Project Manual for:

2024 ARPA Cumberland City Water System Improvements

Bid# CC-2026-1

Town of Cumberland City

Phillip Taylor, Honorable Mayor

Linda Gunson, Vice Mayor

Melissa Dunlap-Cross, Alderman

Eric Milliken, Alderman

Wanda Gilliam, Alderman

PREPARED BY:

RYE ENGINEERING PLC

January 2026

Set Number _____

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

Town of Cumberland City

2024 ARPA Cumberland City Water System Improvements

01/27/2025

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

2024 ARPA Cumberland City Water System Improvements

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FOR PROJECT MANUAL

BID NO. CC-2026-1

GENERAL

This Project Manual follows the Construction Specifications Institute Format Document Identifying System and Cost Accounting Numbers.

Nonapplicable 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 Engineer will be responsible for Bids submitted that are based on incomplete Bidding Documents.

VOLUME I

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

TECHNICAL SPECIFICATIONS

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

ADVERTISEMENT FOR BIDS

CUMBERLAND CITY
STEWART COUNTY, TENNESSEE

The Town of Cumberland City (Owner) is requesting Bids for the construction of the following Project:

2024 ARPA Cumberland City Water System Improvements

Bid # CC-2026-1

Bids for the construction of the Project will be received at the Cumberland City Town Hall located at **121 Main St, Cumberland City, TN 37050**, until **February 26th, 2026,** at **2:00PM** local time. At that time the bids received will be publicly opened and read.

The Project includes the following Work:

The Work consists of replacing two sections of the existing 6" water main currently suspended on the side of two bridges in The Town of Cumberland City. The existing hanging waterline shall be removed and replaced with a new, insulated Ductile Iron waterline, which will be reattached to the bridges.

The Issuing Office for the Bidding Documents is:

Rye Engineering PLC
4210 West Main Street
Erin, TN 37061

Prospective Bidders may examine the Bidding Documents online at ryeengineering.com or at the Issuing Office, Monday through Friday between the hours of 8:30 am – 4:00 pm and may obtain copies of the Bidding Documents as described below. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including addenda, if any, obtained from sources other than the Issuing Office.

Digital copies may be obtained at ryeengineering.com for a non-refundable fee of $100 for each set. Printed copies of the Bidding Documents may be obtained from the Issuing Office by request for a non-refundable fee of $100 for each set. Make deposit checks for Bidding Documents payable to Rye Engineering PLC. Upon the Issuing Office's receipt of payment, printed Bidding Documents will be sent via USPS or FedEx.

The bidding documents may be examined at the following:

Rye Engineering
www.ryeengineering.com

Governor's Office of Business Initiatives and Development (Go-BID)
www.tn.gov

This project is being supported with the American Rescue Plan Act (ARPA), Coronavirus State and Local Fiscal Recovery Fund (SLFRF) Grant Program and is administered through the TDEC State Water Infrastructure Grants (SWIG) agency. Therefore, certain restrictions and other federal requirements attach to this opportunity.

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

This Advertisement is issued by:

Owner: **Cumberland City**
By: **Phillip Taylor**
Title: **Honorable Mayor**
Date: **01/27/2026**

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INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

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ARTICLE 1—DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office*—The office from which the Bidding Documents are to be issued and which registers plan holders.

ARTICLE 2—BIDDING DOCUMENTS

2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

2.03 Bidder must register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office, in order to bid. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.04 Plan rooms (including construction information subscription services, and electronic and virtual plan rooms) may make Bidding Documents available for examination only.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within **10** days of Owner's request, Bidder must submit the following information:

A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.

B. Subcontractor and Supplier qualification information.

C. Other required information regarding qualifications.

3.02 Bidder is to submit the following information with its Bid to demonstrate Bidder's qualifications to perform the Work:

A. Evidence of Bidder's authority to do business in the state where the Project is located.

B. Bidder's state or other contractor license number, if applicable.

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3.03 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.04 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4—PRE-BID CONFERENCE

4.01 A pre-bid conference will not be conducted for this Project.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 *Site and Other Areas*

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

5.02 *Existing Site Conditions*

A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions*

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:

a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.

b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.

c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the

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presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 *Other Site-related Documents*

A. No other Site-related documents are available.

5.04 *Site Visit and Testing by Bidders*

A. Bidder is encouraged to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.

B. All access to the Site must be coordinated through the Engineer. Bidder must conduct the Site visit during normal working hours.

C. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

D. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

E. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

F. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 *Other Work at the Site*

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

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ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Express Representations and Certifications in Bid Form, Agreement*

A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.

B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

7.01 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing. Contact information and submittal procedures for such questions are as follows:

A. **Seth Rye, P.E., Rye Engineering PLC, email: srye@ryeengineering.com.**

AND

B. **Micah Westerman, E.I., Rye Engineering PLC, email: mwesterman@ryeengineering.com.**

7.02 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than five days prior to the date for opening of Bids may not be answered.

7.03 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents.

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the

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Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 7 days after the Bid opening.

ARTICLE 9—CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.

9.02 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS

10.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer within 10 days of the issuance of the Advertisement for Bids or invitation to Bidders. Each such request must comply with the requirements of Paragraphs 7.05 and 7.06 of the General Conditions, and the review of the request will be governed by the principles in those paragraphs. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all registered Bidders. Bidders cannot rely upon approvals made in any other manner.

10.02 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.01 A Bidder must be prepared to retain specific Subcontractors and Suppliers for the performance of the Work if required to do so by the Bidding Documents or in the Specifications. If a prospective Bidder objects to retaining any such Subcontractor or Supplier and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

11.02 The apparent Successful Bidder, and any other Bidder so requested, must submit to Owner a list of the Subcontractors or Suppliers proposed for portions of the Work within five days after Bid opening if requested by Owner.

11.03 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given,

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request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

11.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

ARTICLE 12—PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

12.02 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

12.03 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.

12.04 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.

12.05 A Bid by an individual must show the Bidder's name and official address.

12.06 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

12.07 All names must be printed in ink below the signatures.

12.08 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.

12.09 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.

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12.10 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

12.11 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

13.01 *Unit Price Bids*

A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

13.02 *Unit Price Bids with Alternate*

A. Bidders must submit a Bid on the Unit Price basis as set forth in the Bid Form. Bidders must also fill out Alternate #1, that could replace the Base Bid, if selected by the Owner.

ARTICLE 14—SUBMITTAL OF BID

14.01 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, and, if applicable, the designated portion of the Project for which the Bid is submitted, the name and address of Bidder, and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.

14.02 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted

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prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.

15.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

ARTICLE 16—OPENING OF BIDS

16.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.

18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.

18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.

18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.

18.05 *Evaluation of Bids*

A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

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18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 19—BONDS AND INSURANCE

19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.

19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 20—SIGNING OF AGREEMENT

20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 30 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21—SALES AND USE TAXES

21.01 Owner is exempt from Tennessee state sales and use taxes on materials and equipment to be incorporated in the Work. Said taxes must not be included in the Bid.

ARTICLE 22—CONTRACTS TO BE ASSIGNED (RESERVED)

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BID FORM FOR CONSTRUCTION CONTRACT

The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to: **The Town of Cumberland City, TN**

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security;

B. Section 00411 State Contractor License Information Form (attach to outside of bid envelope);

C. Section 00412 Iran Divestment Act Affidavit;

D. Section 00413 Non-Boycott of Israel Certification;

E. Section 00414 Drug-Free Workplace Affidavit;

F. Section 00415 Contractor's Attestation Regarding Illegal Immigrants;

G. Section 00416 Certification Regarding Debarment;

H. Section 00417 Female / Minority Subcontractor Certification;

I. Section 00418 Byrd Anti-Lobbying Amendment Certification;

J. Evidence of authority to do business in the state of the Project;

K. Contractor's license number as evidence of Bidder's State Contractor's License.

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ARTICLE 3—BASIS OF BID—UNIT PRICES AND ALTERNATE

2024 ARPA Cumberland City Water System Improvements

3.01 *Unit Price Bids*

A. Bidder will perform the following Work at the indicated unit prices:

Item No.	Description	Quantity	Unit	Unit Price	Total Price
1	Mobilization (Maximum of 3% of Total Base Bid)	1	LS		
2	8" MJ Flexible Expansion Joint	2	EA		
3	8" MJ Gate Valve	8	EA		
4	8" RJ DIP	906	LF		
5	Pipe Hangers and Supports Per Detail	1	LS		
6	Foam Insulation with Foil Jacket	906	LF		
7	Compact MJ DI Fittings	450	LBS		
8	Concrete Reverse Anchor	4	EA		
9	2" Blowoff Assembly	4	EA		
10	Crushed Limestone (Backfill in rocky areas, under concrete / pavement areas, etc.)	100	TON		
11	Pavement Restoration	490	SF		
12	Silt Fencing	1	LS		
13	Cleanup, Seed & Straw, Restoration	2,000	SF		

Total of all Unit Price Bid Items Written (Dollars & Cents)

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B. Bidder acknowledges that:

1. Each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and

2. Estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Work will be based on actual quantities, determined as provided in the Contract Documents.

3.02 *Alternate #1- 12-Inch Crossing*

Item No.	Description	Quantity	Unit	Unit Price	Total Price
1	Mobilization (Maximum of 3% of Total Base Bid)	1	LS		
2	12" MJ Flexible Expansion Joint	2	EA		
3	12" MJ Gate Valve	8	EA		
4	12" RJ DIP	906	LF		
5	Pipe Hangers and Supports Per Detail	1	LS		
6	Foam Insulation with Foil Jacket	906	LF		
7	Compact MJ DI Fittings	550	LBS		
8	Concrete Reverse Anchor	4	EA		
9	2" Blowoff Assembly	4	EA		
10	Crushed Limestone (Backfill in rocky areas, under concrete / pavement areas, etc.)	100	TON		
11	Pavement Restoration	490	SF		
12	Silt Fencing	1	LS		
13	Cleanup, Seed & Straw, Restoration	2,000	SF		

Total of all Alternate #1 Bid Items Written (Dollars & Cents)

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ARTICLE 4—TIME OF COMPLETION

4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

4.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

A. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 *Instructions to Bidders*

A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date
1	2/11/2026

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

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6. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

8. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

10. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation.

2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.

3. Bidder has not solicited or induced any individual or entity to refrain from bidding.

4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:

a. Corrupt practice means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process.

b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.

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c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.

d. Coercive practice means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

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BIDDER hereby submits this Bid as set forth above:

Bidder:

_____

(typed or printed name of organization)

By: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

Address for giving notices:

_____

_____

Bidder's Contact:

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Phone: _____

Email: _____

Address:

_____

_____

_____

Bidder's Contractor License No.: (if applicable) _____

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SECTION 00411
STATE CONTRACTOR LICENSE INFORMATION FORM

*Complete applicable portions of this form and **attach to the outside of envelope** containing the bid.*

PROJECT NAME: 2024 ARPA Cumberland City Water System Improvements

BIDDER / PRIME CONTRACTOR NAME: _____

If bid amount is $25,000 or greater, complete Tennessee Contractor License Information:

License No.:

Expiration Date:

License Classification: License Limit:

- If bid includes **Electrical, Plumbing or HVAC** work to be performed by someone other than the Prime Contractor, enter the Subcontractor(s)' name below.
- If subcontract portion is $25,000 or greater, the Subcontractor(s)' state license information is also to be provided.

ELECTRICAL SUBCONTRACTOR

Name:

License No.: Expiration Date:

License Classification: License Limit:

PLUMBING SUBCONTRACTOR

Name:

License No.: Expiration Date:

License Classification: License Limit:

HVAC SUBCONTRACTOR

Name:

License No.: Expiration Date:

License Classification: License Limit:

- If bid includes **Masonry** work to be performed by someone other than the Prime Contractor, enter the Subcontractor(s)' name below.
- If subcontract portion is $100,000 or greater, the Subcontractor(s)' state license information is also to be provided.

MASONRY SUBCONTRACTOR

Name:

License No.: Expiration Date:

License Classification: License Limit:

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SECTION 00412

IRAN DIVESTMENT ACT CERTIFICATION

SUBJECT CONTRACT NUMBER(S):

CONTRACTOR LEGAL ENTITY NAME:

EDISON SUPPLIER IDENTIFICATION NUMBER:

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.

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

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 00413

NON-BOYCOTT OF ISRAEL CERTIFICATION

The Contractor 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. § 12-4-127. 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.

Signature:_____

Printed Name: _____

Title: _____

Date: _____

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SECTION 00414

DRUG-FREE WORKPLACE AFFIDAVIT

STATE OF _____

COUNTY OF _____

CHECK ONE:

□ The undersigned, principal officer of _____, an employer of five (5) or more employees contracting with the Town of Cumberland City government to provide construction services, hereby state 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.

□ I hereby state that I employ less than five (5) employees and I am not required to submit the Drug-Free Workplace Affidavit.

Further affiant saith not.

_____
Principal Officer

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SECTION 00415

CONTRACTOR'S ATTESTATION REGARDING ILLEGAL IMMIGRANTS or ALIENS

Contractor/Company/Business Name: _____

Contractor/Company/Business' Authorized Agent: _____
(Printed Name)

Pursuant to Tennessee Code Annotated §12-4-124, I (we), the Contractor identified above, hereby attest, certify, warrant and assure that I (we) will not knowingly utilize the services of any illegal immigrant or alien in the performance of this Contract, and will not knowingly utilize the services of any subcontractor who will utilize the services of an illegal immigrant or alien in the performance of this Contract.

Contractor/Company/Business' Authorized Agent: _____
(Signature)

Date: _____

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SECTION 00416

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY MATTERS

The prospective participant certifies to the best of its knowledge and belief that it and its principals:

□ Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency.

□ Have not within a three year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statues or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

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

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

I understand that a false statement on this certification may be grounds for rejection of this proposal or termination of the award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years, or both.

_____

Typed Name & Title of Authorized Representative

_____

Signature of Authorized Representative Date

____I am unable to certify to the above statements. My explanation is attached

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SECTION 00417

CERTIFICATION OF BIDDER REGARDING USE OF WOMEN/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 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.

Signature of Authorized Representative	Date
Printed Name	Phone Number
Email Address	Mailing Address

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SECTION 00418

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.

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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.

Signature of Authorized Representative	Date
Printed Name	Phone Number

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

BID BOND (PENAL SUM FORM)

Bidder	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Bid**
Name: **Town of Cumberland City**	Project *(name and location)*: **2024 ARPA Cumberland City Water System Improvements**
Address *(principal place of business)*: **121 Main St, Cumberland City, TN 37050**	**Cumberland City, TN**
	Bid Due Date:
Bond	
Penal Sum:	
Date of Bond:	

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth in this Bid Bond, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

Bidder	Surety
(Full formal name of Bidder)	*(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)*	By: _____ *(Signature) (Attach Power of Attorney)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title: _____	Title: _____
Attest: _____ *(Signature)*	Attest: _____ *(Signature)*
Name: _____ *(Printed or typed)*	Name: _____ *(Printed or typed)*
Title:	Title:

Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.

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1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation will be null and void if:
   3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
   3.2. All Bids are rejected by Owner, or
   3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond will be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

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NOTICE OF AWARD

Date of Issuance:			
Owner:	**Town of Cumberland City**	Owner's Project No.:	**CC-2026-1**
Engineer:	**Rye Engineering, PLC**	Engineer's Project No.:	**CC-2026-1**
Project:	**2024 ARPA Cumberland City Water System Improvements**		
Bidder:	**TBD**		
Bidder's Address:	**TBD**		

You are notified that Owner has accepted your Bid dated _____ for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

Base Bid: 2024 ARPA Cumberland City Water System Improvements

The Contract Price of the awarded Contract is **$**_____

Four (4) unexecuted counterparts of the Contract Documents and Agreement accompany this Notice of Award.

☒ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner **four (4)** counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any): **N/A**

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 fifteen days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Engineer: **Rye Engineering, PLC**

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

Copy: Owner

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TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

This Agreement is by and between the **Town of Cumberland City** ("Owner") and _____ ("Contractor").

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: **Replacing two sections of the existing 6" water main currently suspended on the side of two bridges in The Town of Cumberland City. The existing hanging waterline shall be removed and replaced with a new, insulated Ductile Iron waterline, which will be reattached to the bridges.**

THE PROJECT

1.02 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: **Replacing two sections of the existing 6" water main currently suspended on the side of two bridges in The Town of Cumberland City. The existing hanging waterline shall be removed and replaced with a new, insulated Ductile Iron waterline, which will be reattached to the bridges.**

ENGINEER

1.03 The Owner has retained Rye Engineering PLC ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.

1.04 The part of the Project that pertains to the Work has been designed by Engineer.

ARTICLE 2—CONTRACT TIMES

2.01 *Time is of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

2.02 *Contract Times: Dates*

A. The Work will be substantially complete on or before June 30, 2026, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before July 31, 2026.

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2.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. *Substantial Completion:* Contractor shall pay Owner **$250.00** for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.

2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner **$250.00** for each day that expires after such time until the Work is completed and ready for final payment.

3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

ARTICLE 3—CONTRACT PRICE

3.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 4—PAYMENT PROCEDURES

4.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

4.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on the basis of Contractor's Applications for Payment on or about the last day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

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TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

    a. 95 percent of the value of the Work completed (with the balance being retainage).

        1) If 50 percent or more of the Work has been completed, as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

    b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

4.03 *Final Payment*

A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

4.04 *Consent of Surety*

A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

4.05 *Interest* **(RESERVED)**

ARTICLE 5—CONTRACT DOCUMENTS

5.01 *Contents*

A. The Contract Documents consist of all of the following:

1. This Agreement.
2. Bonds:
    a. Performance bond (together with power of attorney).
    b. Payment bond (together with power of attorney).
3. General Conditions.
4. Supplementary Conditions.
5. Specifications as listed in the table of contents of the project manual.
6. Addenda (numbers **[number]** to **[number]**, inclusive).
7. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid.
8. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
    a. Notice to Proceed.

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b. Work Change Directives.

c. Change Orders.

d. Field Orders.

e. Warranty Bond, if any.

B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 7.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 6—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

6.01 *Contractor's Representations*

A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:

1. Contractor has examined and carefully studied the Contract Documents, including Addenda.

2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.

4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price,

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within the Contract Times, and in accordance with the other terms and conditions of the Contract.

8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

9. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

10. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

6.02 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

6.03 *Standard General Conditions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

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IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____ (which is the Effective Date of the Contract).

Owner:	Contractor:
Town of Cumberland City *(typed or printed name of organization)*	_____ *(typed or printed name of organization)*
By: _____ *(individual's signature)*	By: _____ *(individual's signature)*
Date: _____ *(date signed)*	Date: _____ *(date signed)*
Name: _____ *(typed or printed)*	Name: _____ *(typed or printed)*
Title: _____ *(typed or printed)*	Title: _____ *(typed or printed)* *(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*
Attest: _____ *(individual's signature)*	Attest: _____ *(individual's signature)*
Title: _____ *(typed or printed)*	Title: _____ *(typed or printed)*
Address for giving notices:	Address for giving notices:
Designated Representative:	Designated Representative:
Name: _____ *(typed or printed)*	Name: _____ *(typed or printed)*
Title: _____ *(typed or printed)*	Title: _____ *(typed or printed)*
Address:	Address:
Phone:	Phone:
Email:	Email:
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)	License No.: _____ *(where applicable)* State:

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PERFORMANCE BOND

Contractor Name: Address *(principal place of business)*:	**Surety** Name: Address *(principal place of business)*:
Owner Name: **Town of Cumberland City** Mailing address *(principal place of business)*: **121 Main St, Cumberland City, TN 37050**	**Contract** Description *(name and location)*: **2024 ARPA Cumberland City Water System Improvements** **Cumberland City, TN** Contract Price: Effective Date of Contract:
Bond Bond Amount: Date of Bond: *(Date of Bond cannot be earlier than Effective Date of Contract)* Modifications to this Bond form: ☐ None ☐ See Paragraph 16	
Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Performance Bond, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.	
Contractor as Principal _____ *(Full formal name of Contractor)*	Surety _____ *(Full formal name of Surety) (corporate seal)*
By: _____ *(Signature)* Name: _____ *(Printed or typed)* Title: _____ Attest: _____ *(Signature)* Name: _____ *(Printed or typed)* Title: _____	By: _____ *(Signature)(Attach Power of Attorney)* Name: _____ *(Printed or typed)* Title: _____ Attest: _____ *(Signature)* Name: _____ *(Printed or typed)* Title: _____
Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.	

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:

   3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;

   3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

   3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

   5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

   5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

   5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

   5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

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5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

   7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

   7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

   7.3. liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price will not be reduced or set off on account of any such unrelated obligations. No right of action will accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.

12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such

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statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

    14.1. *Balance of the Contract Price*—The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

    14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

    14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

    14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

    14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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PAYMENT BOND

Contractor	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Contract**
Name: **Town of Cumberland City**	Name:
Mailing address *(principal place of business)*:	**2024 ARPA Cumberland City Water System Improvements**
121 Main St, Cumberland City, TN 37050	**Cumberland City, TN**
	Contract Price:
	Effective Date of Contract:

Bond

Bond Amount:

Date of Bond:

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth in this Payment Bond, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

Contractor as Principal	Surety
_____	_____
(Full formal name of Contractor)	*(Full formal name of Surety) (corporate seal)*
By: _____	By: _____
(Signature)	*(Signature)(Attach Power of Attorney)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____
Attest: _____	Attest: _____
(Signature)	*(Signature)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____

Notes: 1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond will arise after the following:

    5.1. Claimants who do not have a direct contract with the Contractor

        5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

        5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).

    5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

    7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

    7.2. Pay or arrange for payment of any undisputed amounts.

    7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

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8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit will be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

    16.1. *Claim* – A written statement by the Claimant including at a minimum:

        16.1.1. The name of the Claimant;

        16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;

        16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;

        16.1.4. A brief description of the labor, materials, or equipment furnished;

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16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;

16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

16.1.7. The total amount of previous payments received by the Claimant; and

16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

18. Modifications to this Bond are as follows:

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SECTION 00671

CERTIFICATE OF OWNER'S ATTORNEY

2024 ARPA CUMBERLAND CITY WATER SYSTEM IMPROVEMENTS

I, the undersigned, _____, the duly authorized and acting legal representative of The Town of Cumberland City, do hereby certify as follows:

I have examined the attached contract and surety bonds and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements have been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to 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.

_____ _____

Signature Date

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

NOTICE TO PROCEED

Owner:	**The Town of Cumberland City**	Owner's Project No.:	**CC-2026-1**
Engineer:	**Rye Engineering, PLC**	Engineer's Project No.:	**CC-2026-1**
Contractor:	***TBD***	Contractor's Project No.:	**CC-2026-1**
Project:	**2024 ARPA Cumberland City Water System Improvements**		
Effective Date of Contract:	***TBD***		

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on _____ pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement:

The date by which Substantial Completion must be achieved is **June 30, 2026**, and the date by which readiness for final payment must be achieved is **July 31, 2026.**

Before starting any Work at the Site, Contractor must comply with the following:

Inform Engineer of intended start time, project schedule, and contact information of Foreman / superintendent on site.

Engineer: **Rye Engineering, PLC**

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

Date Issued: _____

Copy: Owner

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The Advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*

a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the

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

b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the

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

22. *Engineer*—The individual or entity named as such in the Agreement.

23. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.

    a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

    c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

25. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

26. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

27. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.

28. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

29. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

30. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

31. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor's plan to accomplish the Work within the Contract Times.

32. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

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33. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.

34. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

35. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals.

36. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

37. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

38. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.

39. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

40. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

42. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion of such Work.

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43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

44. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

45. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

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

49. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

50. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

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1.02 *Terminology*

A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*: The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*: The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

1. does not conform to the Contract Documents;

2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

3. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).

E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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F. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2—PRELIMINARY MATTERS

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

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

C. *Evidence of Owner's Insurance*: After receipt of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each additional insured (as identified in the Contract), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work, and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other Submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

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ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one Contract Document is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic versions of the Contract Documents (including any printed copies derived from such electronic versions) and the printed record version, the printed record version will govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

F. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation will be deemed stricken, and all remaining provisions will continue to be valid and binding upon Owner and Contractor, which agree that the Contract Documents will be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

2. any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity, except as may otherwise be required by Laws and Regulations.

3.02 *Reference Standards*

A. *Standards Specifications, Codes, Laws and Regulations*

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

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

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B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly notify Owner and Contractor in writing that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media versions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein precludes Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

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

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. Abnormal weather conditions;

3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

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D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

2. Contractor shall not be entitled to an adjustment in Contract Price for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor. Such a concurrent delay by Contractor shall not preclude an adjustment of Contract Times to which Contractor is otherwise entitled.

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.

G. Paragraph 8.03 addresses delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

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

5.01 *Availability of Lands*

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

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B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas, or to improvements, structures, utilities, or similar facilities located at such adjacent lands or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment

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

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

5.03 *Subsurface and Physical Conditions*

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

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

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

3. Technical Data contained in such reports and drawings.

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

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

D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;

3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

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5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;

2. is of such a nature as to require a change in the Drawings or Specifications;

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

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

a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;

b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

2. complying with applicable state and local utility damage prevention Laws and Regulations;

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3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;

4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.

C. *Engineer's Review*: Engineer will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;

2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;

3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and

4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

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

a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and

c. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;

2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

3. Technical Data contained in such reports and drawings.

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

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

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of construction to be employed by Contractor, and safety precautions and programs incident thereto;

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special

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

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 3.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, the Supplementary Conditions, or other provisions of the Contract.

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or

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

D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by

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

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

H. Contractor shall require:

1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

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L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;

4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

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4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

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

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

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.

D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

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6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

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

7.02 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who will not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.03 *Labor; Working Hours*

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

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B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.

C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.04 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that the proposed item:

1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

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2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) has a proven record of performance and availability of responsive service; and

4) is not objectionable to Owner.

b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

A. *Contractor's Request; Governing Criteria*: Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

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3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:

   a. will certify that the proposed substitute item will:

      1) perform adequately the functions and achieve the results called for by the general design;

      2) be similar in substance to the item specified; and

      3) be suited to the same use as the item specified.

   b. will state:

      1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;

      2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

      3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

   c. will identify:

      1) all variations of the proposed substitute item from the item specified; and

      2) available engineering, sales, maintenance, repair, and replacement services.

   d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

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

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.

E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.

F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

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H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.

K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If an invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

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7.09 *Permits*

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

7.10 *Taxes*

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

7.11 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

C. Owner or Contractor may give written notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such written notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.12 *Record Documents*

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

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7.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

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

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

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I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.14 *Hazard Communication Programs*

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

7.15 *Emergencies*

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

7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

1. Before submitting a Shop Drawing or Sample, Contractor shall:

a. review and coordinate the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

2) the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;

c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

2. Each Shop Drawing or Sample must bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that Submittal, and that Contractor approves the Submittal.

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3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

a. Contractor shall submit the number of copies required in the Specifications.

b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.

2. *Samples*

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will

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

5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

D. *Resubmittal Procedures for Shop Drawings and Samples*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

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

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

   a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

   b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

   c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

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d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.

B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

1. Observations by Engineer;

2. Recommendation by Engineer or payment by Owner of any progress or final payment;

3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. Use or occupancy of the Work or any part thereof by Owner;

5. Any review and approval of a Shop Drawing or Sample submittal;

6. The issuance of a notice of acceptability by Engineer;

7. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

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9. Any correction of defective Work by Owner.

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

7.18 *Indemnification*

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

B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

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D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;

2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and

3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.

G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

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E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. An itemization of the specific matters to be covered by such authority and responsibility; and

3. The extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

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

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B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.

1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.

2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.

C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

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

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

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

9.07 *Change Orders*

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

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ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

A. Engineer has the authority to reject Work in accordance with Article 14.

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

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

10.05 *Determinations for Unit Price Work*

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

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

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

10.07 *Limitations on Engineer's Authority and Responsibilities*

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

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

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

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

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

10.08 *Compliance with Safety Program*

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

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ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

A. The Contract may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. Changes in Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. Changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and

4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

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

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B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

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

11.07 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

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1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);

2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or

3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit will be determined as follows:

1. A mutually acceptable fixed fee; or

2. If a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. For costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee will be 15 percent;

b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;

c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;

d. No fee will be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and

f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

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11.08 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

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

B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.

   a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

   b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

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

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change

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

5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

C. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

11.10 *Notification to Surety*

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

ARTICLE 12—CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and

4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge

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

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

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2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

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

5. Other costs consisting of the following:

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

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are

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

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

c. *Construction Equipment Rental*

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.

3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

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g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work does not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. The cost of purchasing, renting, or furnishing small tools and hand tools.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

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

5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

6. Expenses incurred in preparing and advancing Claims.

7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change

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

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

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment for any of the foregoing will be valid.

C. *Owner's Contingency Allowance*: Contractor agrees that an Owner's contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor for Work covered by allowances, and the Contract Price will be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision

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

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

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

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

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D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

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

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs,

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

14.04 *Acceptance of Defective Work*

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

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

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

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

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation

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

3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

   a. the Work has progressed to the point indicated;

   b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

   c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

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4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

    a. to supervise, direct, or control the Work;

    b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;

    c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;

    d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or

    e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

    a. the Work is defective, requiring correction or replacement;

    b. the Contract Price has been reduced by Change Orders;

    c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

    d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

    e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*

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

E. *Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

    a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

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b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. The Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. The Contract Price has been reduced by Change Orders;

i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;

j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or

l. Other items entitle Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

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

15.03 *Substantial Completion*

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

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

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion, subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

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

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

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.

2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.

2. The final Application for Payment must be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

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d. a list of all duly pending Change Proposals and Claims; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Final Application and Recommendation of Payment*: If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *Completion of Work*. The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

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

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

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

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such adjacent areas;
2. correct such defective Work;
3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

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

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

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

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects,

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

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The

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

ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and

2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;

2. by registered or certified mail, postage prepaid, to the recipient's place of business; or

3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

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

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18.03 *Cumulative Remedies*

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

18.04 *Limitation of Damages*

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

18.05 *No Waiver*

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

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Assignment of Contract*

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

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

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

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

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

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

No suggested Supplementary Conditions in this Article.

ARTICLE 2—PRELIMINARY MATTERS

2.02 *Copies of Documents*

SC-2.02 Amend the first sentence of Paragraph 2.02.A to read as follows:

Owner shall furnish to Contractor one printed copy of the Contract Documents (including one fully signed counterpart of the Agreement).

2.03 *Before Starting Construction*

SC-2.02 Add Paragraph 2.02.B. to read as follows:

Preconstruction Video Recording.

The Contractor shall video record the proposed working area of the entire construction project route prior to any construction activity. Particular attention is to be noted to broken headwall, cracked foundations, etc., which have sustained damage prior to the construction activity. The video recording is to be turned over to the Engineer prior to starting the construction. The video recording is to be indexed for easy review throughout the duration of the job. It is imperative that the video recording will be done in a professional manner, i.e. containing a narrative describing the location of the camera relative to street addresses, manhole stations, etc. and its direction as well as any findings concerning the surrounding area. The movement of the camera should be slow and steady especially when a zoom mode is being used. Video recording shall be presented on a DVD or jump drive in a format acceptable to Owner.

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ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

No suggested Supplementary Conditions in this Article.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

No suggested Supplementary Conditions in this Article.

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

5.03 *Subsurface and Physical Conditions* **[NOT USED]**

5.06 *Hazardous Environmental Conditions*

SC-5.06 Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

ARTICLE 6—BONDS AND INSURANCE

6.03 *Contractor's Insurance*

SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

D. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	Policy limits of not less than:
Workers' Compensation	
State	Statutory
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
Employer's Liability	
Each accident	$1,000,000.00
Each employee	$1,000,000.00
Policy limit	$1,000,000.00

E. *Commercial General Liability—Claims Covered:* Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:

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1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
2. damages insured by reasonably available personal injury liability coverage, and
3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage.
    a. Such insurance must be maintained for three years after final payment.
    b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
4. Underground, explosion, and collapse coverage.
5. Personal injury coverage.
6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:

1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).
2. Any exclusion for water intrusion or water damage.
3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.
4. Any exclusion of coverage relating to earth subsidence or movement.
5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).

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6. Any limitation or exclusion based on the nature of Contractor's work.

7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.

I. *Commercial General Liability—Minimum Policy Limits*

Commercial General Liability	Policy limits of not less than:
General Aggregate	$1,000,000.00
Products—Completed Operations Aggregate	$1,000,000.00
Personal and Advertising Injury	$1,000,000.00
Bodily Injury and Property Damage—Each Occurrence	$1,000,000.00

J. *Automobile Liability:* Contractor shall purchase and maintain automobile liability insurance 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 automobile liability policy must be written on an occurrence basis.

Automobile Liability	Policy limits of not less than:
Bodily Injury	
Each Person	$1,000,000.00
Each Accident	$1,000,000.00
Property Damage	
Combined Single Limit	
Combined Single Limit (Bodily Injury and Property Damage)	$1,000,000.00

K. *Umbrella or Excess Liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

Excess or Umbrella Liability	Policy limits of not less than:
Each Occurrence	$1,000,000.00
General Aggregate	$1,000,000.00

L. *Contractor's Professional Liability Insurance:* If Contractor will provide or furnish professional services under this *Contract*, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.

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Contractor's Professional Liability	Policy limits of not less than:
Each Claim	$1,000,000.00
Annual Aggregate	$1,000,000.00

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.02 *Supervision and Superintendence*

SC-7.02 Add the following new paragraphs immediately after Paragraph 7.03.B:

C. *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 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

D. *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 the contract) and understands and agrees that the (name of the subrecipient entering 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

7.03 *Labor; Working Hours*

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

D. *Davis-Bacon Act*

1. 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

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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.

2. 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.

3. Additionally, contractors are required to pay wages not less than once a week.

E. *Copeland Anti-Kickback Act*

1. 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.

2. 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 these contract clauses.

3. 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."

F. *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

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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.

7.04 *Services, Materials, and Equipment*

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

D. *Procurement of Recovered Materials*

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.

E. *Domestic Preference for Procurement*

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."

7.08 *Patent Fees and Royalties*

SC-7.08 Delete Paragraph 7.08.B in its entirety.

7.11 *Laws and Regulations*

SC-7.11 Add the following Paragraphs immediately after 7.11.C.

D. 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

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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

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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.

7.13 *Safety and Protection*

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SC-7.13 Add the following new Paragraph 7.13.K immediately after Paragraph 7.13.J:

K. Certain aspects of Work performed under this Contract may involve the entry into manholes, tanks, pits, etc. which are defined as confined spaces by the OSHA requirements which are detailed in the Combined Federal Register 1910.146. The Contractor is advised to become familiar with all aspects and requirements of this OSHA policy for the Contractor to protect his employees and all others involved from the dangers, which may be associated with the limited access, and hazardous atmospheres that may exist in these confined spaces. It is the Contractor's responsibility to become familiar with and institute the various permitting, sampling and other associated safety requirements for confined space entry.

ARTICLE 8—OTHER WORK AT THE SITE

No suggested Supplementary Conditions in this Article.

ARTICLE 9—OWNER'S RESPONSIBILITIES

No suggested Supplementary Conditions in this Article.

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.03 *Resident Project Representative*

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.B:

C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:

1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.

2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.

3. *Liaison*

a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-site operations.

c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.

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4. *Review of Work; Defective Work*

    a. Conduct on-site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.

    b. Observe whether any Work in place appears to be defective.

    c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.

5. *Inspections and Tests*

    a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.

    b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.

6. *Payment Requests:* Review Applications for Payment with Contractor.

7. *Completion*

    a. Participate in Engineer's visits regarding Substantial Completion.

    b. Assist in the preparation of a punch list of items to be completed or corrected.

    c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the work, and prepare a final punch list of items to be completed or corrected by Contractor.

    d. Observe whether items on the final punch list have been completed or corrected.

D. The RPR will not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.

5 Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Authorize Owner to occupy the Project in whole or in part.

ARTICLE 11—CHANGES TO THE CONTRACT

No suggested Supplementary Conditions in this Article.

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ARTICLE 12—CLAIMS

No suggested Supplementary Conditions in this Article.

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

No suggested Supplementary Conditions in this Article.

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

No suggested Supplementary Conditions in this Article.

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

15.01 *Progress Payments*

SC 15.01 Amend Paragraph 15.01.D.1 to read as follows:

1. Within 30 days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

No suggested Supplementary Conditions in this Article.

ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES

No suggested Supplementary Conditions in this Article.

ARTICLE 18—MISCELLANEOUS

No suggested Supplementary Conditions in this Article.

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THE TOWN OF CUMBERLAND CITY

2024 ARPA CUMBERLAND CITY WATER SYSTEM IMPROVEMENTS

TECHNICAL SPECIFICATIONS

01/27/2026

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2024 ARPA CUMBERLAND CITY WATER SYSTEM IMPROVEMENTS

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DIVISION 40 – PROCESS INTERCONNECTIONS

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SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 GENERAL

1.01 GENERAL SCOPE AND SPECIAL PROVISIONS

A. The Work consists of replacing two sections of the existing 6" water main currently suspended on the side of two bridges in The Town of Cumberland City. The existing hanging waterline shall be removed and replaced with a new, insulated Ductile Iron waterline, which will be reattached to the bridges.

B. The Contractor shall be responsible for all costs associated with the materials, equipment, and labor necessary to construct, and test all proposed items shown on the Drawings. Contractor shall also be responsible for the traffic control, worker protection, environmental pollution control, waste disposal and all other ancillary actions required to complete the work as shown on the Drawings.

C. Submittals

All project submittals shall be submitted to the Engineer (Seth W. Rye, P.E., Rye Engineering PLC, 4210 West Main Street, Erin, Tennessee 37061).

1. Unless otherwise specified, the Contractor shall provide five sets of submittals and/or shop drawings for Engineer review.

2. Submittals shall be clear and legible, and of sufficient size for legibility and clarity of the presented data.

3. The submittal transmittal page shall include at a minimum the following information:

   a. Contractor identification:
      i. Contractor
      ii. Supplier
      iii. Manufacturer
      iv. Supplier or Manufacturer Representative

   b. Date of submission

   c. Project number

   d. Project name

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e. Description/identification of the product

f. Reference to Contract drawing(s), if applicable

g. Specification section number, page and paragraph(s), if applicable

h. Reference to applicable standards, such as ASTM or Federal Standards numbers

i. Contractor's approval and certification statement

j. Reference to previous submittal (for resubmittals)

D. Contractor shall schedule all work in close coordination with Owner and Engineer. Due to the criticality of the pump station down time, timely work is crucial.

E. Existing Utilities, Underground Pipelines and Electric Conduit

From investigations during the design surveys, at least the following existing utilities were found to be present in the area:

Water Lines.....The Town of Cumberland City, Cumberland City, TN

Sewer Lines.....The Town of Cumberland City, Cumberland City, TN

Power Lines .....Cumberland Electric Membership Cooperation, Dover, TN

Telephone Lines.....AT&T, TN

Precautions shall be taken by the Contractor to avoid damage to existing overhead and underground utilities.

F. Project Sign

1. The General Contractor shall erect a sign at the Project site identifying the Project. The sign shall be erected within twenty-one (21) days after the Notice to Proceed and shall be in accordance with the Specifications and details included in this Section. The project sign and sign panel shall be installed by the Contractor at the location designated by the Owner's Representative. Wording and colors shall be as shown on the detail at the end of this Section.

2. The project sign shall be furnished, erected, and maintained by the Contractor in accordance with the following specifications:

a. Sign Panel: The sign panel shall be constructed of 3/4-inch minimum thickness marine plywood rabbited into a 2-inch x 4-inch wood frame. All fasteners used in the construction of the sign shall be of a rustproof nature.

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b. Painting: All supports, trim and back of the sign panel shall be painted with at least two (2) coats of the same paint used for the sign face. All paint used shall be exterior grade paint, suitable for use on wood signs.

c. Sign Supports: The supports for the project sign shall be at least two 4" by 4" treated wood posts. The sign panel shall be securely fastened to the sign supports with at least six (6) 3/8 ⍰⍰galvanized bolts, nuts and washers. The positioning and alignment of the sign shall be as determined by the Owner's Representative.

d. Maintenance: The project sign shall be maintained by the Contractor, in good condition, at all times, for the duration of construction.

e. Removal of Sign from Project Site: The removal of the project sign from the construction site by the Contractor shall be at the completion of construction, when ordered by the Owner's Representative.

f. Payment: The cost of the fabrication, erection, maintenance, and removal of the project sign, including all labor and materials, shall be included in the General Contractor's Lump Sum Bid. No extra payment will be made for obliterating certain names and offices and replacement thereof of others because of administrative changes during the course of this Contract.

g. Identification Plate – NOT USED

G. Progress Pictures

1. The Contractor shall furnish progress pictures to the Engineer at the end of each month at the time the estimate is submitted. The pictures shall be submitted in digital and print format, with descriptions. These pictures shall be approximately 3" x 5" and clearly show the work performed. The name of the project, Contractor's name, and the date shall be shown on the progress pictures. Twenty pictures minimum shall be required per month.

H. Documents at Site

2. Contractor shall maintain an approved original set of Drawings and Specifications on Site at all times. Said Drawings, Specifications and permits shall be available for inspection by Engineer, Owner and SFM officials at all times.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

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:

WATER INFRASTRUCTURE FOR TENNESSEE

DEPARTMENT OF ENVIRONMENT AND CONSERVATION

GOVERNOR
BILL LEE

COMMISSIONER
DAVID SALYERS

THE TOWN OF
CUMBERLAND CITY

MAYOR
PHILLIP TAYLOR

AMERICAN RESCUE PLAN PROJECT
STATE WATER INFRASTRUCTURE GRANTS

GRANT AWARD: **$** 986,825.20

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.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 01 29 00

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 THE REQUIREMENT

A. The Bid Form lists each item of the Project for which payment will be made. No payment will be made for any items other than those listed in the Bid Form.

B. Required items of work and incidentals necessary for the satisfactory completion of the work which are not specifically listed in the Bid Form, and which are not specified in this Section, shall be considered incidental to the work. All costs thereof shall be considered as included in the lump sum or unit prices bid for the various Bid items. The Contractor shall prepare the Bid accordingly.

C. Contractor shall include in the prices provided for the items listed herein adequate amounts considered by Contractor to cover all costs associated with furnishing all tools, equipment, supplies, manufactured articles and for all labor, operations, taxes, commissions, transportation and handling, bonds, permit fees, insurance, overhead and profit for each item.

1.02 BASE BID ITEMS

A. Unit prices bid by Contractor are deemed to be full compensation for all required labor, products, tools, equipment, plant, transportation, testing, inspection, services, incidentals, administrative, procedures, applicable taxes, permit fees, overhead, profit, and other miscellaneous expenses, unless specified otherwise.

B. Mobilization (Maximum of 3% of Total Base Bid)

1. MEASUREMENT

a. Measurement for the Mobilization (Maximum of 3% of Total Base Bid) will be measured as a lump sum. The lump sum shall include all labor, materials, and all equipment necessary to Mobilize on site to prepare for beginning work.

2. PAYMENT

b. Payment will be made at the lump sum price listed on the bid form. The price on the bid form shall not exceed 3% of the total base bid. If it does, then contractor shall only be paid for 3% of the total base bid.

C. 8" MJ Flexible Expansion Joint

1. MEASUREMENT

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

a. Measurement for the 8" MJ Flexible Expansion Joint will be measured as a unit price bid item for Each (EA) expansion joint in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

a. Payment will be made at the unit price listed on the bid form.

D. 8" MJ Gate Valve

1. MEASUREMENT

a. Measurement for the 8" MJ Gate Valve will be measured as a unit price bid item for Each (EA) valve in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

a. Payment will be made at the unit price listed on the bid form.

E. 8" RJ Ductile Iron Pipe (DIP)

1. MEASUREMENT

a. Measurement for the 8" RJ Ductile Iron Pipe (DIP) will be measured as a unit price bid item for every Linear Foot (LF) in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications

2. PAYMENT

a. Payment will be made at the unit price listed on the bid form.

F. Pipe Hangers and Supports Per Detail

1. MEASUREMENT

a. Measurement for Pipe Hangers and Supports will be measured as a Lump Sum (LS) item in the project. The lump sum shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

a. Payment will be made at the Lump Sum price listed on the bid form.

G. Foam Insulation with Foil Jacket

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

1. MEASUREMENT

    a. Measurement for Foam Insulation with Foil Jacket will be measured as a unit price bid item for every Linear Foot (LF) in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

    a. Payment will be made at the unit price listed on the bid form.

H. Compact MJ DI Fittings

1. MEASUREMENT

    a. Measurement for Compact MJ DI Fittings will be measured as a unit price bid item for each Pound (LBS) in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

    a. Payment will be made at the unit price listed on the bid form.

I. Concrete Reverse Anchor

1. MEASUREMENT

    a. Measurement for Concrete Reverse Anchor will be measured as a unit price bid item for Each (EA) anchor in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

    a. Payment will be made at the unit price listed on the bid form.

J. 2" Blowoff Assembly

1. MEASUREMENT

    a. Measurement for the 2" Blowoff Assembly will be measured as a unit price bid item for Each (EA) blowoff assembly in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

a. Payment will be made at the unit price listed on the bid form.

K. Crushed Limestone (Backfill in rocky areas, under concrete / pavement areas, etc.)

1. MEASUREMENT

a. Measurement for Crushed Limestone will be measured as a unit price bid item for each Ton (TON) in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

a. Payment will be made at the unit price listed on the bid form.

L. Pavement Restoration

1. MEASUREMENT

a. Measurement for Pavement Restoration will be measured as a unit price bid item for each Square Foot (SF) restored in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

a. Payment will be made at the unit price listed on the bid form.

M. Silt Fencing

1. MEASUREMENT

a. Measurement for Silt Fencing will be measured as a Lump Sum (LS) item in the project. The Lump Sum shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

a. Payment will be made at the Lump Sum price listed on the bid form.

N. Cleanup, Seed & Straw, Restoration

1. MEASUREMENT

a. Measurement for Cleanup, Seed & Straw, Restoration will be measured as a unit price bid item for each Square Foot (SF) restored in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

2. PAYMENT

a. Payment will be made at the unit price listed on the bid form.

1.03 ALTERNATE #1 – 12-INCH CROSSING

A. Mobilization (Maximum of 3% of Total Base Bid)

1. MEASUREMENT

a. Measurement for the Mobilization (Maximum of 3% of Total Base Bid) will be measured as a lump sum. The lump sum shall include all labor, materials, and all equipment necessary to Mobilize on site to prepare for beginning work.

2. PAYMENT

a. Payment will be made at the lump sum price listed on the bid form. The price on the bid form shall not exceed 3% of the total base bid. If it does, then contractor shall only be paid for 3% of the total base bid.

B. 12" MJ Flexible Expansion Joint

1. MEASUREMENT

b. Measurement for the 12" MJ Flexible Expansion Joint will be measured as a unit price bid item for Each (EA) expansion joint in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

2. PAYMENT

b. Payment will be made at the unit price listed on the bid form.

C. 12" MJ Gate Valve

2. MEASUREMENT

b. Measurement for the 12" MJ Gate Valve will be measured as a unit price bid item for Each (EA) valve in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

b. Payment will be made at the unit price listed on the bid form.

D. 12" RJ Ductile Iron Pipe (DIP)

2. MEASUREMENT

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

b. Measurement for the 12" RJ Ductile Iron Pipe (DIP) will be measured as a unit price bid item for every Linear Foot (LF) in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications

3. PAYMENT

b. Payment will be made at the unit price listed on the bid form.

E. Pipe Hangers and Supports Per Detail

2. MEASUREMENT

b. Measurement for Pipe Hangers and Supports will be measured as a Lump Sum (LS) item in the project. The lump sum shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

b. Payment will be made at the Lump Sum price listed on the bid form.

F. Foam Insulation with Foil Jacket

2. MEASUREMENT

b. Measurement for Foam Insulation with Foil Jacket will be measured as a unit price bid item for every Linear Foot (LF) in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

b. Payment will be made at the unit price listed on the bid form.

G. Compact MJ DI Fittings

2. MEASUREMENT

b. Measurement for Compact MJ DI Fittings will be measured as a unit price bid item for each Pound (LBS) in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

b. Payment will be made at the unit price listed on the bid form.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

H. Concrete Reverse Anchor

2. MEASUREMENT

b. Measurement for Concrete Reverse Anchor will be measured as a unit price bid item for Each (EA) anchor in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

b. Payment will be made at the unit price listed on the bid form.

I. 2" Blowoff Assembly

2. MEASUREMENT

b. Measurement for the 2" Blowoff Assembly will be measured as a unit price bid item for Each (EA) blowoff assembly in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

b. Payment will be made at the unit price listed on the bid form.

J. Crushed Limestone (Backfill in rocky areas, under concrete / pavement areas, etc.)

2. MEASUREMENT

b. Measurement for Crushed Limestone will be measured as a unit price bid item for each Ton (TON) in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

b. Payment will be made at the unit price listed on the bid form.

K. Pavement Restoration

2. MEASUREMENT

b. Measurement for Pavement Restoration will be measured as a unit price bid item for each Square Foot (SF) restored in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

b. Payment will be made at the unit price listed on the bid form.

L. Silt Fencing

2. MEASUREMENT

b. Measurement for Silt Fencing will be measured as a Lump Sum (LS) item in the project. The Lump Sum shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

b. Payment will be made at the Lump Sum price listed on the bid form.

M. Cleanup, Seed & Straw, Restoration

2. MEASUREMENT

b. Measurement for Cleanup, Seed & Straw, Restoration will be measured as a unit price bid item for each Square Foot (SF) restored in the project. The unit price shall include all labor, materials, and all equipment necessary to complete the work, per the construction drawings and specifications.

3. PAYMENT

b. Payment will be made at the unit price listed on the bid form.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 01 66 00

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION

A. This Section includes General Requirements for storing and protecting materials and equipment.

B. The Contractor shall be responsible for storage and handling of Owner furnished equipment.

1.02 STORAGE

A. Store and protect materials and equipment in accordance with manufacturer's recommendations and the Contract Documents.

B. Contractor shall make all arrangements and provisions necessary for, and pay all costs for, storing materials and equipment. Excavated materials, construction equipment, and materials and equipment to be incorporated into the Work shall be placed to avoid damaging the Work and existing facilities and property, and so that free access is maintained at all times to all parts of the Work and to public utility installations in vicinity of the Work. Store materials and equipment neatly and compactly in locations that cause minimum inconvenience to Owner, other contractors, public travel, and owners, tenants, and occupants of adjoining property. Arrange storage in manner to provide easy access for inspection.

C. Areas available at the Site for storing materials and equipment will be discussed with the Owner at the Pre-Bid Meeting and Kickoff Meeting of the project.

D. Contractor shall be fully responsible for loss or damage (including theft) to stored materials and equipment.

E. Do not open manufacturer's containers until time of installation, unless recommended by the manufacturer, required to verify all contents or otherwise specified in the Contract Documents.

F. Do not store materials or equipment in structures being constructed unless approved by Engineer in writing.

G. Do not use lawns or other private property for storage without written permission of the owner or other person in possession or control of such premises. Prior to use written permission must be submitted to Engineer for record purposes.

1.03 PROTECTION

A. Equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipping, handling, and storage, in accordance with Section 01 65 00, Product Delivery Requirements.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

B. Store all materials and equipment off the ground or floor on raised supports such as skids or pallets.

C. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Painted equipment surfaces that are damaged or marred shall be repainted in their entirety in accordance with equipment manufacturer and paint manufacturer requirements, to the satisfaction of Engineer.

D. Protect electrical equipment, controls, and instrumentation against moisture, water damage, heat, cold, and dust. Space heaters provided in equipment shall be connected and operating at all times until equipment is placed in operation and permanently connected.

1.04 UNCOVERED STORAGE

A. The following types of materials may be stored outdoors without cover on supports so there is no contact with the ground:

1. Reinforcing steel.
2. Structural steel.
3. Piping.
4. Precast concrete materials.
5. Castings.
6. Handrails and railings.
7. Grating.
8. Checker plate.
9. Metal stairs.
10. Metal access hatches.
11. Fiberglass products.
12. Rigid electrical conduit.
13. Loose granular material.
14. Others as directed by Owner.

1.05 COVERED STORAGE

A. The following materials and equipment may be stored outdoors on supports and completely covered with covering impervious to water:

1. Rough lumber.
2. Filter media.
3. Masonry units.
4. Grout and mortar materials.
5. Others as directed by Owner.

B. Tie down covers with rope, and slope covering to prevent accumulation of water.

1.06 FULLY PROTECTED STORAGE

A. Store all material and equipment not named in Articles 1.4 and 1.5 of this Section in on supports in buildings or trailers that have concrete or wooden flooring, roof, and fully closed walls on all

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

sides. Covering with Visqueen plastic sheeting or similar material in space without floor, roof, and walls is not acceptable. Comply with the following:

1. Provide heated storage for materials and equipment that could be damaged by low temperatures or freezing.
2. Provide air-conditioned storage for materials and equipment that could be damaged by high temperatures.
3. Protect mechanical and electrical equipment from being contaminated by dust, dirt, and moisture.
4. Maintain humidity at levels recommended by manufacturers for electrical and electronic equipment.

1.07 HAZARDOUS PRODUCTS

A. Prevent contamination of personnel, storage area, and the Site. Comply with Laws and Regulations and manufacturer's instructions.

1.08 MAINTENANCE OF STORAGE

A. On scheduled basis, periodically inspect stored materials and equipment to ensure that:

1. State of storage facilities is adequate to provide required conditions.
2. Required environmental conditions are maintained on continuing basis.
3. Materials and equipment exposed to elements are not adversely affected.

B. Mechanical and electrical equipment requiring long-term storage shall have complete manufacturer's instructions for servicing each item, with notice of enclosed instructions shown on exterior of container or package.

1. Comply with manufacturer's instructions on scheduled basis.

2. Space heaters that are part of electrical equipment, shall be connected and operated continuously until equipment is placed in service and permanently connected.

1.09 MICROPROCESSORS, PANELS, AND INSTRUMENTATION STORAGE

A. Microprocessor-based equipment, store panels, electronics, and other devices subject to damage or decreased useful life because of temperatures below 40 degrees F or above 100 degrees F, relative humidity above 90 percent, or exposure to rain or exposure to blowing dust in climate-controlled storage space.

B. Requirements:

1. Owner and Engineer have the right to inspect materials and equipment during normal working hours.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

2. Placed inside each panel or device a desiccant, volatile corrosion inhibitor blocks (VCI), moisture indicator, and maximum-minimum indicating thermometer.

3. Check panels and equipment at least once per month. Replace desiccant, VCI, and moisture indicator as often as required, or every six months, whichever occurs first.

4. Certified record of daily maximum and minimum temperature and humidity in storage facility shall be available for inspection by Owner and Engineer. Certified record of monthly inspection, noting maximum and minimum temperature for month, condition of desiccant, VCI, and moisture indicator, shall be available for inspection by Owner and Engineer.

C. Costs for storing climate-sensitive materials and equipment shall be paid by Contractor. Replace panels and devices damaged during storage, or for which storage temperatures or humidity range has been exceeded, at no additional cost to Owner. Delays resulting from such replacement are causes within Contractor's control.

D. Do not ship panels and equipment to the Site until conditions at the Site are suitable for installation, including slabs and floors, walls, roofs, and environmental controls. Failure to have the Site ready for installation shall not relieve Contractor from complying with the Contract Documents.

1.10 RECORDS

A. Keep up-to-date account of materials and equipment in storage to facilitate preparation of Applications for Payment, if the Contract Documents provide for payment for materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 01 71 33

PROTECTION OF PROPERTY AND WORK

PART 1 GENERAL

1.01 THE REQUIREMENT

A. Contractor shall be responsible for the preservation and protection of property adjacent to the work site against damage or injury as a result of his operations under this Contract. Any damage or injury occurring on account of any act, omission or neglect on the part of the Contractor shall be restored in a proper and satisfactory manner or replaced by and at the expense of the Contractor to an equal or superior condition than previously existed.

B. Contractor shall comply promptly with such safety regulations as may be prescribed by the Owner or the local authorities having jurisdiction and shall, when so directed, properly correct any unsafe conditions created by, or unsafe practices on the part of, his employees. In the event of the Contractor's failure to comply, the Owner may take the necessary measures to correct the conditions or practices complained of, and all costs thereof will be deducted from any monies due the Contractor. Failure of the Engineer to direct the correction of unsafe conditions or practices shall not relieve the Contractor of his responsibility hereunder.

C. In the event of any claims for damage or alleged damage to property as a result of work under this Contract, the Contractor shall be responsible for all costs in connection with the settlement of or defense against such claims. Prior to commencement of work in the vicinity of property adjacent to the work site, the Contractor, at his own expense, shall take such surveys as may be necessary to establish the existing condition of the property. Before final payment can be made, the Contractor shall furnish satisfactory evidence that all claims for damage have been legally settled or sufficient funds to cover such claims have been placed in escrow, or that an adequate bond to cover such claims has been obtained.

1.02 PROTECTION OF WORK AND MATERIAL

A. During the progress of the work and up to the date of final payment, the Contractor shall be solely responsible for the care and protection of all work and materials covered by the Contract.

B. All work and materials shall be protected against damage, injury or loss from any cause whatsoever, and the Contractor shall make good any such damage or loss at his own expense. Protection measures shall be subject to the approval of the Engineer.

1.03 BARRICADES, WARNING SIGNS AND LIGHTS

A. The General Contractor shall provide, erect and maintain as necessary, strong and suitable barricades, danger signs and warning lights along all roads accessible to the public, as required by the authority having jurisdiction, to ensure safety to the public. All barricades and obstructions along public roads shall be illuminated at night and all lights for this purpose shall be kept burning from sunset to sunrise.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

B. Each Contractor shall provide and maintain such other warning signs and barricades in areas of and around their respective work as may be required for the safety of all those employed in the work, the Owner's operating personnel, or those visiting the site.

1.04 EXISTING UTILITIES AND STRUCTURES

A. The term existing utilities shall be deemed to refer to both publicly-owned and privately-owned utilities such as electric power and lighting, telephone, water, gas, storm drains, process lines, sanitary sewers and all appurtenant structures.

B. Where existing utilities and structures are indicated on the Drawings, it shall be understood that all of the existing utilities and structures affecting the work may not be shown and that the locations of those shown are approximate only. It shall be the responsibility of the Contractor to ascertain the actual extent and exact location of existing utilities and structures. In every instance, the Contractor shall notify the proper authority having jurisdiction and obtain all necessary directions and approvals before performing any work in the vicinity of existing utilities.

C. Prior to beginning any excavation work, the Contractor shall, through field investigations, determine any conflicts or interferences between existing utilities and new utilities to be constructed under this project. This determination shall be based on the actual locations, elevations, slopes, etc., of existing utilities as determined in the field investigations, and locations, elevation, slope, etc. of new utilities as shown on the Drawings. If an interference exists, the Contractor shall bring it to the attention of the Engineer as soon as possible. If the Engineer agrees that an interference exists, he shall modify the design as required. Additional costs to the Contractor for this change shall be processed through a Change Order as detailed elsewhere in these Contract Documents. In the event the Contractor fails to bring a potential conflict or interference to the attention of the Engineer prior to beginning excavation work, any actual conflict or interference which does arise during the Project shall be corrected by the Contractor, as directed by the Engineer, at no additional expense to the Owner.

D. The work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Temporary connections shall be provided, as required, to ensure the non-interruption of existing services. Any damage resulting from the work of this Contract shall be promptly repaired by the Contractor at his own expense in a manner approved by the Engineer and further subject to the requirements of any authority having jurisdiction. Where it is required by the authority having jurisdiction that they perform their own repairs or have them done by others, the Contractor shall be responsible for all costs thereof.

E. Where excavations by the Contractor require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction work, such support and protection shall be provided by the Contractor. All such work shall be performed in a manner satisfactory to the Engineer and the respective authority having jurisdiction over such work. In the event the Contractor fails to provide proper support or protection to any existing utility, the Engineer may, at his discretion, have the respective authority to provide such support or protection as may be necessary to ensure the safety of such utility, and the costs of such measures shall be paid by the Contractor.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 03 30 00

CAST IN PLACE CONCRETE

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

The work to be performed is shown on the drawings. It involves the selective demolition of existing concrete supports, and the installation of new concrete supports. Contractor shall submit marked up drawing of construction plans to Engineer to review placement of concrete supports.

1.02 QUALITY ASSURANCE

A. Codes and Standards:

1. ACI 301 "Specifications for Structural Concrete for Buildings".
2. ACI 302 "Guide for Concrete Floor and Slab Construction".
3. ACI 318 "Building Code Requirements for Reinforced Concrete".
4. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".

B. Provide special inspections and verifications for concrete construction in compliance with Section 1705.3 of the International Building Code, 2012 Edition, meeting the minimum requirements of Table 1705.3. A qualified special inspector, approved by the Architect, shall be retained by the Contractor. Payment for special inspector's services will be by Owner.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's product data with application installation instructions for proprietary materials and items, including reinforcement, admixtures, patching compounds, curing compounds and others as requested.

B. Shop Drawings; Reinforcement: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of concrete reinforcement.

C. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test as specified. Material certificates may be submitted in lieu of laboratory test reports. Material certificates shall be signed by the manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

PART 2 PRODUCTS

2.01 FORM MATERIALS

TO BID CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

A. Forms for Exposed Finish Concrete: Construct formwork for exposed concrete surfaces with plywood having integral liner, metal, or other acceptable paneltype materials, to provide continuous, straight, smooth, exposed surfaces. Refer to architectural drawings for locations requiring special form liners.
B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material.

C. Form Coatings: Provide commercial formulation formcoating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.02 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.

B. Steel Wire: ASTM A 82, plain, colddrawn, steel.

C. Welded Wire Fabric: ASTM A 1064, welded steel wire fabric. Provide flat sheets. Rolled wire fabric will not be allowed.

D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars in place. Use wire bar type supports complying with CRSI recommendations.

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I.

1. Use one brand of cement throughout project.

B. Fly Ash: ASTM C 618, Class C.

C. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

1. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used.

D. Water: Potable.

E. AirEntraining Admixture: ASTM C 260.

F. WaterReducing Admixture: ASTM C 494, Type A.

G. WaterReducing, Accelerator Admixture: ASTM C 494, Type C or E.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

H. WaterReducing, Retarding Admixture: ASTM C 494, Type D.

1. Calcium chloride not permitted.

2.04 RELATED MATERIALS

A. Moisture Barrier: Provide moisture barrier cover over prepared base material polyethylene sheet not less than 10 mils thick.

B. NonShrink Grout: CRDC 621, Type D, nonmetallic, factory premixed grout.

1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

a. "Masterflow 713"; BASF

b. "NS-Grout"; Euclid Chemical Co.

c. "Five Star Grout"; Five Star Products

d. "Duragrout"; L & M Const. Chemical Co.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

D. MoistureRetaining Cover: One of the following, complying with ASTM C 171.

1. Waterproof paper.

2. Polyethylene film.

3. Polyethylenecoated burlap.

E. Liquid MembraneForming Curing Compound: ASTM C309, Type I.

1. Products offered by manufacturers to comply with the requirements for membraneforming curing compounds include the following:

a. "Aqua-Cure VOX"; Euclid Chemical Corp.

b. "Masterkure"; BASF.

c. "Dress and Seal"; L & M Construction Chemicals.

F. Epoxy Adhesive: 100% solids, two component material suitable for use on dry or damp surfaces.

1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

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a. "Sikadur 35 HiMod LV"; Sika Chemical Corp.

b. "Eucopoxy"; Euclid Chemical Co.

G. Bonding Compound: Polyvinyl acetate, rewettable type.

1. Available Products: Subject to compliance with requirements, products which may be incorporated in the work include, but are not limited to, the following:

a. "Everbond"; L & M Construction Chemicals.

b. "Euco Weld"; Euclid Chemical Co.

c. "Daraweld C"; Grace Construction Products.

2.05 PROPORTIONING AND DESIGN OF MIXES

A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. The concrete mix design shall be at Contractor's expense.

1. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.

2. Design mixes to provide normal weight concrete with the following properties, as indicated on the drawings.

a. 3000 psi 28-day compressive strength (Limit fly ash to not exceed 20% of cement content by weight)

b. 4000 psi 28-day compressive strength (Limit fly ash to not exceed 20% of cement content by weight)

B. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Architect.

C. Admixtures:

1. Use water reducing admixture in all concrete.

2. Use accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F.

D. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

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1. Ramps and Sloping Surfaces: Not more than 3".
2. Other Concrete: Not less than 2" and not more than 5".
3. Slump limits are before the addition of superplasticizers.

2.06 CONCRETE MIXING

A. JobSite Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cu. yd., or smaller capacity, continue mixing at least 11/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 11/2 minutes of mixing time by 15 seconds for each additional cu. yd., or fraction thereof. Jobsite mixing shall be allowed for minor applications only.

B. ReadyMix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

1. Maximum of 2 gallons of water per cubic yard may be added to the batch for material of insufficient slump.

2. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.

3. When air temperature is between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 11/2 hours to 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMS

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position. Design and construction of formwork is the responsibility of the Contractor.

1. Construct forms complying with ACI 347, to sizes shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.

2. Fabricate forms for easy removal without hammering or prying against concrete surfaces.

3. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete.

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4. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

B. Form Ties: Factory fabricated, adjustable length, removable or snap off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.

1. Coat contact surfaces of forms with a form coating compound before reinforcement is placed.

3.02 PLACING REINFORCEMENT

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

1. Weld rebar only if specifically permitted by Structural Engineer. Accomplish welding per AWS "Recommended Practices for Welding Reinforcing Steel, Metal Inserts, and Connections in Reinforced Concrete Construction".

D. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.03 JOINTS

A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Architect.

1. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints, unless noted otherwise.

B. Isolation Joints in Slabs on Ground: Construct isolation joints in slabs on ground at points of contact between slabs on ground and vertical surfaces, such as columns, walls, and elsewhere as indicated.

C. Contraction (Control) Joints in Slabs on Ground: Construct control joints in slabs on ground to form panels of patterns as shown. Use metal preformed keyway joints or saw cuts to 1/4 of slab depth, unless otherwise indicated.

1. Install metal keyway joints per manufacturer's instructions and as shown on drawings.

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2. If contraction joints are formed by saw cutting, saw as soon as possible after slab finishing without dislodging aggregate.

3.04 INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast in place concrete.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface.

3.05 CONCRETE PLACEMENT

A. General: Comply with ACI 304, and as herein specified.

1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

B. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

2. Do not use vibrators to transport concrete inside forms. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

C. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed. Bring slab surfaces to correct level with straight edge and strike off.

D. Cold Weather Placing: Protect concrete work from freezing or low temperatures, in compliance with ACI 306 and as herein specified.

1. When air temperature has fallen to or is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain a concrete temperature of not less than 50 degrees F, and not more than 80 degrees F at point of placement.

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2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.

3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

E. Hot Weather Placing: During hot weather, place concrete in compliance with ACI 305 and as herein specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.

2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.

3. Wet forms thoroughly before placing concrete during hot weather.

4. Use water reducing retarding admixtures (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.06 FINISH OF FORMED SURFACES

A. Rough Form Finish: For formed concrete surfaces not exposed to view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

B. Smooth Form Finish: For formed concrete surfaces exposed to view, or that are to be covered with a coating material applied to concrete, or a covering material applied directly to concrete, such as waterproofing, damp proofing, painting or other similar system. This is as cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.

C. Smooth Rubbed Finish: Provide smooth rubbed finish to scheduled concrete surfaces, which have received smooth form finish treatment, not later than one day after form removal.

Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets surfaces occurring adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

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3.07 MONOLITHIC SLAB FINISHES

A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile and other bonded applied cementitious finish flooring material, and as otherwise indicated. After placing slabs, plane surface to a tolerance not exceeding 1/4" in 2' when tested with a 2' straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set, with stiff brushed, brooms or rakes.

B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand bed terrazzo, and as otherwise indicated. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power driven floats, or both. Consolidate surface with power driven floats, or by hand floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 5/16" in 10' when tested with a 10' straight edge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

C. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed to view, and slab surfaces to be covered with resilient flooring, paint or other thin film finish coating system. After floating, begin first trowel finish operation using a power driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand troweling operation, free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 3/16" in 10' when tested with a 10' straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.

D. Non Slip Broom Finish: Apply nonslip broom finish to exterior concrete slabs, steps and ramps, and elsewhere as indicated. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route.

3.08 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Start curing as soon as free water has disappeared from concrete surface after placing and finishing. Continue curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture retaining cover curing, by membrane curing, and by combinations thereof, as herein specified.

C. Provide moist curing by following methods:

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1. Keep concrete surface continuously wet by covering with water.

2. Continuous water fog spray.

3. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

D. Provide moisture cover curing as follows: Cover concrete surfaces with moisture retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproofing tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

E. Provide curing compound to slabs as follows: Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

1. Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, waterproofing, damp proofing, membrane roofing, painting, and other coatings and finish materials, unless otherwise acceptable to Architect. Use moisture cover curing for these surfaces.

F. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

G. Curing Unformed Surfaces: Cure unformed flat surfaces by application of the specified curing compound or moisture cover curing.

3.09 REMOVAL OF FORMS

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 7 days and until concrete has attained 85 percent of design minimum compressive strength at 28days. Determine potential compressive strength of in-place concrete by testing cured specimens representative of concrete location or members.

3.10 REUSE OF FORMS

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A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.11 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

3.12 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.

1. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in on case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush coat the area to be patched with the specified bonding compound. Place patching mortar after bonding compound has dried.

2. Correct high areas in unformed surfaces such as slabs by grinding, after concrete has cured at least 14 days.

3. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.

4. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts ad expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete, apply bonding compound and allow bonding compound to dry. Mix patching concrete of same materials to provide concrete of same type

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or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

5. Repair isolated random cracks and single holes not over 1" in diameter by dr ypack method. Groove top of cracks and cutout holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix drypack, consisting of one part Portland cement to 21/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

6. Use epoxy based adhesive and/or mortar for structural repairs, where directed by Architect.

3.13 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. Materials and operations shall be tested and inspected as work progresses. Failure to detect defective work shall not prevent rejection when defect is discovered, nor shall it obligate the Owner for final acceptance.

1. The Special Inspector described in Part 1.03 of this Specification section shall provide quality control testing. His testing firm shall meet the requirements of "Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction", ASTM E329.

2. The following testing services shall be performed by the testing firm and shall be paid by the Owner:

a. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.

b. Slump: ASTM C 143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.

c. Air Content: ASTM C 173, volumetric method for lightweight concrete; ASTM C 231 pressure method for normal weight concrete; one for each set of compressive strength test specimens.

d. Concrete Temperatures: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F and above; and each time a set of compression test specimens made.

e. Compressive Strength Tests: ASTM C 39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; one field cured and one laboratory cured specimen tested at 7 days, one field cured and two laboratory cured specimen tested at 28 days, and one laboratory cured specimen retained in reserve for later testing if required.

B. When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.

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C. When strength of field cured cylinders is less than 85% of companion laboratory cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in place concrete.

D. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

1. To facilitate testing and inspection, Contractor shall:

a. Furnish labor to assist testing firm in obtaining and handling samples at the jobsite.

b. Advise testing firm in advance of operations to allow for the assignment of testing personnel.

c. Provide and maintain, for the use of the testing firm, adequate facilities for proper curing of concrete test specimens on the project site in accordance with ASTM C31.

F. Test results will be reported in writing to Architect, Structural Engineer, and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7day tests and 28day tests.

G. Additional Tests: The testing firm will make additional tests of in place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing firm may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

END OF SECTION

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SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.01 DEFINITIONS

A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.

B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.

C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2-inch caliper to a depth of 6 inches below subgrade.

D. Scalping: Removal of sod without removing more than upper 3 inches of topsoil.

E. Stripping: Removal of topsoil remaining after applicable scalping is completed.

F. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.02 SCHEDULING AND SEQUENCING

A. Prepare Site only after adequate erosion and sediment controls are in place.

B. Contractor may clear and grub for linear pipe line projects 1,000 feet ahead of pipe laying, or a greater distance with written approval of the Owner. However, at Owner's discretion, areas cleared may require the application of soil stabilization seed mix. As the Work progresses, the initial portion of the alignment shall be restored, in accordance with Section 31 25 00, Erosion and Sediment Control, as additional alignment is cleared.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Clear, grub, and strip areas actually needed for waste disposal, borrow, or Site improvements within limits shown or specified.

B. Do not injure or deface vegetation that is not designated for removal.

3.02 LIMITS

A. As follows, but not to extend beyond Project limits.

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1. Excavation Excluding Trenches: 5 feet beyond top of cut slopes.

2. Trench Excavation for Utilities: width of permanent easement as shown on the Drawings, or greater up to temporary easement, upon Owner approval.

3. Fill: Clearing and Grubbing: 5 feet beyond toe of permanent fill.

4. Structures: 15 feet outside of new structures.

5. Roadways: Clearing and grubbing: 10 feet from roadway shoulders, unless otherwise required for cut or fill sections.

6. Other Areas: As shown.

B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 TEMPORARY REMOVAL OF INTERFERING PLANTINGS

A. Remove and store plants, shrubs and trees that are not designated for removal but do interfere with construction or could be damaged by construction activities.

B. Photograph and document location, orientation, and condition of each plant, shrub, or tree prior to its removal. Record sufficient information to uniquely identify each plant removed and to assure accurate replacement.

3.04 CLEARING

A. Clear areas within limits shown or specified.

B. Fell trees so that they fall away from facilities and vegetation not designated for removal.

C. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

3.05 GRUBBING

A. Grub areas within limits shown or specified.

3.06 SCALPING AND STRIPPING

A. Where required on the plans, do not remove sod until after clearing and grubbing is completed and resulting debris is removed. Scalp areas within limits shown or specified.

B. Do not remove topsoil until after scalping is completed. Strip areas within limits to minimum depths shown or specified. Do not remove subsoil with topsoil. Stockpile strippings, meeting requirements of Section 32 91 13, Soil Preparation, for topsoil, separately from other excavated material.

3.07 TREE REMOVAL OUTSIDE CLEARING LIMITS

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A. Remove Within Project Limits:

1. Dead, dying, leaning, or otherwise unsound trees that may strike and damage Project facilities in falling.

2. Trees designated by Owner.

B. Cut stumps off flush with ground, grub, and remove debris, and if disturbed, restore surrounding area to its original condition.

3.08 PRUNING

A. Remove branches below the following heights:

1. 20 feet above roadways and shoulders.

2. 9 feet above sidewalks.

3. 6 feet above roofs.

3.09 SALVAGE

A. With permission from Owner, saleable log timber may be sold to Contractor's benefit. Promptly remove from Project Site.

B. Other limbs or woody debris shall be chipped and used for erosion control or mulch, if practical, or disposed of off-site.

C. With permission from Owner, sod with commercial value may be sold to Contractor's benefit. Promptly remove from Project Site.

3.10 DISPOSAL

A. Clearing and Grubbing Debris:

1. Dispose of debris offsite. Burning is not permitted.

2. If practical, woody debris may be chipped and used for landscaping onsite as mulch or uniformly mixed with topsoil, provided that resulting mix will be fertile and not support combustion. Maximum dimensions of chipped material used onsite shall be 1/4 inch by 2 inches. Dispose of chips that are unsuitable for landscaping or other uses with unchipped debris.

3. Limit offsite disposal of clearing and grubbing debris to locations that are approved by federal, state, and local authorities, and that will not be visible from Project.

B. Scalpings: As specified for clearing and grubbing debris.

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C. Strippings: Stockpile topsoil in sufficient quantity to meet Project needs. Dispose of excess strippings as specified for clearing and grubbing.

END OF SECTION

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SECTION 31 23 00

EXCAVATION AND FILL

PART 1 GENERAL

1.01 THE REQUIREMENT

A. Furnish all labor, equipment and materials required to complete all work associated with excavation, including off-site borrow excavation, dewatering, backfill, drainage layers beneath and around structures, foundation and backfill stone, filter fabric, embankments, stockpiling topsoil and any excess suitable material in designated areas, in place compaction of embankments, backfill and subgrades beneath foundations and roadways, excavation support, disposing from the site all unsuitable materials, providing erosion and sedimentation control grading, site grading and preparation of pavement and structure subgrade, and other related and incidental work as required to complete the work shown on the Drawings and specified herein.

B. All excavations shall be in conformity with the lines, grades, and cross sections shown on the Drawings or established by the Engineer.

C. It is the intent of this Specification that the Contractor conduct the construction activities in such a manner that erosion of disturbed areas and off-site sedimentation be minimized.

D. All work under this Contract shall be done in conformance with and subject to the limitations of the latest editions of the Tennessee Department of Transportation (TDOT) Standard Specifications for Roads and Structures and the Tennessee Erosion and Sediment Control Planning and Design Manual.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 31 22 00 Grading

B. Section 31 23 00 Excavation and Fill

C. Section 31 25 00 Erosion and Sedimentation Control

1.03 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Contractor shall comply with the applicable requirements of the following documents. All referenced codes and standards refer to the edition referenced in the code adopted by the Project.

1. Tennessee Department of Transportation Standard Specifications for Roads and Structures, latest edition.

2. American Society for Testing and Materials (ASTM):

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ASTM C 127	Test for Specific Gravity and Absorption of Coarse Aggregate.
ASTM C 136	Test for Sieve Analysis of Fine and Coarse Aggregates.
ASTM D 422	Particle Size Analysis of Soils.
ASTM D 423	Test for Liquid Limit of Soils.
ASTM D 424	Test for Plastic Limit and Plasticity Index of Soils.
ASTM C 535	Test for Resistance to Degradation of Large Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
ASTM D 698	Standard Method of Test for the Moisture - Density Relations of Soils Using a 5.5 lb. (2.5 kg) Rammer and a 12 inch (305 mm) Drop.
ASTM D1556	Test for Density of Soil in Place by the Sand-Cone Method.
ASTM D1557	Test for Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lbs. (4.5 kg) Rammer and 18-inch (457 mm) Drop.
ASTM D2049	Test Method for Relative Density of Cohesionless Soils.
ASTM D2167	Test for Density of Soil in Place by the Rubber-Balloon Method.
ASTM D2216	Test for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil Aggregate Mixtures.
ASTM D2487	Test for Classification of Soils for Engineering Purposes.
ASTM D2922	Test for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.04 SUBSURFACE CONDITIONS

A. Supplemental documents for existing conditions have been made available to the Contractor in the Appendices to these Specifications. This data is furnished for information only, and it is expressly understood that the Owner and Engineer will not be held responsible for any interpretations or conclusions drawn therefrom.

B. It shall be noted that there may be water pipes, storm drains and other utilities located in the area of proposed excavation. Contractor shall take necessary means to identify below grade, in service utilities and avoid disruption of service. Contractor shall perform all repairs to same in the event that excavation activities disrupt service.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

1.05 SUBMITTALS

A. In accordance with the procedures and requirements set forth in Section 01 33 00, Submittals the Contractor shall submit the following:

1. Name and location of all material suppliers.

2. Certificate of compliance with the standards specified above for each source of each material.

3. List of disposal sites for waste and unsuitable materials and all required permits for use of those sites.

4. Plans and cross sections of open cut excavations showing side slopes and limits of the excavation at grade.

5. Product data for such products as may be required by these specifications, including geotextile filter fabric, underdrain piping, geogrid, etc.

6. Other submittals as required by Related Work Specified Elsewhere.

1.06 PRODUCT HANDLING

A. Soil and rock material shall be excavated, transported, placed, and stored in a manner so as to prevent contamination, segregation and excessive wetting. Materials which have become contaminated or segregated will not be permitted in the performance of the work and shall be removed from the site.

1.07 USE OF EXPLOSIVES

A. The use of blasting or explosives shall not be allowed under this project.

PART 2 PRODUCTS

2.01 GENERAL

A. Where excavated material does not meet requirements for select fill, Contractor shall furnish off-site borrow material meeting the specified requirements herein. Determination of whether the borrow material will be paid for as an extra cost will be made based on Article 4 of the General Conditions, as amended by the Supplementary Conditions. When the excavated material from required excavations is suitable for use as backfill, bedding, or embankments, but is replaced with off-site borrow material for the Contractor's convenience, the costs associated with such work and material shall be borne by the Contractor.

2.02 SELECT FILL

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

B. Soils from the excavations meeting requirements stipulated herein with the exceptions of topsoil and organic material may be used as select fill for general backfilling and constructing embankments, except as otherwise required.

C. Select fill used as an embankment or soil cap shall be a silty or clayey soil material with a Maximum Liquid Limit (LL) of 50 and a Plasticity Index (PI) between 7 and 20.

D. Select fill used for backfilling shall be as specified herein or approved by the Engineer.

2.03 STONE FILL

A. Stone fill shall be a coarse aggregate material meeting the gradation requirements of #57 aggregates in accordance with ASTM C-33 or approved equal.

B. Stone fill shall be used under all structural foundations and against all below grade walls, unless indicated otherwise.

2.04 TOPSOIL

A. Topsoil shall be considered the surface layer of soil and sod, suitable for use in seeding, sodding, and planting. It shall contain no mixture of refuse or any material toxic to plant growth.

PART 3 EXECUTION

3.01 GENERAL

A. Earthwork operations shall be performed in a safe and proper manner with appropriate precautions being taken against all hazards and to avoid slides that will cause disturbance of the subgrade or damage of adjacent areas. Comply with local regulations and with the provisions of the "Manual of Accident Prevention in Construction" of the Associated General Contractors of America, Inc., OSHA, and other applicable safety requirements.

B. The Contractor shall control grading in a manner to prevent surface water from running into excavations. Obstruction of surface drainage shall be avoided and means shall be provided whereby storm water flow can be uninterrupted in existing gutters, other surface drains, or temporary drains.

3.02 STRIPPING OF TOPSOIL

A. In all areas to be excavated, filled, paved, or graveled the topsoil shall be stripped to its full depth and shall be deposited in storage piles on the site, at locations designated by the Owner or Engineer, for subsequent reuse. Topsoil shall be kept separated from other excavated materials and shall be piled free of roots and other undesirable materials.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

3.03 EXCAVATION

A. All material excavated, regardless of its nature or composition, shall be considered UNCLASSIFIED EXCAVATION. Excavation shall include the removal of all soil, rock, weathered rock, rocks of all types, boulders, conduits, pipe, and all other obstacles encountered or shown to be removed within the limits of excavation shown on the Drawings or specified herein. The cost of excavation shall be included in the Lump Sum Bid Price and no additional payment will be made for the removal of obstacles encountered within the excavation limits shown on the Drawings and specified herein.

B. All suitable material removed in the excavation shall be used as far as practicable in the formation of embankments, subgrades, and shoulders, and at such other places as may be indicated on the Drawings or indicated by the Engineer.

C. The Engineer and/or Materials Testing Agency will designate materials that are unsuitable for use. The Contractor shall remove all unsuitable material, as directed by the Engineer, dispose of the material off-site, and replace it with thoroughly compacted select fill, and/or stone fill.

D. All excavations shall be made in the dry and in such a manner and to such widths as will give ample room for properly constructing and inspecting the structures and/or piping they are to contain and for such excavation support, pumping and drainage as may be required. Excavation shall be made in accordance with the grades and details shown on the Drawings and as specified herein.

E. No rock or boulders shall be left in place which protrude more than 1 foot within the typical section cut slope lines. All protruding roots and other objectionable vegetation shall be removed from slopes.

F. Foundations for a structure shall bear on similar materials. Should excavation for a foundation bearing on earth be partially in rock, the Contractor shall undercut that portion of the rock and bring the excavation to bearing elevation with compacted stone fill. The thickness of the compacted stone fill shall be as indicated on the Drawings and uniform under the structure.

G. All cuts shall be brought to the grade and cross section shown on the Drawings, prior to final inspection and acceptance by the Engineer.

H. Slides and overbreaks which occur due to negligence, carelessness or improper construction techniques on the part of the Contractor shall be removed and disposed of by the Contractor as indicated by the Engineer at no additional cost to the Owner. If grading operations are suspended for any reason whatsoever, partially completed cut and fill slopes shall be brought to the required slope and the work of seeding and mulching or other required erosion and sedimentation control operations shall be performed.

3.04 EXCAVATION SUPPORT

A. The Contractor shall furnish, place, and maintain such excavation support which may be required to support sides of excavation or to protect pipes and structures from possible damage and to provide safe working conditions. The Contractor shall be responsible for the adequacy of all

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

supports used and for all damage resulting from failure of support system or from failure to install and maintain it.

3.05 REMOVAL OF EXCESS AND UNSUITABLE MATERIALS

A. The Contractor shall remove and dispose of all excess and unsuitable materials off-site.

B. The Contractor shall be compensated for the removal of unsuitable materials, which are beyond the excavation limits required by the Contract Documents, as directed by the Engineer and in accordance with Section 01 29 00 Measurement and Payment.

1. No payment will be made for excavation beyond the limits required by the Contract Documents without prior approval by the Engineer.

2. Removal of unsuitable materials within the excavation limits required by the Contract Documents shall be considered Unclassified Excavation.

C. All unsuitable materials shall be disposed of in locations and under conditions that comply with federal, state and local laws and regulations.

D. The Contractor shall obtain an off-site disposal area prior to beginning demolition or excavation operations.

E. All excess and unsuitable materials shall be hauled in trucks of sufficient capacity and tight construction to prevent spillage. Trucks shall be covered to prevent the propagation of dust.

F. When all excess and unsuitable material disposal operations are completed, the Contractor shall leave the disposal sites in a condition acceptable to the Owner and Owner(s) of the disposal site(s).

3.06 PROTECTION OF SUBGRADE

A. To minimize the disturbance of bearing materials and provide a firm foundation, the Contractor shall comply with the following requirements:

1. Use of heavy rubber-tired construction equipment shall not be permitted on the final subgrade unless it can be demonstrated that drawdown of groundwater throughout the entire area of the structure is at least 3 feet below the bottom of the excavation (subgrade). Even then, the use of such equipment shall be prohibited should subgrade disturbance result from concentrated wheel loads.

2. Subgrade soils disturbed through the operations of the Contractor shall be excavated and replaced with compacted select fill or stone fill at the Contractor's expense as indicated by the Engineer.

3. The Contractor shall provide protection against penetration of frost into materials below the bearing level. This protection may consist of a temporary blanket of straw or salt hay covered with a plastic membrane or other acceptable means.

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3.07 DEWATERING

C. The Contractor shall perform all dewatering as required for the completion of the work. Procedures for dewatering proposed by the Contractor shall be submitted to the Engineer for review prior to any earthwork operations. All water removed by dewatering operations shall be disposed of in accordance with the Tennessee Department of Environment and Conservation and as required by the Owner.

D. The dewatering system shall be of sufficient size and capacity as required to control groundwater or seepage to permit proper excavation operations, embankment construction, subgrade preparation, and to allow concrete to be placed in a dry condition.

1. The system shall include a sump system or other equipment, appurtenances and other related earthwork necessary for the required control of water.

2. The Contractor shall draw-down groundwater to at least 2-feet below the bottom of excavations (subgrade) at all times in order to maintain a dry and undisturbed condition.

E. The Contractor shall be solely responsible for proper design, installation, proper operation, maintenance, and any failure of any component of the system.

F. The Contractor shall be responsible for and shall repair without cost to the Owner, any damage to installed work and the excavation, including damage to the subgrade or fill materials. The Contractor shall be responsible for damages to any other area or structure caused by his failure to maintain and operate the dewatering system.

G. The Contractor shall take all the steps that he considers necessary to familiarize himself with the surface and subsurface site conditions, and shall obtain the data that is required to analyze the water and soil environment at the site and to assure that the materials used for the dewatering systems will not erode, deteriorate, or clog to the extent that the dewatering systems will not perform properly during the period of dewatering.

H. Copies of the geotechnical report are made available to the Contractor in the Appendices to these Specifications. This data is furnished for information only, and it is expressly understood that the Owner and Engineer will not be held responsible for any interpretations or conclusions drawn therefrom.

I. Prior to the execution of the work, the condition of the existing structures shall be documented in accordance with Section 01 32 33 Photographic Documentation.

3.08 PROOFROLLING

A. After stripping of topsoil, excavation to subgrade, and prior to placement of fills, the exposed subgrade shall be carefully inspected by the materials testing consultant by probing and testing as needed. Any topsoil or other organic material still in place, frozen, wet, soft, or loose soil, and other undesirable materials shall be removed prior to probing and testing.

B. The subgrade of all structures and all areas that will support pavements or fill shall be proof rolled.

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C. The exposed subgrade shall be proofrolled with at least six (6) passes by a heavily loaded tandem-wheeled dump truck or similar vehicle, in the presence of the Engineer, to check for soft or unsuitable bearing material.

D. Any depressions due to soft soils which develop during proof rolling shall be filled with fill material and proof rolled smooth and level.

1. If subgrade still contains depressions, the area of soft soils shall be undercut, backfilled, and proof rolled to achieve a suitable subgrade, unless otherwise directed by the Engineer.

E. Any unsuitable materials, as identified by the Engineer, shall be removed and replaced with an approved compacted fill material, as specified herein.

3.09 BACKFILL

A. It is the intent of these Specifications that all structures shall bear on stone fill placed to the thickness shown on the Drawings, as specified in these Specifications, or not less than 6-inches. Bedding for process piping shall be as specified in Section 40 05 00, Common Work Results for Process Interconnections, or as shown on the Drawings.

B. The backfill shall be deposited in successive, uniform, approximately horizontal layers not exceeding compacted depth indicated for the full width.

C. Stones or fragmentary rock larger than 4-inches in their greatest dimension will not be allowed within the top 12-inches of finished grade nor within 6 inches of pipes. No stone or fragmentary rock larger than 12-inches in their greatest dimension will be allowed for any portion of backfill.

D. For backfill against below grade walls, a wedge of stone fill shall be provided the full height of the wall, except that the top 18-inches shall consist of a soil cap and topsoil, pavement, or concrete slab, as required by the Drawings. The top of the wedge of stone fill shall extend outward away from the wall at least half the height of the wall.

3.10 COMPACTION

A. The Contractor shall compact embankments, backfill, crushed stone, aggregate base, and in place subgrade in accordance with the requirements.

B. Soils shall be compacted at a moisture content not more than 1% below nor more than 4% above the optimum moisture content for the particular material tested in accordance with the ASTM D698.

C. The densities specified herein refer to percentages of maximum dry density as determined by the noted test methods.

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	Density Std. Proctor (D698)	Density Mod. Proctor (D1557)	Max. Lift Thickness as Compacted
Embankments Beneath Structures*	98%	95%	8”
Other Embankments	95%	92%	8”
Backfill Against walls of Structure	95%	92%	8”
Backfill in Pipe Trenches	95%	92%	8”
Stone Fill Beneath Structures	98%	95%	12”
Aggregate Base Course (ABC) Beneath Pavements	--	98%	8”
In place Subgrade Beneath Structures	98%	95%	Top 12-inches

* Embankments beneath structures shall include a zone 10 feet beyond the limits of the foundation of the structure and extend down to the natural grade on a 45□ slope.

** The aggregate shall be compacted to a degree acceptable to the Engineer by use of a vibratory compactor and/or crawler tractor.

D. Testing will be performed by a material testing consultant retained by the Owner.

1. Field density tests will be performed in accordance with ASTM D 1556, ASTM D 2167, or ASTM D 2922, as determined by the Engineer and materials testing consultant, to determine if the specified densities have been achieved, and these tests shall be the basis for accepting or rejecting the compaction.

2. The Contractor shall notify material testing consultant in advance when density testing will be required and coordinate access with the material testing consultant.

3. One in-place density test shall be performed for each 400 cubic yards of backfill placed, with a minimum of one test performed each day that backfill is placed.

4. Failure to achieve the specified densities shall require the Contractor to re-compact the material or remove and replace it, as deemed appropriate by the Engineer.

5. Retesting for in-place density of fill, which was previously tested and failed to meet the requirements of these specifications, shall be paid for by the Contractor.

E. The Contractor shall, if necessary, increase his compactive effort by increasing the number of passes, using heavier or more suitable compaction equipment, or by reducing the thickness of the layers. The Contractor shall adjust the moisture contents of the soils to bring them within the optimum range by drying them or adding water as required.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Water control plan.

2. Discharge permits, if applicable.

1.02 WATER CONTROL PLAN

A. As a minimum, include:

1. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment; methods; standby equipment and power supply; pollution control facilities; discharge locations to be utilized; and provisions for immediate temporary water supply as required by this section.

2. Drawings showing locations, dimensions, and relationships of elements of each system.

3. Design calculations demonstrating adequacy of proposed dewatering systems and components.

B. If system is modified during installation or operation revise or amend and resubmit Water Control Plan.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Remove and control water during periods when necessary to properly accomplish Work.

3.02 SURFACE WATER CONTROL

A. Remove surface runoff controls when no longer needed.

3.03 DEWATERING SYSTEMS

A. Provide, operate, and maintain dewatering systems of sufficient size and capacity to permit excavation and subsequent construction in dry and to lower and maintain groundwater level

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a minimum of 2 feet below the lowest point of excavation. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade.

B. Design and Operate Dewatering Systems:

1. To prevent loss of ground as water is removed.

2. To avoid inducing settlement or damage to existing facilities, completed work, or adjacent property.

3. To relieve artesian pressures and resultant uplift of excavation bottom.

C. Provide supplemental ditches and sumps only as necessary to collect water from local seeps. Do not use ditches and sumps as primary means of dewatering.

3.04 DISPOSAL OF WATER

A. Obtain discharge permit for water disposal from authorities having jurisdiction.

B. Treat water collected by dewatering operations, as required by regulatory agencies, prior to discharge.

C. Discharge water as required by discharge permit and in manner that will not cause erosion or flooding, or otherwise damage existing facilities, completed work, or adjacent property.

D. Remove solids from treatment facilities and perform other maintenance of treatment facilities as necessary to maintain their efficiency.

3.05 PROTECTION OF PROPERTY

A. Make assessment of potential for dewatering induced settlement. Provide and operate devices or systems, including but not limited to reinjection wells, infiltration trenches and cutoff walls, necessary to prevent damage to existing facilities, completed work, and adjacent property.

B. Securely support existing facilities, completed work, and adjacent property vulnerable to settlement due to dewatering operations. Support shall include, but not be limited to, bracing, underpinning, or compaction grouting.

END OF SECTION

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SECTION 31 32 19.16

GEOTEXTILE

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO): M288, Standard Specification for Geotextile Specification for Highway Applications.

2. ASTM International (ASTM):

a. D737, Standard Test Method for Air Permeability of Textile Fabrics.

b. D4355/D4355M, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.

c. D4491/D4491M, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.

d. D4533/D4533M, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

e. D4595, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.

f. D4632/D4632M, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.

g. D4716/D4716M, Standard Test Method for Determining the (In-Plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.

h. D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.

i. D4873, Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

j. D4833/D4833M, Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products.

k. D4884/D4884M, Standard Test Method for Strength of Sewn or Bonded Seams of Geotextiles.

l. D4886, Standard Test Method for Abrasion Resistance of Geotextiles (Sand Paper/Sliding Block Method).

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m. D5199, Standard Test Method for Measuring the Nominal Thickness of Geosynthetics.

n. D5261, Standard Test Method for Measuring Mass per Unit Area of Geotextiles.

o. D6193, Standard Practice for Stitches and Seams.

1.02 DEFINITIONS

A. Fabric: Geotextile, a permeable geosynthetic comprised solely of textiles.

B. Maximum Average Roll Value (MaxARV): Maximum of series or average roll values representative of geotextile furnished.

C. Minimum Average Roll Value (MinARV): Minimum of series of average roll values representative of geotextile furnished.

D. Nondestructive Sample: Sample representative of finished work, prepared for testing without destruction of Work.

E. Overlap: Distance measured perpendicular from overlapping edge of one sheet to underlying edge of adjacent sheet.

F. Seam Efficiency: Ratio of tensile strength across seam to strength of intact geotextile, when tested according to ASTM D4884/D4884M.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:

a. Manufacturer material specifications and product literature.

b. Installation drawings showing geotextile sheet layout, location of seams, direction of overlap, and sewn seams.

c. Description of proposed method of geotextile deployment, sewing equipment, sewing methods, and provisions for holding geotextile temporarily in place until permanently secured.

2. Samples:

a. Geotextile: One-piece, minimum 18 inches long, taken across full width of roll of each type and weight of geotextile furnished for Project. Label each with brand name and furnish documentation of lot and roll number from which each Sample was obtained.

b. Field Sewn Seam: 5-foot length of seam, 12 inches wide with seam along center, for each type and weight of geotextile.

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c. Securing Pin and Washer: One each.

B. Informational Submittals:

1. Certifications from each geotextile manufacturer that furnished products have specified property values. Certified property values shall be either minimum or maximum average roll values, as appropriate, for geotextiles furnished.

2. Field seam efficiency test results.

1.04 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Geosynthetic Accreditation Institute (GAI – Laboratory Accreditation Program (LAP)

2. American Association for Laboratory Accreditation (A2LA).

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver each roll with sufficient information attached to identify it for inventory and quality control.

B. Handle products in manner that maintains undamaged condition.

C. Do not store products directly on ground. Ship and store geotextile with suitable wrapping for protection against moisture and ultraviolet exposure. Store geotextile in way that protects it from elements. If stored outdoors, elevate and protect geotextile with waterproof cover.

1.06 SCHEDULING AND SEQUENCING

A. Where geotextile is to be laid directly upon ground surface, prepare subgrade as specified in Drawings, first.

B. Notify Owner whenever geotextiles are to be placed. Do not place geotextile without Owner's approval of underlying materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers:

1. Carthage Mills, Cincinnati, OH.

2. Propex Fabrics, Austell, GA.

3. Thrace-LINQ Inc., Summerville, SC.

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4. TenCate Geosynthetics Mirafi, Pendergrass, GA.

5. Advanced Drainage Systems Inc., Spartanburg, SC.

6. Approved equal.

2.02 NONWOVEN GEOTEXTILE

A. Pervious sheet of polyester, polypropylene, or polyethylene fabricated into stable network of fibers that retain their relative position with respect to each other. Nonwoven geotextile shall be composed of continuous or discontinuous (staple) fibers held together through needle-punching, spun-bonding, thermalbonding, or resin-bonding.

B. Geotextile Edges: Selvaged or otherwise finished to prevent outer material from pulling away from geotextile.

C. Unseamed Sheet Width: Minimum 12 feet.

D. Nominal Weight per Square Yard: 4.8 ounces per ASTM D5261.

E. Nominal Thickness (mils): 1.4 mils per ASTM D5199.

F. Physical Properties: Conform to requirements in Table No. 1.

Table No. 1
Physical Property Requirements for Nonwoven Geotextile

Property	Requirement	Test Method
Water Permittivity	0.5 sec.-1, MinARV	ASTM D4491/D4491M (Falling Head)
Apparent Opening Size (AOS)	40 U.S. Standard Sieve Size	ASTM D4751
Grab Tensile Strength, Machine Direction	110 lb/in, MinARV	ASTM D4632/D4632M
Grab Elongation, Machine Direction	50 percent, MaxARV	ASTM D4632/D4632M
Puncture Strength	40 lb, MinARV	ASTM D4833/D4833M
Trapezoid Tear Strength	50 lb, MinARV	ASTM D4533/D4533M
Ultraviolet Radiation Resistance	70 percent strength retention, MinARV after 500 hours	ASTM D4355/D4355M

2.03 SEWING THREAD

A. Polypropylene, polyester, or Kevlar thread.

B. Durability: Equal to or greater than durability of geotextile sewn.

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2.04 SECURING PINS

A. Steel Rods or Bars:

1. 3/16-inch diameter.

2. Pointed at one end.

3. With head on other end sufficiently large to retain washer.

4. Minimum Length: 12 inches.

B. Steel Washers for Securing Pins:

1. Outside Diameter: Not less than 1.5 inches.

2. Inside Diameter: 1/4 inch.

3. Thickness: 1/8 inch.

C. Steel Wire Staples:

1. U-shaped.

2. 10 gauge.

3. Minimum Length: 6 inches.

PART 3 EXECUTION

3.01 LAYING GEOTEXTILE

A. Lay and maintain geotextile smooth and free of tension, folds, wrinkles, or creases.

3.02 SHEET ORIENTATION ON SLOPES

A. Orient geotextile with long dimension of each sheet parallel to direction of slope.

3.03 JOINTS

A. Unseamed Joints:

1. Overlapped.

2. Overlap, unless otherwise shown:

a. Foundation/Subgrade Stabilization: Minimum 18 inches.

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b. Riprap: Minimum 18 inches.

c. Drain Trenches: Minimum 18 inches, except overlap shall equal trench width if trench width is less than 18 inches.

d. Other Applications: Minimum 12 inches.

B. Sewn Seams: Made wherever stress transfer from one geotextile sheet to another is necessary. Sewn seams, as approved by Owner, also may be used instead of overlap at joints for applications that do not require stress transfer.

1. Seam Efficiency:

a. Minimum 70 percent.

b. Verified by preparing and testing minimum of one set of nondestructive Samples per acre of each type and weight of geotextile installed.

c. Tested according to ASTM D4884/D4884M.

2. Types:

a. Preferred: "J" type seams.

b. Acceptable: Flat or butterfly seams.

3. Stitch Count: Minimum three to maximum seven stitches per inch.

4. Stitch Type: Double-thread chainstitch according to ASTM D6193.

5. Sewing Machines: Capable of penetrating four layers of geotextile.

6. Stitch Location: 2 inches from geotextile sheet edges, or more, if necessary to develop required seam strength.

3.04 SECURING GEOTEXTILE

A. Secure geotextile during installation as necessary with sandbags or other means approved by Engineer.

B. Secure Geotextile with Securing Pins or Staples:

1. Insert securing pins with washers through geotextile.

2. Securing Pin Alignment:

a. Midway between edges of overlaps.

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b. 6 inches from free edges.

3. Spacing of Securing Pins:

Slope	Maximum Pin Spacing
Steeper than 3:1	2 feet
3:1 to 4:1	3 feet
Flatter than 4:1	5 feet

4. Install additional pins across each geotextile sheet as necessary to prevent slippage of geotextile or to prevent wind from blowing geotextile out of position.
5. Push each securing pin through geotextile until washer bears against geotextile and secures it firmly to subgrade.

6. Where staples are used instead of securing pins, install in accordance with alignment and spacing above. Push in to secure geotextile firmly to subgrade.

3.05 PLACING PRODUCTS OVER GEOTEXTILE

A. Before placing material over geotextile, notify Owner. Do not cover installed geotextile until after Engineer provides authorization to proceed.

B. If tears, punctures, or other geotextile damage occurs during placement of overlying products, remove overlying products as necessary to expose damaged geotextile. Repair damage as specified in Article 3.09 below.

3.06 INSTALLING GEOTEXTILE IN TRENCHES

A. Place geotextile in a way to completely envelope granular drain material to be placed in trench and with specified overlap at joints. Overlap geotextile in direction of flow. Place geotextile in a way and with sufficient slack for geotextile to contact trench bottom and sides fully when trench is backfilled.

B. After granular drain material is placed to required grade, fold geotextile over top of granular drain material, unless otherwise shown. Maintain overlap until overlying fill or backfill is placed.

3.07 RIPRAP APPLICATIONS

A. Overlap geotextile at each joint with upstream sheet of geotextile overlapping downstream sheet.

B. Sew joints where wave run-up may occur.

C. Limit height of riprap fall onto geotextile to prevent damage.

1. Drop Height: 1 foot for greater than 200-pound rock.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

3.08 GEOTEXTILE-REINFORCED EARTH WALL APPLICATIONS

A. Sew exposed joints; extend sewn seams minimum 3 feet behind face of wall.

B. Protect exposed geotextile from damage, ultraviolet light exposure, and deterioration until permanent facing is applied.

3.09 REPAIRING GEOTEXTILE

A. Repair or replace torn, punctured, flawed, deteriorated, or otherwise damaged geotextile.

B. Repair Procedure:

1. Place patch of undamaged geotextile over damaged area and at least 18 inches in all directions beyond damaged area.

2. Remove interfering material as necessary to expose damaged geotextile for repair.

3. Sew patches or secure them with heat fusion tacking or with pins and washers, as specified above in Article 3.04, or by other means approved by Owner.

3.10 REPLACING CONTAMINATED GEOTEXTILE

A. Protect geotextile from contamination that would interfere, in Engineer's opinion, with its intended function. Remove and replace contaminated geotextile with clean geotextile.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 31 41 00

SHORING

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Excavation support plan. Required when excavations are greater than 5 feet wide, or greater than 15 feet deep, or when non-traditional shoring systems are utilized. Traditional shoring systems are trench sloping or pre-engineered supports (such as trench boxes).

2. Movement monitoring plan.

3. Movement measurement and data and reduced results indicating movement trends.

1.02 QUALITY ASSURANCE

A. Provide surveys to monitor movements of critical facilities.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Design, provide, and maintain shoring, sheeting, and bracing as necessary to support the sides of excavations and to prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed the Work.

B. Sufficiently sheet, shore, and brace all excavations to facilitate installation of the Work and to prevent slides, cave-ins, settlement, undermining of structures, or movement of the banks. Use solid sheets in wet, saturated, or flowing ground. All sheeting, shoring, and bracing shall have enough strength and rigidity to withstand the pressures exerted, to keep the walls of the excavation properly in place, and to protect all persons and property from injury or damage. Shoring systems shall be installed in accordance with Drawings sealed by a Licensed Tennessee Professional Engineer, wherever necessary.

C. Contractor shall comply with all applicable OSHA regulations to determine the proper excavation protective system.

D. Notify Owner of planned shoring activities prior to implementation and notify property owners at or near the excavation, including adjacent property owners, of the proposed activities and planned sheeting systems to be used for protection of the Work and Property.

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E. Sheeting, shoring, or bracing materials shall not be left in place unless called for by the Drawings, ordered by Owner, or deemed necessary for the safety or protection of the new or existing work or features. Protect all work and structures during removal of shoring systems. All voids present upon removal shall be filled and compacted as specified herein.

3.02 EXCAVATION SUPPORT PLAN

A. Prepare excavation support plan addressing following topics:

1. Details of shoring, bracing, sloping, or other provisions for worker protection from hazards of caving ground.

2. Design assumptions and calculations.

3. Methods and sequencing of installing excavation support.

4. Proposed locations of stockpiled excavated material.

5. Minimum lateral distance from the crest of slopes for vehicles and stockpiled excavated materials.

6. Anticipated difficulties and proposed resolutions.

3.03 MOVEMENT MONITORING PLAN (IF REQUIRED BY OWNER)

A. Prepare movement monitoring plan addressing following topics:

1. Survey control.

2. Location of monitoring points.

3. Plots of data trends.

4. Interval between surveys.

3.04 REMOVAL OF EXCAVATION SUPPORT

A. Remove excavation support in a manner that will maintain support as excavation is backfilled.

B. Do not begin to remove excavation support until support can be removed without damage to existing facilities, completed work, or adjacent property.

C. Remove excavation support in a manner that does not leave voids in the backfill.

3.05 TRENCHES

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

A. For trench excavation exceeding 5 feet in depth, provide adequate safety system meeting requirements of applicable state and local construction safety orders, and federal requirements.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 32 01 17

FLEXIBLE PAVING REPAIR

PART 1 GENERAL

1.01 SCOPE

A. The Work to be performed under this section shall consist of removing and replacing existing pavement, sidewalks and curbs in paved areas where such have been removed for construction of water mains, fire hydrants, sewers, manholes and all other water, sewer and utility appurtenances and structures.

1.02 SUBMITTALS

A. Provide certificates stating that materials supplied comply with Specifications. Certificates shall be signed by the asphalt producer and the Contractor.

1.03 CONDITIONS

A. Weather Limitations:

1. Do not conduct paving operations when surface is wet or contains excess of moisture which would prevent uniform distribution and required penetration.

2. Construct prime and tack coats, and asphaltic courses only when atmospheric temperature in the shade is above 50 degrees F, when the underlying base is dry and when weather is not rainy.

3. Place base course when air temperature is above 35 degrees F and rising.

B. Grade Control: Establish and maintain the required lines and grades for each course during construction operations.

C. Work in accordance with the Authority Having Jurisdiction (AHJ): All work within Cumberland County (Cumberland County Highway Department), (931-484-5424) or TDOT (931-582-6293) road rights-of-way shall be performed in accordance with the respective standards and requirements of the AHJ and its governing standards and specifications. Prior to commencing work on the Project, if work in road right of way is required, Contractor shall coordinate with the agency(s) and determine the appropriate procedures for notifications and execution of the Work.

PART 2 PRODUCTS

2.01 MATERIALS

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

A. Mineral Aggregate Base Course: Mineral aggregate base course shall conform to the requirements of the Tennessee Department of Transportation Bureau of Highways Standard Specifications for Road and Bridge Construction, Section 303, Type A base, Class A, Grading D base.

B. Binder (Hot Mix): The base of all paved roadways shall conform to the requirements of Section 307 of the Tennessee Department of Transportation Bureau of Highways Standard Specifications for Road and Bridge Construction.

C. Asphaltic Concrete Surface (Hot Mix): The surface course for all pavement shall conform to the requirements of the Tennessee Department of Transportation Bureau of Highways Standard Specifications for Road and Bridge Construction, Section 411, Grading "E" or Grading "D".

D. Double Bituminous Surface Treatment: The surface for all pavements shall conform to the requirements of the Tennessee Department of Transportation Bureau of Highways Standard Specifications for Road and Bridge Construction, Section 404.

E. Concrete: Provide concrete and reinforcing for concrete pavement or base courses in accordance with the requirements of the Tennessee Department of Transportation Bureau of Highways Standard Specifications for Road and Bridge Construction, Section 501.

F. Special Surfaces: Where driveways or roadways are disturbed or damaged which are constructed of specialty type surfaces, e.g. brick or stone, these driveways and roadways shall be restored utilizing similar, if not original, materials. Where the nature of these surfaces dictate, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

2.02 TYPES OF PAVEMENTS

A. General: All existing pavement removed, destroyed or damaged by construction shall be replaced with the same type and thickness of pavement as that existing prior to construction, unless otherwise directed by the Owner or required by the AHJ. Materials, equipment and construction methods used for paving work shall conform to the Tennessee Department of Transportation Bureau of Highways specifications applicable to the particular type required for replacement, repair or new pavements.

B. Aggregate Base: Aggregate base shall be constructed in accordance with the requirements of Section 303, Class B, Grading D of the TDOT Standard Specifications for Road and Bridge Construction, latest version. Material shall be mixed and placed by the stationary plant method. If the finished compacted base course depth is 6-inches or more, the course shall be constructed in two or more layers of approximately equal thickness with a maximum lift thickness of 6-inches.

C. Concrete Pavement: Concrete pavement or base courses shall be replaced with concrete. The surface finish of the replaced concrete pavement shall conform to that of the existing

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

pavement. The surface of the replaced concrete base course shall be left rough. The slab depth shall be equivalent to the existing concrete pavement or base course, but in no case less than 4-inches thick. Transverse and longitudinal joints removed from concrete pavement shall be replaced at the same locations and to the same types and dimensions as those removed. Concrete pavements or concrete base courses shall be reinforced and shall conform to the Tennessee Department of Transportation Bureau of Highways Standard Specifications, Section 501. If edge of trench is within three feet of an expansion joint, concrete shall be removed and replaced to the edge of the joint.

D. Asphalt Concrete Base, Binder and Surface Course: Asphalt concrete base, binder and surface course construction shall conform to the Tennessee Department of Transportation Bureau of Highways Standard Specifications, Section 307 for bituminous plant mix base course and Section 411. The pavement mixture shall not be spread until the designated surface has been previously cleaned and prepared as specified herein, or as required by the AHJ. After compaction, the asphalt concrete shall be smooth and true to established profiles and sections. Immediately correct any high, low or defective areas by cutting out the course, replacing with fresh hot mix, and immediately compacting to conform and thoroughly bond to the surrounding area.

E. Gravel Surfaces: Existing gravel road, drive and parking area replacement shall meet the requirements of aggregate base course.

F. Temporary Measures: During the time period between pavement removal and complete replacement of permanent pavement, maintain highways, streets and roadways in accordance with the requirements of the AHJ.

PART 3 EXECUTION

3.01 REMOVING PAVEMENT

A. Remove existing pavement as necessary for installing the pipe line and appurtenances.

B. Before removing any pavement, mark the pavement neatly paralleling pipe lines and existing street lines. Space the marks the width of the trench.

C. Pavement or concrete must be cut or sawed to straight, clean lines before excavation begins.

D. Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.

E. Any pavement removal which will include removal of traffic signal loops embedded in the pavement shall be coordinated with the entity having jurisdiction over the traffic signal, with proper advance notification prior to pavement removal.

F. Remove and replace any sidewalks disturbed by construction for their full width and to the nearest undisturbed joint.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

G. Remove and replace any curb disturbed by construction to the nearest undisturbed joint.

3.02 REPLACING PAVEMENT

A. Pavement shall be replaced within the timeframe established by the AHJ.

B. During backfilling and preparation of the subgrade, arrange to have the compaction tested by an independent testing laboratory, if required by the AHJ. After compaction testing has been satisfactorily completed, replace all pavements, sidewalks and curbs removed.

1. The existing street pavement or surface shall be removed along the lines of the Work for the allowable width specified for the trench or structure. After the installation of the sewerage or water works facilities and after the backfill has been compacted suitably, the additional width of pavement to be removed, as shown on the Standard Detail Drawings, shall be done immediately prior to replacing the pavement.

2. Trench backfill shall be compacted for the full depth of the trench as specified in Section 31 23 00, Excavation and Fill, of these Specifications.

3. Temporary trench backfill along streets and driveways shall include 6-inches of crushed stone or cherty clay as a temporary surfacing of the trenches or asphalt as directed by the Owner. This temporary surface shall be maintained carefully at grade and dust-free by the Contractor until the backfill of the trench has thoroughly compacted in the opinion of the Owner and permission is granted to replace the street pavement.
4. When temporary crushed stone or chert surface is considered by the Owner to be sufficient surface for gravel pavement, the surface shall be graded smooth and to an elevation that will make the final permanent surfacing level with the adjacent surfacing that was undisturbed.

C. Pavement Replacement:

1. Replace all street and roadway pavement as shown on the Drawings. Replace driveways, sidewalks and curbs with the same material, to nearest existing undisturbed construction joint and to the same dimensions as those existing.

2. If the temporary crushed stone or chert surface is to be replaced, the top 6-inches shall be removed and the crushed stone surfacing for unpaved streets or the base for the bituminous surface shall be placed.

3. Following this preparation, the crushed stone base shall be primed with a suitable bituminous material and surfaced with the proper type of bituminous surface treatment.

4. Where the paved surface is to be replaced with asphaltic concrete pavement, concrete pavement or with a concrete base and a surface course, the temporary chert or crushed stone surface and any necessary backfill material, additional existing paving and new excavation shall be removed to the depth and width shown on the Standard Detail Drawings. Concrete base slabs and crushed stone bases, if required, shall be placed and

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

allowed to cure for three days before bituminous concrete surface courses are applied. Expansion joints, where applicable, shall be replaced in a manner equal to the original joint.

5. Where driveways or roadways, constructed of specialty type surfaces, e.g. brick or stone are disturbed or damaged, these driveways and roadways shall be restored utilizing similar materials. Where the nature of these surfaces dictate, a specialty contractor shall be used to restore the surfaces to their previous or better condition. Special surfaces shall be removed and replaced to the limits to which they were disturbed.

D. Pavement Resurfacing:

1. Certain areas to be resurfaced may be specified or noted on the Drawings. Where pavement to be resurfaced has been damaged with potholes, the Contractor shall remove all existing loose pavement material and fill the hole with Bituminous Plant Mix Base, as specified, to the level of the existing pavement. After all pipe line installations are complete and existing pavement has been removed and replaced along the trench route, apply tack coat and surface course as specified.

2. Resurfacing limits shall be perpendicular to the road centerline. The limits of resurfacing shall be 10 feet beyond the edge of the pavement replacement on the main road being resurfaced, and to the point of tangency, of the pavement on the side streets.

E. Pavement Striping: Pavement striping removed or paved over shall be replaced with the same type, dimension and material as original unless directed otherwise by the AHJ or Owner.

F. Traffic Signal Loops: The replacement or repair of all traffic signal loops removed or damaged during the removal and replacement of pavement shall be coordinated by the Contractor with the entity having jurisdiction over each traffic signal. The Contractor shall be responsible for payment of all fees associated with replacement or repair of traffic signal loops.

3.03 SIDEWALK AND CURB REPLACEMENT

A. Construction:

1. All concrete sidewalks and curbs shall be replaced with concrete.

2. Preformed joints shall be 1/2-inch thick, conforming to the latest edition of AASHTO M 59 for sidewalks and AASHTO M 123 for curbs.

3. Forms for sidewalks shall be of wood or metal, shall be straight and free from warp, and shall be of sufficient strength, when in place, to hold the concrete true to line and grade without springing or distorting.

4. Forms for curbs shall be metal and of an approved section. They shall be straight and free from distortions, showing no vertical variation greater than 1/8-inch in 10 feet and no lateral variation greater than 1/4-inch in 10 feet from the true plain surface on the vertical

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face of the form. Forms shall be of the full depth of the structure and constructed such to permit the inside forms to be securely fastened to the outside forms.

5. Securely hold forms in place true to the lines and grades to match existing.

6. Wood forms may be used on sharp turns and for special sections, as approved by the Owner. Where wooden forms are used, they shall be free from warp and shall be the nominal depth of the structure.

7. All mortar and dirt shall be removed from forms and all forms shall be thoroughly oiled or wetted before any concrete is deposited.

B. When a section is removed, the existing sidewalk or curb shall be cut to a neat line, perpendicular to both the centerline and the surface of the concrete slab. Existing concrete shall be cut along the nearest existing construction joints; if such joints do not exist, the cut shall be made at minimum distances to match existing.

C. Existing concrete sidewalks and curbs that have been cut and removed for construction purposes shall be replaced with the same width and surface as the portion removed. Sidewalks shall have a minimum uniform thickness of 4-inches. The new work shall be neatly jointed to the existing concrete so that the surface of the new work shall form an even, unbroken plane with the existing surfaces.

D. The subgrade shall be formed by excavating to a depth equal to the thickness of the concrete, plus 2-inches. Subgrade shall be of such width as to permit the proper installation and bracing of the forms. Subgrades shall be compacted by hand tamping or rolling. Soft, yielding or unstable material shall be removed and backfilled with satisfactory material. Place 2-inches of porous crushed stone under all sidewalks and curbs and compact thoroughly, then finish to a smooth, unyielding surface at proper line, grade and cross section.

E. Joint for Curbs:

1. Joints shall be constructed to match existing and as specified. Construct joints true to line with their faces perpendicular to the surface of the structure and within 1/4-inch of their designated position.

2. Thoroughly spade and compact the concrete at the faces of all joints filling all voids.

3. Install expansion joint materials at the point of curve at all street returns. Install expansion joint material behind the curb at abutment to sidewalks and adjacent structures.

4. Place contraction joints every 10 feet along the length of the curbs and gutters. Form contraction joints using steel templates or division plates which conform to the cross section of the structure. Leave the templates in place until the concrete has set sufficiently to hold its shape, but remove them while the forms are still in place. Contraction joint templates or plates shall not extend below the top of the steel

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

reinforcement or they shall be notched to permit the reinforcement to be continuous through the joint. Contraction joints shall be a minimum of 1-1/2-inches deep.

F. Expansion joints shall be required to replace any removed expansion joints. Expansion joints shall be true and even, shall present a satisfactory appearance, and shall extend to within 1/2-inch of the top of finished concrete surface.

G. Finishing:

1. Strike off the surface with a template and finish the surface with a wood float using heavy pressure, after which, contraction joints shall be made and the surface finished with a wood float or steel trowel.

2. Finish the face of the curbs at the top and bottom with an approved finishing tool of the radius to match existing.

3. Finish edges with an approved finishing tool having a 1/4 inch radius.

4. Provide a final broom finish by lightly combing with a stiff broom after troweling is complete.

5. The finished surface shall not vary more than 1/8-inch in 10 feet from the established grade.

H. Driveway and Sidewalk Ramp Openings:

1. Provide driveway openings of the widths and at the locations to match existing and as directed by the Owner.

2. Provide sidewalk ramp openings to match existing, in conformance with the applicable regulations and as directed by the Owner.

I. Concrete shall be suitably protected from freezing and excessive heat. It shall be kept covered with burlap or other suitable material and kept wet until cured. Provide necessary barricades to protect the Work. All damage caused by people, vehicles, animals, rain, the Contractor's operations and the like shall be repaired by the Contractor, at no additional expense to the Owner.

3.04 MAINTENANCE

A. The Contractor shall maintain the surfaces of roadways built and pavements replaced until the acceptance of the Project and shall provide and comply with any warranty required by the AHJ. Maintenance shall include replacement, scraping, reshaping, wetting and rerolling as necessary to prevent raveling of the road material, the preservation of reasonably smooth surfaces and the repair of damaged or unsatisfactory surfaces, to the satisfaction of the Owner. Maintenance shall include sprinkling as may be necessary to abate dust from the gravel surfaces.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

3.05 SUPERVISION AND APPROVAL

A. Pavement restoration shall meet the requirements of the regulatory agency responsible for the pavement. Obtain agency approval of pavement restorations before requesting final payment.

B. Obtain the Owner's approval of restoration of pavement, such as private roads and drives, that are not the responsibility of a regulatory agency.

C. Complete pavement restoration as soon as possible after backfilling.

D. Failure of Pavement: Should any pavement restoration or repairs fail or settle during the life of the Contract, including the bonded period, promptly restore or repair defects.

3.06 CLEANING

A. The Contractor shall remove all surplus excavation materials and debris from the street surfaces and rights-of-way and shall restore street, roadway or sidewalk surfacing to its original condition.

3.07 FLOWABLE FILL

A. Flowable fill shall be used where designated on the Drawings and on any crossing of a State Highway or as required by Owner's Street Department or the County Highway Department.

B. Flowable fill shall be covered or otherwise protected while in the flowable state. No embankment or fill shall be placed on the flowable fill prior to final set or hardening as determined by the Engineer.

C. All sections of pipe shall be securely braced or anchored both horizontally and vertically, if necessary, to prevent movement of the pipe during placement of the flowable fill. Pipe sections shall be joined so as to prevent the influx of flowable fill around the joints. The Contractor shall replace at his expense any pipe or sections of pipe which do not conform to the above requirements.

D. Design mix shall be excavatable and be proportioned to have an unconfined compressive strength 150 psi.

E. Where open cutting of streets is called for or incidental to the Work, flowable fill shall be used from 6" above top of pipe to the top of trench. TDOT #57 stone shall be used to bed and backfill the pipe from trench bottom to 6" above the top of pipe. Steel road plates of appropriate thickness are required during curing period. All pavement shall be saw cut and patched accordingly.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 32 91 13

SOIL PREPARATION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):

a. C33/C33M, Standard Specification for Concrete Aggregates.

b. C602, Standard Specification for Agricultural Liming Materials.

c. D2974, Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.

d. D5268, Standard Specification for Topsoil Used for Landscaping Purposes.

1.02 SUBMITTALS

A. Action Submittals:

1. Samples:

a. Representative of stockpiled or imported topsoil.

B. Informational Submittals:

1. Certified Topsoil Analysis Reports: if requested by Owner.

a. Indicate quantities of materials necessary to bring onsite or imported topsoil into compliance with textural/gradation requirements.

b. Indicate quantity of lime, quantity and analysis of fertilizer, and quantity and type of soil additive.

1.03 SEQUENCING AND SCHEDULING

A. Rough grade areas to be planted or seeded, prior to performing work specified under this section.

PART 2 PRODUCTS

2.01 TOPSOIL

TO BID CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

A. General: Natural, friable, sandy loam, obtained from well-drained areas, free from objects larger than 1-1/2 inches maximum dimension, and free of subsoil, roots, grass, other foreign matter, hazardous or toxic substances, and deleterious material that may be harmful to plant growth or may hinder grading, planting, or maintenance.

B. Use onsite topsoil wherever possible. If imported topsoil is specifically called for on the project Drawings, it shall meet the requirements in the paragraphs below.

C. Composition: In general accordance with ASTM D5268:3

1. Gravel-Sized Fraction: Maximum 5 percent by weight retained on a No. 10 sieve.

2. Sand-Sized Fraction: Minimum 20 to 60 percent passing No. 10 sieve.

3. Silt and Clay-Sized Fraction: Minimum 35 to 70 percent.

D. Organic Matter: Greater than 2 percent by dry weight as determined in accordance with ASTM D2974.

E. pH: Range 5.5 to 7.0.

F. Textural Amendments: Amend as necessary to conform to required composition by incorporating sand, peat, manure, or sawdust.

G. Source: Stockpile material onsite, in accordance with specifications. Import topsoil if onsite material is insufficient in quantity, and as approved by the Owner.

2.02 LIME

A. Composition: Ground limestone with not less than 85 percent total carbonates, ASTM C602.

B. Gradation:

1. Minimum 50 percent passing No. 100 sieve.

2. Minimum 90 percent passing No. 20 sieve.

3. Coarser material acceptable provided rates of application are increased proportionately on basis of quantities passing No. 100 sieve.

2.03 SOIL ADDITIVES

A. Sawdust or Ground Bark:

1. Nontoxic, of uniform texture, and subject to slow decomposition when mixed with soil.

2. Nitrogen-treated, or if untreated mix with minimum 0.15 pound of ammonium nitrate or 0.25 pound of ammonium sulfate per cubic foot of loose material.

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B. Peat:

1. Composition: Natural residue formed by decomposition of reeds, sedges, or mosses in a freshwater environment, free from lumps, roots, and stones.

a. Organic Matter: Not less than 90 percent on a dry weight basis as determined by ASTM D2974.

b. Moisture Content: Maximum 65 percent by weight at time of delivery.

C. Fertilizer:

1. Natural:

a. Manure:

i. Well-rotted, stable or cattle manure, free from weed seed and refuse.

ii. Maximum 50 percent sawdust or shavings by volume.

iii. Age: Minimum 4 months; maximum 2 years.

2. Commercial:

a. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose.

b. Contain the following minimum percentage of plant food by weight:

i. Nitrogen: 10 percent.

ii. Phosphoric Acid: 10 percent.

iii. Potash: 10 percent.

D. Sand: Fine Aggregate: Clean, coarse, well-graded, ASTM C33/C33M.

2.04 SOURCE QUALITY CONTROL

A. If requested by Owner, provide Topsoil Analysis/Testing: Performed by county or state soil testing service or approved certified independent testing laboratory.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

A. Apply lime at the rate of 50 pounds per 1,000 square feet to subgrade before tilling.

B. Scarify subgrade to minimum depth of 4 inches where topsoil is to be placed.

C. Remove stones over 2-1/2 inches in any dimension, sticks, roots, rubbish, and other extraneous material.

D. Limit preparation to areas which will receive topsoil within 2 days after preparation.

3.02 TOPSOIL PLACEMENT

A. Do not place topsoil when subsoil or topsoil is frozen, excessively wet, or otherwise detrimental to the Work.

B. Mix soil amendments, lime, and other soil additives identified in analysis reports with topsoil before placement or spread on topsoil surface and mix thoroughly into entire depth of topsoil before planting or seeding. Delay mixing of fertilizer if planting or seeding will not occur within 3 days.

C. Place topsoil to depth of 5 inches and lightly compact where seeding and planting are scheduled.

D. Uniformly distribute to within 1/2 inch of final grades. Fine grade topsoil eliminating rough or low areas and maintaining levels, profiles, and contours of subgrade.

E. Remove stones exceeding 1-1/2-inch diameter, roots, sticks, debris, and foreign matter during and after topsoil placement.

F. Remove surplus subsoil and topsoil from Site. Grade stockpile area as necessary and place in condition acceptable for planting or seeding.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 32 92 00

TURF AND GRASSES

PART 1 – GENERAL

1.01 DEFINITIONS

A. Maintenance Period: Begin maintenance immediately after each area is planted (seed, sod) and continue until all planting under this section is completed and a satisfactory stand has been established.

B. Satisfactory Stand: Grass that has:

1. No bare spots larger than 3 square feet.

2. Not more than 10 percent of total area with bare spots larger than 1 square foot.

3. Not more than 15 percent of total area with bare spots larger than 6 square inches.

1.02 SUBMITTALS

A. Action Submittals: Product labels/data sheets.

B. Informational Submittals:

1. Seed: Certification of seed analysis, germination rate, and inoculation:

a. Mixtures: Proportions of each kind of seed.

2. Certification of sod: include source and harvest date of sod, and sod seed mix.

3. Description of required maintenance activities and activity frequency.

1.03 DELIVERY, STORAGE, AND PROTECTION

A. Seed:

1. Furnish in standard containers with seed name, lot number, net weight, percentages of purity, germination, and hard seed and maximum weed seed content, clearly marked for each container of seed.

2. Keep dry during storage.

B. Sod:

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

1. Do not harvest if sod is excessively dry or wet to the extent survival may be adversely effected.

2. Harvest and deliver sod only after laying bed is prepared for sodding.

3. Roll or stack to prevent yellowing.

4. Deliver and lay within 24 hours of harvesting.

5. Keep moist and covered to protect from drying from time of harvesting until laid.

1.04 WEATHER RESTRICTIONS

A. Perform Work under favorable weather and soil moisture conditions as determined by accepted local practice.

1.05 SEQUENCING AND SCHEDULING

A. Prepare topsoil as specified in Section 32 91 13, Soil Preparation, before starting Work of this section.

B. Complete Work under this section within 3 days following completion of soil preparation.

C. Planting Season: Those times of year that are normal for such work as determined by accepted local practice.

1.06 MAINTENANCE SERVICE

A. Contractor: Perform maintenance operations during maintenance period to include:

1. Watering: Keep surface moist.

2. Washouts: Repair by filling with topsoil, liming, fertilizing, seeding, and mulching.

3. Mulch: Replace wherever and whenever washed or blown away.

4. Mowing: Mow to 2 inches after grass height reaches 3 inches, and mow to maintain grass height from exceeding 3-1/2 inches.

5. Reseed unsatisfactory areas or portions thereof immediately at the end of the maintenance period if a satisfactory stand has not been produced.

6. Reseed/replant during next planting season if scheduled end of maintenance period falls after September 15.

7. Reseed/replant entire area if satisfactory stand does not develop by July 1 of the following year.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

PART 2 – PRODUCTS

2.01 FERTILIZER

A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose. Minimum percentage of plant food by weight.

B. Application Rates: 20 pounds per 1,000 square feet.

C. Mix:

1. Nitrogen: 10.

2. Phosphoric Acid: 10.

3. Potash: 10.

2.02 SEED

A. Fresh, clean new-crop seed that complies with the tolerance for purity and germination established by Official Seed Analysts of North America.

B. Seeds of Legumes: Inoculated with pure culture of nitrogen-fixing bacteria prepared specifically for legume species in accordance with inoculants manufacturer's instructions.

C. Seed Mix:

Seeding Dates	**Species**	**Proportion By Weight**
February 1 to July 1	Kentucky 31 Fescue	80%
	Korean Lespedeza	15%
	English Rye	5%
June 1 to August 15	Kentucky 31 Fescue	55%
	Korean Lespedeza	20%
	English Rye	15%
	German Millet	10%
April 15 to August 15	Kentucky 31 Fescue	60%
	Korean Lespedeza	15%
	Kobe Lespedeza	15%
August 1 to December 1	Kentucky 31 Fescue	70%
	English Rye	20%
	White Clover	10%
February 1 to December 1	Kentucky 31 Fescue	70%
	Crown Vetch	25%
	English Rye	5%

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

2.03 SOD

A. Certified, containing grass mix specified.

B. Strongly rooted pads, capable of supporting own weight and retaining size and shape when suspended vertically from a firm grasp on upper 10 percent of pad.

1. Grass Height: Normal.

2. Strip Size: Supplier's standard.

3. Soil Thickness: Uniform; 1 inch plus or minus 1/4 inch at time of cutting.

4. Age: Not less than 10 months or more than 30 months.

5. Condition: Healthy, green, moist; free of diseases, nematodes and insects, and of undesirable grassy and broadleaf weeds. Yellow sod, or broken pads, or torn or uneven ends will not be accepted.

2.04 STRAW MULCH

A. Threshed straw of oats, wheat, barley, or rye, free from (i) seed of noxious weeds or (ii) clean salt hay.

2.05 NETTING

A. Jute:

1. Heavy-duty, twisted, weighing 1 pound(s) per square yard.
2. Openings Between Strands: Approximately 1 inch square.

B. Plastic:

1. Extruded Polypropylene: 20 mils.

2. Opening Between Strands: 1 inch by 2 inch.

C. Matting:

1. Excelsior mat or straw blanket; staples as recommended by matting manufacturer.

2. Manufacturers and Products:

a. North American Green, Evansville, IN; S150 blanket.

b. Approved equal.

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2.06 TACKIFIER

A. Derived from natural organic plant sources containing no growth or germination-inhibiting materials.

1. Capable of hydrating in water, and to readily blend with other slurry materials.

2. Wood Cellulose Fiber: Add as tracer, at rate of 150 pounds per acre.

3. Manufacturers and Products:

a. Reinco, Inc.; Terra Tack SC.

b. Reclamare; J-Tac.

c. Approved equal.

2.07 WEED BARRIER

A. 6 mils (0.006 inch) black polyethylene sheet.

2.08 DIVIDER

A. Cedar, Standard or Better Grade.

2.09 EDGING

A. Steel: 1/8 inch by 4 inches wide in 15-foot minimum lengths, manufacturer's standard black, with 18-inch-long steel stakes and fastenings on curb.

B. Plastic: Polyethylene edging 1/8 inch by 4 inches wide, black, with integral design to provide a firm hold without staking.

PART 3 – EXECUTION

3.01 PREPARATION

A. Grade areas to smooth, even surface with loose, uniformly fine texture.

1. Roll and rake, remove ridges, fill depressions to meet finish grades.

2. Limit such work to areas to be planted within immediate future.

3. Remove debris using a mechanical device such as a Harley Rake or similar mechanical implement to remove all debris.

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B. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry off before seeding. Do not create muddy soil.

C. Restore prepared areas to specified condition if eroded or otherwise disturbed after preparation and before planting.

3.02 FERTILIZER

A. Apply evenly over area in accordance with manufacturer's instructions. Mix into top 2 inches of topsoil, when applied by broad cast method.

B. Application Rate: 20 pounds per 1,000 square feet.

3.03 SEEDING

A. Start within 2 days of preparation completion.

B. Mechanical: Broadcast seed in two different directions, compact seeded area with cultipacter or roller.

1. Sow seed at uniform rate of 15 pounds per 1,000 square feet.

2. Use Brillion type seeder.

3. Broadcasting will be allowed only in areas too small to use Brillion type seeder. Where seed is broadcast, increase seeding rate 20 percent.

4. Roll with ring roller to cover seed, and water with fine spray.

C. Cover Crop Seeding: Apply seed at rate of 120 pounds per acre to areas that are bare or incomplete after September 15.

D. Mulching: Apply uniform cover of straw mulch at a rate of 2 tons per acre.

E. Netting: Immediately after mulching, place over mulched areas with slopes steeper than 3:1, in accordance with manufacturer's instructions. Locate strips parallel to slope and completely cover seeded areas.

F. Tackifier: Apply over mulched areas with slopes steeper than 4:1 at rate of 5 gallons per 1,000 square feet in accordance with the manufacturers recommended requirements.

G. Water: Apply with fine spray after mulching to saturate top 4 inches of soil.

3.04 SODDING

A. Do not plant dormant sod, or when ground is frozen.

B. Lay sod to form solid mass with tightly fitted joints; butt ends and sides, do not overlap.

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1. Stagger strips to offset joints in adjacent courses.

2. Work from boards to avoid damage to subgrade or sod.

3. Tamp or roll lightly to ensure contact with subgrade; work sifted soil into minor cracks between pieces of sod, remove excess to avoid smothering adjacent grass.

4. Complete sod surface true to finished grade, even, and firm.

C. Fasten sod on slopes to prevent slippage with wooden pins 6 inches long driven through sod into subgrade, until flush with top of sod. Install at sufficiently close intervals to securely hold sod.

D. Water sod with fine spray immediately after planting. During first week, water daily or more frequently to maintain moist soil to depth of 4 inches.

E. Apply top dress fertilizer at recommended rate.

3.05 FIELD QUALITY CONTROL

A. 8 weeks after seeding is complete and on written notice from Contractor that a satisfactory stand has been established, Owner will, within 15 days of receipt, determine if a satisfactory stand has been established.

B. If a satisfactory stand has not been established, Owner will make another determination after written notice from Contractor following the next growing season.

END OF SECTION

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SECTION 33 01 13

DISINFECTION & TESTING OF WATER UTILITIES

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section.

1. American Water Works Association (AWWA):

a. B300, Hypochlorites.

b. B301, Liquid Chlorine.

e. C651, Disinfecting Water Mains.

f. C652, Disinfection of Water Storage Facilities.

2. NSF International (NSF):

a. NSF/ANSI 61, Drinking Water System Components – Health Effects.

3. Standard Methods for the Examination of Water and Wastewater, as published by American Public Health Association, American Water Works Association, and the Water Environment Federation.

1.02 SUBMITTALS

A. Informational Submittals:

1. Plan describing and illustrating conformance to appropriate AWWA standards and this Specification.

2. Procedure and plan for cleaning system.

3. Procedures and plans for disinfection and testing.

4. Proposed locations within system where Samples will be taken.

5. Type of disinfecting solution and method of preparation.

6. Certification that employees working with concentrated chlorine solutions or gas have received appropriate safety training.

7. Method of disposal for highly chlorinated disinfecting water.

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PART 2 PRODUCTS

2.01 GENERAL

A. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the AHJ that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.

1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 WATER FOR DISINFECTION AND TESTING

A. Clean, uncontaminated, and potable.

B. Owner will supply potable quality water. Contractor shall convey in disinfected pipelines or containers.

2.03 CONTRACTOR'S EQUIPMENT

A. Furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.

B. Water used to fill pipeline may be supplied using a temporary connection to existing distribution system. Provide protection against cross-connections as required by AWWA C651.

PART 3 EXECUTION

3.01 WATER LINE PRESSURE TESTS

A. All newly laid pipe or any valved section thereof shall be subjected to hydrostatic pressure testing. Conduct hydrostatic testing in accordance with AWWA C600 for ductile iron pipe or AWWA C605 for PVC pipe.

B. Where practicable, pipelines shall be tested in lengths between line valves or plugs of no more than 3,000 feet.

C. Hydrostatic testing shall be conducted only with potable water. Due to the inherent safety hazard potential associated with testing components and systems with compressed air or other compressed gases, pressure testing shall never be accomplished using compressed air.

D. The Contractor shall furnish all gauges, recording devices, meters, pumps, pipe, connections and other equipment required to conduct the test and shall maintain said

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equipment in condition for accurate testing as determined by the Owner. Gauges used for pressure tests shall be oil-filled gauges.

E. Hydrostatic test results shall be recorded on an appropriate chart recorder. The Contractor shall furnish a recording gauge and water meter for recording pressure charts and for measuring makeup water used during the hydrostatic testing. Recording pressure charts shall be submitted to the Owner at the conclusion of testing. The pressure recording device shall be suitable for outside service, with a range from 0–300 psig, 24-hour spring wound clock, designed for 9-inch charts, and shall be approved by the Engineer. For Contractor's information only, such pressure recording devices may be available from Foxboro Company, Foxboro, Massachusetts; Bristol Division of ACCO, Waterbury, Connecticut; or Weksler Instruments Corporation, Freeport, New York.

F. Prior to testing, the Contractor shall place sufficient backfill to prevent pipe movement. When local conditions require that the trenches be backfilled immediately after the pipe has been laid, the testing may be carried out after backfilling has been completed but before placement of permanent surfacing. The Contractor shall ensure that thrust blocking or other types of restraining systems will provide adequate restraint prior to pressurizing the pipeline.

G. Cross Connection Control: When existing water mains are used to supply test water, they should be protected from backflow contamination by temporarily installing a double check valve assembly between the test and supply main or by other means approved by the Engineer. Prior to pressure and leakage testing, the temporary backflow protection should be removed and the main under test isolated from the supply main.

H. Test Pressure Requirements:

1. The test pressure shall not be less than 1.25 times the stated working pressure of the pipeline measured at the highest elevation along the test section and not less than 1.5 times the stated working pressure at the lowest elevation of the test section, but not greater than 200 psi.

2. The test pressure shall not exceed the thrust restraint design pressure or 1.5 times the pressure rating of the pipe or joint, whichever is less (as specified by the manufacturer).

3. The test pressure shall not exceed the rated working pressure of the valves when the pressure boundary of the test section includes closed, resilient seated gate valves or butterfly valves.

4. Valves shall not be operated in either direction at a differential pressure exceeding the rated valve working pressure. A test pressure greater than the rated valve working pressure can result in trapped test pressure between the gates of a doubledisc gate

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valve. For tests exceeding the rated valve working pressure, the test setup should include a provision, independent of the valve, to reduce the line pressure to the rated valve working pressure on completion of the test. The valve can then be opened enough to equalize the trapped pressure with the line pressure, or the valve can be fully opened if desired.

I. Test Procedure:

1. Each valved section of pipeline shall be slowly filled with potable water using a backflow prevention and test apparatus assembly. When venting air from pipelines, it is important to limit the pipeline fill rate to avoid excessive surge pressures when the water reaches the air venting opening(s).

2. Before applying the specified test pressure, air shall be expelled completely from the pipeline section under test. If permanent air vents are not located at all high points, corporation cocks shall be installed at such points to expel air as the line is filled with water. After all the air has been expelled, close the corporation cocks and apply the test pressure. At the conclusion of the pressure test, remove the corporation cocks and plug or leave in place at the discretion of the Engineer.

3. The specified test pressure shall be applied using a suitable pump connected to the pipeline in a manner satisfactory to the Engineer. The specified test pressure shall be based on the elevation of the lowest point of the pipeline or section under test and corrected to the elevation of the test gauge, in accordance with test pressure requirements specified herein.

4. The pipeline shall be allowed to stabilize at the test pressure before conducting the hydrostatic test. This may require several cycles of pressurizing and bleeding trapped air prior to beginning the test. It is recommended that the line remain pressurized for a minimum of 24 hours before testing in order for joints to tighten and pockets of air to dissolve in the water.

5. The hydrostatic test shall be at least 2 hours in duration after reaching the specified test pressure where joints are exposed and at least 8 hours where joints are covered.

6. The test pressure shall not vary by more than +/- 5 psi for the duration of the test. Test pressure shall be maintained within this tolerance by adding makeup water through the pressure test pump into the pipeline. The amount of makeup water added shall be accurately measured (in gallons per hour) by suitable methods and shall not exceed the applicable testing allowance as specified herein.

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J. Visual Inspection:

Any exposed pipe, fittings, valves, hydrants and joints shall be examined carefully during the hydrostatic pressure test. Any damaged or defective materials that are discovered during or following the pressure test shall be repaired or replaced at the Contractor's expense, and the test shall be repeated until satisfactory results are obtained. Water main repair and replacement shall be in accordance with Paragraph 3.01.K.4.

K. Testing Allowance:

1. Testing allowance shall be defined as the maximum quantity of makeup water that is added into a pipeline undergoing hydrostatic pressure testing, or any valved section thereof, in order to maintain pressure within +/- 5 psi of the specified test pressure (after the pipeline has been filled with water and the air has been expelled).

2. No pipe installation will be accepted if the quantity of makeup water is greater than that determined by the following formula:

$$L = \frac{S*D*(P)^{\frac{1}{2}}}{148{,}000}$$

Where:

L = testing allowance (makeup water), in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = average test pressure during the hydrostatic test, in pounds per square inch (gauge pressure)

This formula is based on a testing allowance of 10.5 gpd/mile/inch of nominal diameter at a pressure of 150 psi. Values of testing allowance at various pressures are shown in the following table. When testing against closed metal-seated valves, an additional testing allowance per closed valve of 0.0078 gal/hr/inch of nominal valve size shall be allowed. When hydrants are in the test section, the test shall be made against the main valve of the hydrant.

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Hydrostatic Testing Allowance per 1,000 feet of pipeline (gallons per hour) *											
Average Test Pressure (psi)	Nominal Pipe Diameter (inches)										
	4	6	8	10	12	14	16	18	20	24	30
250	0.43	0.64	0.85	1.07	1.28	1.50	1.71	1.92	2.14	2.56	3.21
225	0.41	0.61	0.81	1.01	1.22	1.42	1.62	1.82	2.03	2.43	3.04
200	0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.72	1.91	2.29	2.87
175	0.36	0.54	0.72	0.89	1.07	1.25	1.43	1.61	1.79	2.15	2.68
150	0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.49	1.66	1.99	2.48
125	0.30	0.45	0.60	0.76	0.91	1.06	1.21	1.36	1.51	1.81	2.27
100	0.27	0.41	0.54	0.68	0.81	0.95	1.08	1.22	1.35	1.62	2.03
75	0.23	0.35	0.47	0.59	0.70	0.82	0.94	1.05	1.17	1.40	1.76
50	0.19	0.29	0.38	0.48	0.57	0.67	0.76	0.86	0.96	1.15	1.43

*If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

3. Acceptance of the installation shall be determined on the basis of testing allowance only. Should any test of pipe laid disclose leakage greater than that specified, the Contractor shall, at his own expense, locate and repair the defective joints until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of the allowance used for testing. Hydrostatic test results shall be recorded on an appropriate chart recorder as specified herein. A copy of the test chart shall be provided to the Engineer.

4. To repair or replace damaged or defective water main pipe, the Contractor shall maintain positive pressure on the main (valves left partially open) while he excavates around and under (2' clearance) the pipe so that water can be pumped out of the excavation pit before it enters the newly constructed main during the repair process. Contractor shall have adequate pumping capacity to prevent any trench water or debris from entering the main during this process. The interior of all pipe and fittings shall be sprayed with a 1% hypochlorite solution before they are installed in the repair process. To produce this one percent hypochlorite solution, one gallon of 5% hypochlorite bleach can be diluted with four (4) gallons of water. Flooding or contamination of the main during this process shall invoke the Paragraph below.

3.02 FAILURE TO FOLLOW SPECIFICATIONS

A. Failure to take such preventative measures mentioned in these specifications, or flooding or contamination of the main for any reason, shall require the Contractor to clean the line with a hydraulically propelled foam pig (or other suitable pigging device acceptable to the Engineer)

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and slug chlorinate the line as specified in Paragraph 3.03 of this Section. The Contractor shall also be required to take whatever other measures required by the Engineer in accordance with these specifications or AWWA C-651 to remove the contamination. All such procedures shall be fully documented and submitted for approval by the Engineer.

3.03 CLEANING AND DISINFECTING OF WATER LINES

A. Disinfection Tests: Conduct disinfection tests in accordance with AWWA C-651.

B. During construction, take precautions to protect pipe interiors, fittings, and valves against contamination. Follow all Material Storage and Handling Requirements in Section 02713 Part 2.

C. All chlorine products shall be NSF approved chlorine. Pool chlorine products shall not be used.

D. The Granular Method shall be used as the standard disinfection method on all newly installed pipelines unless prior approval for the continuous feed or slug method is obtained from the Engineer.

E. Granular Method (Standard Method):

1. Obtain chlorine product from reputable source. This chlorine product shall be OxyChem ACL 60 Disinfecting Granules (sodium dichloroisocyanurate) with approximately 62% available chlorine or equal.

2. Place granular chlorine in the pipe at the beginning of the line, beginning of each branch line, and at 500-feet intervals (every 25 pipe joints).

3. Place enough granular chlorine in the pipe to achieve a 25 ppm dosage in the pipeline. See Table 1 for dosage amounts for the particular size pipe being disinfected.

4. Slowly fill the pipeline with water and eliminate all air pockets. Hold the disinfection solution in the pipeline for 24 hours.

5. Flush thoroughly to clear the strong chlorine solution from the pipelines before bacteriological sampling.

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TABLE I - GRANULAR METHOD	
Granular Chlorine Dose Size for 500 FT of pipe at 25 PPM (MG/L)	
Pipe Diameter (in)	**Dose Size (oz)**
2	0.5
4	2
6	4
8	7
10	11
12	16
16	28
24	63
30	99
36	142

F. Continuous Feed Method (Special Approval Required):

1. Granular chlorine may be placed (optional) in the pipeline during construction (see Granular Method).

2. Thoroughly flush the pipeline to remove all sediments and air pockets.

3. Add a continuous dose of chlorine while flowing water slowly into the new main until a 25 ppm chlorine concentration is reached throughout the new pipelines. Contractor shall use Sodium Hypochlorite to obtain the 25 ppm dosage (see Table II for total amount of Sodium Hypochlorite to be fed to establish 25 ppm dosage for 500 feet of pipe). In the alternative, granular chlorine can be mixed to obtain the 25 ppm concentration (see Table I for total amount of granular chlorine to be fed to establish 25 ppm concentration for 500 feet of pipe). Measure the chlorine residual at various locations to conform proper residual has been achieved.

4. Hold the disinfection solution in the lines for 24 hours and confirm that the chlorine residual is at least 10 ppm after 24 hours.

5. Flush thoroughly to clear the strong solution from the pipelines before bacteriological sampling.

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TABLE II – CONTINUOUS FEED METHOD			
Sodium Hypochlorite Dose Size for 500 ft of Pipe at 25 ppm (mg/l)			
Pipe Diameter (in)	Sodium Hypochlorite Volume (gal)		
	5.0%	6.15%	10.0%
2	0.04	0.03	0.02
4	0.16	0.13	0.08
6	0.37	0.30	0.18
8	0.65	0.53	0.33
10	1.0	0.83	0.51
12	1.5	1.2	0.73
16	2.6	2.1	1.3
24	5.9	4.8	2.9
30	9.2	7.5	4.6
36	13.2	10.7	6.6

G. Slug Method (Special Approval Required):

1. Granular chlorine may be placed (optional) in the pipeline during construction (see Granular Method).

2. Thoroughly flush the line to remove all sediments and air pockets.

3. Admit water to the new main very slowly and dose with enough chlorine to produce a residual of at least 100 ppm. Contractor shall use Sodium Hypochlorite or granular chlorine according to Table III to obtain the 100 ppm concentration. The objective is to produce a column of 100 ppm chlorine solution which will move slowly as a slug through the new pipeline. The column or slug of highly chlorinated water must be long enough to contact all surfaces of the pipe interior for at least 3 hours. Measure chlorine residuals in the slug as it moves down the pipeline. The residual must be maintained over 50 ppm.

4. For emergency line repair situations only, to be performed only by, or in the presence of, authorized Owner personnel, and where no service connections exist, the standard 100 ppm concentration can be substituted for a 300 ppm solution and the contact time can be reduced from the standard 3 hours to 15 minutes. Table IV indicates the Sodium Hypochlorite and granular chlorine dose sizes to be used for this method. Refer to Paragraph 3.03.B for appropriate situations and procedures.

5. Flush thoroughly to clear the strong chlorine solution from the pipelines before bacteriological sampling.

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TABLE III – SLUG METHOD				
Chlorine Dose Size for 500 ft of Pipe at 100 ppm (mg/l)				
Pipe Diameter (in)	Sodium Hypochlorite Volume (gal)			Granular Chlorine (oz. of weight)
	5.0%	6.15%	10.0%	62%
2	0.2	0.1	0.1	2.1
4	0.7	0.5	0.3	7.1
6	1.5	1.2	0.7	16
8	2.6	2.1	1.3	28
10	4.1	3.3	2.0	44
12	5.9	4.8	2.9	63
16	10	8.5	5.2	112
24	23	19	12	253
30	37	30	18	395
36	53	43	26	569

TABLE IV – SLUG METHOD				
Chlorine Dose Size for 500 ft of Pipe at 300 ppm (mg/l)				
Pipe Diameter (in)	Sodium Hypochlorite Volume (gal)			Granular Chlorine (oz. of weight)
	5.0%	6.15%	10.0%	62%
2	0.5	0.4	0.2	6.3
4	2.0	1.6	1.0	21
6	4.4	3.6	2.2	48
8	7.8	6.4	3.9	84
10	12	10	6.1	132
12	18	14	8.8	190
16	31	25	16	336
24	70	57	35	758
30	110	90	55	1185
36	159	129	79	1706

H. While chlorine is being applied, manipulate valves so that the treatment dosage will not flow back into the line that is supplying the water. Continue application of chlorine until the entire line being treated is filled with the chlorine solution.

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I. Final Flushing: Conduct final flushing in accordance with AWWA C651.

1. After applicable retention period, flush heavily chlorinated water from the line until chlorine concentration in water leaving the main is no higher than that generally prevailing in the system, or less than 2 mg/l. Unless special approval is obtained from Engineer, all water shall be flushed through de-chlorinating diffusers rated to remove the appropriate chlorine concentration (Arden Industries' Bazooka with Liquid Calcium Thiosulfate Feed or equal). The Owner may, at its option, provide such devices to the Contractor while the line is flushed. The Contractor must contact the Inspector prior to flushing any water from the newly constructed line. The Inspector shall provide de-chlorinating diffuser(s) to the Contractor before flushing. If no diffusers are available through the city, the Contractor shall be required to provide diffusers. The Inspector shall approve the flushing location. The Inspector shall also check the chlorine level in the main before final flushing. If the residual chlorine level is out of the effective range of the de-chlorinating diffuser, the Inspector shall require the Contractor to wait until the residual level has dropped to within the range of the de-chlorinating diffuser before flushing.

2. In the alternative, but only with special approval from the Engineer, neutralizing chemicals may be applied externally as the water reaches the ground. Perform such flushing only at sites where Engineer has approved. If no approved point of discharge is available, neutralizing chemicals must be applied to the water in order to neutralize the chlorine residual. The amount of chemicals required to neutralize various residual chlorine concentrations in 100,000 gallons of water are shown in Table V.

3. Flushing Velocity: The velocity of water used to flush the line shall be at least 2 fps. The flow rates required to produce this velocity varies depending on pipe diameter. To approximate this velocity, refer to Table VI to select the proper number of taps or 2-½" Fire Hydrant Nozzles to open at the end of the line.

4. Minimum Flushing Time: At minimum, the line shall be flushed to remove two complete volumes of water through the newly constructed pipeline, approximately 7 minutes per 500 ft. The Disinfection, Flushing, and Pressure Testing Worksheet presents the minimum flushing time for various lengths of pipe.

5. Additional Flushing: After flushing pipe for minimum time specified in Item 4 above, check for trapped air at Air Release Valves, Blow-offs and services at high points. Verify that all mud, air cloudiness, or other discoloration is absent from flushing stream. If such problems exist, continue to flush line until the stream is clear.

6. Once a line has been flushed, test to make certain that the residual chlorine in the water is within acceptable limits.

7. It must be noted that flushing is no substitute for taking preventative measures before and during the laying of water lines. Certain contaminants – especially those in caked

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deposits – are difficult or even impossible to remove by flushing, no matter how high the velocity. Furthermore, in pipe with diameters of 16" or more, it can be difficult to achieve even the minimum recommended flushing velocity of 2.5 fps.

TABLE V - Required Chemicals to Neutralize Chlorine Concentration (per 100,000 gallons of water)				
Residual Chlorine Concentration (mg/L)	**Sulfur Dioxide (SO_2) lb**	**Sodium Bisulfite ($NaHSO_3$) lb**	**Sodium Sulfite (Na_2SO_3) lb**	**Sodium Thiosulfate ($Na_2S_2O_3$-$5H_2O$) lb**
1	0.08	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
3	8.3	12.5	14.6	12.0
4	41.7	62.6	73.0	60.0

TABLE VI - Minimum number of openings to produce 2.5 fps. (at 40 psi Residual)			
Pipe Diameter (in)	**Number of 1" Taps**	**Number of 2" Taps**	**Number of 2-1/2" FH Nozzles**
2	1	---	---
4	1	1	1
6	---	1	1
8	---	1	1
10	---	2	1
12	---	2	2
16	---	4	2
24	---	-	4
30	---	---	6
36	---	---	8

J. Bacteriological Testing:

1. After a water line has undergone final flushing but before it is placed into service, collect a sample for bacteriological testing from the end of that line. In the case of extremely long lines, take additional samples if the Owner so directs. Bacteriological samples shall be collected at approximately 2,500-foot intervals with samples near the beginning point and at the end point of each section of line. Where sanitary conditions were not maintained before, during or after construction, an additional bacteriological sample shall be collected from a location representing the water from the contaminated area.

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Unsanitary conditions include failure to document sanitary handling of materials, to conduct construction inspections and to maintain records, and to document sanitary practices during construction and other hazards such as trench flooding during construction.

2. Collect these samples in sterile bottles treated with sodium thiosulfate. Fire hydrants shall be used to take samples. Other locations may be utilized if no fire hydrant is available.

3. Samples will be collected by water plant personnel to be tested for bacteriological quality in order to determine if they contain any coliform organisms. The sample is required to be taken 48 hours after flushing all new pipelines. If the initial disinfection fails to produce satisfactory samples, repeat disinfection until satisfactory samples are obtained.

4. When the samples tested are found to be satisfactory, the water line may be placed in service.

5. The Contractor shall fill out and sign a Disinfection, Flushing, and Pressure Testing Worksheet documenting adherence to the Specifications. Contractor shall obtain a blank worksheet from the Owner upon issuance of a construction permit. The Contractor shall complete the worksheet during the construction process and present a signed copy to the Inspector prior to bacteriological testing. If improper or inadequate documentation is presented, the Contractor shall be deemed to have failed to follow the specifications and shall be required to follow the cleaning and chlorination procedures specified in Paragraph 3.03.

6. Only smooth brass or copper testing ports shall be used to collect bacteriological samples. Air valves may serve as suitable sampling locations. Sampling ports shall be spaced no farther than 2500' apart and shall be present at the beginning and end of each water line. If directed, the Contractor shall install a ¾" or 1" corporation with copper service line at appropriate sampling locations, at the discretion of the Engineer.

Section K and L below are for Authorized Owner Personnel or Contractors working under direct supervision of Authorized Owner Personnel.

K. Positive Pressure Method:

1. Contact Tennessee One Call to have all other utilities located; notify Service Department and Water Treatment Plant of areas affected.

2. All attempts will be made to repair line under "wet" conditions to avoid or eliminate possible contaminants from entering the system.

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3. Close nearest isolation valves on the downstream side of the leak. Reduce the flow from the upstream side of the leak by throttling back the remaining valve, leaving **positive pressure** on the line. DO NOT OPEN ANY FIRE HYDRANTS TO REDUCE LINE PRESSURE PRIOR TO OPENING THE TRENCH TO A DEPTH OF AT LEAST 18-INCHES BELOW THE LINE. This will prevent contaminants from entering the system. Complete the repair trench excavation.

4. After excavation of the repair trench is complete (to a depth of at least 18-inches below the line) close the remaining valve after removing the standing water to fully expose the pipe 360 degrees. Treat any standing water now remaining in the repair trench with ½ oz. of Granular Chlorine (62% purity) for every one hundred gallons of trench water to achieve a 25-ppm solution.

5. To ensure a clean repair, inspect around the pipe in and near the damaged area and remove any debris, soil, or other material from the damaged area. Swab or spray the damaged area of the pipe and interior of all repair clamps or other appropriate devices with a 1% hypochlorite solution (5.2 fluid oz. of 6.15% bleach/quart of water) before installation. Complete the repair.

6. Open the appropriate valve(s) and flush the water main toward the repair location from both directions if valve and hydrant locations permit. Continue flushing until all discolored water is eliminated and a satisfactory chlorine residual is reached.

7. Before the water main is returned to full service, collect a single water sample at a point nearest the repaired section. If direction of flow can be determined, the sample should be collected from downstream of the break repair. If direction of flow cannot be determined, samples should be collected from above and below the break repair. These samples should be coded "D". This sample is to be delivered as soon as possible to the Water Treatment Plant for bacteriological testing.

8. Check all valves to insure they have been returned to the open position.

9. If the test results are negative, the test results will serve as a record of compliance and no future work is required.

10. Fill out all appropriate forms indicating disinfection procedures.

11. If the test results are positive, then additional sampling should be undertaken immediately. A total of three (3) additional samples should be taken. The first additional sample should be taken from the original sampling location and the other two additional samples should be taken above and below the original sampling location. These three samples should be coded "R". If all three samples are negative, then no further work is required. If any of the additional samples is positive, then follow the normal repeat monitoring procedure.

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L. Dewatered Method: If it is not possible to maintain positive pressure as stated above and the pipe must be dewatered prior to opening and preparing the repair trench, then the entire section of pipe must be disinfected in accordance with Paragraph 3.03.G. (Slug Method), which is derived from Section 4.7.4 of AWWA C651-99.

1. Contact Tennessee One Call to have all other utilities located; notify the Service Department and Water Treatment Plant of areas affected.

2. Close the nearest isolation valves on all sides of main break.

3. If there are customers in the isolated area, turn off all services at the lock wing on the meter yokes. Remove the meters. This will prevent the disinfectant from entering the customer's premises.

4. In order to lessen the possibility of additional contaminates from entering the exposed line, after excavation of the repair trench is complete, pump the water down below the main line. Treat the standing water in the repair trench with ½ oz. of granular chlorine for every one hundred gallons of trench water to achieve a 25-ppm solution.

5. Clean the area around the pipe. Swab or spray the interior of all repair pipe and fittings with a 1 percent hypochlorite solution (5.2 fluid oz. of 6.15% bleach/quart of water) before installation.

6. The line should be properly disinfected by the slug method using a chlorine dosage of 100 mg/L and a contact time of at least 3 hours for areas where service connections are present.

7. In areas where no service connections exist the line can be properly disinfected by the slug method using a chlorine dosage of 300 mg/L and a contact time of at least 15 minutes.

8. After the disinfectant has been added to the line by using a sodium hypochlorite solution or calcium hypochlorite granules, an upstream valve should be opened slightly, along with an opened downstream hydrant, to allow air and highly discolored contaminated water to be removed. The slow flowing concentrated slug will gradually move through the pipe allowing all parts to be exposed to the disinfectant.

9. Once the highly discolored contaminated water has been flushed, the valve and flushing hydrant should be closed to allow for the prescribed disinfectant contact time.

10. After the prescribed contact time has been reached, prepare to treat (de-chlorinate) the highly chlorinated water to be flushed from the isolated line if there is a possibility that the discharge will cause any damage to the environment.

11. Open the upstream valve and the downstream hydrant and flush until all discolored water is eliminated, de-chlorinating the discharge if necessary. Test for highly

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chlorinated water remaining in the line and continue flushing if necessary until elimination is successful and the concentration is no higher than that in the prevailing water in the surrounding area.

12. Before the water main is returned to full service, collect a single water sample at a point nearest the repaired section. If direction of flow can be determined, the sample should be collected from downstream of the break repair. If direction of flow cannot be determined, samples should be collected from above and below the break repair. These samples should be coded "D". This sample is to be delivered as soon as possible to the Water Treatment Plant for bacteriological testing.

13. Open the customer's services at the lock wings and flush the service lines. Reinstall meters.

14. Open the remaining valves in the isolated area.

15. Flush the area again at the highest hydrant in the area to insure the elimination of any discolored water.

16. If the test results are negative, the test results will serve as a record of compliance and no future work is required.

17. Fill out all appropriate forms indicating disinfection procedures.

18. If the test results are positive, then additional sampling should be undertaken immediately. A total of three (3) additional samples should be taken. The first additional sample should be taken from the original sampling location and the other two additional samples should be taken above and below the original sampling location. These three samples should be coded "R". If all three samples are negative, then no further work is required. If any of the additional samples is positive, then follow the normal repeat monitoring procedure.

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DISINFECTION, FLUSHING AND PRESSURE TESTING WORKSHEET

(MANDATORY BEFORE BACTERIOLOGICAL TESTING)

PRESENT TO INSPECTOR

Date: _____

Project Name: _____

Material: ☐ PVC ☐ D.I. Size: _____

Length of Section: _____

Contractor: _____

Instructions:

1. This worksheet references the Granular Method.
2. This worksheet must be properly filled out and presented to inspector before bacteriological testing.
3. Use one worksheet per test section. If test pit is moved, use a new sheet. If pipe diameter changes, use a new sheet.

A. DISINFECTION

1. Select Granular Chlorine Dose Size

Pipe Dia (in)	Dose Size (oz.)
2	0.5
4	2
6	4
8	7
10	11
12	16
16	28
24	63
30	99
36	142

2. Select Number of Doses Needed

Pipe Length (ft)	No. of Doses
500	1
1000	2
1500	3
2000	4
2500	5
3000	6
3500	7
4000	8
4500	9
5000	10

3. Calculate Total Granular Chlorine

_____ X _____ = _____ oz.

Dose Size (Table 1) | No. of Doses (Table 2)

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1. Check granular chlorine container for approval (62% purity, NSF stamp) ☐
2. Place 1 dose at the beginning of the line ☐
3. Place 1 dose every 500 feet during construction ☐
4. After construction, install test pit (back flow/meter assembly by sleeving into the line) ☐
5. Partially open valve at test pit ☐
6. Adjust valve to slowly fill line ☐
7. Open blow-offs, services, and air release valves at high points to remove air ☐
8. Allow water to sit for at least 24 hours ☐

B. <u>FLUSHING</u>

1. Select Number of Flushing Ports (circle below)

Pipe Dia (in)	No. of 1" Taps	No. of 2" Taps	No. of FH Nozzles
2	1	-	-
4	1	1	1
6	-	1	1
8	-	1	1
10	-	2	1
12	-	2	2
16	-	4	2
24	-	-	4
30	-	-	6
36	-	-	8

2. Select Minimum Flushing Time (circle below)

Pipe Length (ft)	Min. Flush Time (min)
500	7
1000	14
1500	20
2000	27
2500	34
3000	40
3500	47
4000	54
4500	60
5000	67

3. Select Flushing Location (list below)

_____

_____

_____

4. Contact Inspector and attach dechlorinating diffuser (provided by Inspector) to each flushing port and open. ☐
5. Fully open valve at test pit. ☐
6. Flush for time selected in Step 2. ☐
7. Check for trapped air at ARV's, blow-offs and services at high points. ☐
8. Check for mud, air, and cloudiness (flush until clear). ☐

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C. PRESSURE TESTING

1. Apply 200 psi maximum test pressure (measured at pit or lowest point) through test pit. ☐
2. Fix all defective parts of water line according to Standard Specifications ☐
3. Call Inspector to witness pressure test. ☐
4. The pressure held at _____ psi for _____ hrs.

_____
Inspector's Initials

D. SAMPLING PORTS

1. Provide smooth copper brass sampling taps and spacing described in project Plans/Specifications or required by Distribution Operator. ☐

_____
No. of Taps

E. SKETCH

Attach a simple sketch identifying this section of test pit location, line, sampling location, flushing locations, and chlorine dosing locations.

F. BACTERIOLOGICAL TESTING

1. Sign statement below.
2. Call inspector for bacteriological testing.

G. STATEMENT

I certify that the above information is correct, and this water is ready to be tested by the Distribution Operator for bacteriological contamination.

_____
Contractor's Authorized Signature

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DISINFECTION, FLUSHING AND PRESSURE TESTING SKETCH

INCLUDES THE FOLLOWING FEATURES:

☐ Test Pit	☐ Sample Ports	☐ Chlorine Dosing Locations	☐ North Arrow
☐ Flush Ports	☐ Water Line	☐ Street Names	☐ Other Info

END OF SECTION

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SECTION 33 05 19

DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards that may be referenced in this section:

1. American Association of State Highway and Transportation Officials (AASHTO): T099-15-UL, Standard Method of Test for the Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop.

2. American Society of Mechanical Engineers (ASME):

   a. B16.21, Nonmetallic Flat Gaskets for Pipe Flanges.

   b. B16.42, Ductile Iron Pipe Flanges and Flanged Fittings Classes 150 and 300.

3. American Water Works Association (AWWA):

   a. C104/A21.4, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.

   b. C105/A21.5, Polyethylene Encasement for Ductile-Iron Pipe Systems.

   c. C110/A21.10, Ductile-Iron and Gray-Iron Fittings.

   d. C111/A21.11, Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

   e. C115/A21.15, Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Flanges.

   f. C116/A21.16, Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings.

   g. C150/A21.50, American National Standard for Thickness Design of Ductile-Iron Pipe.

   h. C151/A21.51, American National Standard for Ductile-Iron Pipe. Centrifugally Cast, for Water.

   i. C153/A21.53, American National Standard for Ductile-Iron Compact Fittings for Water Service.

   j. C600, Installation of Ductile-Iron Water Mains and Their Appurtenances.

   k. C606, Grooved and Shouldered Joints.

4. ASTM International (ASTM):

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a. A307, Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rods 60,000 psi Tensile Strength.

b. A563, Standard Specification for Carbon and Alloy Steel Nuts.

c. D882, Standard Test Method for Tensile Properties of Thin Plastic Sheeting.

d. D1330, Standard Specification for Rubber Sheet Gaskets.

e. D1922, Standard Test Method for Propagation Tear Resistance of Plastic Film and Thin Sheeting by Pendulum Method.

f. D2000, Standard Classification System for Rubber Products in Automotive Applications.

g. D4976, Standard Specification for Polyethylene Plastics Molding and Extrusion Materials.

5. International Organization for Standardization (ISO): 9001, Quality Management Systems – Requirements.

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings: Marking plan and details of standard pipe section showing dimensions, pipe joints, fitting and special fitting pressure rating and thickness, size, coating and lining data.

B. Informational Submittals:

1. Field Hydrostatic Testing Plan: Submit at least 15 days prior to testing and at minimum, include the following:

a. Testing dates.

b. Piping systems and section(s) to be tested.

c. Method of isolation.

d. Method of conveying water from source to system being tested.

2. Certifications of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.

3. Test documentation form and results.

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1.03 QUALITY ASSURANCE

A. Pipe manufacturer shall be ISO 9001 registered or provide the services of an independent inspection agency.

B. Prior to start of manufacturing, manufacturer not meeting or having ISO registration requirements shall submit name of at least two independent inspection agencies for approval.

1. Independent inspection agency shall be responsible, on a daily basis, for sample monitoring of chemical and mechanical tests, sample visual inspection of quality assurance tests performed on in-process pipe and fittings, and sample visual and dimensional inspection on finished products.

PART 2 PRODUCTS

2.01 MATERIALS

A. General:

1. Ductile iron pipe shall be manufactured, lined, coated, and tested domestically in the United States of America.

2. Ductile iron fittings shall be manufactured, lined, coated, and tested domestically or for fittings produced outside of the United States of America they shall bear the name of the domestic manufacturer supplying the pipe.

3. Pipe manufacturer shall certify source manufacturing facility has been producing ductile iron pipe of the specified diameters, pressure, dimensions and standards for a period of not less than 10 years.

4. Ductile iron pipe and fitting shall be supplied by a single manufacturer.

a. Mixing of components and sources is not permitted.

b. Fitting from outside the United States of America shall be produced in a facility with a minimum of 5 years' documented experience manufacturing, coating, testing, and delivery of size and type specified to projects in the United States of America.

5. Manufacturers:

a. American Cast Iron Pipe Company

b. McWane Ductile

c. U.S. Pipe.

B. Pipe:

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1. General:

    a. Pipe shall be new and recently manufactured. Refurbished pipe shall not be provided.

    b. Lined and coated as specified.

2. Meet requirements of AWWA C150/A21.50, AWWA C151/A21.51, and AWWA C111/A21.11.

3. Centrifugally cast, grade 60-42-10 iron.

4. Minimum pressure rating of pipe by diameter unless otherwise noted on the Drawings shall be:

    a. 12-inch and Smaller: 350 psi.

    b. 14-inch to 24-inch: 250 psi.

    c. 30–inch and larger: 250 psi.

5. Ductile iron pipe is required for all water lines 12” and larger.

C. Joints:

1. Push-On Joint: Rated at minimum working pressure equal to pipe material design.

    a. Manufacturers and Products:

        i. American Cast Iron Pipe Company, Fastite

        ii. McWane Ductile, Tyton

        iii. U.S. Pipe, Tyton and NXT

2. Restrained Joint:

    a. Manufactured proprietary joint that mechanically restrains pipe to adjoining pipe.

    b. Manufacturers and Products:

        i. American Cast Iron Pipe: Fastite Pipe with Fast-Grip Gaskets; Flex-Ring; Field Flex-Ring; Lok Ring

        ii. McWane Ductile: Tyton Pipe with Locking Gaskets; TR Flex

        iii. U.S. Pipe: Tyton Pipe with Locking Gaskets; TR Flex; HP Lok

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3. Mechanical Wedge Action Type Joint:

   a. Use only in areas where adjoining to fixed points where laying length is determined in field.

   b. Prior to purchase and installation, type and application of this joint shall be approved by Owner.

   c. Manufacturers and Products: Grip Ring Pipe Restrainers by Romac.

4. Use of set screws for restraint shall not be allowed.

D. Fittings:

1. Fittings shall be new and recently manufactured. Refurbished fittings will not be accepted.

2. Mechanical, Push-On, Flanged, or Restrained Joint: In accordance with the following table:

Minimum Pressure Ratings for AWWA C110/A21.10 and C115/A21.15 Ductile Iron Fittings

Diameter (inches)	Rubber Gasket Joints (Push-on, Mechanical, Restrained) (psi)	Flanged Joints (psi)
3 to 24	350	350
30 to 48	250	250

Minimum Pressure Ratings for AWWA C153/A21.53 Ductile Iron Fittings

Diameter (inches)	Rubber Gasket Joints (Push-on, Mechanical, Restrained) (psi)	Flanged Joints (psi)
3 to 24	350	Not included in C153/A21.53 (refer to the C110/A21.10 Standard)
30 to 48	250	Not included in C153/A21.53 (refer to the C110/A21.10 Standard)
54 to 64	250	250

3. Rubber Gasket Joints Including Mechanical Joints, Push-On Joints, and Flanged Joints: In accordance with AWWA C111/A21.11.

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4. Mechanical Joint Fittings: In accordance with AWWA C110/A21.10 and AWWA C153/A21.53.

5. Use of compact fittings manufactured in accordance with AWWA C153/A21.53 is typical. Only use full body AWWA C110/A21.10 and C115/A21.10 when specifically shown on the Drawings, or with Owner approval.

E. Welded Outlet: Only weld to pipe in manufacturer's shop.

F. Lining:

1. Pipe and fittings for clean water applications shall be cement-lined and asphaltic seal coated as recommended by manufacturer in accordance with AWWA C104/A21.4.

2. For sewer applications, 40-mil nominal lining in one or more coats of Series 431 Perma-Shield PL by Tnemec, or Owner approved equal is required.

G. Coating: Asphaltic type, 1 mil thick, in accordance with AWWA C151/A21.51, AWWA C115/A21.15, AWWA C110/A21.10, and AWWA C153/A21.53.

1. For any Ductile Iron Pipe that is covered by insulation and foil jacket, the following coating shall be applied:

2. **Surface Preparation:** All external surfaces of new ductile iron pipe and fittings shall be delivered to the application facility without asphalt or any other protective lining on the exterior surface. For all applications, all oils, small deposits of asphalt, paint, grease, and soluble deposits should be removed and uniformly abrasive blasted using angular abrasive in accordance with NAPF 500-03-04 and NAPF 500-03-05. When viewed without magnification, the exterior surfaces shall be free of all visible dirt, dust, loose annealing oxide, rust, mold coating and other foreign matter. Any area where rust reappears before application shall be reblasted. The surface shall contain a minimum angular anchor profile of 1.5 mils (38.1 microns) (Reference NACE SP0287 or ASTM D 4417, Method C).

3. **Coating System:**
First Coat: Tnemec Series N140 Pota-Pox Plus N69 Hi-Build Epoxoline II applied at 6.0 to 8.0 dry mils. May be shop applied.

Second Coat: Tnemec Series N69 Hi-Build Epoxoline II applied at 6.0 to 8.0 dry mils
Total minimum dry film thickness shall be **12.0** mils.

H. Polyethylene Encasement:

1. Virgin polyethylene raw material conforming to requirements of ASTM D4976.

2. Elongation: 800 percent, minimum, in machine and transverse direction (ASTM D882).

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3. Tensile Strength: 3,600 psi, minimum.

4. Dielectric Strength: 800V per mil-thickness, minimum.

5. Propagation Tear Resistance: 2,550-gram force (gf), minimum, in machine and transverse direction (ASTM D1922).

6. Tube Form: Conform to AWWA C105/A21.5.

7. Film: 0.008 inch (8 mil) combined thickness, minimum.

8. Number of Film Layers: Three.

9. Inside surface of polyethylene wrap in contact with pipe exterior shall be infused with antimicrobial biocide.

I. Bolting:

1. Flanged Connection Bolts: Carbon steel, ASTM A307, Grade A hex bolts and ASTM A563, Grade A hex head nuts.

J. Gaskets:

1. Flat Faced Flange Gaskets:

a. Pipe Smaller Than 54 Inches: Rated for working pressure 150 psi to 250 psi, 1/8 inch thick, red rubber (SBR), hardness 80 (Shore A), rated to 200 degrees F, conforming to ASME B16.21, AWWA C207, and ASTM D1330, Grade 1 and Grade 2.

b. Pipe 54 Inches and Larger: Rated for working pressure greater than 250 psi; shall be Toruseal gaskets as manufactured by American Ductile Iron Pipe or Flange-Tyte gaskets as manufactured by U.S. Pipe.

K. Manufacturers: Sigma or approved equal.

2.02 SOURCE QUALITY CONTROL

A. Factory Tests:

1. General:

a. Tests shall be performed on pipe with metal thickness equal to that specified.

b. Only pipe that passes leak test shall be shipped.

2. Hydrostatic Proof Test:

a. All Pipe: Perform at 500 psi for a minimum duration of 10 seconds.

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b. Pipe 30 Inches and Larger: Additionally test to 75 percent of minimum yield strength during test duration which shall not be less than 15 seconds.

c. Record each test cycle on a strip chart.

d. Each test cycle for 30-inch and larger pipe shall be marked by pipe number.

e. Inspect each pipe during testing for leaks.

f. Pipe which shows evidence of leaks shall be scrapped.

g. Repair welding of leaks is not permitted.

3. Perform a 15-psi air test on welded-on outlet pipe.

4. Pipe ends (spigot end, bell and socket) shall be gauged with suitable gauges at sufficiently frequent intervals to ensure compliance to standard dimensions of AWWA C151/A21.51.

a. In addition, each socket and spigot shall be inspected in a well-lighted area for injurious defects which could affect the joint performance.

b. Remove defects by cutting of pipe ends.
c. Pipe with injurious defects in the bell shall be scrapped.

d. Manufacturer shall have a recommended ovality tolerance for pipes 18 inches inch and larger.

e. Each end of each 18-inch and larger pipe shall be measured and approved by manufacturer's quality assurance inspector to meet tolerances.

5. Submit a certified inspection report from the independent agency of witnessed tests within 10 days of the inspection.

a. Test results shall show restrained joints in the sizes specified have been successfully tested to at least twice the specified pressure rating of the joint without leakage or failure.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect pipe and fittings to ensure no cracked, broken, or otherwise defective materials are being used.

3.02 PREPARATION

A. Trench Grade:

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1. When specified, grade bottom of trench by hand to specified line and grade with proper allowance for pipe thickness and pipe base. Trench bottom shall form a continuous and uniform bearing and support for pipe between bell holes.

2. Before laying each section of pipe, check grade and correct irregularities found. Grade may be disturbed for removal of lifting tackle.

B. Bell (Joint) Holes: At each joint, dig bell holes of ample dimensions in bottom of trench, and at sides where necessary, to permit joint to be made properly and to permit easy visual inspection of entire joint.

3.03 INSTALLATION

A. General:

1. Provide and use proper implements, tools, and facilities for safe and proper prosecution of the Work.

2. Lower pipe, fittings, and appurtenances into trench, piece by piece, by means of a crane, slings, or other suitable tools and equipment in such a manner as to prevent damage to pipe materials, protective coatings and linings.
3. Do not drop or dump pipe materials into trench.

B. Cleaning Pipe and Fittings:

1. Remove lumps, blisters, and excess coal tar coating from bell and spigot ends of each pipe. Wire brush outside of spigot and inside of bell and wipe clean, dry, and free from oil and grease before pipe is laid.

2. Wipe ends of mechanical joint pipe and fittings and of rubber gasket joint pipe and fittings clean of dirt, grease, and foreign matter.

C. Laying Pipe:

1. Direction of Laying: Lay pipe with bell end facing in direction of laying. For lines on an appreciable slope, face bells upgrade at discretion of Owner.

2. Mechanical Joint, Push-On Joint and Restrained Joint Pipe: After first length of pipe is installed in trench, secure pipe in place with approved backfill material tamped under and along sides to prevent movement. Keep ends clear of backfill. After each section is jointed, place backfill as specified to prevent movement.

3. Take precautions necessary to prevent floating of pipe prior to completion of backfill operation.

4. When using movable trench shield, take necessary precautions to prevent pipe joints from pulling apart when moving shield ahead.

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5. Do not allow foreign material to enter pipe while it is being placed in trench.

6. Close and block open end of last laid section of pipe to prevent entry of foreign material or creep of gasketed joints when laying operations are not in progress, at close of day's work, or whenever workers are absent from job.

D. Joining Push-On Joint Pipe and Mechanical Joint Fittings:

1. Join pipe with push-on joints and mechanical joint fittings in accordance with manufacturer's recommendations.

2. Provide special tools and devices, such as, special jacks, chokers, and similar items required for installation.
3. Lubricate pipe gaskets using lubricant furnished by pipe manufacturer. No substitutes will be permitted.

4. Clean ends of fittings of dirt, mud, and foreign matter by washing with water and scrubbing with a wire brush, after which, slip gland and gasket on plain end of pipe. If necessary, lubricate end of pipe to facilitate sliding gasket in place, then guide fitting onto spigot of pipe previously laid.

E. Cutting Pipe:

1. General: Cut pipe for inserting valves, fittings, or closure pieces in a neat and workmanlike manner without damaging pipe or lining and so as to leave a smooth end, at right angles to axis of pipe.

2. Pipe: Cut pipe with milling type cutter or saw. Do not flame cut.

3. Dressing Cut Ends: Dress cut end of mechanical joint pipe to remove sharp edges or projections, which may damage rubber gasket. Dress cut ends of push-on joint pipe by beveling, as recommended by manufacturer.

F. Field Welding:

1. Use of field welded outlets will not be allowed. Welding for outlets shall be performed only in pipe manufacturer's shop.

2. Field installed outlets may be installed with saddle approved by Owner. Opening in pipe shall be machined cut and not with cutting torch.

3. Field welding of bars for restrained joint systems will not be allowed. Welding shall be performed in pipe manufacturer's shop.

G. Line and Grade:

1. Minimum Pipe Cover: 3 feet, unless otherwise indicated.

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2. No high points will be allowed between air valves.

3. Maintain pipe grade between invert elevations to provide minimum clearance at air valve locations of 4 feet from existing ground surface to top of pipe.

4. Install air valves as shown and field verify intervening low points. When field conditions warrant, exceptions may be made upon approval of Owner.

5. Deviations exceeding 6 inches from specified line or 1 inch from specified grade will not be allowed without express approval of Owner.

6. Pipeline sections that are not installed to elevations shown or installed as approved by Owner shall be reinstalled to proper elevation.

H. Thrust Restraint:

1. At a minimum, provide joint restraint at every pipe fitting. Additional restraint shall be provided where indicated on the Drawings, based on restraint length calculations.

2. Primary method of joint restraint shall be thrust blocking. Restrained joint pipe shall be used where detailed on Drawings and as approved by Owner as additional restraint.

I. Polyethylene Encasement:

1. Encase pipe, fittings, and valves where specified on the Drawings in accordance with AWWA C105/A21.5, Method A.

2. Cut polyethylene tube approximately 2 feet longer than pipe length.

3. Slip tube around pipe, centering to provide 1-foot overlap on each adjacent section.

4. Pull encasement to take out slack and wrap snug around pipe.

5. Secure overlap in place and fold at quarter points of pipe length.

6. Wrap and tape encasement snug around fittings and valves.

7. Encasement within sections of pipe installed in steel casings is not required.

3.04 HYDROSTATIC TESTING

A. Reference Section 33 01 13 – Disinfection & Testing of Water Utilities for all hydrostatic testing & disinfection of Ductile Iron Pipe for potable water applications.

B. Reference Section 33 01 31 – Testing of Sewer Utilities for all testing of Ductile Iron Pipe for sanitary sewer applications.

C. Allowable Leakage: Allowable leakage is zero.

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END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 33 10 00.01

WATER SERVICE CONNECTIONS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section.

1. American Association of State Highway and Transportation Officials (AASHTO).

2. American Water Works Association (AWWA): C800, Underground Service Line Valves and Fittings.

3. ASTM International (ASTM):

a. B88, Standard Specification for Seamless Copper Water Tube.

b. D3350, Standard Specification for Polyethylene Plastics Pipe and Fittings Material.

4. NSF International (NSF):

a. NSF/ANSI 61, Drinking Water System Components – Health Effects.

b. NSF/ANSI 372, Drinking Water System Components – Lead Content.

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:

a. Product Data:

i. Pipe material data.

ii. Materials of construction for corporation stops, curb stops, and meter stops.

iii. Fitting types.

b. Details with dimensions and fabricating tolerances for component ends.

c. Drawing showing how components of water service connection will fit together.

d. Operating pressure and allowable test pressure for components making up the service connection.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

e. Allowable test pressure for connected components.

f. Proposed thrust restraint data for restraining joints including drawing details, materials, assembly ratings, and pipe attachment methods.

g. Factory test results of components.

B. Informational Submittals:

1. Manufacturer's Certificate of Compliance, in accordance with AWWA C800.

2. Manufacturer's Certificate of Compliance, in accordance with NSF/ANSI 61.

3. Statement of Qualifications:

a. Piping manufacturer.

b. Fitting and specials manufacturer.

4. Procedure for field testing water mains and service connections, including disinfection.

PART 2 PRODUCTS

2.01 GENERAL

A. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the AHJ that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.

1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 SERVICE CONNECTION

A. Furnish components same size as nominal designation of service pipe. For example, 1-inch connection consists of:

1. 1-inch corporation stop.

2. 1-inch curb stop.

3. 1-inch meter coupling.

B. Refer to Standard Details in Drawings and coordinate product names and requirements with these Specifications.

2.03 SERVICE SADDLES

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

A. Provide in accordance with the following:

1. Choose model number for each manufacturer based on pipe being saddled and corrosivity of surrounding soils.

2. Style: Two-piece hinged.

3. Material: Bronze.

4. Manufacturers and Products:

a. Mueller Co: Model No. S-13000;

b. Approved equal.

2.04 CORPORATION STOPS

A. Characteristics:

1. Accommodate piping being connected.

2. Meet criteria promulgated by Owner.

3. Resistant to soil corrosivity.

4. Inlet: AWWA taper (Mueller "CC") thread.

5. Outlet: Mueller 110 Conductive Compression Connection for CTS O.D. tubing.

B. Manufacturers and Products:

1. Mueller; Model B-25008N**.**

2.05 MISCELLANEOUS FITTINGS

A. Provide as required to be compatible with mainline and service pipe and fittings.

B. Manufacturers and Products:

1. Straight coupling with multi-purpose thread by Mueller 110 Conductive Compression Connection for CTS O.D. tubing:

a. Mueller; Model H-14227N or equal.

2. Straight coupling with multi-purpose thread by copper flare or F.I.P.

a. Mueller; Model H-14222N, or equal

2.06 METER BOXES, VAULTS, AND COVERS

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

A. Meter Boxes – 3/4" to 1 1/2" meters

1. Water meters shall be located in a landscaped area near the property line unless otherwise approved by the Owner.

2. The depth of the meter yoke inlet for 5/8"-1" meters shall be 18" to 24".

3. The depth of the meter yoke inlet for 1-1/2"-6" meters shall be 24" to 36".

4. Meter box to be of sufficient size to facilitate easy installation and removal of the water meter.

5. Where the service assemblies include a pressure reducing valve, sufficiently size box for installation of the pressure reducing valve in the meter box.

6. Characteristics:

   a. Heavy wall plastic, rectangular body.

   b. Ductile iron lid, removable for meter reading.

7. Manufacturers and Products:

   a. Meter Box:

      i. Mid-States Plastics, Inc; BCF Series or equal

   b. Cover:

      i. Mid-States Plastics, Inc.; MSP Ductile Iron Covers for BCF Series Meter Boxes or equal.

B. Vaults – 2" and larger

1. Characteristics:

   a. Precast reinforced concrete vault with aluminum cover having the following features:

      i. 1/4" aluminum trend plate cover;

      ii. T 316 stainless steel hardware;

      iii. Hold open arm;

      iv. Recessed lift handle;

      v. Padlock bar.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

2. Manufacturers and Products:

   a. Vault: Consolidated Pipe and Supply, precast meter vaults or equal

   b. Cover: Halliday, S1, S2 and H2W Series (for traffic areas); with padlock bar and removable continuous concrete anchor or equal

Meter	Vault Dimensions (LxWxH)	Opening Dimensions (LxW)
2”	57” x 27” x 32”	45” x 21”
3”	78” x 49” x 42”	45” x 27”
4”	78” x 49” x 42”	70.5” x 34.5”
6”+	108” x 84” x 86”	72” x 48”

2.07 WATER SERVICE ASSEMBLIES

A. Water Meters.

1. Meters shall be located in non-traffic areas.

2. Water services shall be located near the center of the lot in non-traffic areas so that they are not in driveways. Water meters shall be located in a landscaped area near the property line unless otherwise approved by the Owner.

3. The name of the manufacturer imprinted in the lid of the register box and the meter serial number imprinted thereon.

B. 5/8”, 5/8” x 3/4”, and 1” meters:

1. For 5/8”, 5/8” x 3/4”: Disc Meter (or owner approved equal)

2. For 1”: Ultrasonic Meter (or owner approved equal)

3. Conforming to AWWA C700.

4. 5/8” x ¾” unless otherwise specified or shown on the Drawings.

5. Frost proof with a cast bronze casing and a hinged cover.

6. Direct reading register, in gallons, unless otherwise specified.

7. Disc operated with magnetic drive.

8. A suitable non-corrosive strainer located over the inlet to the measuring chamber.

9. Certified to NSF/ANSI Standards 61 and 372.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

10. Lead-free bronze alloy compliant with lead-free provisions of the Safe Water Drinking Act.

11. AMR meter reading features included, in addition to direct reading register.

C. 2" Meters (as determined by Owner):

1. Ultrasonic Meter

a. Conforming to ANSI/AWWA C701.

b. Measuring Element: Rotor.

c. Must have capability to integrate with Owner's AMR/AMI system.

d. 2" meter connections with two bolt flanged ends.

e. Bronze maincase with bronze bottom cover, thermoplastic rotor assembly, stainless steel strainer, and stainless steel casing bolts.

2. Master Meter Octave: Ultrasonic Meter

a. Must have no moving parts with minimal flow intrusion.

b. Minimum 1/16 GPM flow sensitivity.

c. No strainer required.

d. Double beam ultrasonic measurement sensors.

e. Must have capability to integrate with Owner's AMR/AMI system.

f. Integrated LCD display.

g. Open collector pulse output, encoder or externally powered loop 4-20 mA.

h. Lithium battery with guaranteed 10 year life expectancy.

i. Ruggedized NEMA 6P/IP-68+ construction able to be fully submersed.

j. Certified to NSF/ANSI Standards 372.

D. Greater than 2" Meters:

1. Ultrasonic Meter

a. Must have no moving parts with minimal flow intrusion.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

b. Minimum 1/16 GPM flow sensitivity.

c. No strainer required.
d. Double beam ultrasonic measurement sensors.

e. Must have capability to integrate with Owner's AMR/AMI system.
f. Integrated LCD display.

g. Open collector pulse output, encoder or externally powered loop 4-20 mA.

h. Lithium battery with guaranteed 10 year life expectancy.

i. Ruggedized NEMA 6P/IP-68+ construction able to be fully submersed.

j. Certified to NSF/ANSI Standards 372.

2.08 METER YOKES

A. Characteristics:

1. Size to match associated service.

2. Connections to match adjacent piping.

3. Materials to resist soil corrosivity (if any).

4. Meet criteria promulgated by governing agency.

5. Rated for working pressure of adjacent piping.

6. Equipped with angle dual check valve.

7. Equipped with lock wing angle ball valve.

8. Includes by-pass with lock wing ball valve and check valve for 2" yokes.

B. Manufacturers and Products:

1. Mueller (or equal); Model:

a. 1 inch and 3/4-inch horizontal inlet and outlet: B2404N-2.

b. 1 inch and 3/4-inch straight line inlet and outlet: B-2418N-2.

b. 2" flanged meters with horizontal inlet and outlet: B-2423-2N.

2.09 COPPER TUBING

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

A. Characteristics:

1. Size: Matching that of service connection and meter.

a. Single-set residential water lines shall be 1-inch copper to the meter yoke.

b. Double-set residential water lines shall be 1-inch copper to the service tee, then reduced to ¾-inch copper to the meter yoke.

2. Type K, soft, seamless.

3. Conform to ASTM B88.

4. Compression fittings.

B. Use copper service lines only as noted on the plans.

2.10 CROSS-LINKED POLYETHYLENE (PEX) PLASTIC PIPE

A. Characteristics:

1. Manufactured using high pressure peroxide method for cross-linked polyethylene (Engel method, PEX).

2. Conforming to ASTM F876, F877, CSAB 137.5, and PPI TR-3.

3. Certified to NSF Standards 14/61.

4. Working Pressure equal to or greater than rated working pressure of the service connection.

5. Color: Blue.

6. Compatible with compression sleeve fittings certified to ASTM F2080 and CSA B 137.5.

7. Meets the requirements of NSF P171 and ASTM F 2023 for chlorine resistance.

B. Manufacturer and Product: Rehau, Incorporated; RAUPEX UV Shield Pipe.

C. PEX shall be installed on all water service lines 2” and smaller.

PART 3 EXECUTION

3.01 GENERAL

A. Install service connections, excluding meters, during or after construction of the main.

B. Water Meters: Installed by others.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

C. Depth of cover over the pipe shall be minimum 18 inches.

D. Install service connection in accordance with Standard Details in Drawings.

3.02 TRENCH EXCAVATION AND BACKFILL

A. In accordance with Section 31 23 00, Excavation and Fill

3.03 CONNECTION TO MAIN

A. Clean exterior of main of dirt and other foreign matter that may impair the quality of the completed connection.

B. Place service clamp (saddle) at desired location.

C. Clamp by tightening alternate nuts progressively.

D. Do not place service clamp within 1 foot of pipe joint, or another clamp.

E. Make taps with adapters for the size main being tapped.

3.04 CROSSING OF HARD SURFACE ROADS

A. Bore or jack under road crossings.

B. Do not open-cut asphalt or concrete roads.

3.05 COPPER TUBING

A. Cut square ends, ream clean, and make up tightly.

B. Prevent the tube from kinking or buckling on short radius bends. If tube should kink or buckle, cut out kinked or buckled sections and splice with brass fitting.

3.06 CROSS-LINKED POLYETHYLENE (PEX) PLASTIC PIPE

A. Install in conformance with manufacturer's recommendations.

3.07 METER BOXES

A. Installation:

1. Construct enclosures plumb, and flush with existing ground surface unless shown otherwise.

2. Use standard extension sections to adjust to grade..

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

3. Place lightly compacted earth backfill inside meter box to depth shown.

4. Backfill around meter vaults as specified in Section 31 23 00, Excavation and Fill.

5. Corporation Stops: OPEN position.

6. Angle Stops: CLOSED position.

3.08 TESTING

A. Test service connection and piping with connecting main at the main's test pressure.

B. Inspect service connections for leakage under normal system pressure. Joints shall be watertight before acceptance.

C. Test Duration: At least 15 minutes.

D. Inspect for leaks and repair before backfilling.

3.09 DISINFECTION OF SERVICE CONNECTIONS

A. Make connection to the main, which has been pressure tested, and disinfected as specified in Section 33 01 13, Disinfection & Testing of Water Utilities.

B. Extra chlorine will be put into the system by Owner during service connection transfers to provide adequate disinfection capacity when above procedures are executed.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 33 14 13

PUBLIC WATER UTILITY DISTRIBUTION PIPING

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Water Works Association (AWWA):

a. C105, Polyethylene Encasement for Ductile Iron Pipe Systems.

b. C110, Ductile-Iron and Gray-Iron Fittings.

c. C111, Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.

d. C153, Ductile-Iron Compact Fittings.

e. C205, Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 in. (100 mm) and Larger - Shop Applied.

f. C208, Dimensions for Fabricated Steel Water Pipe Fittings.

g. C605, Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.

2. ASTM International (ASTM):

a. A615/A615M, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

b. C150/C150M, Standard Specification for Portland Cement.

c. C151/C151M, Standard Test Method for Autoclave Expansion of Hydraulic Cement.

d. C361, Standard Specification for Reinforced Concrete Low-Head Pressure Pipe.

e. C596, Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement.

f. D16, Standard Terminology for Paint, Related Coatings, Materials, and Applications.

g. D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

h. D2241, Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

i. D2321, Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.

j. D2412, Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.

k. E329, Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

l. F477, Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

3. NSF International (NSF).

a. NSF/ANSI 61, Drinking Water System Components – Health Effects.

b. NSF/ANSI 372, Drinking Water System Components – Lead Content.

1.02 DEFINITIONS

A. SDR: Standard Dimension Ratio.

1.03 SUBMITTALS

A. Action Submittals:

1. Drawings showing pipe diameter, dimensions, pipe class, pipe joints, fitting details, fitting pressure rating, and coating and lining data.

B. Informational Submittals:

1. Hydrostatic Testing Plan: Submit at least 15 days prior to testing and at minimum, include the following:

a. Testing dates.
b. Piping systems and section(s) to be tested.
c. Method of isolation.
d. Method of conveying water from source to system being tested.
e. Leakage test results.

2. Certification of Calibration: Approved testing laboratory certificate if pressure gauge for hydrostatic test has been previously used. If pressure gauge is new, no certificate is required.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

3. Test report documentation.

4. Manufacturer's written recommendations for pipe handling and installation.

5. For high density polyethylene (HDPE) pipe, provide Informational Submittals consistent with requirements of Section 33 05 34, High-Density Polyethylene (HDPE) Pressure Pipe and Fittings.

PART 2 PRODUCTS

2.01 MATERIALS

A. Polyvinyl Chloride (PVC) Pipe shall only be allowed on water mains 10-inches in diameter and smaller. Pipe, joints, fittings, and appurtenances shall be provided in accordance with Section 33 05 33, PVC Pressure Pipe and Fittings.

B. High Density Polyethylene (HDPE) Pipe shall only be allowed in horizontal directional drilling and bridge crossings on a case-by-case basis with the Owner. Pipe, joints, fittings, and appurtenances shall be provided in accordance with Section 40 05 33, High-Density Polyethylene (HDPE) Pressure Pipe and Fittings.

C. Ductile Iron Pipe (DIP) shall be required on water mains 12-inches in diameter and larger. Pipe, joints, linings, coatings, fittings, and appurtenances shall be provided in accordance with Section 33 05 19 Ductile Iron Pipe and Fittings.

D. Service connection pipe and fitting materials shall be as provided in Section 01 18 13, Water Service Connections.

2.02 SOURCE QUALITY CONTROL

A. As required for PVC, HDPE, or DIP based on respective Division 33 Section's requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Notify Owner immediately of manufacturing imperfections or damage caused by improper handling.

B. Verify size, pipe condition, and pipe class prior to installation of pipe.

3.02 PREPARATION

A. Pipe Distribution: Do not distribute more than 1 week's supply of materials in advance of laying, unless otherwise approved by Owner.

B. Inspect pipe and fittings prior to lowering into trench to ensure no cracked, broken, or otherwise defective materials are being used.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

C. Remove foreign matter and dirt from inside of pipe and fittings and keep clean during and after laying. Wash ends of section clean with wet brush prior to joining sections of pipe.

D. Specific requirements for PVC, HDPE, or DIP based on respective Division 33 requirements for Preparation.

3.03 INSTALLATION

A. PVC Pipe

1. AWWA Standard C605, AWWA Manual 23, and related AWWA Standards.

2. Installation, Testing, and Reporting as required by Section 33 05 33, PVC Pressure Pipe and Fittings and Section 33 01 10.58, Disinfection of Water Utility Distribution.

B. HDPE Pipe

1. AWWA Standard C901, AWWA Manual 55, and related AWWA Standards.

2. Installation, Testing, and Reporting as required by Section 40 05 33, High-Density Polyethylene (HDPE) Pressure Pipe and Fittings and Section 33 01 10.58, Disinfection of Water Utility Distribution.

C. DI Pipe

1. AWWA Standard C600, AWWA Manual M-41, and related AWWA Standards.

2. Installation, Testing, and Reporting as required by Section 33 05 19, Ductile Iron Pipe and Fittings and Section 33 01 10.58, Disinfection of Water Utility Distribution.

D. Service Connection

1. AWWA Standard C800 and related AWWA Standards.

2. Installation, Testing, and Reporting as required by Section 01 18 13, Water Service Connections.

E. Disinfection of Mains and Services

1. AWWA Standard C651 and related AWWA Standards.

2. Disinfection, Disposal, Testing, and Reporting as required by Section 33 01 10.58, Disinfecting of Water Utility Distribution.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 33 14 19

WATER UTILITY DISTRIBUTION VALVES

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section.

1. American Water Works Association (AWWA):

a. C500, Metal-Seated Gate Valves for Water Supply Service.

b. C509, Resilient-Seated Gate Valves for Water Supply Service.

c. C515, Reduced-Wall Resilient-Seated Gate Valves for Water Supply Service.

d. C550, Protective Interior Coatings for Valves and Hydrants.

2. NSF International (NSF):

a. NSF/ANSI 61, Drinking Water System Components – Health Effects.

b. NSF/ANSI 372, Drinking Water System Components – Lead Content.

1.02 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:

a. Product data sheets for each make and model. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.

b. Product data sheets for coating and lining products.

c. Certification for compliance to NSF/ANSI 61 for valves used for drinking water service.

B. Informational Submittals:

1. Method for hydrostatic testing.

2. Tests and inspection results.

3. Operation and Maintenance Data.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

PART 2 PRODUCTS

2.01 GENERAL

A. Valve same size as adjoining pipe, unless otherwise indicated.

B. Valve ends to suit adjacent piping.

C. Valves shall have no leakage (drip tight) in either direction at valve rated design pressure, unless otherwise allowed for in this section or in referenced valve standard.

D. Valve to open by turning counterclockwise, unless otherwise specified.

E. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the AHJ that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.

1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 GATE VALVES

A. General:

1. AWWA gate valves to be in compliance with referenced AWWA standard.

2. Provide 2-inch operating nut for buried valves and handwheel for exposed valves.

3. Provide totally enclosed spur or bevel gear operator with indicator for AWWA gate valves 14 inches and larger.

4. Mark AWWA gate valves with manufacturer's name or mark, year of valve casting, valve size, and working water pressure.

5. Repaired AWWA gate valves will not be allowed.

6. Open left.

B. Two inch and Three Inch Gate Valves

1. Iron body, resilient seat, bronze stem and stem nut, threaded ends, non-rising stem, full port accordance with AWWA C509.

2. Minimum design work water pressure: 250 psig.

3. Manufacturers and Models:

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

a. Mueller; Model A-2360-8.

b. Approved equal.

C. Resilient-Seated Ductile Iron Gate Valve 4 Inches to 14 Inches:

1. Iron body, resilient seat, bronze stem and stem nut, flanged ends for exposed valves, mechanical joint ends on buried valves, and tapping valves to be flanged end by mechanical joint ends, unless otherwise shown on Drawings, non-rising stem, full port in accordance with AWWA C509.

2. Minimum Design Working Water Pressure: 250 psig.

3. Manufacturers and Models:

a. Mueller; Model A-2360-16 for tapping valves (MJ x FL);

b. Mueller; Model A-2360-20 for buried valves (MJ x MJ);

c. Mueller; Model A-2360-6 for exposed valves (FL x FL).

d. Approved Equal.

D. Resilient-Seated Gate Valve 14 Inches and larger:

1. Ductile-iron body, resilient seat, bronze stem and stem nut, flanged ends for exposed valves and mechanical joint ends on buried valves, unless otherwise shown on Drawings, non-rising stem, full port in accordance with AWWA C515.

2. Minimum Design Working Water Pressure: 250 psig.

3. Manufacturers and Products:

a. Mueller; Series Series 2361

b. Approved Equal.

E. Factory Finishing of Gate Valve:

1. Lining and Coating:

a. Interior Lining:

i. Manufacturer's standard.

ii. In accordance with AWWA C550.

iii. Formulated from materials deemed acceptable to NSF/ANSI 61.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

c. Exterior Coating:

i. If valve and operator will not be subsequently field-coated, factory-applied coating shall be either two-part liquid material or heat-activated (fusion) material.

ii. In accordance with AWWA C550.

iii. Dry Film Thickness: Minimum 10 mils.

2.03 BALL VALVE

A. Ball Valve 2 Inches and Smaller:

1. Two-piece, full port, NPT threaded ends, silicone bronze alloy body and end piece, silicone bronze allow ball, PTFE seats and packing, blowoutproof stem, adjustable packing gland, zinc-coated steel hand lever operator with vinyl grip, rated 600 pound non-shock CWP, complies with MSS SP 110:

a. Manufacturers and Products for Threaded or Soldered Ends:

i. Nibco; T/S-585-80-LF.

ii. Approved equal.

2.04 VALVE BOXES

A. Cast iron, 2-piece or 3-piece, screw type with shaft diameter of not less than 5" (John Bouchard 562-S or approved equal).

B. Comply with AWWA M44.

C. Heavy roadway type equipped with a cover containing the word "WATER" in raised letters on top.

D. Base of such size as to permit its installation without allowing it to come in contact with either the valve or the pipe.

E. In paved areas, the top of the box casting shall be made level with the adjacent pavement. In unpaved areas, the box shall be level with the adjacent ground and encircled with a concrete collar 4" thick and 2' in diameter. Pre-cast concrete valve collars may also be used around valve boxes.

2.05 TAPPING VALVES AND SLEEVES

A. Tapping valves shall meet all the requirements of 2.02 above and shall be Mueller A2360-16.

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

B. Tapping sleeves shall be Mueller H-304 SS (or Equal) unless specified in drawings.

C. Tapping sleeves shall be two-piece fabricated stainless steel with adjusting/tightening bolts on each side. The fabricated sleeve must contain all stainless materials and be rated for the anticipated working pressure. Sleeves must have a stainless steel outlet flange. Sleeves with ductile iron or carbon steel flanges will not be accepted. Care must be used to assure that all bolts are equally tightened. The tapping valve is to be solidly supported with brick or block and carefully bedded to prevent shifting due to setting back fill.

D. After valve is bolted to sleeve and with valve closed, remove test plug from the tap on sleeve and air test sleeve to 100 psi prior to making tap.

PART 3 EXECUTION

3.01 INSTALLATION

A. Mount buried valves such that operating nut is accessible and operable from above.

B. Install in accordance with manufacturer's written instructions.

3.02 DISINFECTION

A. Valves used for potable water service shall be disinfected in accordance with Section 33 01 13, Disinfection & Testing of Water Utilities.

3.03 FUNCTIONAL AND HYDROSTATIC TESTING

A. Functional Test:

1. Test that valves open and close smoothly under operating pressure conditions.

2. Test that two-way valves open and close smoothly under operating pressure conditions from both directions.

3. Count and record number of turns to open and close valve; account for discrepancies with manufacturer's data.

B. Hydrostatic Testing:

1. Valves shall be hydrostatically tested in accordance with Section 33 01 13, Disinfection & Testing of Water Utilities.

END OF SECTION

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

SECTION 33 14 23.16

INSULATED ALUMINUM ENCLOSURES FOR WATER UTILITY PIPING AND VALVES

PART 1 GENERAL

1.01 DESCRIPTION

A. Aluminum Roll Jacketing with Polyfilm Moisture Barrier (PFMB) to be used as protective cladding over insulation on piping to provide a durable, weather-resistant, and corrosion-protective outer covering that shields insulation and underlying surfaces from moisture, UV exposure, and mechanical damage.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. Shall be Ideal Products Aluminum Roll Jacketing with Polyfilm Moisture Barrier (PFMB) or approve equal.

2.02 MATERIALS SPECIFICATIONS

A. Shall meet ASTM B-209 standards.

B. Material shall meet the following specifications:

1. Alloys:
   a. 3105

2. Tempers:
   a. H14

3. Thicknesses:
   a. 0.016"

4. Moisture Barriers:
   a. Factory applied co-extruded mil polyethylene film.

5. Melting Point
   a. 660 °c (1220 °f)

6. ASTM E84 Flame spread / Smoke Development:
   a. 25/50 or less

7. ASTM C1371 Surface emittance:
   a. Bare oxidized in-service: 0.1

TO BID, CONTRACTOR MUST OBTAIN DOCUMENTS FROM ISSUING OFFICE

2.03 PHYSICAL PROPERTIES

A. Finishes shall include:

1. Smooth Plain Mill

B. Colored exterior finishes shall be added to Aluminum Roll Jacketing for desired preferences or to reach specific emissivity levels. Colors shall be:

1. Grey

2.04 APPLICATION THICKNESSES

A. ALUMINUM PIPE JACKETING *min. thickness**

OUTER INSULATION DIAMETER (in)	MIN. ALLOWABLE THICKNESS (in)	
	RIGID Insulation	NON-RIGID Insulation
≤ 8	0.016	0.016
over 8 – 11	0.016	0.020
over 11 – 24	0.016	0.024
over 24 – 36	0.020	0.032
over 36	0.024	0.040

PART 3 EXECUTION

3.01 INSTALLATION

A. Contractor to install aluminum jacket after insulation, per manufacturers recommendations.

END OF SECTION

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SECTION 40 00 00

FLEXIBLE EXPANSION JOINT

PART 1 GENERAL

1.01 DESCRIPTION

A. Furnish and install flexible expansion joints designed to accommodate axial expansion and contraction, angular deflection, and lateral offset in piping systems subject to thermal movement, settlement, seismic activity, or differential ground motion. The joint shall be EBAA Iron, Inc FLEX-TEND Flexible Expansion Joint or approved equal.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

A. EBAA Iron, Inc FLEX-TEND Flexible Expansion Joint or approved equal.

1. Must meet applicable AWWA Standards.

2.02 MATERIALS

A. Body and Pressure-Containing Components

1. Ductile Iron conforming to ASTM A536 and ANSI/AWWA C153/A21.53, minimum 60-42-10.

B. Seals and Gaskets

1. EPDM elastomer conforming to ANSI/AWWA C111/A21.11 and NSF/ANSI 61.

C. Coatings

1. All internal ("wetted") surfaces shall be lined with a minimum 15 mils fusion-bonded epoxy conforming to ANSI/AWWA C213 and NSF/ANSI 61.

2. Exterior surfaces shall be coated with a minimum 6 mils fusion-bonded epoxy conforming to ANSI/AWWA C116/A21.16.

D. Polyethylene Encasement

1. Provide polyethylene wrap meeting ANSI/AWWA C105/A21.5 for direct burial installations.

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2.03 CONFIGURATION AND CONNECTIONS

A. Expansion joints shall be provided in single-ball or double-ball configurations as shown on the Drawings and as required for the intended application.

B. End Connections

1. Flanged ends shall conform to ANSI/AWWA C110/A21.10 (Class 150) and include integral O-ring groove and O-ring gasket to ensure a watertight seal.

2. Mechanical joint ends shall conform to ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, as applicable.

3. End connection types shall match adjoining piping materials and systems.

2.04 PERFORMANCE REQUIREMENTS

A. Pressure Rating

1. Rated for 350 psi working water pressure for sizes 3-inch through 24-inch.

2. Rated for 250 psi working water pressure for 2-inch and 30-inch and larger sizes.

B. Movement Capability

1. Minimum angular deflection per ball joint:

a. 20° for sizes 2-inch through 12-inch

b. 15° for sizes 14-inch through 36-inch

c. 12° for sizes 42-inch through 48-inch

2. Integral axial expansion and contraction capability with factory preset 50% expansion / 50% contraction, unless otherwise indicated.

3. Additional expansion sleeves shall be available to increase axial movement capacity.

C. Testing

1. Each expansion joint shall be hydrostatically pressure tested prior to shipment to its rated working pressure.
2. A minimum 2:1 safety factor shall apply relative to published pressure ratings.

D. Application

1. Suitable for water and wastewater pipelines installed above ground or buried.

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2. Suitable for direct burial without vaults, provided movement is not impeded.

PART 3 INSTALLATION

3.01 GENERAL

A. Install flexible expansion joints in accordance with the manufacturer's written instructions and approved submittals.

B. Handle joints carefully to prevent damage to epoxy coatings, sealing surfaces, and end connections.

3.02 PIPELINE RESTRAINT AND SUPPORT

A. All piping adjacent to the flexible expansion joint shall be properly restrained to transfer axial, angular, and lateral loads to the joint.

B. Mechanical joint restraints or other approved restraint systems shall be provided as required by the manufacturer.

C. Thrust forces generated by internal pressure shall be accommodated by pipeline restraint, thrust blocks, or structural anchorage as applicable.

3.03 INSTALLATION REQUIREMENTS

A. Install expansion joints at locations and orientations shown on the Drawings.

B. Ensure sufficient clearance is provided so that expansion, contraction, and deflection are not restricted.

C. For buried installations, install polyethylene encasement and backfill in a manner that does not impede movement.

3.04 INSPECTION

A. Inspect joints after installation and prior to backfilling to confirm proper alignment and restraint.

END OF SECTION

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SECTION 40 05 07

PIPE HANGERS AND SUPPORTS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work in this section includes furnishing and installing adjustable steel yoke pipe rolls for suspending piping where longitudinal movement may occur due to thermal expansion or contraction, complete with all hardware, accessories, and finishes as indicated and specified.

B. All pipe supports shall be complete with hardware, accessories, and finishes as specified herein and as shown on the Drawings.

1.02 SUBMITTALS

A. Product Data: Materials, finishes, load ratings, and available size range for the specified pipe roll.

B. Certifications: Evidence of compliance with reference standards listed in 2.02.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. ASC Engineered Solutions ANVIL Adjustable Steel Yoke Pipe Roll or approved equal.

2.02 APPROVALS

A. Complies with Federal Specification:

1. A-A-1192A (Type 43)
2. WW-H-171-E (Type 44)
3. ANSI/MSS SP-69
4. MSS SP-58 (Type 43).

2.03 MATERIALS AND FINISHES

A. Roll: Cast-iron.
B. Yoke, roll rod, and hex nuts: Carbon steel.
C. Finishes:

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1. Plain.
2. Hot-dip galvanized yoke with zinc-plated parts.
3. Resilient coated.

2.04 PERFORMANCE AND DESIGN REQUIREMENTS

A. Service: Suspension from a single rod; accommodates longitudinal pipe movement due to expansion/contraction.

B. Temperature Limits:

1. Standard roller: 400 °F maximum.
2. Resilient-coated roller: 300 °F maximum.

C. Features:

1. Optional resilient coating provides a protective, low friction contact surface.
2. Non-conductive roller prevents transfer of electric current between pipe and structure.
3. Corrosion resistance suitable for severe weather exposure, marine atmospheres, and UV.

D. Standards compliance: Meets the standards listed in 1.02.

2.05 SIZE RANGE AND LOAD ENVELOPE

A. Dimensions (in), Loads (lbs), Weight (lbs).

Pipe Size	Max O.D. of Covering	Max Load	Wgt.	Rod Size A	B	C	D	Rod Take Out E	H	DI/CI Pipe Size	Roller Size
2½	3	225	1.7	½	5¾	3¼	1 15/16	2⅞	1 11/16	3	4
3	3⅝	340	2.2		6⅜	3⅞	2¼	3⅛	1⅝	4	5
3½	4⅛	390	2.5		7	4⅜	2 9/16	3½	1 11/16	6	6
4	4 11/16	475	3.2	⅝	7 9/16	4 15/16	2 13/16	3⅝	1⅝	8	8
5	5¾	685	6.3		9⅛	6	3 7/16	4½	1 15/16	10	10
6	6⅞	780	9.3	¾	10 5/16	7⅛	4	5	1⅞	12	14
8	9		14.5		12 11/16	9¼	5⅛	6⅛	2	14	16
10	11	965	18.8	⅞	15 1/16	11¼	6⅜	7¼	2 1/16	16	18
12	13		27.7		17 7/16	13¼	7 7/16	8⅜	2¼	18	20
14	14¼	1,200	39.1	1	18⅞	14½	8⅜	8¾	2	20	24
16	16¼		49.1		20 13/16	16½	9⅜	9 11/16	1 15/16		
18	18¼	1,400	57.8		23¾	18½	10 7/16	11 7/16	2 13/16		
20	20¼	1,600	75.9	1¼	26	20½	11⅝	12¼	2½		
24	24¼	1,800	119.3	1½	32 5/16	24⅝	13 15/16	15¾	4⅜		

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B. When pipe insulation/protection saddles are used, furnish oversized rollers suitable for the insulated outside diameter.

2.06 DIMENSIONS AND WEIGHTS

A. Dimensional requirements and unit weights shall be as shown on the project drawings for each pipe size.

B. Ductile iron and cast-iron pipe roll sizing shall be based on the roller size assignments provided in the project drawings.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with this specification and the project drawings.

B. Verify that support sizes match the pipe (bare or insulated) indicated.

C. Provide hangers/rods as required to achieve the specified rod sizes and clearances.

3.02 ADJUSTMENT

A. After installation, adjust supports so pipe bears uniformly on the roller and moves freely in the longitudinal direction.

END OF SECTION

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SECTION 40 42 13

PROCESS PIPING INSULATION

PART 1 GENERAL

1.01 DESCRIPTION

A. Provide molded fiberglass pipe insulation for hot, cold, concealed, and exposed piping systems operating from 0°F to 1000°F. Insulation shall be factory-formed, one-piece sections designed for application to iron, copper, stainless steel, PVC, or CPVC piping.

PART 2 PRODUCTS

2.01 ACCEPTABLE PRODUCTS

A. Knauf Earthwool 1000° Pipe Insulation with ECOSE® Technology, or approved equal.

2.02 PRODUCT FORMS AND SIZES

A. Produced in 3’ (914 mm) sections.

B. For iron pipe ½” – 24” (15 mm – 610 mm) nominal pipe size.

C. For copper tube 5⁄8” – 61⁄8” (16 mm – 156 mm).

D. All insulation inner and outer diameters comply with ASTM C585.

E. Wall thicknesses from ½” to 6” (13 mm to 152 mm) in single layer for most sizes.

F. Insulation shall be furnished with or without a white, factory-applied jacket, ASJ+ (all-service jacket) is composed of aluminum foil, reinforced with a glass scrim bonded to a kraft paper interleaving with an outer film layer, leaving no paper exposed.

G. Each section shall be supplied with a matching ASJ+ butt strip.

H. The longitudinal lap shall incorporate the SSL+ self-sealing system to provide a durable, long-lasting bond.

2.03 PACKAGING

A. Insulation shall be packaged in four standard carton sizes for ease of ordering, inventory tracking, and storage.

B. Cartons shall include reinforced handles for lifting strength and barcodes for accurate shipment and tracking.

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C. A full range of product sizes shall be stocked by authorized distributors to ensure prompt availability.

2.04 LIMITED WARRANTY

A. Where painting is required, paint shall be water-, oil-, or solvent-based and tested for compatibility and adhesion prior to use.

B. All piping shall have continuous insulation coverage.

C. The longitudinal lap shall be positioned downward to minimize dirt and moisture infiltration.

D. Pipe insulation shall not be exposed to excessive vibration or physical abuse.

E. Faced insulation shall not be subjected to surface temperatures exceeding 150°F (66°C).

2.05 FIBERGLASS AND MOLD

A. Fiberglass insulation shall not support mold growth. Any insulation that has been wet or contaminated shall be inspected and, if showing signs of mold or degradation, shall be discarded.

B. Wet insulation without visible mold shall be dried thoroughly. Damaged or degraded facing shall be replaced.

C. All inspections and maintenance shall be conducted in accordance with manufacturer recommendations.

D. Insulation shall comply with applicable safety data and be free of flame hazards under normal service conditions.

2.06 INDOOR AIR QUALITY

A. Insulation shall meet or exceed the following environmental and health certifications:

1. Asthma & Allergy Friendly®
2. Verified Healthier Air™
3. UL Environment GREENGUARD Certified
4. GREENGUARD Gold Certified
5. Validated to be Formaldehyde-Free
6. Shall not contain polybrominated diphenyl ethers (PBDE) such as:
   a. Penta – BDE
   b. Octa – BDE
   c. Deca – BDE
7. EUCEB Certified
8. IgCC Section 806.6 compliant

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2.07 SPECIFICATION COMPLIANCE

A. Insulation shall comply with the following standards as applicable:

1. ASTM C547; Type I, Type IV
2. ASTM C585
3. ASTM C1136 (jacket); Type I, II, III, IV, VII, VIII, X
4. NFPA 90A and 90B
5. Conformity for fit Marine Equipment IMO 1408
6. MIL-DTL-32585; Type 1, Form 4, Facing A and D
7. USCG 164.109/4/1
8. UL/ULC Classified
9. Listed and Labeled Pipe Insulation by Underwriter Laboratories (UL) File No. R8583, Category: Insulated Plastic Pipe Assemblies (BSMP) for installation over PVC, Polypropylene, and CPVC meeting "FHC 25/50" with minimum 1 inch insulation thickness.
10. ASTM C795, MIL-I-24244, NRC Reg. Guide 1.36 (Certification needs to be specified at time of order)

2.08 TECHNICAL DATA

Property (Unit)	Test	Performance
Corrosiveness	ASTM C665	Does not accelerate corrosion of steel
Corrosion	ASTM C1617	Pass
Maximum Service Temperature	ASTM C411 + ASTM C447	1000° F (538° C)
Water Vapor Permeance	ASTM E96, Procedure A	0.01 perms or less
Water Vapor Sorption (by weight)	ASTM C1104	Less than 5%
Shrinkage	ASTM C356	Negligible
Mold Growth	ASTM C1338	Pass
Surface Burning Characteristics (flame spread/smoke developed)	ASTM E84, UL 723, CAN/ULC S102	UL/ULC Classified FHC 25/50

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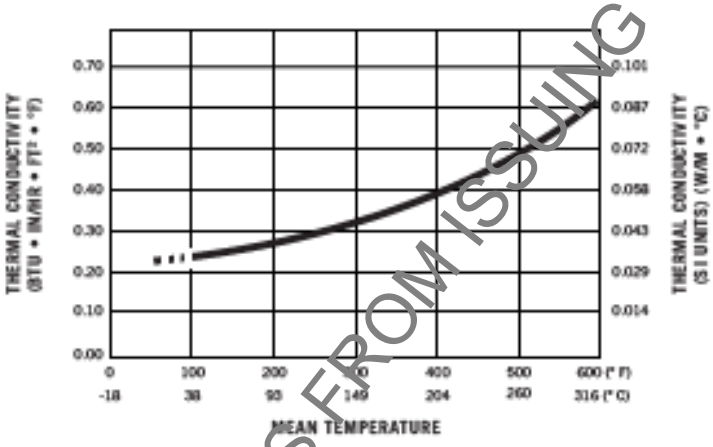
2.09 THERMAL CONDUCTIVITY - ASTM C335

Mean Temperature	k	k (SI)
75° F (24° C)	0.23	0.033
100° F (38° C)	0.24	0.035
200° F (93° C)	0.28	0.040
300° F (149° C)	0.34	0.049
400° F (204° C)	0.42	0.061
500° F (260° C)	0.51	0.074
600° F (316° C)	0.62	0.089



2.10 ASHRAE 90.1-2022 REQUIREMENTS - MINIMUM PIPE INSULATION THICKNESS

Fluid Operating Temperature Range and Usage	Insulation Conductivity		Nominal Pipe or Tube Size				
	Conductivity Range BTU-in./(hr · ft² · °F)	Mean Temperature Rating	<1"	1"–<1½"	1½"–<4"	4"–<8"	≥8"
Heating and Hot Water Systems (Steam, Steam Condensate, Hot-Water Heating and Domestic Water Systems) a, b, c, d							
Above 350° F	**0.32–0.34**	**250° F**	**4½"**	**5"**	**5"**	**5"**	**5"**
251–350° F	**0.29–0.32**	**200° F**	**3"**	**4"**	**4½"**	**4½"**	**4½"**
201–250° F	**0.27–0.30**	**150° F**	**2½"**	**2½"**	**2½"**	**3"**	**3"**
141–200° F	**0.25–0.29**	**125° F**	**1½"**	**1½"**	**2"**	**2"**	**2"**
105–140° F	**0.22–0.28**	**100° F**	**1"**	**1"**	**1½"**	**1½"**	**1½"**
Cooling Systems (Chilled Water, Brine, Refrigerant) a, b, c, d							
40–60° F	**0.21–0.27**	**75° F**	**½"**	**½"**	**1"**	**1"**	**1"**
Below 40° F	**0.20–0.26**	**50° F**	**½"**	**1"**	**1"**	**1"**	**1½"**

A. For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows:

1. $T=r\{(1+t/r)^{K/k}-1\}$, where T=minimum insulation thickness (in.)
2. r=actual outside radius of pipe (in.)
3. t=insulation thickness listed in this table for applicable fluid temperature and pipe size
4. K=conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature {Btu · in.(h · ft² · °F)}
5. k=the upper value of the conductivity range listed in this table for the applicable fluid temperature.

B. These thicknesses are based on energy efficiency considerations only.

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C. For piping smaller than 1½" and located in partitions within conditioned spaces, reduction of these thicknesses by 1" shall be permitted (before thickness adjustment required in footnote a) but not to thicknesses below 1". These thicknesses are based on energy efficiency considerations only. Issues such as water vapor permeability or surface condensation sometimes require vapor retarders or additional insulation.

D. The table is based on steel pipe. Non-metallic pipes schedule 80 thickness or less shall use the table values. For other non-metallic pipes having thermal resistance greater than that of steel pipe, reduced insulation thicknesses are permitted if documentation is provided showing that the pipe with the proposed insulation has no more heat transfer per foot than a steel pipe of the same size with the insulation thickness shown on the table.

PART 3 EXECUTION

3.01 PRECAUTIONS

A. Cold Pipe

1. Use a continuous vapor retarder on piping operating below ambient temperatures.
2. Seal all joints, surfaces, seams and fittings to prevent condensation.
3. On below freezing applications, and in high-abuse areas, the ASJ+ jacket shall be protected with a PVC vapor retarding outer jacket. In addition, exposed ends of insulation shall be sealed with vapor barrier mastic installed per the mastic manufacturer's instructions. Vapor seals at butt joints shall be applied at 12' to 21' intervals; at the Engineer's discretion and at each fitting to isolate any water incursion.
4. On chilled water systems operating in high humidity conditions, it is recommended that the same guidelines be followed as listed above for below freezing applications.
5. Exterior hanger supports are recommended.

B. Outside Application

1. Do not expose pipe insulation to weather. It must be covered with appropriate jacketing, mastic or vapor retardant coatings.
2. All exposed surfaces must be protected. Proto® Indoor/Outdoor PVC Jacketing, or equal, is recommended. See Knauf Insulation Guide Specifications for recommended PVC jacketing application guidelines.
3. Apply jacketing, mastics or vapor retardant adhesives per manufacturer's instructions.
4. For metallic jackets, factory-applied moisture retarders are recommended.

C. ASJ+ SSL+

1. Keep adhesive and contact surfaces free from dirt and water. Seal immediately once adhesive is exposed.

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2. Apply when ambient and insulation temperatures are between 20° F and 130° F (-6.7° C and 54° C).
3. If stored below 20° F or above 130° F, allow insulation cartons to stand within recommended temperature range for 24 hours prior to application.
4. Do not store product below -20° F (-29° C) or above 150° F (66° C).
5. When using Knauf Insulation's SSL+ Advanced Closure System, make sure the longitudinal and circumferential joints are properly sealed by rubbing the closure firmly with a squeegee. Use of staples is not recommended.
6. When using Earthwool® 1000° pipe insulation, the surface temperature of the ASJ+ facing should not exceed 150° F (66° C).

D. Fittings and Hangers

1. Use Proto 25/50 Rated (ASTM E84) PVC Fitting Covers, applying PVC fittings per Proto's Data Sheet.
2. Fittings should be insulated to same thickness as the adjoining insulation.
3. Apply fittings per manufacturer's instructions.
4. When required by specification, a hard insert of sufficient length should be used to avoid compression of the insulation.

3.02 SSL+ INSTALLATION

A. To install SSL+, first remove the kraft release liner to expose adhesive.

B. Carefully align the jacketing. Starting in the center of the insulation section, begin initial SSL+ tack using pressure in the direction of the overlap. Again, starting in the center of the insulation section, with a plastic squeegee begin to apply firm pressure to the bonded lap area swiping from the center of the insulation section toward each end.

C. Note: After initial SSL+ adhesive tack, it is critical that the closure is not re-opened and repositioned on the facing. Doing so will delaminate the jacket and adhesive, diminishing the bond strength.

3.03 BUTT STRIP INSTALLATION

A. To install Butt Strips, remove the kraft release liner by separating the butt strip from the kraft using the convenient, easy release kiss cut.

B. Simply wrap the butt strip, centered around the joint, and apply firm pressure with a squeegee.

C. Note: After initial Butt Strip adhesive tack, it is critical that the closure is not re-opened and repositioned on the facing. Doing so will weaken the adhesive and diminish bond strength.

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D. Recommended Thicknesses (ASHRAE 90.1-2022)

1. The minimum thicknesses are based on ASHRAE 90.1-2022 standards and do not necessarily represent the Economic Thickness of Insulation or the thickness required for proper condensation control. Rather, they serve as minimum recommendations for commercial applications. For recommended Economic Thickness, install according to Knauf Insulation or NAIMA 3E Plus programs or as specified.

3.04 APPLICATION GUIDELINES

A. Storage

1. Protect insulation from water damage or other abuse, welding sparks and open flame.
2. Cartons are not designed for outside storage.

B. Preparation

1. Apply only on clean, dry surfaces
2. Pipe or vessel should be tested and released before insulation is applied.

C. General Guidelines

1. All sections should be firmly butted.
2. Seal circumferential joint with a minimum 3" (76 mm) wide butt strip.
3. Jackets, coating and adhesives should have a comparable F.H.C. rating.
4. ASJ+ may be painted. As with traditional ASJ, Knauf Insulation does not encourage the painting of ASJ+ because the application of any paint may change the surface burning characteristics and will void the UL Classification and Knauf Insulation Limited Warranty.

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