks or other defect; remove defective pipe from the construction site.
- F. The interior of each joint of the pipe shall be cleaned to remove all undesirable material.
- G. Prepare and clean the spigot and the bell end of the pipe and remove undesirable material from the gasket and gasket recess.
- H. Establish line and grade for pipe and appurtenances. Verify location and elevation of other utilities and manholes for gravity sewers.

### **3.02 INSTALLATION OF GRAVITY SANITARY SEWERS**

- A. Sewers shall be installed in locations to provide a minimum of 18 inches of clearance (horizontally and vertically) between all other existing utilities (refer to paragraph 1.07, Part C. for installation near water mains).
- B. Lay pipe true to the lines and grades from the grade and alignment stakes, or equally usable references.
  - 1. Lasers shall be used to install sewer lines and type and procedures shall be approved by the Owner. Reference points for both line and grade shall be set at each manhole. Check for pipe alignment and grade after each joint has been installed. Measure for grade at pipe invert; not at top of pipe.
  - 2. Set offset hubs at such distance from centerline of excavation as is suitable for the excavating method and machinery used.
  - 3. Check invert elevation at each installed manhole with survey-grade equipment acceptable to owner before proceeding with installation of next pipe segment.
- C. Gravity sewers 12-inches or less in diameter shall be either ductile iron pipe or PVC (SDR 35). Ductile Iron Pipe shall be used for trench depths of 12 feet or greater (No Exceptions). Gravity sewers greater than 12-inches in diameter shall be Class 150 ductile iron pipe.
- D. Lay pipe progressively up grade, with bell upstream, in such a manner as to form close, concentric joints with smooth bottom inverts. Joining of all pipe shall be in accordance with manufacturer's specifications.
- E. Bed each pipe section and provide Check Dams in accordance with the Standard Details and Specifications.
- F. Unless otherwise specified, provide all gravity sewer lines with a minimum of 4 feet of cover in roadways and 2-1/2 feet of cover in open areas, unless ductile iron pipe or concrete encasement is used.
- G. Do not allow walking on complete pipelines until backfill has been placed to a depth of at least 6 inches above the crown of the pipe.

- H. Keep the interior of the pipe free of all unsuitable material, and upon completion of a section between any two manholes it shall be possible to view a complete circle of light when looking through the pipe.
- I. When pipe laying ceases, close the open ends of the pipe with a suitable plug to prevent the entrance of foreign materials.
- J. Couplings and adapters used for joining dissimilar gravity pipe materials, for repairing and rejoining sections of gravity sewer, and for connecting the first full joint of pipe to a short stub through a manhole wall shall meet the requirements of ASTM C-425. (See Standard Details).
- K. All couplings and adapters for gravity sewer pipe shall be of rubber, plastic and metallic materials that will not react chemically or biologically with municipal wastewaters or aggressive elements in the soil and conform to ASTM - 425, Section 5.
- L. All gravity sewers, including DIP, shall be installed with a 12-gauge tracer wire throughout the entire system, including service laterals to the cleanout. Wire shall be installed with (directly beneath or beside of) the sewer main. Keep wire as continuous as possible. Where connections are needed, strip wire back approximately 1-inch and connect with waterproof direct-bury lug with dual conductor slots (DryConn #90120 or approved equal). Wrap connection well on each side connection with electrical tape. When installation is complete, the entire system must be tested for continuity in the presence of a RWSG inspector. RWSG will require re-excavation and improvement to areas that do not trace well and/or show low or poor continuity. Tracer wire shall be high-strength copper clad steel conductor that is specifically made for underground utility locating purposes, and shall be #12 AWG HS-CCS HDPE 30 mil as manufactured by "Copperhead Industries, LLC" or approved equal, and shall be insulated with a 30 mil, high density, high molecular weight polyethylene blue insulation and rated for direct burial use at 30 volts. Heavier wire may be required for directional drilling and pipe bursting.

### **3.03 INSTALLATION: SEWER MANHOLES - GENERAL**

- A. Unless otherwise specified, all manholes shall have inside diameter of not less than 48 inches and a vertical wall height of not less than 2.5 feet.
- B. The clear opening into the manhole shall be not less than 27 inches.
- C. Backfill manholes in the same manner as specified for pipelines.

### **3.04 INSTALLATION: STANDARD PRECAST CONCRETE MANHOLES**

- A. Manhole shall be installed in accordance with ASTM C-478.
- B. Excavate to the required depth and remove materials that are unstable or unsuitable for a good foundation. Prepare a level, compacted foundation extending a minimum of 6 inches beyond the manhole base. Add 6-inches (minimum) bedding material in accordance with 2.01 A. Bedding material shall be shaped and compacted utilizing a vibratory compacter in order to firmly integrate the bedding material into the subgrade resulting in a firm, unyielding, consolidated bedding surface.
- C. When wet or unconsolidated material occurs or when over excavation of the base occurs, provide a



subbase with a minimum of 12 inches of Class I, granular material, well compacted with mechanical tamping equipment.

- D. Set base plumb and level, aligning manhole invert with pipe invert.
- E. Secure Pipe Connectors to Pipe according to the written Connector Manufacturer's instructions. When pipe stub outs are installed, provide restraint from vertical and longitudinal movements before backfill.
- F. Inlets and outlets from each manhole shall be finished smooth and flush with the sides of manholes walls so as not to obstruct the flow of liquid through the manhole.
- G. Thoroughly clean bells and spigots to remove dirt and other foreign materials that may prevent sealing. Unroll the Butyl Sealant rope directly against base of spigot. Leave protective wrapper attached until sealant is entirely unrolled against spigot. Do not stretch. Overlap from side to side, not top to bottom and remove protective wrapper.
- H. Set risers and cones so that steps align, taking particular care to clean, prepare and seal joints.
- I. After joining manhole sections and setting adjustment rings, apply the primer sealer and the butyl sealant sheet around the outside perimeter of the joint as shown in the Standard Details.
- J. Lift Holes leaving less than 2 inches of wall thickness shall be plugged from the outside using a sand cement mortar, then covered with butyl sealant sheet. Should Lift Holes penetrate the wall they shall be additionally sealed with an interior application of an epoxy gel  $\frac{3}{4}$ -inch thick extending 2 inches beyond the penetration.
- K. Perform the final finishing to the manhole interior by filling all chips or fractures greater than  $\frac{1}{2}$ -inch in length, width, or depth and depressions more than  $\frac{1}{4}$  inch deep in inverts with an approved hydraulic cement. Do not fill the joints between the precast concrete sections with cementitious material. Clean the interior of the manhole, removing all dirt, spills or other foreign matter.

### **3.05 INSTALLATION: MANHOLE GRADE ADJUSTMENT RINGS**

- A. Installation and surface preparation shall be in accordance with the grade adjustment ring manufacturer's written instructions.
- B. The joint between the first grade ring and top of the manhole shall be sealed using an adhesive/sealant meeting the requirements of Paragraph 2.10 G.
- C. If the top of the manhole is not level or is irregular, then a non-shrink repair mortar meeting the requirements of Paragraph 2.10 H. or non-shrink cementitious grout meeting the requirements of Paragraph 2.10 I. shall be used. A bed of the specified mortar or grout shall be placed on the top surface of the manhole structure and then the first grade ring shall be embedded and leveled into the bed of material.
- D. The remaining joints between all manhole adjustment rings and frame and cover shall be sealed using an adhesive/sealant meeting the requirements of Paragraph 2.10 G.

- E. No other materials shall be used in the construction of the grade adjustment area beyond those specified above. Prohibited materials include, but are not limited to, wood or wood shims of any kind, concrete, brick, block, stones, etc.
- F. The use of any heat shrinkable chimney seals shall only be permitted with Owner's written approval.

### **3.06 INSTALLATION: MANHOLE RINGS AND COVERS**

- A. Seal and anchor manhole rings in place with butyl sealant rope and sealant sheets and bolts in accordance with the Standard Details.
- B. The bearing surfaces between cast rings and covers shall be machined, fitted together, and match marked to prevent rocking.
- C. All castings shall be of the types, dimensions, and weights as shown in the Project Details and shall be free of faults, cracks, blow-holes, or other defects.
- D. Set the manhole frames to the required elevation using no more than 11 inches of grade adjustment rings, sealing all joints between cone, adjusting rings, and manhole frame.
- E. Standard manholes frames set above grade and all water tight frames shall be held in place by four (4) threaded anchors. Anchors shall consist of:
  - 1. Four (4)  $\frac{3}{4}$  inch diameter by 8-inch long stainless steel all-thread rod.
  - 2. Set all-thread rod into  $\frac{3}{4}$  inch holes 6 inches deep into the precast manhole with approved two (2) component epoxy anchor bolt setting compound.
  - 3. Secure ring with stainless steel washers and nuts after setting compound has cured.

### **3.07 INSTALLATION: DROP MANHOLE ASSEMBLIES**

- A. Drop manhole assemblies shall be constructed as outlined on the Project Details and in the Contract Documents.
- B. The material used in the outside drop pipe construction shall be Protecto 401 (or approved equal) lined Ductile Iron Pipe and Class B concrete.
- C. Inside drop bowl assembly shall be installed with stainless steel fasteners in accordance with the written manufacturer's recommendations.
- D. Abandonment of existing drop assembly shall be incidental to the cost of inside drop assembly. The abandonment procedure shall be as follows:
  - 1. Remove flow from subject line segment by plugging, by-pass pumping, or other methods approved by Owner and Engineer.
  - 2. Plug existing incoming sanitary sewer (lower pipe) from inside manhole with concrete or grout plug.

3. Fill existing vertical outside drop pipe to within 6 inches of top with crushed stone.
  4. Cap off remaining 6 inches of existing drop pipe with concrete or grout plug. Provide smooth finish to match invert of existing incoming sanitary sewer.
- E. For inside drop assembly installations where incoming sanitary sewer is being lined, contractor to extend liner pipe a maximum of 2 inches into manhole and cut a "V" shaped notch at bottom edge of incoming pipe in accordance with drip bowl manufacturer's written recommendations.

### **3.08 INSTALLATION: SERVICE CONNECTIONS**

- A. Use in-line factory made sanitary tee fittings for all service connections on new sewer mains up to 15-inches in diameter. Where a service saddle is required in making service connections to existing sewers or new sewers 16 inches or larger in diameter, a Romac Industries, Inc. Style "CB" Sewer Saddle (or approved equal) shall be used.
- B. Wherever existing sewer services are encountered, temporary measures shall be employed to keep sewer services available. The installation of service connections shall follow immediately or be concurrent with the construction of the main sewer. This requirement shall apply particularly where traveled streets are involved so that the said streets will only be closed once during the construction period. This method of construction will permit more advantageous handling of backfilling and street paving replacement, and will also avoid possible damage to the main sewer by subsequent exposure for connection of the service lines.
- C. All service laterals shall be 6-inch diameter to the property line and/or edge of easement installed at a minimum of 1% slope, unless field verified by Engineer. A 6"x4" eccentric increaser coupling (with taper) as manufactured by Royal Building Products/Plastic Trends (part number G616-4 or approved equal), installed after the cleanout shall be used for single family residential connection.
- D. The service lateral shall be terminated at the end of the cleanout with a plug for future services.
- E. Service laterals that originate on the sewer main shall be of the same material as the main at that location on the main unless otherwise approve by Owner. Ductile Iron service laterals shall be Class 350.
- F. The service lateral shall not protrude into the sewer main.
- G. Service lateral cleanouts shall be a 2-way cleanout as manufactured by Royal Building Products/Plastic Trends (G1006), or approved equal, and extend 3 feet above finished grade to mark sewer service connections until building connection is made. Cleanouts installed and reconnected to existing services shall be installed at finish/existing grade.
- H. Any sanitary sewer services which are over 12 feet in depth shall require water line and/or mechanical joint quality pipe.
- I. Reconnect existing service connections, including those that are intended to serve unoccupied or abandoned buildings or vacant lots, unless directed otherwise by the Owner or Engineer. For service line pipe connections beyond the cleanout, use flexible coupling as specified in paragraph 2.09 A. 3. for connecting PVC pipe to dissimilar materials, or use a standard Fernco (or approved

equal) coupling with concrete cradles. Knock-on Repair Couplings are acceptable for connecting new PVC to existing PVC pipe.

- J. Crushed stone bedding and haunching shall be placed in accordance with the Standard Details.
- K. Initial and final backfill and surface restoration shall be completed as referenced and specified in Section 02221, Unclassified Excavation for Utilities, and other appropriate sections.
- L. Contractor shall install tracer wire along the service line from the main to the cleanout in accordance with Section 02532 3.02 L.
- M. Contractor shall provide service tee-wye locations, including size, manhole reach, lot or building number, stationing from nearest downstream manhole, right or left side connection (looking upstream), invert of the sewer main at tee-wye location and depth of cleanout in a tabular form.
- N. Sewer Lateral Discharge (Main Floor Elevation) shall be a minimum of 6 inches above the top of the lowest of the two adjacent manholes.
- O. The tapping of service connections into manholes will not be permitted.

### **3.09 ABANDON EXISTING MANHOLE PROCEDURE**

- A. The Contractor shall:
  - 1. If manhole has salvageable cast iron frame and cover, remove cast iron frame and cover and deliver to RWSG or as directed by Engineer.
  - 2. Permanently plug all incoming and outgoing pipes from inside manhole in accordance with the typical pipe plug detail.
  - 3. Collapse manhole into itself to an elevation not less than 36 inches below finished grade.
  - 4. Fill manhole with T.D.O.T. No. 2 stone within 12 inches (+/-) of the top (after manhole has been collapsed).
  - 5. Use compacted T.D.O.T. base grading "D" to cap remaining excavation over existing manhole.
  - 6. Backfill to finished grade with suitable soil material for manholes in non-paved areas, or backfill to required sub-grade with compacted T.D.O.T. base grading "D" for paved areas.

### **3.10 FIELD TEST - INITIAL PROOF TESTING OF SANITARY SEWERS**

- A. It is the intent to specify a "test as you go" procedure in order to establish confidence in the installation and avoid the necessary delay of final acceptance.

- B. Before a reach of pipeline is approved for payment, successfully proof test that reach for grade, alignment, cleanliness, and leakage.
- C. In the event that four or more reaches fail to satisfactorily pass proof testing procedures, cease pipe laying until deficiencies are identified and corrected.
- D. The basis for grade, alignment and cleanliness testing will be visual inspection. Leakage testing will be by means of low pressure air or exfiltration or infiltration as deemed acceptable by the Engineer.
- E. Proof test flexible pipeline installation for deflection by pulling a "go no-go" test mandrel through the line after the initial backfill is complete to avoid unnecessary dig-ups.

**3.11 FIELD TEST - FINAL GRAVITY SEWER TESTING**

- A. Before the Work is accepted and before any house services are connected, a final testing procedure is to be followed.
- B. Perform a visual inspection when groundwater levels are above the pipeline if possible. All visible leaks shall be repaired.
- C. The standard leak test for all gravity sewers shall be a low pressure air exfiltration test. Other exfiltration tests, if approved by the Engineer, will be conducted in accordance with ASTM C-828 or latest revision.
- D. If flexible pipe is used, pull an approved "go no-go" deflection mandrel of 95/100 pipe diameter through all reaches of gravity sewer main. This test shall be conducted no sooner than 24 hours after completion of backfilling of the tested reach. No sections will be accepted that exhibit a deflection of more than 5%.

**3.12 LOW PRESSURE AIR EXFILTRATION TEST - GRAVITY SEWERS**

- A. Calculate the pressure drop as the number of minutes for the air pressure to drop from a stabilized pressure of 4.0 to 3.0 PSIG.
- B. Times for mixed pipe sized of varying lengths should be calculated as described in ASTM, C828-76T using formula  $t = K d/q$  ( $q = .0020$ ).
- C. Lengths of sections under test shall not exceed 500 linear feet.
- D. Gravity sewer line testing shall include service laterals.
- E. The following items are for one pipe size only:

**AIR TEST TABLE**  
**SPECIFICATION TABLE (MIN:SEC) REQUIRED WHEN TESTING ONE PIPE DIAMETER ONLY**  
**PIPE DIAMETER, INCHES**

FT.	4	6	8	10	12	15	18	21	24	27	38	33	36	39	42
25	0:04	0:10	0:18	0:28	0:40	1:02	1:29	2:01	2:38	3:20	4:08	4:59	5:56	6:58	8:05
50	0:09	0:20	0:35	0:55	1:19	2:04	2:58	4:03	5:17	6:41	8:15	9:59	11:53	13:57	16:10
75	0:13	0:30	0:53	1:23	1:59	3:06	4:27	6:04	7:55	10:01	12:23	14:58	17:00	18:25	19:50
100	0:18	0:40	1:10	1:50	2:38	4:08	5:56	8:05	10:34	12:45	14:10	15:35			
125	0:22	0:50	1:28	2:18	3:18	5:09	7:26	9:55	11:20				20:25	19:58	23:06
150	0:26	0:59	1:46	2:45	3:58	6:11	8:30			13:24	16:32	17:09	23:49	23:57	27:43
175	0:31	1:09	2:03	3:13	4:37	7:05			12:06	15:19	18:54	20:01	27:13	27:57	32:20
200	0:35	1:19	2:21	3:40	5:17			10:25	13:36	17:13	21:16	22:52	30:37	31:56	36:58
225	0:40	1:29	2:38	4:08	5:40		8:31	11:35	15:07	19:08	23:38	25:44	34:01	35:56	41:35
250	0:44	1:39	2:56	4:35			9:24	12:44	16:38	21:03	25:59	28:35	37:25	39:56	46:12
275	0:48	1:49	3:14	4:43		8:16	10:12	3:53	18:09	22:58	28:21	31:27	40:49	43:55	50:49
300	0:53	1:59	3:31		6:03	9:27	11:54	16:12	21:10	26:47	33:05	34:16	47:38	47:55	55:26
350	1:02	2:19	3:47		6:48	10:38	13:36	18:31	24:12	30:37	37:48	40:01	54:26	55:54	64:41
400	1:10	2:38			7:34	11:49	15:19	20:50	27:13	34:27	42:32	45:44	61:14	63:53	73:55
450	1:19	2:50		5:14	8:19	13:00	17:01	23:09	30:14	38:16	47:15	51:27	68:02	71:52	83:10
500	1:28			5:45	9:04	14:11	18:43	25:28	33:16	42:06	51:59	57:10	74:51	49:51	92:24
550	1:37		4:02	6:17	9:50	15:21	20:25	27:47	36:17	45:56	56:42	62:53	81:39	87:50	101:38
600	1:46	2:50	4:22	6:48			22:07	30:06	39:19	49:45	61:26	68:36	88:27	95:49	110:53
650	1:54											74:19		103:48	120:07

**3.12 FIELD TEST - PRECAST MANHOLES**

A. Manholes shall be physically and vacuum tested to assure compliance with the Contract Documents and the desired workmanship of the finished work has been achieved.

B. Manhole Vacuum Test:

1. Backfill shall be placed around the base of the manhole to a depth of 1 foot over the top of the sewer pipe before the vacuum test is performed.
2. The maximum vacuum applied to a manhole shall be 12 inches of mercury (Hg).
3. All manholes shall be subject to a vacuum test of a minimum of 10 inches Hg prior to acceptance by the Owner. The test shall be considered acceptable if the vacuum drops no more than 1 inch within the time specified in the following table:

<b>Manhole I.D. (inches)</b>	<b>48</b>	<b>60</b>	<b>72</b>	<b>84</b>	<b>96</b>	<b>120</b>
<b>Test Time for up to 8 feet in depth (seconds)</b>	<b>60</b>	<b>70</b>	<b>80</b>	<b>90</b>	<b>100</b>	<b>120</b>
<b>Additional Test Time for each 4 Foot Added Depth (Seconds)</b>	<b>10</b>	<b>15</b>	<b>20</b>	<b>30</b>	<b>40</b>	<b>60</b>

4. Testing Sequence:
  - a. All manholes shall be physically and vacuum tested. Manholes failing the test shall be repaired by the Contractor, and retested.
  - b. Manholes failing the vacuum test two (2) times may, at the discretion of the Owner, be allow to be hydrostatically tested by an exfiltration test in accordance with 3.12 C. for acceptance.
  - c. The OWNER may require complete replacement of any manhole failing three (3) leak tests. Replacement shall be at no cost to the OWNER.
5. The CONTRACTOR shall furnish all necessary equipment and personnel to conduct the tests in the presence of the ENGINEER.
6. Costs for initial testings shall be included within and incidental to the Contract Unit Price for manhole construction or rehabilitating.
7. Repairing, retesting, pressure grouting and/or replacement of defective manholes shall be at the sole cost and responsibility of the CONTRACTOR, and shall be pursued in a timely manner to prevent disruption to the Project and/or sewer services.

8. Manholes moved, disturbed, displaced and/or damaged in any way during the finishing and/or backfilling operation subsequent to successful testing shall be retested for acceptance as specified above, at the CONTRACTOR's expense.

C. Hydrostatic Testing:

1. Hydrostatic (exfiltration) testing allowed only if vacuum testing has failed two (2) times and only at the discretion of the Owner or Owner's Representative.
2. Plug inlets and outlets and fill manhole with water to level/height determined by Owner or Owner's Representative.
3. Manhole shall be filled 24 hours prior to time of testing to allow normal absorption into manhole walls to occur.
4. After soak period, add additional water as required to fill manhole to original water level/height as determined by Owner or Owner's Representative.
5. Test period shall be conducted for a minimum of four hours.
6. Leakage in manhole shall not exceed 0.1 gallon per hour per foot of head above invert.
7. Contractor shall repair or replace (as directed by Owner's Representative) manholes that do not meet leakage test requirements, or do not meet specified requirements from visual inspection at no cost to the Owner.

**3.13 FIELD TEST – POST CONSTRUCTION CCTV**

- A. Closed Circuit TV Inspections (CCTV's) shall be performed for all new gravity sewer lines in accordance with Section 02541, Sewer Line Television Inspection.

End of Section