

CITY OF CLYDE, OHIO

Specifications for: East Street Improvements

July 2012

PREPARED BY:

GGJ, INC.
35585 CURTIS BLVD., UNIT C
EASTLAKE, OHIO 44095
PHONE: (440) 953-1567
FAX: (440) 953-0580

PREPARED FOR:

CITY OF CLYDE, OHIO
222 N. MAIN STREET
CLYDE, OHIO 43410
PHONE: (419) 547-6898

SPECIFICATION REVIEW:

Reviewed by: _____
Project Manager

Reviewed by: _____
Specification Engineer

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CITY OF CLYDE
EAST STREET IMPROVEMENTS

CITY OFFICIALS

ADMINISTRATION

Scott Black, Mayor

Paul Fiser, City Manager

Craig Davis, Finance Director

Barry Bova, City Solicitor

Phillip Farrar, Superintendent of Water Treatment

Thomas Bauer, Superintendent of Wastewater

Kevin Wright, Superintendent of Light & Power

Rick Harrah, Superintendent of Service Department

Don Ball, Superintendent of Environmental Services

James Mason, Superintendant Parks and Cemetery

Kenneth Winke, Zoning Inspector

COUNCIL

Carolyn Farrar, Vice Mayor

Gary Beamer, Council Member

Kenneth Dick, Council Member

Steve Keegan, Council Member

Janet Dickman, Clerk of Council

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PROJECT DIRECTORY

OWNER:

City of Clyde, Ohio
222 North Main Street
Clyde, Ohio 43410
Attn: Paul Fiser, City Administrator

Phone: 419-547-6898

ENGINEER:

GGJ, Inc.
35585 Curtis Blvd., Unit C
Eastlake, Ohio 44095
Attn: John Sabo, P.E.

Phone: 440-953-1567
Fax: 440-953-0580

PROJECT CERTIFICATION

I hereby certify that the Project Drawings and the Project Manual were prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Ohio.

John Sabo, P.E.

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* Sheet 6 omitted for this design, see sheet 5A for various quantities pertaining to the cul-de-sac.

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SECTION 00020

INVITATION TO BID

Sealed proposals will be received at the City of Clyde, 222 N. Main Street, Clyde, Ohio 43410 until 11:00 o'clock A.M. Local Time on Thursday, August 2, 2012 and will be opened and read immediately thereafter for the:

EAST STREET IMPROVEMENTS

PROJECT DESCRIPTION: The project consists of the complete replacement and widening of East Street from Duane Street to East Forest Street. The proposed project also includes the replacement and/or installation of the sanitary, water and Storm Utility improvements within the construction limits.

COMPLETION DATE: 120 CALENDAR DAYS

Contract Documents may be examined at the following locations:

OWNER:
City of Clyde
222 N. Main Street
Clyde, Ohio 43410
Phone: (419) 547-6898

ENGINEER: (Clyde Office)
GGJ, Inc
137 East McPherson Highway
Clyde, Ohio 43410
Phone: (419) 547-8611

ENGINEER: (Eastlake Office)
GGJ, Inc.
35585 Curtis Blvd., Unit C
Eastlake, Ohio 44095
Phone: (440) 953-1567

Plans, specifications and bidding blanks may be obtained at the above office of the ENGINEER (Eastlake) upon payment of **ONE HUNDRED DOLLARS (\$100.00) NON-REFUNDABLE**. Contract Documents will be mailed as soon as possible after receipt of request and payment for such documents. Checks shall be made payable to **GGJ, INC.**

Addenda will be forwarded only to holders of record of complete sets of Contract Documents.

A bid guaranty must be submitted with the bid. The bid guaranty shall be in the form of a Certified check, a Cashiers check, or an Irrevocable Letter of Credit for an amount equal to ten percent (10%) of the bid; OR a Bond for the FULL AMOUNT of the bid. Said bid guaranty shall be made payable to the CITY OF CLYDE and is to be held as a guarantee that in the event the bid is accepted and a contract awarded to the BIDDER, the contract will be duly executed and its performance properly secured. The bidder and surety company must be approved by the CITY OF CLYDE.

The successful BIDDER shall be required to furnish a Contract Bond in a sum of not less than one hundred percent (100%) of the total price bid for the complete work, said bond shall be that of an approved surety company authorized to transact business in the State of Ohio and shall be underwritten by a surety that is listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds".

BONAFIDE BIDDER REQUIREMENTS: Bid Proposals will **ONLY** be opened and/or received from Bonafide Plan Holders. Any Bid Proposal(s) received by a non-Bonafide Plan Holder, will be deemed invalid.

Questions by prospective bidders concerning this project should be directed to the office of the engineer (440) 953-1567, Monday through Friday between 8:30 A.M. and 4:30 P.M. No questions will be taken during any other time.

A pre-bid meeting will be held at 11:00 A.M. on July 26, 2012 at the City Hall located on 222 N. Main Street, Clyde, Ohio 43410. All Contractors interested in bidding should attend. A visual inspection of the project will be conducted after the meeting.

Each proposal must be made upon the blanks furnished with the Contract Documents and must be delivered to CITY OF CLYDE, 222 N. Main Street, Clyde, Ohio 43410, previous to 11:00 AM, Local Time, on the date specified.

WAGE RATES - Each employee employed by the CONTRACTOR or any SUBCONTRACTOR and engaged in work on the project under this contract shall be paid the higher prevailing hourly wage established by the Department of Industrial Relations of the State of Ohio for the employee's job classification, as provided by the appropriate sections of the Ohio Revised Code.

This shall occur regardless of any contractual relationship which may be said to exist between the CONTRACTOR or any SUBCONTRACTOR and such employee.

No Bidder may withdraw his bid within 90 days after the actual date of the opening thereof.

Any Contractor submitting a Bid on this project hereby certifies, indicates, and acknowledges that he has a license and meets all the qualifications required by the statutes of the State and subdivision in which the Work is to be performed.

The CITY OF CLYDE reserves the right to reject any or all bids or to waive any informalities or irregularities in the bids or bidding procedures.

All bids may be held by the CITY OF CLYDE, OHIO for a period of sixty (60) days from the opening day of the bids or until the contract has been awarded for the purpose of reviewing and investigating the qualifications of the bidders.

Upon official bid award, the successful bidder shall execute within thirty (30) days and deliver to the City of Clyde a signed and fully executed contract document, including all other documents as required by law.

Bids for the Contract must be sealed and marked CITY OF CLYDE, EAST STREET IMPROVEMENTS and addressed to the CITY OF CLYDE, 222 N. Main Street, CLYDE, OHIO 43410

CITY OF CLYDE

Paul Fiser
City Manager

Published

Clyde Enterprise

July 11, 2012

July 18, 2012

July 25, 2012

END OF SECTION

DIVISION 0

BIDDING AND CONTRACT REQUIREMENTS

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INSTRUCTIONS TO BIDDERS**1. PROJECT DESCRIPTION**

- 1.1 OWNER: City of Clyde
222 N. Main Street
Clyde, Ohio 43410
- 1.2 DESCRIPTION: East Street Improvements
- 1.3 COMPLETION TIME: Substantial Completion: 120 Calendar Days
Final Completion: 30 Calendar Days after Substantial Completion
- 1.4 ENGINEER'S OPINION OF PROBABLE COST:
General Construction: \$ 515,000.00
- 1.5 ENGINEER: GGJ, Inc.
35585 Curtis Blvd., Unit C
Eastlake, Ohio 44095
Telephone: (440) 953-1567
Fax: (440) 953-0580
Project Contact Person: John Sabo, P.E.

2. PLANS, SPECIFICATIONS, & BIDDING DOCUMENT

- 2.1 **Viewing and Purchasing Contract Documents:** Copies of the Contract Documents may be examined at the City of Clyde, 222 N. Main Street, Clyde, Ohio 43410 and at the office of the Engineer. The Contract Documents including Drawings, Specifications, bidding forms, and related contract materials may be obtained at the Eastlake office of the Engineer upon payment of **ONE HUNDRED DOLLARS (\$ 100.00) NON-REFUNDABLE.** CONTRACT DOCUMENTS will be mailed as soon as possible after receipt of request and payment for such CONTRACT DOCUMENTS. Checks shall be made payable to GGJ, INC.
- 2.2 **Bonafide Plan Holder:** is one who purchases plans and specifications for a specific project and is acknowledged by either the owner and/or his deemed representative.
- 2.3 **A pre-bid meeting** will be held at **11:00 A.M. Thursday, July 26, 2012** at the City Hall located on 222 N. Main Street, Clyde, Ohio 43410. All Contractors interested in bidding should attend. A visual inspection of the project will be conducted after the meeting.
- 2.4 **Questions during Bidding:** All questions regarding the meaning or intent of the Contract Documents shall be directed to the Engineer's Contact Person noted above. Subsequent interpretations and clarifications considered necessary by the Engineer will be issued by Addenda. Questions received less than seven (7) days prior to the scheduled date for opening bids may not be answered. Only questions and clarifications made by formal written addenda will be binding. Oral and other interpretations or clarifications, when given, will be without legal effect. The Contract Work shall be performed in accordance with the Contract Documents as prepared by the Engineer.
- 2.5 **Issuance of Contract Document Sets:** Upon award of the Contract, the Owner will furnish two (2) executed copies of the Drawings, Specifications and related Contract Materials; and if requested, will furnish one (1) set of reproducible project Drawings, at no cost to the Contractor. Additional sets of Contract Documents may be purchased from the ENGINEER for the price set forth above and in the Invitation to Bid.
- 2.6 **Addendum:** Addenda may be issued by the Engineer or Owner to notify that the Contract Documents have been amended. The Bidder is required to acknowledge receipt of Addenda in the Bidding Documents or they may be subject to disqualification. Addenda will be mailed or otherwise delivered to all parties

recorded by Engineer as having received the Bidding Documents.

- 2.7 **Other Project Related Information:** The following information is available for inspection at the Owner's offices and at the Engineer's Offices:

2.6.1 N/A

3. **SUBMISSION OF BID PROPOSALS**

- 3.1 Sealed Bid Proposals will be received by the Owner at the designated place until the date and time specified in the Invitation to Bid, as may be amended, at which time they will be publicly opened and read.
- 3.2 All submitted Bid Proposals shall be sealed in individual envelopes and addressed as follows:
- CITY OF CLYDE
222 N. MAIN STREET
CLYDE, OHIO 43410
- 3.3 Each "sealed" envelope containing a Bid Proposal must bear on the outside, the Bidder's name, address, and the name of the project for which the Bid Proposal is submitted. If forwarded by mail, the sealed envelope containing the Bid Proposal must be enclosed in another (mailing) envelope addressed to the Owner at the above address.
- 3.4 Any Bid Proposal received after the time and date stated, will not be considered.
- 3.5 Bids must be made on the Bid Proposal forms (or photocopies thereof) furnished in the Contract Documents.
- 3.5.1 All prices bid must be entered in figures only on the Bid Schedule form provided. If the bid item embraces labor and material, the Bid Proposal shall separately state the Unit Price for Material and the Unit Price for Labor.
- 3.5.2 Enter each Bid Item's Total Unit Price as the sum of the Unit Prices entered for Material and for Labor, if the Item embraces both OR as a lump sum amount, if the item is a Lump Sum Item.
- 3.5.3 Enter each Item's Total Price as the product of its Estimated Quantity and the Item's Total Unit Price. In the event of a conflict, the Estimated Quantities and the Total Unit Price listed on the form shall govern over the Unit Prices for Material and Labor, and the Total Price listed.
- 3.6 Each Bidder must bid on all Items and Alternates contained on the Bid Schedule form. Any Bid that does not conform to this requirement may be considered informal and may be rejected.
- 3.7 Each Bidder is required to disclose in his Bid, the full names and addresses, and the place of business of all people, other than the named Bidder, that have a legal or ownership interest in the Bid Proposal. If the Bidder is a corporation, only the names of its president and secretary need to be provided. If no other person has an interest, the Bidder shall state that fact.
- 3.8 The prices recorded in the Bid Schedule must be in ink and be complete when submitted.
- 3.8.1 Any corrections to the Bid Proposal made prior to submission must be initialed by the person signing the Bid Proposal.
- 3.8.2 Submit one copy of the Bid Proposal documents.
- 3.9 Bid Proposals submitted by Corporations must be executed in the corporate name by its President, Vice-President, or other Officer accompanied by evidence of authority to sign the proposal. The corporate seal must be affixed and attested to by the Secretary.
- 3.10 Bid Proposals submitted by partnerships must be executed in the partnership name and be signed by a partner, whose title must appear along with the signature.
- 3.11 All names must be typed or printed below the signature.

- 3.12 The Bid Proposal shall contain an acknowledgment the Bidder has received all of the issued Addenda; otherwise the Bid may be disqualified.
- 3.13 The Owner reserves the right to hold the Bid Proposals for a period of sixty (60) days after opening and to award Contracts at any time during that period.
- 3.13.1 No Bidder may withdraw a Bid within 60 days after the actual date of the opening thereof.
- 3.13.2 Should there be reasons why the Contract cannot be awarded within the specified period; the time may be extended by mutual agreement between the Owner and the Bidder.
- 3.13.3 Each Bid Proposal must be accompanied by a bid guarantee instrument payable to the Owner in the form of one of the following:
- 3.13.3.1 A Bid Bond for the full amount of the Bid, including alternatives, with a corporate Surety approved by the Owner. Use Bid Guaranty and Contract Bond (Bid Bond) form included in the bidding documents for projects located in the State of Ohio. For projects located in other states, provide Bid Bond. If bid is accepted, Bidder will be required to provide Performance Bond(s) assuring required Payments, Maintenance, and Guarantees. Should a Bid be rejected, the Bond will be promptly returned to the Bidder. Bid Bonds provided for this work shall be underwritten by a surety that is listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bond". Include the names and addresses of the Bid Bond Agent and the Surety Company.
- 3.13.3.2 A certified check equal to 10 percent of the Bid.
- 3.13.3.3 A cashier's check equal to 10 percent of the Bid.
- 3.13.3.4 An irrevocable letter of credit equal to 10 percent of the Bid.
- 3.14 The successful Bidder will be required to furnish a Contract Performance Bond for the full amount bid for the complete work, including all selected alternatives. This bond shall be that of an approved Surety company authorized to transact business in the State of Ohio and shall be underwritten by a Surety that is listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds".
- 3.15 Within ten (10) days after opening the Bids, the Bids will be compared and the OWNER will return the Bid guaranties of all Bidders except for the three lowest Bidders.
- 3.16 When the agreement is executed and delivered, or the period for holding the Bids has expired and no time extension has been mutually agreed upon, the Bid guarantees of the remaining Bidders will be returned.
- 3.17 Any Bid may be withdrawn prior to the scheduled time for the opening of Bids or authorized postponement thereof.
- 3.17.1 If a Bidder wishes to withdraw his Bid Proposal, he shall state his desire in writing to the Owner BEFORE the time fixed for the opening, and when Bidder's Proposal is reached it will be set aside and returned.
- 3.18 Materials to be incorporated in this work may be purchased by the Contractor free of Ohio State or County Sales Tax.
- 3.19 The successful Bidder must comply with the minimum wage rates for laborers and mechanics as determined by the State of Ohio prevailing wages.

4. EXAMINATION OF CONTRACT DOCUMENTS & SITE

- 4.1 In submitting a Bid, Bidder warrants that he has investigated and is acquainted with the conditions to be encountered for performing the work including the character, quality, quantities of work to be performed, the materials to be furnished, the prevailing hourly wage rates for the area in which the project is located, and the requirements of the Contract Documents. It is mutually agreed that the submission of a Bid shall be considered prima facie evidence that Bidder has made such examination and is satisfied as to all the

conditions that will affect the work.

- 4.1.1 Bidders shall satisfy themselves of the accuracy of the estimated quantities in the Bid Schedule by making an examination of the site and a review of the Contract Documents, including all issued Addenda.
- 4.2 Before submitting a Bid, each Bidder must (a) examine the Bid Proposal thoroughly, (b) visit the site to familiarize himself with local conditions that may in any manner affect cost, progress or performance of the work, (c) familiarize himself with Federal, State and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the work; and (d) study and carefully correlate Bidder's observations with the Contract Documents.
 - 4.2.1 All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project shall apply to the Contract throughout.
 - 4.2.2 The Contract Documents contain the provisions required for the construction of the Project.
- 4.3 Reference is made to the Supplementary Conditions and to paragraph 2.6 above for the identification of those reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the work that have been relied upon by the Engineer in preparing the Drawings and Specifications. Owner will make copies of such reports available to any Bidder requesting them. These reports are not guaranteed as to accuracy or completeness; nor are they part of the Contract Documents. Before submitting his Bid, each Bidder shall, at his expense, make such additional investigations and tests as the Bidder may deem necessary to determine his Bid for performance of the work in accordance with the time, price and other terms and conditions of the Contract Documents.
- 4.4 Upon request, the Owner will provide each Bidder access to the site to conduct such investigations and tests as each Bidder deem necessary for submission of his Bid.
- 4.5 The lands upon which the work is to be performed, rights-of-way for access to the site, and other lands designated for use by Bidder in performing the work, are identified in the Contract Documents.
- 4.6 The submission of a Bid will constitute an incontrovertible representation by the Bidder that he has complied with every requirement of this Section and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance of the work.
- 4.7 Information obtained from an officer, agent, or employee of the Owner or any other person shall not affect the risks or obligations assumed by the Bidder or relieve him from fulfilling any of the conditions of the Contract.

5. CONTRACTOR'S QUALIFICATION AND EQUIPMENT

- 5.1 Bidder shall provide evidence of sufficient previous experience on work of a similar nature to assure the Owner of his capability to perform the work.
- 5.2 Bidder shall complete the appropriate parts of the Bid Proposal relating to work experience and equipment available for use.
- 5.3 Bidder shall provide pertinent information to the Owner relative to any pending suits or outstanding liens. If no information is provided by the Bidder, the Owner shall assume that no such suits or liens exist.
- 5.4 Bidder shall provide information on all incomplete contracts including the Owner's name, Contract Amount, and Status.

6. ESTIMATED QUANTITIES

- 6.1 The unit price quantities listed in the Bid Schedule are approximate and are to be used for comparing Bids and in no way binds the Owner to using the quantities, or any part thereof, in the execution of the work.
- 6.2 Except for lump sum items, payments will be made to the Contractor for the actual quantities of work performed or materials furnished in accordance with the Contract Documents, and it is understood that the scheduled quantities of work to be done and materials to be furnished may be increased or decreased without invalidating the unit prices bid.

- 6.3 The Owner reserves the right to increase or decrease the quantities or omit altogether any items that in the judgment of the Owner may be deemed advisable after the award of the Contract.
- 6.4 The successful Bidder will be required to furnish the Owner a complete breakdown of the lump sum Items, to the satisfaction of the Engineer within five (5) days after the Notice of Award is provided, and before signing the Construction Contract.
- 6.5 Payments for lump sum Items will be based on an estimated percentage of the Item's completeness, as determined by the Engineer.

7. SUBCONTRACTORS

- 7.1 The Bidder shall state on the appropriate Contract form the names of all Subcontractors that he proposes to utilize and the work they will be assigned. All work of Bidder not assigned to a Subcontractor shall be understood by the Owner to be performed by the Bidder.
- 7.2 Each Bidder shall perform with his own organization not less than FIFTY PERCENT (50%) of the total Contract price.
- 7.3 The Owner reserves the right to approve or disapprove all Subcontractors proposed by the Bidder. If the Owner, after due investigation, rejects the use of a proposed Subcontractor, the apparent successful Bidder may either submit an acceptable substitution without increase in Bid price or decline substitution and withdraw his Bid Proposal without sacrificing his Bid security. Any listed Subcontractor that Owner does not make written objection to before awarding the Contract, shall be deemed acceptable to the Owner.
- 7.4 Requests by the Bidder to change Subcontractors after the award shall be subject to the Owner's approval and shall not change the Contract Bid prices.
- 7.5 No Bidder shall be required to employ any Subcontractor, person, or organization against which he has reasonable objection.

8. NON-COLLUSION AFFIDAVIT

- 8.1 Each Bid Proposal must be accompanied by a completed Non-Collusion Affidavit provided within the Bid Proposal.
- 8.2 Where this is reason to believe collusion or combination among Bidders exists, the Owner reserves the right to reject the Bid Proposal of those concerned.

9. INSURANCE

- 9.1 Verification of Workers' Compensation, General Liability, Automobile Liability, and Property insurances consistent with the provisions of the Contract Documents must be submitted to the Owner prior to an Award of Contract. The required Certificates of Insurance shall show that the Owner, Engineer, Engineer's Consultants, and other people identified in the Contract Documents shall be specifically named as additional insured on all policies covering work under this Contract.
- 9.2 All insurance shall be endorsed so that it cannot be canceled until thirty (30) days after Insurer's written notice to Owner of such proposed action.

10. CONTRACT

- 10.1 Before entering into the Contract, the Owner will require the Bidder to provide a Contract Performance Bond and a Payment Bond, each for 100 percent of the Contract Price, with a corporate surety approved by the Owner, to assure the faithful performance of the Contract. All bonds must be underwritten by a surety company authorized to transact business in the State where the work is located and upon which service of process can be made, conditioned on the faithful performance of the work in accordance with the Contract Documents. Such security or bond also shall indemnify the Owner against damages suffered as a result of the Bidder's failure to perform the Contract in accordance with the Contract Documents, and guaranteeing the related construction and performance of the improvements for a period not less than one (1) year from the date of final acceptance by the Owner, and guaranteeing the payment of all lawful claims of

Subcontractors, equipment and material providers, and for labor performed in carrying forward or completing the Contract.

- 10.2 All bonds shall be in the form required by the Department of Housing and Urban Development and the State of Ohio.
- 10.3 All bonds shall be underwritten by a surety that is listed on the most current Department of the Treasury Circular 570, "Surety Companies Acceptable on Federal Bonds."

11. AWARD OF CONTRACT

- 11.1 The Owner reserves the right to reject any and all Bids, to waive any informalities or irregularities in the Bids received, and to accept any Bid it deems most favorable.
- 11.2 All extensions and totals of unit prices and quantities submitted as part of the Bid shall be considered informal until verified by the Owner.
- 11.3 In evaluating Bids, the Owner may consider the qualifications and experience of the Bidders, whether or not the Bids comply with the prescribed requirements, and alternates and unit prices if requested in the Bid Forms.
- 11.4 Owner may consider the qualifications and experience of Subcontractors and other people and organizations (including those who are to furnish the principal items, material, or equipment) proposed for portions of the work. Operation costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by the Owner.
- 11.5 Owner may conduct such investigations as it deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications, and financial ability of the Bidders, proposed Subcontractors, and other persons and organizations to perform the work in accordance with the Contract Documents to Owner's satisfaction and within the prescribed time. Bidder shall furnish all information and data for this purpose as the Owner may request.
- 11.6 The Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of the Bidder fails to satisfy the Owner that Bidder is sufficiently qualified to carry out the obligations of the Contract and to satisfactorily complete the work identified therein.
- 11.7 If a Contract is awarded, it will be awarded to the lowest and best Bidder whose evaluation by the Owner indicated to Owner that the award will be in the best interests of the project.
- 11.8 If a Contract is awarded, Owner will give the successful Bidder a Notice of Award within sixty (60) days after the day of the Bid opening.
 - 11.8.1 Copies of Notice of Award will be sent to both the Bid Bond Agent and Surety Company.
- 11.9 A conditional or qualified Bid will not be accepted.
- 11.10 Prior to awarding the Contract, the Bidder must submit certification from the Secretary of State that Bidder is authorized to do business in the State of Ohio. Also prior to award, the Bidder must submit a Power of Attorney to the Secretary of State designating it as an agent for the purpose of accepting the service of summons in any action brought under the Ohio Revised Code and the contract and bond are submitted to the Attorney General for their certified approval.

12. EXECUTION OF CONTRACT

- 12.1 Accompanying the written Notice of Award will be three (3) unsigned sets of Contract Documents not including the Drawings. Within fourteen (14) calendar days from the date of receipt of the Notice of Award, the successful Bidder shall sign and deliver to the Owner the Contract Document sets along with a performance Bond, a payment Bond, and insurance verifications.
 - 12.1.1 The Notice of Award will be accompanied by the necessary Contract and Bond forms.
- 12.2 Within fourteen (14) days of receipt of the successful Bidder's signed Contracts, the Owner will sign the Contracts and return two (2) fully executed Contracts.

- 12.3 The date of the Owner's signature shall be the effective Contract date. The Contract completion time does not start until the issuance date of the Notice to Proceed.

13. BID SECURITY

- 13.1 In the event that the successful Bidder fails, on his part, to execute the Contracts within the specified time, the Owner may consider the Bidder in default and award the Contract to the next lowest Bidder. The Bidder and/or Surety failing to enter into a contract are liable to the Owner for the lesser amount of:

13.1.1 The difference between his Bid and the next lowest Bid, or

13.1.2 A sum not to exceed ten percent (10%) of the Bid.

- 13.2 If the Owner chooses to re-bid the work, the Bidder failing to enter into a contract and/or his Surety shall pay the lesser amount of:

13.2.1 A sum not more than ten percent (10%) of the Bid, or

13.2.2 The cost incurred in the process of re-bidding, including labor, printing costs, advertising, and mailings to prospective Bidder.

- 13.3 In the event that the second lowest Bidder is awarded the Contract and fails to execute the Contract within ten (10) days, the Owner may then award to the third lowest bidder.

13.3.1 Same as the 13.2.1 above.

13.3.2 Same as the 13.2.2 above.

- 13.4 When more than one Bidder fails to execute a Contract and the Owner re-advertises for Bids, each Bidder that failed to enter into a Contract shall equally share in the re-bidding costs.

14. LIQUIDATED DAMAGES

- 14.1 Provisions for liquidated damages, if any are set forth in the Bid Proposal and the Contract.

15. DELINQUENT PERSONAL PROPERTY STATEMENT

- 15.1 Included with the Contract Documents is a delinquent Personal Property Statement to be filled out by the successful Bidder after the award of the Contract.

- 15.2 The Statement shall be sent to both the COUNTY AUDITOR and the COUNTY TREASURER. A signed copy shall remain in the Contract Documents as well.

16. SALES TAX

- 16.1 The Owner is Ohio sales tax exempt and will provide a certification of sales tax exemption. Bidder shall verify utilization of the certification with legal counsel and the State of Ohio.

END OF SECTION

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**CITY OF CLYDE
EAST STREET IMPROVEMENTS**

BASIS OF PAYMENT

GENERAL: Payment for the work Items shall be at the total unit or lump sum price Bid for each unit of work completed and accepted in accordance with the Contract Documents.

The latest "State of Ohio, Department of Transportation, Construction and Material Specifications" manual shall govern the material and procedures used in this project, if not otherwise specified in the project Specifications or noted on the Drawings.

PRICES TO INCLUDE: For each Bid Item, the total unit price or lump sum price Bid shall be considered full compensation for the completed and accepted work, and shall include all labor, materials, tools, equipment and transportation needed to perform the work in accordance with the Contract Documents so as to provide a complete and properly functional system. The General Contractor shall be responsible for reviewing the contents and conditions of all Contract Documents as they may relate to the work under this Contract and comply with the requirement thereof.

ITEM 1 - BONDS AND INSURANCE

A. Payment:

1. The lump sum amount stated in the Bid Schedule for bonds and insurance shall include all bonds and insurance required to be in force at the commencement of the work. Successful bidder will be required to provide receipts verifying the actual costs of this item when known.
2. Subsequent expenses for bonds and insurance as may be necessary throughout the contract period for changes to the contract or for other occurrences, shall not be a part of this item.
3. Fees for bonds and insurance due to changes in the work shall be respectively a part of the cost of that work.

ITEM 2 - MOBILIZATION

A. Work included: As described in Section 00800 Supplementary Conditions SC-22 and other work incidental to this Item.

B. Payment: Lump Sum price with payments as specified in Section 00800 Supplementary Conditions SC-22.

ITEM 3 – MAINTENANCE OF TRAFFIC

A. Description: This work in this Item shall consist of work shall consists of maintaining and protecting vehicular and pedestrian traffic at the work area while the contract is in force, in accordance with the latest Ohio Department of Transportation Construction and Material Specifications, including all current supplemental specifications and standard construction drawings and all specifications and drawings in these Contract Documents and in this contract book.

B. Payment: The Lump Sum Price bid for Item Maintaining Traffic shall include the cost of removal of conflicting pavement markings and placement of interim markings, maintaining the existing roadways in a safe condition for public use, providing flaggers and their equipment, furnishing and maintaining and subsequently removing temporary traffic control items as required by the plans and specifications.

ITEM 4 – CONSTRUCTION LAYOUT STAKES

A. Description: This work in this Item shall consist of providing all construction stakes required to complete the work as shown in the Drawings and/or specified in the Contract Documents.

- B. Payment: The Lump Sum Price bid for this Item shall include providing all construction stakes required to complete the work as shown in the Drawings and/or specified in the Contract Documents.

ITEM 5 – CONCRETE CURB REMOVED

- A. Description: The work in this Item consist of the removal and disposal of existing concrete curb as shown on the Drawings and/or Specifications and as follows:
1. All removed material shall be disposed of by the Contractor at his own expense.
- B. Payment: The unit price stipulated for removal of this Item – Concrete Curb which shall be a lump sum including labor, equipment, and disposal of same by the contractor.

ITEM 6 – ASPHALT PAVMENT REMOVED

- A. Description: The work in this Item consists of the full depth removal of existing pavement in areas that require removal for the purposes of constructing new roadway and relocation of utilities. All excavated material shall first be offered to the City for reuse. If the City accepts the excavated material the contractor shall be responsible for hauling the material to a destination determined by the City. If the City refuses the material the contractor shall be responsible for the disposing material offsite.
- B. Payment: The unit price stipulated shall be full compensation for each cubic yard of existing pavement removed and shall include the excavation and removal of all excavated material.

ITEM 7 – REMOVE EXISTING CONCRETE DRIVEWAY AND APRON

- A. Description: The work in this Item shall consist of the removal and disposal of existing concrete driveway as shown on the Drawings and/or Specifications and as follows:
1. All removed material shall be disposed of by the Contractor at his own expense.
 2. A neat joint shall be sawed or otherwise cut at the removal limit if it does not occur at an existing joint.
- B. Payment: The unit price stipulated shall be full compensation for removal of each square yard of concrete driveway removed, which shall include labor, equipment, saw cutting and disposal of same by the contractor.

ITEM 8 – REMOVE EXISTING GRAVEL DRIVEWAY AND APRON

- A. Description: The work in this Item shall consist of the removal and disposal of existing gravel driveway as shown on the Drawings and/or Specifications and as follows:
1. All removed material shall be disposed of by the Contractor at his own expense.
- B. Payment: The unit price stipulated shall be full compensation for removal of each square yard of gravel driveway removed, which shall include labor, equipment, and disposal of same by the contractor.

ITEM 9 – REMOVE EXISTING ASPHALT DRIVEWAY AND APRON

- A. Description: The work in this Item shall consist of the removal and disposal of existing asphalt driveway as shown on the Drawings and/or Specifications and as follows:
1. All removed material shall be disposed of by the Contractor at his own expense.
 2. A neat joint shall be sawed or otherwise cut at the removal limit if it does not occur at an existing joint.
- B. Payment: The unit price stipulated shall be full compensation for removal of each square yard of asphalt driveway removed, which shall include labor, equipment, saw cutting and disposal of same by the contractor.

ITEM 10 – REMOVE EXISTING SIDEWALK, INCLUDING CURB RAMPS

- A. Description: The work in this Item shall consist of the removal and disposal of existing sidewalks and curb ramps as shown on the Drawings and/or Specifications and as follows:

1. All removed material shall be disposed of by the Contractor at his own expense.
 2. A neat joint shall be sawed or otherwise cut at the removal limit if it does not occur at an existing joint.
- B. Payment: The unit price stipulated shall be full compensation for removal of each square foot of sidewalk or curb ramp which shall include labor, equipment, saw cutting and disposal of same by the contractor.

ITEM 11– MANHOLE REMOVED

- A. Description: This work in this Item shall consist of the removal of existing manholes as shown on the Drawings and/or Specifications.
- B. Payment: The unit price stipulated shall be full compensation for each manhole removed. The price shall include furnishing labor, backfill, compaction, sheeting, shoring, restoring all disturbed areas and utilities to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.
- C. Disposal of Manholes shall be as follows:
1. All removed material shall be disposed of by the Contractor at his own expense.
 2. All castings shall be stored by the contractor for salvage by the City

ITEM 12 – CATCH BASIN REMOVED

- A. Description: This work in this Item shall consist of the removal of existing catch basins as shown on the Drawings and/or Specifications.
- B. Payment: The unit price stipulated shall be full compensation for each catch basin removed. The price shall include furnishing labor, backfill, compaction, sheeting, shoring, restoring all disturbed areas and utilities to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.
- C. Disposal of Catch Basins shall be as follows:
1. All removed material shall be disposed of by the Contractor at his own expense.
 2. All castings shall be stored by the contractor for salvage by the City

ITEM 13 – EXCAVATION, LESS PAVEMENT REMOVED

- A. Description: The work in this Item shall consist of the removal and disposal of existing material, not including existing pavement, to reach the bottom of the sub-base of the proposed pavement as shown on the Drawings and/or Specifications.
- B. Payment: The unit price stipulated for this Item will be for each cubic yard excavated and disposed of as shown on the Drawings and/or Specifications.

ITEM 14 – EMBANKMENT

- A. Description: The work in this Item shall consist of the use of acceptable excavated material to be used for embankment purposes as shown on the Drawings and/or Specifications, less 3" of topsoil, which will be paid for under the item for topsoil.
- B. Payment: The unit price stipulated for this Item will be for each cubic yard of embankment placed as shown on the Drawings and/or Specifications.

ITEM 15 – EXCAVATION & GRANULAR MATERIAL, (AASHTO #1, #2, & #10)

- A. Description: The work in this Item shall consist of the excavating, furnishing, placing and compacting one or more courses of aggregate, including furnishing and incorporating all water required for compacting on a

prepared surface, and in reasonably close conformity to the lines, grades and typical cross sections shown on the Drawings and/or Specifications.

- B. Payment: The unit price stipulated to be paid per cubic yard of excavated material removed and placed performed and measured for payment purposes shall be full compensation for the actual number of cubic yards installed complete and in place, including labor, materials and equipment.

ITEM 16 – GEOGRID, (ODOT ITEM 861, Special Material per plans)

- A. Description: This work shall consist of furnishing and placing geogrid over prepared subgrade as specified over an area within the contract (pay) limits.
- B. Payment: The unit price stated in the Bid Schedule shall be full compensation for each square yard of geogrid furnished and placed which is directly or indirectly caused by the project work as shown on the Drawings and/or specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 17 –SEEDING & MULCHING

- A. Measurement: The quantity of each type of seeding and mulching measured for unit price payment purposes, will be the number of square yards of seeding and mulching acceptably placed and compacted when required or as specified over an area within the contract (pay) limits.
- B. Payment: The unit price stated in the Bid Schedule shall be full compensation for each square yard of seeding and mulching furnished and installed which is directly or indirectly caused by the project work as shown on the Drawings and/or specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 18 –3 INCH TOPSOIL, FURNISHED AND PLACED

- A. Description: This work shall consist of furnishing and spreading topsoil and preparing subgrade as specified over an area within the contract (pay) limits.
- B. Payment: The unit price stated in the Bid Schedule shall be full compensation for each cubic yard of topsoil furnished and placed which is directly or indirectly caused by the project work as shown on the Drawings and/or specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 19 – REMOVE AND RESET EXISTING GROUND MOUNTED SIGNS

- A. Description: This work in this Item shall consist of removing and resetting existing ground mounted signs as shown in the Drawings and/or specified in the Contract Documents.
- B. Payment: The unit price stipulated shall be full compensation for each existing ground mounted sign removed and reset as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 20 - TACK COAT .05 GAL./S.Y.

- A. Description: The work in this Item shall consist of preparing and treating a paved surface with bituminous material and will be measured by the gallon actually installed under this item.
- B. Payment: The unit price stipulated per gallon of this Item – Tack Coat as shown on the Drawings and/or Specifications including labor, materials and equipment.

ITEM 21 - PRIME COAT 0.35 GAL./S.Y.

- A. Description: The work in this Item shall consist of preparing and treating a paved surface with bituminous material and will be measured by the gallon actually installed under this item.
- B. Payment: The unit price stipulated per gallon of This Item – Prime Coat as shown on the Drawings and/or Specifications including labor, materials and equipment.

ITEM 22 – COMBINATION CURB & GUTTER, TYPE 2

- A. Description: This work shall consist of the construction of Type 2 Curb and Gutter and shall conform to the plans and specifications.
- B. Payment: The unit price stipulated to be paid for each linear foot of Type 2 Curb and Gutter shall be full compensation for the actual number of linear feet installed including all labor, laying, restoring all disturbed areas, and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 23 – 6" PERFORATED PIPE UNDERDRAIN WITH FILTER SOCK AND WASHED GRANULAR MATERIAL

- A. Description: This work in this Item shall consist of the placement of shallow pipe underdrains as shown on the plans and specification and shall include excavation, bedding, and tees left for future connections.
- B. Payment: The unit price stipulated to be paid for each lineal foot of Pipe Underdrain With Filter Sock and Washed Granular Material, shall be full compensation for the actual number of lineal feet of pipe furnished and installed including labor, materials and equipment.

ITEM 24- 1.5" ASPHALT CONCRETE (ODOT ITEM 448 LEVELING COURSE, TYPE 2)

- A. Description: The work in this Item shall consist of constructing a leveling course of aggregate and asphalt cement mixed in a central plant and spread on a prepared surface in accordance with the Drawings and/or Specification.
- B. Payment: The unit price stipulated per cubic yard of this Item – Asphalt Concrete, shall be full compensation for the actual number of cubic yards installed complete and in place, including labor, materials and equipment.

ITEM 25 - 1-1/2" ASPHALT CONCRETE (ODOT Item 448 Surface Course, Type 1)

- A. Description: The work in this Item shall consist of constructing a surface course of aggregate and asphalt cement mixed in a central plant and spread on a prepared surface in accordance with the Drawings and/or Specification.
- B. Payment: The unit price stipulated per cubic yard of this Item – Asphalt Concrete, shall be full compensation for the actual number of cubic yards installed complete and in place, including labor, materials and equipment.

ITEM 26 - 3" BITUMINOUS AGGREGATE BASE (ODOT ITEM 301)

- A. Description: The work in this Item shall consist of constructing a base course of aggregate and bituminous material, mixed in a central plant and spread on a prepared surface in accordance with the Drawings and/or Specifications.
- B. Payment: The unit price stipulated to be paid per cubic yard of this Item - 6" Bituminous Aggregate Base complete and in place including labor, materials and equipment.

ITEM 27 - 6" AGGREGATE BASE (ODOT ITEM 304)

- A. Description: The work in this Item shall consist of the furnishing, placing and compacting one or more courses of aggregate, including furnishing and incorporating all water required for compacting on a prepared surface, and in reasonably close conformity to the lines, grades and typical cross sections shown on the Drawings and/or Specifications.
- B. Payment: The unit price stipulated to be paid per cubic yard of aggregate base work performed and measured for payment purposes shall be full compensation for the actual number of cubic yards installed complete and in place, including labor, materials and equipment.

ITEM 28– SUBGRADE COMPACTION

- A. Description: The work in this Item shall consist of the preparation of the sub-grade where pavement is to be placed. Including the testing of the stability and uniformity of compaction as well as proof rolling of the same.

- B. Payment: The unit price stipulated shall be full compensation for each square yard of Sub-grade Compaction as measured under the proposed pavement and shall include Proof Rolling.

ITEM 29 – 4" CONCRETE SIDEWALK

- A. Description: This item of work shall consist of constructing concrete walks in reasonable close conformity with lines, grades and dimensions shown on the plans or established by the Engineer.
- B. Payment: The unit price stated for 4" concrete sidewalk walk shall be full compensation for the actual number of square foot, calculated from pay limits, including labor, excavation, backfill, base course, expansion joint, forming, and excavation and removal of all excavated material, completed in compliance with the contract Drawings and Specifications.

ITEM 30 - 4" AGGREGATE BASE (SIDEWALK)

- A. Description: The work in this Item shall consist of the furnishing, placing and compacting one or more courses of aggregate, including furnishing and incorporating all water required for compacting on a prepared surface, and in reasonably close conformity to the lines, grades and typical cross sections shown on the Drawings and/or Specifications.
- B. Payment: The unit price stipulated to be paid per cubic yard of aggregate base work performed and measured for payment purposes shall be full compensation for the actual number of cubic yards installed complete and in place, including labor, materials and equipment.

ITEM 31 – 4' CONCRETE CURB RAMPS W/TRUNCATED DOME PAVERS (ODOT ITEM 608)

- A. Description: The work in this Item consists of construction of concrete curb ramps as shown on the plans and specifications.
- B. Payment: The unit price stipulated for each curb ramp shall be for the materials and labor to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 32 – 10' CONCRETE CURB RAMPS W/TRUNCATED DOME PAVERS (ODOT ITEM 608)

- A. Description: The work in this Item consists of construction of concrete curb ramps as shown on the plans and specifications.
- B. Payment: The unit price stipulated for each curb ramp shall be for the materials and labor to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 33 – 6" PLAIN CONCRETE PAVEMENT, DRIVE APRONS (LIMESTONE AGGREGATE) (ODOT ITEM 452)

- A. Description: This work shall consist of constructing a pavement composed of reinforced Portland cement concrete on a prepared subgrade and base course in accordance with the details, lines, grades, thickness and typical cross sections shown on the plans and specifications.
- B. Payment: The unit price stipulated shall be paid per square yard of 6" Plain Concrete Pavement, and shall be full compensation for furnishing and placing all materials including labor, equipment, and saw cutting to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 34 – CONCRETE DRIVEWAY BEHIND APRONS, DEPTH TO MATCH EXISTING

- A. Description: This work shall consist of constructing a pavement composed of unreinforced Portland cement concrete shown on the plans and specifications. The depth shall match the existing driveway sections that are being removed.
- B. Payment: The unit price stipulated shall be paid per square yard of this item, and shall be full compensation for furnishing and placing all materials including labor, equipment, and saw cutting to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 35 – GRAVEL DRIVEWAY BEHIND APRONS, DEPTH TO MATCH EXISTING

- A. Description: This work shall consist of constructing gravel driveway sections as shown on the plans and specifications. The depth shall match the existing driveway sections that are being removed.
- B. Payment: The unit price stipulated shall be paid per square yard of this item, and shall be full compensation for furnishing and placing all materials including labor and equipment to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 36 – ASPHALT DRIVEWAY BEHIND APRONS, DEPTH TO MATCH EXISTING

- A. Description: This work shall consist of constructing asphalt driveway sections as shown on the plans and specifications. The depth shall match the existing driveway sections that are being removed.
- B. Payment: The unit price stipulated shall be paid per square yard of this item, and shall be full compensation for furnishing and placing all materials including labor and equipment to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 37 – ADJUST EXISTING CASTINGS/ VALVE BOXES TO GRADE

- A. Description: The work in this Item consists of the adjustment of existing castings or valve boxes to grade.
- B. Payment: The unit price stated for this item shall be a lump sum for all of the work involved with adjusting existing castings or valve boxes to grade due to the proposed pavement improvements.

ITEM 38 – TYPE C PAVEMENT REPLACEMENT

- A. Description: The work in this Item shall consist of the Type C pavement replacement in the areas shown on the Drawings.
- B. Payment: The unit price stipulated to be paid for each square yard of Type C Pavement Replacement shall be full compensation for the actual number of square yards, calculated from payment limits as called for in the contract drawings, completed in compliance with the contract drawings and specifications and accepted for payment purposes and shall include furnishing all labor, materials, tools, appliances and equipment necessary thereto and, in connection with same, restore all disturbed site features and other items plus provide all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 39 - NEOPLAST YARD DRAIN

- A. Description: The work in this Item shall consist of the construction of Yard Drains of the type and sizes shown on the Drawings and /or Specifications and shall include excavation, bedding, and backfill.
- B. Payment: The unit price for each Yard Drain shall be full compensation for the unit, furnished, installed, and connected in accordance with the Drawings and Specifications including excavation, backfill, labor material, inlet, equipment, and restoration.

ITEM 40 - CATCH BASIN TYPE 3A

- A. Description: The work in this Item shall consist of the construction of Catch Basins of the type and sizes shown on the Drawings and /or Specifications and shall include excavation, bedding, and backfill.
- B. Payment: The unit price for each precast catch basin shall be full compensation for the catch basin, furnished, installed, and connected in accordance with the Drawings and Specifications including excavation, backfill, labor material, frame and grates, equipment, and restoration.

ITEM 41– 12" RCP SEWER PIPE (STORM)

- A. Description: The work in this Item shall consist of furnishing and installing RCP Storm Sewer Pipe as shown on the Drawings and/or specified, including removal and disposal of existing sewers. Measurements shall be made on a linear foot basis for the actual work performed under this item, measured along the horizontal projection of the longitudinal axis of the pipe.

- B. Payment: The unit price stated on the Bid Schedule shall be compensation for each lineal foot of pipe installed including all fittings and plugs measured for payment. The price shall include furnishing labor, backfill, compaction, laying, sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, removing existing sewers, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for –use installation.

ITEM 42 – 24" RCP SEWER PIPE (STORM)

- A. Description: The work in this Item shall consist of furnishing and installing RCP Storm Sewer Pipe as shown on the Drawings and/or specified, including removal and disposal of existing sewers. Measurements shall be made on a linear foot basis for the actual work performed under this item, measured along the horizontal projection of the longitudinal axis of the pipe.
- B. Payment: The unit price stated on the Bid Schedule shall be compensation for each lineal foot of pipe installed including all fittings and plugs measured for payment. The price shall include furnishing labor, backfill, compaction, laying, sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, removing existing sewers, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for –use installation.

ITEM 43 – 24" D.I.P. CL 52 SEWER PIPE (STORM)

- C. Description: The work in this Item shall consist of furnishing and installing DIP Storm Sewer Pipe as shown on the Drawings and/or specified, including removal and disposal of existing sewers. Measurements shall be made on a linear foot basis for the actual work performed under this item, measured along the horizontal projection of the longitudinal axis of the pipe.
- D. Payment: The unit price stated on the Bid Schedule shall be compensation for each lineal foot of pipe installed including all fittings and plugs measured for payment. The price shall include furnishing labor, backfill, compaction, laying, sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, removing existing sewers, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for –use installation.

ITEM 44 – STORM SEWER BORE & JACK 36" STEEL CASING (24" DIP CL 52 CARRIER PIPE)

- A. Measurement: The footage measured will be the actual number of lineal feet of Bore & Jack Construction complete in place as work performed under this item and measured from beginning to end along the longitudinal axis of each pipe run end to end of its respective steel casing.
- B. Payment: The unit price stipulated to be paid for each lineal foot of Bore & Jack sewer shall be full compensation for the actual number of lineal feet of Bore & Jack Construction including steel casing, DIP carrier pipe and boring and receiving pits installed, measured and accepted for payment purposes and shall include furnishing labor, materials, tools, appliances and equipment necessary to provide and install and test pipe, fittings and specials as specified and, in connection with same, to excavate, bed, backfill, shore, sheet, clear site, remove and dispose of existing structures, restore all disturbed utilities, structures, and site features plus provide all appurtenances to complete the work as shown on the drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 45 – STORM MANHOLE – 48" BASE

- A. Description: The work in this Item shall consist of the construction of Manholes of the type and sizes shown on the Drawings and /or Specifications and shall include excavation, bedding, and backfill.
- B. Payment: For each Item – Manholes, shall be as stated below:
1. The unit price for each precast manhole shall be full compensation for the manholes, furnished, installed, and connected in accordance with the Drawings and Specifications including excavation, backfill, labor material, frame and grates, equipment and restoration.
 2. The unit price stated in the Bid Schedule shall include precast sections, waterproofing, manhole steps, grade adjusting, labor, construction, backfill, compaction, regular and drop manhole connections, frame and covers, restoration of all disturbed areas and utilities, and all other appurtenances for the work shown on the Drawings and/or specified in the Construction Documents for a complete and ready-for-use installation.

ITEM 46 – 6" PVC GRAVITY STORM LATERAL CONNECTION

- A. Measurement: Measurement shall be for each lateral connection installed, as shown on the contract drawings and/or specified for a complete and ready-for-use installation.
- B. Payment: The unit price stated in the Bid Schedule shall be full compensation for each lateral connection installed for payment. The price shall include furnishing, backfill, compaction, laying, sheeting, shoring, inspecting, testing of pipe and fittings, restoring all utilities, and all appurtenances to complete the work as shown on the Drawings and/or specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 47 – 6" PVC STORM CLEANOUT

- A. Measurement: Measurement shall be for each cleanout installed, as shown on the contract drawings and/or specified for a complete and ready-for-use installation.
- B. Payment: The unit price stated in the Bid Schedule shall be full compensation for each cleanout installed for payment. The price shall include furnishing, backfill, compaction, laying, sheeting, shoring, inspecting, testing of pipe and fittings, restoring all utilities, and all appurtenances to complete the work as shown on the Drawings and/or specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 48 – 8" PVC GRAVITY SEWER PIPE – ASTM D-3034, SDR 26 (SANITARY)

- A. Description: The work in this Item shall consist of furnishing and installing PVC Sanitary Sewer Pipe as shown on the Drawings and/or specified, including removal and disposal of existing sewers. Measurements shall be made on a linear foot basis for the actual work performed under this item, measured along the horizontal projection of the longitudinal axis of the pipe.
- B. Payment: The unit price stated on the Bid Schedule shall be compensation for each lineal foot of pipe installed including all fittings and plugs measured for payment. The price shall include furnishing labor, backfill, compaction, laying, sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, removing existing sewers, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for –use installation.

ITEM 49 – 8" D.I.P. CL 52 SEWER (SANITARY)

- A. Description: The work in this Item shall consist of furnishing and installing DIP Sanitary Sewer Pipe as shown on the Drawings and/or specified, including removal and disposal of existing sewers. Measurements shall be made on a linear foot basis for the actual work performed under this item, measured along the horizontal projection of the longitudinal axis of the pipe.
- B. Payment: The unit price stated on the Bid Schedule shall be compensation for each lineal foot of pipe installed including all fittings and plugs measured for payment. The price shall include furnishing labor, backfill, compaction, laying, sheeting, shoring, inspection, testing of pipe and fittings, restoring all disturbed areas and utilities, removing existing sewers, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for –use installation.

ITEM 50 – SANITARY BORE & JACK 15" STEEL CASING (8" DIP CL 52 CARRIER PIPE)

- A. Measurement: The footage measured will be the actual number of lineal feet of Bore & Jack Construction complete in place as work performed under this item and measured from beginning to end along the longitudinal axis of each pipe run end to end of its respective steel casing.
- B. Payment: The unit price stipulated to be paid for each lineal foot of Bore & Jack sewer shall be full compensation for the actual number of lineal feet of Bore & Jack Construction including steel casing, DIP carrier pipe and boring and receiving pits installed, measured and accepted for payment purposes and shall include furnishing labor, materials, tools, appliances and equipment necessary to provide and install and test pipe, fittings and specials as specified and, in connection with same, to excavate, bed, backfill, shore, sheet, clear site, remove and dispose of existing structures, restore all disturbed utilities, structures, and site features plus provide all appurtenances to complete the work as shown on the drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 51– 6" (PVC) GRAVITY SANITARY LATERAL CONNECTION

- A. Measurement: Measurement shall be for each lateral connection installed, as shown on the contract drawings and/or specified for a complete and ready-for-use installation.
- B. Payment: The unit price stated in the Bid Schedule shall be full compensation for each lateral connection installed for payment. The price shall include furnishing, backfill, compaction, laying, sheeting, shoring, inspecting, testing of pipe and fittings, restoring all utilities, and all appurtenances to complete the work as shown on the Drawings and/or specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 52 – 6" (PVC) SANITARY CLEANOUT

- A. Measurement: Measurement shall be for each cleanout installed, as shown on the contract drawings and/or specified for a complete and ready-for-use installation.
- B. Payment: The unit price stated in the Bid Schedule shall be full compensation for each cleanout installed for payment. The price shall include furnishing, backfill, compaction, laying, sheeting, shoring, inspecting, testing of pipe and fittings, restoring all utilities, and all appurtenances to complete the work as shown on the Drawings and/or specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 53 – SANITARY MANHOLE – 48" BASE

- A. Description: The work in this Item shall consist of the construction of Manholes of the type and sizes shown on the Drawings and /or Specifications and shall include excavation, bedding, and backfill.
- B. Payment: For each Item – Manholes, shall be as stated below:
 - 1. The unit price for each precast manhole shall be full compensation for the manholes, furnished, installed, and connected in accordance with the Drawings and Specifications including excavation, backfill, labor material, frame and grates, equipment and restoration.
 - 2. The unit price stated in the Bid Schedule shall include precast sections, waterproofing, manhole steps, grade adjusting, labor, construction, backfill, compaction, manhole connections, frame and covers, restoration of all disturbed areas and utilities, and all other appurtenances for the work shown on the Drawings and/or specified in the Construction Documents for a complete and ready-for-use installation.

ITEM 54 – 8" PVC C-900 WATERMAIN

- A. Description: The work in this Item shall consist of furnishing and installing waterline as shown on the Drawings and/or specified. Measurements shall be made on a linear foot basis for the actual work performed under this item, measured along the horizontal projection if the longitudinal axis of the pipe.
- B. Payment: The unit price in the Bid Schedule shall be full compensation for each linear foot of waterline installed and measured for payment. The price shall include furnishing, all fittings required including the cost of fittings and plugs, cathodic protection, tracer tape, excavation, backfill, compaction, laying sheeting, shoring, inspection, testing of pipe and fittings, disinfection of potable waterlines, restoring all disturbed areas and utilities, concrete encasement and all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-to-use installation.

ITEM 55 – WATERMAIN BORE & JACK 15" STEEL CASING (8" DIP CL 52 CARRIER PIPE)

- A. Measurement: The footage measured will be the actual number of lineal feet of Bore & Jack Construction complete in place as work performed under this item and measured from beginning to end along the longitudinal axis of each pipe run end to end of its respective steel casing.
- B. Payment: The unit price stipulated to be paid for each lineal foot of Bore & Jack sewer shall be full compensation for the actual number of lineal feet of Bore & Jack Construction including steel casing, DIP carrier pipe and boring and receiving pits installed, measured and accepted for payment purposes and shall include furnishing labor, materials, tools, appliances and equipment necessary to provide and install and test pipe, fittings and specials as specified and, in connection with same, to excavate, bed, backfill, shore, sheet, clear site, remove and dispose of existing structures, restore all disturbed utilities, structures, and site features plus

provide all appurtenances to complete the work as shown on the drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 56 – HYDRANT ASSEMBLY

- A. Description: The work in this Item shall consist of furnishing and installing fire hydrant assemblies as per the plans and specifications. Measurement shall be on an each installed and accepted basis.
- B. Payment: The unit price stipulated to be paid for each Hydrant Assembly shall be full compensation for the actual number of same furnished, installed, tested, shop and field painted complete including valve, operating mechanism(s), extension stem(s), valve boxes, wrenches, glands, gaskets, connecting bolts, cathodic protection and all other appurtenant parts and equipment measured and accepted for payment purposes and shall include furnishing labor, materials, tools, appliances and equipment necessary to provide and construct each installation with shut-off valve, box and cover as specified and, in connection with same, to excavate, bed, backfill, shore, sheet, clear site, restore all disturbed utilities, structures, and site features plus provide all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 57 – 8" TAPPING SLEEVE & VALVE AND APPURTENANCES

- A. Description: The work in this Item shall consist of furnishing and installing Tapping Sleeve and Valve with Box and Cover. Measurement shall be made on each tapping sleeve and valve with box and cover completed and accepted for payment.
- B. Payment: The unit price stipulated to be paid for each tapping sleeve and valve and all appurtenances of the various sizes provided shall be full compensation for the actual number same furnished, installed, tested, shop and field painted complete including valve, operating mechanism(s), extension stem(s), valve boxes, wrenches, glands, gaskets, cathodic protection, connecting bolts and all other appurtenant parts and equipment measured and accepted for payment purposes and shall include furnishing labor, materials, tools, appliances and equipment necessary to provide and construct each tapping sleeve and valve installation with box and cover as specified and, in connection with same, to excavate, bed, backfill, shore, sheet, clear site, remove and dispose of existing structures, restore all disturbed utilities, structures, and site features plus provide all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for-use installation.

ITEM 58 – ¾" TYPE K COPPER SERVICE REPLACEMENT (LONG)

- A. Description: The work in this Item shall consist of furnishing and installing ¾" Type "K" Copper Residential Water Service lines as indicated on the drawings.
- B. Payment: The unit price stipulated to be paid per linear foot of ¾" Type "K" Copper Residential Water Service shall be full compensation for the actual number of linear feet furnished, installed in place, connected, tested and accepted including furnishing, storage, labor, materials, tools, appliances and equipment necessary to provide and construct each new connection as specified and, in connection with same, to excavate, bed, backfill, shore, sheet, clear site, restore all disturbed utilities and site features plus provide all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for use installation.

ITEM 59 – ¾" TYPE K COPPER SERVICE REPLACEMENT (SHORT)

- A. Description: The work in this Item shall consist of furnishing and installing ¾" Type "K" Copper Residential Water Service lines as indicated on the drawings.
- B. Payment: The unit price stipulated to be paid per linear foot of ¾" Type "K" Copper Residential Water Service shall be full compensation for the actual number of linear feet furnished, installed in place, connected, tested and accepted including furnishing, storage, labor, materials, tools, appliances and equipment necessary to provide and construct each new connection as specified and, in connection with same, to excavate, bed, backfill, shore, sheet, clear site, restore all disturbed utilities and site features plus provide all appurtenances to complete the work as shown on the Drawings and specified in the Contract Documents for a complete and ready-for use installation.

PROPOSAL TO THE CITY OF CLYDE, OHIO
EAST STREET IMPROVEMENTS

TO: MAYOR SCOTT BLACK
CITY OF CLYDE
222 NORTH MAIN STREET
CLYDE, OHIO 43410

Gentlemen:

Proposal of _____(hereinafter called "BIDDER"), organized and existing under the laws of the State of Ohio doing business as _____.
To the CITY OF CLYDE (hereinafter called "Owner").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of the EAST STREET IMPROVEMENTS in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submitting this BID, the BIDDER, or in the case of a joint BID, each party thereto, certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

The undersigned have full knowledge of the project site, Drawings, and the conditions of the proposal. The undersigned also, hereby agrees to furnish all the services, labor, materials and equipment necessary to complete these projects according to the Drawings and Specifications and to accept as full compensation the lump sum or unit prices stated in the Bid Schedule for the work and for use when calculating the price of a deduction or an increase in quantities.

BIDDER hereby agrees to commence WORK under this Contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within the period stipulated in the INSTRUCTIONS TO BIDDERS. BIDDER further agrees to pay as liquidated damages and that the CITY may retain from monies that are, or which may become due. The amount of such liquidated damages shall be as stipulated in the CONTRACT AGREEMENT FORM (Section 00500 herein).

* Insert "a corporation", "a partnership", or "an individual" as applicable.

The Bidder hereby acknowledges receipt of the following addenda:

| <u>ADDENDUM NO.</u> | <u>DATE</u> |
|---------------------|-------------|
| <hr/> | <hr/> |
| <hr/> | <hr/> |
| <hr/> | <hr/> |

We further agree that the Owner may reject any or all bids.

SUBMITTED BY:

Firm, Corporation or Individual

Address

Telephone Number

Contractor License Number

Signature:

 Date:

NOTE: Evidence of authority to sign and the corporate seal must be affixed and attested by the Secretary.

COMPLETION DATE: 120 Calendar Days commencing on the date as shown on Notice to Proceed for Final Completion.

PROPOSAL TO THE CITY OF CLYDE, OHIO
EAST STREET IMPROVEMENTS
THROUGH STREET DESIGN
BID SCHEDULE

| Bid Item | Item Description | Est. Qty. | Unit | Unit Price Material | Unit Price Labor | Total Unit Price | Total Price |
|-----------------|--|-----------|------|---------------------|------------------|------------------|-------------|
| General | | | | | | | |
| 1 | Bond & Insurance | 1 | Lump | \$ | \$ | \$ | \$ |
| 2 | Mobilization | 1 | Lump | \$ | \$ | \$ | \$ |
| 3 | Maintenance of Traffic | 1 | Lump | \$ | \$ | \$ | \$ |
| 4 | Construction Layout Stakes | 1 | Lump | \$ | \$ | \$ | \$ |
| Roadway | | | | | | | |
| 5 | Concrete Curb Removed | 1 | Lump | \$ | \$ | \$ | \$ |
| 6 | Asphalt Pavement Removed | 1633 | SY | \$ | \$ | \$ | \$ |
| 7 | Remove Existing Concrete Driveway and Apron | 23 | SY | \$ | \$ | \$ | \$ |
| 8 | Remove Existing Gravel Driveway and Apron | 288 | SY | \$ | \$ | \$ | \$ |
| 9 | Remove Existing Asphalt Driveway and Apron | 15 | SY | \$ | \$ | \$ | \$ |
| 10 | Remove Existing Sidewalk, Including Curb Ramps | 5813 | SF | \$ | \$ | \$ | \$ |
| 11 | Manhole Removed | 2 | Each | \$ | \$ | \$ | \$ |
| 12 | Catch Basin Removed | 1 | Each | \$ | \$ | \$ | \$ |
| 13 | Excavation, Less Pavement Removed | 1484 | CY | \$ | \$ | \$ | \$ |
| 14 | Embankment | 19 | CY | \$ | \$ | \$ | \$ |
| 15 | Excavation & Granular Material | 842 | CY | \$ | \$ | \$ | \$ |
| 16 | Geogrid, | 2513 | SY | \$ | \$ | \$ | \$ |
| 17 | Seeding & Mulching | 1953 | SY | \$ | \$ | \$ | \$ |
| 18 | 3" Topsoil, Furnished and Placed | 163 | CY | \$ | \$ | \$ | \$ |
| 19 | Remove and Reset Existing Ground Mounted Signs | 8 | Each | \$ | \$ | \$ | \$ |
| Pavement | | | | | | | |
| 20 | Tack Coat .05 GAL./ S.Y. | 106 | GAL | \$ | \$ | \$ | \$ |

EAST STREET IMPROVEMENTS
THROUGH STREET DESIGN

| Bid Item | Item Description | Est. Qty. | Unit | Unit Price Material | Unit Price Labor | Total Unit Price | Total Price |
|--------------|---|-----------|------|---------------------|------------------|------------------|-------------|
| 21 | Prime Coat 0.35 GAL / S.Y. | 742 | GAL | \$ | \$ | \$ | \$ |
| 22 | Combination Curb & Gutter, Type 2 | 1548 | LF | \$ | \$ | \$ | \$ |
| 23 | 6" Underdrain w/ Filter Sock | 1548 | LF | \$ | \$ | \$ | \$ |
| 24 | 1 ½" Asphalt Concrete, Leveling Course | 88 | CY | \$ | \$ | \$ | \$ |
| 25 | 1 ½" Asphalt Concrete, Surface Course | 88 | CY | \$ | \$ | \$ | \$ |
| 26 | 3" Bituminous Aggregate Base (ODOT Item 301) | 177 | CY | \$ | \$ | \$ | \$ |
| 27 | 6" Aggregate Base (ODOT Item 304) | 424 | CY | \$ | \$ | \$ | \$ |
| 28 | Subgrade Compaction | 2543 | SY | \$ | \$ | \$ | \$ |
| 29 | 4" Concrete Sidewalk | 5491 | SF | \$ | \$ | \$ | \$ |
| 30 | 4" Aggregate Base | 68 | CY | \$ | \$ | \$ | \$ |
| 31 | 4' Concrete Curb Ramps (ODOT Item 608) | 4 | Each | \$ | \$ | \$ | \$ |
| 32 | 10' Concrete Curb Ramps (ODOT Item 608) | 2 | Each | \$ | \$ | \$ | \$ |
| 33 | 6" Concrete Drive Aprons (ODOT Item 452) | 159 | SY | \$ | \$ | \$ | \$ |
| 34 | Concrete Driveway Behind Aprons | 11 | SY | \$ | \$ | \$ | \$ |
| 35 | Gravel Driveway Behind Aprons | 66 | SY | \$ | \$ | \$ | \$ |
| 36 | Asphalt Driveway Behind Aprons | 5 | SY | \$ | \$ | \$ | \$ |
| 37 | Adjust Existing Castings / Valve Boxes to Grade | 1 | Lump | \$ | \$ | \$ | \$ |
| 38 | Type C Pavement Replacement | 71 | SY | \$ | \$ | \$ | \$ |
| Storm | | | | | | | |
| 39 | NeoPlast Yard Drain | 3 | Each | \$ | \$ | \$ | \$ |
| 40 | Catch Basin Type 3A | 6 | Each | \$ | \$ | \$ | \$ |
| 41 | 12" RCP Sewer Pipe (Storm) | 139 | LF | \$ | \$ | \$ | \$ |
| 42 | 24" RCP Sewer Pipe (Storm) | 718 | LF | \$ | \$ | \$ | \$ |

EAST STREET IMPROVEMENTS
THROUGH STREET DESIGN

| Bid Item | Item Description | Est. Qty. | Unit | Unit Price Material | Unit Price Labor | Total Unit Price | Total Price |
|-----------------|---|-----------|------|---------------------|------------------|------------------|-------------|
| 43 | 24" D.I.P. CL 52 Sewer (Storm) | 8 | LF | \$ | \$ | \$ | \$ |
| 44 | Storm Sewer Bore & Jack (36" Casing, 24" Carrier) | 100 | LF | \$ | \$ | \$ | \$ |
| 45 | Storm Manhole – 48" Base | 5 | Each | \$ | \$ | \$ | \$ |
| 46 | 6" PVC Gravity Storm Sewer Lateral Connection | 7 | Each | \$ | \$ | \$ | \$ |
| 47 | 6" PVC Storm Cleanout | 7 | Each | \$ | \$ | \$ | \$ |
| Sanitary | | | | | | | |
| 48 | 8" PVC Sanitary Sewer Pipe –SDR 26 | 380 | LF | \$ | \$ | \$ | \$ |
| 49 | 8" D.I.P. CL 52 Sewer (Sanitary) | 41 | LF | \$ | \$ | \$ | \$ |
| 50 | Sanitary Bore & Jack (15" Casing, 8" Carrier) | 90 | LF | \$ | \$ | \$ | \$ |
| 51 | 6" PVC Gravity Sanitary Lateral Connection | 5 | Each | \$ | \$ | \$ | \$ |
| 52 | 6" PVC Sanitary Cleanout | 5 | Each | \$ | \$ | \$ | \$ |
| 53 | Sanitary Manhole – 48" Base | 2 | Each | \$ | \$ | \$ | \$ |
| Water | | | | | | | |
| 54 | 8" PVC C-900 Watermain | 741 | LF | \$ | \$ | \$ | \$ |
| 55 | Watermain Bore & Jack (15" Casing, 8" Carrier) | 100 | LF | \$ | \$ | \$ | \$ |
| 56 | Hydrant Assembly | 3 | Each | \$ | \$ | \$ | \$ |
| 57 | 8" Tapping Sleeve & Valve and Appurtenances | 2 | Each | \$ | \$ | \$ | \$ |
| 58 | ¾" Type K Copper Service Replacement (Long) | 2 | Each | \$ | \$ | \$ | \$ |
| 59 | ¾" Type K Copper Service Replacement (Short) | 4 | Each | \$ | \$ | \$ | \$ |
| TOTAL | | | | | | | \$ |

TOTAL AMOUNT OF PROJECT (IN FIGURES)

TOTAL AMOUNT OF PROJECT (IN WORDS)

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FOR REFERENCE ONLY

PROPOSAL TO THE CITY OF CLYDE, OHIO
EAST STREET IMPROVEMENTS
CUL-DE-SAC DESIGN
BID SCHEDULE

| Bid Item | Item Description | Est. Qty. | Unit | Unit Price Material | Unit Price Labor | Total Unit Price | Total Price |
|-----------------|--|-----------|------|---------------------|------------------|------------------|-------------|
| General | | | | | | | |
| 1 | Bond & Insurance | 1 | Lump | \$ | \$ | \$ | \$ |
| 2 | Mobilization | 1 | Lump | \$ | \$ | \$ | \$ |
| 3 | Maintenance of Traffic | 1 | Lump | \$ | \$ | \$ | \$ |
| 4 | Construction Layout Stakes | 1 | Lump | \$ | \$ | \$ | \$ |
| Roadway | | | | | | | |
| 5 | Concrete Curb Removed | 1 | Lump | \$ | \$ | \$ | \$ |
| 6 | Asphalt Pavement Removed | 1620 | SY | \$ | \$ | \$ | \$ |
| 7 | Remove Existing Concrete Driveway and Apron | 23 | SY | \$ | \$ | \$ | \$ |
| 8 | Remove Existing Gravel Driveway and Apron | 288 | SY | \$ | \$ | \$ | \$ |
| 9 | Remove Existing Asphalt Driveway and Apron | 15 | SY | \$ | \$ | \$ | \$ |
| 10 | Remove Existing Sidewalk, Including Curb Ramps | 6084 | SF | \$ | \$ | \$ | \$ |
| 11 | Manhole Removed | 2 | Each | \$ | \$ | \$ | \$ |
| 12 | Catch Basin Removed | 1 | Each | \$ | \$ | \$ | \$ |
| 13 | Excavation, Less Pavement Removed | 1548 | CY | \$ | \$ | \$ | \$ |
| 14 | Embankment | 26 | CY | \$ | \$ | \$ | \$ |
| 15 | Excavation & Granular Material | 871 | CY | \$ | \$ | \$ | \$ |
| 16 | Geogrid, | 2604 | SY | \$ | \$ | \$ | \$ |
| 17 | Seeding & Mulching | 2662 | SY | \$ | \$ | \$ | \$ |
| 18 | 3" Topsoil, Furnished and Placed | 223 | CY | \$ | \$ | \$ | \$ |
| 19 | Remove and Reset Existing Ground Mounted Signs | 8 | Each | \$ | \$ | \$ | \$ |
| Pavement | | | | | | | |
| 20 | Tack Coat .05 GAL./ S.Y. | 112 | GAL | \$ | \$ | \$ | \$ |

EAST STREET IMPROVEMENTS
CUL-DE-SAC DESIGN

| Bid Item | Item Description | Est. Qty. | Unit | Unit Price Material | Unit Price Labor | Total Unit Price | Total Price |
|--------------|---|-----------|------|---------------------|------------------|------------------|-------------|
| 21 | Prime Coat 0.35 GAL / S.Y. | 783 | GAL | \$ | \$ | \$ | \$ |
| 22 | Combination Curb & Gutter, Type 2 | 1443 | LF | \$ | \$ | \$ | \$ |
| 23 | 6" Underdrain w/ Filter Sock | 1443 | LF | \$ | \$ | \$ | \$ |
| 24 | 1 ½" Asphalt Concrete, Leveling Course | 93 | CY | \$ | \$ | \$ | \$ |
| 25 | 1 ½" Asphalt Concrete, Surface Course | 93 | CY | \$ | \$ | \$ | \$ |
| 26 | 3" Bituminous Aggregate Base (ODOT Item 301) | 186 | CY | \$ | \$ | \$ | \$ |
| 27 | 6" Aggregate Base (ODOT Item 304) | 439 | CY | \$ | \$ | \$ | \$ |
| 28 | Subgrade Compaction | 2637 | SY | \$ | \$ | \$ | \$ |
| 29 | 4" Concrete Sidewalk | 4202 | SF | \$ | \$ | \$ | \$ |
| 30 | 4" Aggregate Base | 52 | CY | \$ | \$ | \$ | \$ |
| 31 | 4' Concrete Curb Ramps (ODOT Item 608) | 2 | Each | \$ | \$ | \$ | \$ |
| 32 | 10' Concrete Curb Ramps (ODOT Item 608) | 2 | Each | \$ | \$ | \$ | \$ |
| 33 | 6" Concrete Drive Aprons (ODOT Item 452) | 159 | SY | \$ | \$ | \$ | \$ |
| 34 | Concrete Driveway Behind Aprons | 11 | SY | \$ | \$ | \$ | \$ |
| 35 | Gravel Driveway Behind Aprons | 66 | SY | \$ | \$ | \$ | \$ |
| 36 | Asphalt Driveway Behind Aprons | 5 | SY | \$ | \$ | \$ | \$ |
| 37 | Adjust Existing Castings / Valve Boxes to Grade | 1 | Lump | \$ | \$ | \$ | \$ |
| 38 | Type C Pavement Replacement | 134 | SY | \$ | \$ | \$ | \$ |
| Storm | | | | | | | |
| 39 | NeoPlast Yard Drain | 3 | Each | \$ | \$ | \$ | \$ |
| 40 | Catch Basin Type 3A | 5 | Each | \$ | \$ | \$ | \$ |
| 41 | 12" RCP Sewer Pipe (Storm) | 235 | LF | \$ | \$ | \$ | \$ |
| 42 | 24" RCP Sewer Pipe (Storm) | 718 | LF | \$ | \$ | \$ | \$ |

EAST STREET IMPROVEMENTS
CUL-DE-SAC DESIGN

| Bid Item | Item Description | Est. Qty. | Unit | Unit Price Material | Unit Price Labor | Total Unit Price | Total Price |
|-----------------|---|-----------|------|---------------------|------------------|------------------|-------------|
| 43 | 24" D.I.P. CL 52 Sewer (Storm) | 8 | LF | \$ | \$ | \$ | \$ |
| 44 | Storm Sewer Bore & Jack (36" Casing, 24" Carrier) | 100 | LF | \$ | \$ | \$ | \$ |
| 45 | Storm Manhole – 48" Base | 5 | Each | \$ | \$ | \$ | \$ |
| 46 | 6" PVC Gravity Storm Sewer Lateral Connection | 7 | Each | \$ | \$ | \$ | \$ |
| 47 | 6" PVC Storm Cleanout | 7 | Each | \$ | \$ | \$ | \$ |
| Sanitary | | | | | | | |
| 48 | 8" PVC Sanitary Sewer Pipe –SDR 26 | 380 | LF | \$ | \$ | \$ | \$ |
| 49 | 8" D.I.P. CL 52 Sewer (Sanitary) | 39 | LF | \$ | \$ | \$ | \$ |
| 50 | Sanitary Bore & Jack (15" Casing, 8" Carrier) | 90 | LF | \$ | \$ | \$ | \$ |
| 51 | 6" PVC Gravity Sanitary Lateral Connection | 5 | Each | \$ | \$ | \$ | \$ |
| 52 | 6" PVC Sanitary Cleanout | 5 | Each | \$ | \$ | \$ | \$ |
| 53 | Sanitary Manhole – 48" Base | 2 | Each | \$ | \$ | \$ | \$ |
| Water | | | | | | | |
| 54 | 8" PVC C-900 Watermain | 741 | LF | \$ | \$ | \$ | \$ |
| 55 | Watermain Bore & Jack (15" Casing, 8" Carrier) | 100 | LF | \$ | \$ | \$ | \$ |
| 56 | Hydrant Assembly | 3 | Each | \$ | \$ | \$ | \$ |
| 57 | 8" Tapping Sleeve & Valve and Appurtenances | 2 | Each | \$ | \$ | \$ | \$ |
| 58 | ¾" Type K Copper Service Replacement (Long) | 2 | Each | \$ | \$ | \$ | \$ |
| 59 | ¾" Type K Copper Service Replacement (Short) | 4 | Each | \$ | \$ | \$ | \$ |
| TOTAL | | | | | | | \$ |

TOTAL AMOUNT OF PROJECT (IN FIGURES)

TOTAL AMOUNT OF PROJECT (IN WORDS)

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SECTION 00410

BIDDER'S QUALIFICATIONS

BIDDER'S GENERAL INFORMATION

The Bidder shall furnish and notarize the following information. Additional sheets shall be attached as required. Failure to complete will cause the Bid to be non-responsive and may cause its rejection. No award will be made until all of the Bidder's General Information is provided to the Owner.

1. BIDDER/CONTRACTOR'S name and street address:

Names of Responsible Management Officer or Responsible Management Employee

2. BIDDER'S telephone number: (_____) _____

3. Name of person who inspected the site of the proposed Work for the Bidder:

Name: _____ Date of inspection: _____

4. Identify Surety Company and Agent who will provide the required Bonds on this Contract:

Name of Surety:

Address

Surety Company Agent:

Telephone Numbers: Agent: (_____) _____ Surety: (_____) _____

5. When was Bidder Company Organized?

6. How many years has Bidder been engaged in the construction business under the present firm or trade name?

7. List current contracts under construction by the Bidder, showing amount of each contract and completion date.

| <u>CONTRACT/PROJECT</u> | <u>AMOUNT</u> | <u>COMPLETION DATE</u> |
|-------------------------|---------------|------------------------|
|-------------------------|---------------|------------------------|

| | | |
|----------|-------|-------|
| 1. _____ | _____ | _____ |
|----------|-------|-------|

| | | |
|----------|-------|-------|
| 2. _____ | _____ | _____ |
|----------|-------|-------|

| | | |
|----------|-------|-------|
| 3. _____ | _____ | _____ |
|----------|-------|-------|

8. Briefly describe the general character of work normally performed by the Bidder.

- _____
- _____
9. Has Bidder ever failed to complete any contract awarded to you? If so, describe, list contract, amount, date and why: _____
- _____
10. Has Bidder ever defaulted on a contract? If so, list contract, amount, date and reason: _____
- _____
11. Attach to this BID the resume of the person who will be designated as General Construction Superintendent or on-site Construction Manager for the Bidder.
12. Attach to the BID a financial statement, references, and other information sufficiently comprehensive to permit an appraisal of the Bidder's current financial condition.
13. The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the Local Public Agency in verification of the recitals comprising this statement of Bidder's Qualifications.

Dated at _____ this _____ day of _____, 20_____.

Bidder: _____ By _____ Title: _____

State of _____ County of _____

being duly sworn deposes and says that he is _____ of _____ and that the answers to the foregoing questions and all statements therein contained are true and correct.

Subscribed and sworn to before me this _____ day of _____, 20_____.

Notary Public

My commission expires: _____ 20_____.

LIST OF SUBCONTRACTORS

The BIDDER is required to list in the spaces provided below, the SUBCONTRACTORS who will perform work under this BID in excess of 1% of the Contractor's Total Bid Price. The BIDDER shall also list the other required information for each SUBCONTRACTOR (Name, Address, Phone No., License Number, Work To Be Performed, MBE/WBE Business Owned Company, total amount of work to be performed in dollars and percent of total contract amount). Failure to comply with this requirement will render the BID as non-responsive and may cause its rejection.

The total cost of the work performed by SUBCONTRACTORS must not be more than fifty percent (50% of the total contract amount).

1. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
2. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
3. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
4. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
5. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____
6. Work to be performed _____
Subcontractor, Address, Phone Number _____

License Number _____ MBE/WBE (Yes or No) _____
Total Dollar Amount _____ Percent of Total Contract _____

(Add additional sheets, if necessary.)

EXPERIENCE RECORD

The BIDDER shall furnish the following information on a minimum of three (3) completed projects, of recent date, involving work of similar type and complexity to this Project that the BIDDER successfully completed. List below all information to enable the OWNER to judge the experience and capability of the BIDDER to perform this Project work.

| | | |
|----|----------------------|-----------------|
| 1. | Project Name _____ | |
| | Contract Price _____ | |
| | Date Completed _____ | |
| | Owner: | Engineer: |
| | Name _____ | Name _____ |
| | Address _____ | Address _____ |
| | _____ | _____ |
| | Phone No. _____ | Phone No. _____ |
| | Contact _____ | Contact _____ |
| 2. | Project Name _____ | |
| | Contract Price _____ | |
| | Date Completed _____ | |
| | Owner: | Engineer: |
| | Name _____ | Name _____ |
| | Address _____ | Address _____ |
| | _____ | _____ |
| | Phone No. _____ | Phone No. _____ |
| | Contact _____ | Contact _____ |
| 3. | Project Name _____ | |
| | Contract Price _____ | |
| | Date Completed _____ | |
| | Owner: | Engineer: |
| | Name _____ | Name _____ |
| | Address _____ | Address _____ |
| | _____ | _____ |
| | Phone No. _____ | Phone No. _____ |
| | Contact _____ | Contact _____ |
| 4. | Project Name _____ | |
| | Contract Price _____ | |
| | Date Completed _____ | |
| | Owner: | Engineer: |
| | Name _____ | Name _____ |
| | Address _____ | Address _____ |
| | _____ | _____ |
| | Phone No. _____ | Phone No. _____ |
| | Contact _____ | Contact _____ |

(Add additional sheets, if necessary.)

RECORD OF BIDDER'S EQUIPMENT

The BIDDER shall indicate below construction equipment he has available for Work under this CONTRACT. Information should include age of equipment, description, and existing physical conditions. Also list any equipment you intend to purchase or rent for use on the proposed work. If the BIDDER has previously prepared a description of their construction equipment with the information below, it may be attached to this sheet.

| <u>EQUIPMENT DESCRIPTION</u> | <u>AGE</u> | <u>CONDITION</u> |
|------------------------------|------------|------------------|
| 1. _____ | | |
| 2. _____ | | |
| 3. _____ | | |
| 4. _____ | | |
| 5. _____ | | |
| 6. _____ | | |
| 7. _____ | | |
| 8. _____ | | |
| 9. _____ | | |
| 10. _____ | | |
| 11. _____ | | |
| 12. _____ | | |
| 13. _____ | | |
| 14. _____ | | |
| 15. _____ | | |
| 16. _____ | | |
| 17. _____ | | |
| 18. _____ | | |
| 19. _____ | | |
| 20. _____ | | |
| 21. _____ | | |
| 22. _____ | | |
| 23. _____ | | |
| 24. _____ | | |
| 25. _____ | | |

(Add additional sheets, if necessary.)

END OF SECTION

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SECTION 00420

BID BOND

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

_____, as PRINCIPAL, and _____
[Bidder] [Surety]

as surety (ies), are hereby held and firmly bound unto the City of Clyde, as OBLIGEE in the penal sum of the dollar amount of the BID submitted by the PRINCIPAL to the OBLIGEE on the _____ day of _____, 20____ to undertake the project known as: East Street Improvements.

The penal sum referred to herein shall be the dollar amount of the PRINCIPAL'S BID to the OBLIGEE, incorporating any additive or deductive alternate proposals made by the PRINCIPAL on the date referred to above to the OBLIGEE that are accepted by the OBLIGEE. In no case shall the penal sum exceed _____ dollars. (If this blank is not filled in, the penal sum will be the full amount of the PRINCIPAL'S BID, including all accepted alternates.) Alternatively, if the blank is filled in, the dollar amount stated must not be less than the full amount of the BID including all accepted alternates, in dollars and cents. **(A percentage is not acceptable)** For the payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

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

Signed this _____ day of _____, 20_____.

Surety

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above named PRINCIPAL has submitted a BID for the above referenced project;

Now, therefore, if the OBLIGEE accepts the BID of the PRINCIPAL and the PRINCIPAL fails to enter into a proper CONTRACT in accordance with the CONTRACT DOCUMENTS; and in the event the PRINCIPAL pays to the OBLIGEE the difference, not to exceed ten percent of the penalty hereof between the amount stated in the BID, and such larger amount for which the OBLIGEE may in good faith CONTRACT with the next lowest BIDDER to perform the work covered by the BID; or in the event the OBLIGEE does not award the CONTRACT to the next lowest BIDDER and resubmits the project for BIDDING, the PRINCIPAL pays to the OBLIGEE the difference not to exceed ten percent of the penalty hereof between the amount stated in the BID, or the costs, in connection with the resubmission, of printing new CONTRACT DOCUMENTS, required advertising, and printing and mailing notices to prospective BIDDERS, whichever is less, then this obligation shall be null and void, otherwise to remain in full force and effect. If the OBLIGEE accepts the BID of the PRINCIPAL, and the PRINCIPAL, within ten days after the awarding of the contract, enters into a proper contract in accordance with the CONTRACT DOCUMENTS, which said CONTRACT is made a part of this BOND the same as though set forth herein;

If PRINCIPAL shall well and faithfully do and perform the things agreed to be done and performed according to the terms of said contract; and shall pay all lawful claims of SUBCONTRACTORS, MATERIAL SUPPLIERS, AND LABORERS, for labor performed and materials furnished in the carrying forward, performing, or completing of said contract; we agreeing and assenting that this undertaking shall be for the benefit of any MATERIAL SUPPLIER OR LABORER having a just claim, as well as for the OBLIGEE herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood and agreed that the liability of the surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

The said surety hereby stipulates and agrees that no modifications, omissions, or additions, in or to the terms of the CONTRACT or in or to the Drawings or Specifications therefore shall in any way affect the obligations of said surety on its BOND.

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

SIGNED and SEALED this _____ day of _____, 20_____

Principal

by: _____

title: _____

Surety

by: _____

Attorney-in-Fact

NOTES: Attorney-in-Fact must attach certified and dated copy of this Power of Attorney.

Name and address of both Agent and Surety Company for the issued Bond must accompany bond.

Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and must not exceed the underwriting limitation. Surety companies and their agents or attorneys-in-fact must be authorized to transact business in the state where the PROJECT is located and shall furnish proof of such authorization in the BID.

END OF SECTION

SECTION 00430

CERTIFICATION OF NON-SEGREGATED FACILITIES

The undersigned BIDDER _____, certifies that they do not maintain or provide for their employees any segregated facilities at any of the BIDDERS establishments, and that they do not permit employees to perform their services at any location, under their control, where segregated facilities are maintained. The BIDDER certifies further that they will not maintain or provide for their employees any segregated facilities at any of the BIDDERS establishments, and that they will not permit their employees to perform their services at any location under their control where segregated facilities are maintained. The BIDDER agrees that a breach of this certification will be a violation of the Equal Opportunity clause in any contract resulting from acceptance of this bid. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. The BIDDER agrees that (except where the BIDDER has obtained identical certification from proposed subcontractors for specific time periods) they will obtain identical certifications from proposed subcontractors prior to the award of subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that the BIDDER will retain such certifications in their files.

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

Date _____, 20____

(Signature of Bidder's Representative)

(Printed Name of Representative)

(Title of Bidder's Representative)

END OF SECTION

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SECTION 00440

CERTIFICATION OF NON-COLLUSION AFFIDAVIT

The undersigned BIDDER, _____, certifies that the foregoing Bid Proposal Form is not made in the interest of or on behalf of any undisclosed person, partnership, company, association, organization, or corporation; that such bid proposal form is genuine and not collusive or sham; that said bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, nor that anyone shall refrain from bidding; that said bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of said bidder or of any other bidder, nor to fix any overhead, profit, or cost element of such bid price, nor of that of any other bidder, nor to secure any advantage against the **CITY OF CLYDE** awarding the contract or anyone interested in the proposed contract; that said bidder has not directly or indirectly submitted his bid price or any breakdown thereof, nor the contents thereof, nor divulged information or data relative thereto, nor paid and will not pay a fee in connection therewith to a corporation, partnership, company, association, organization, bid depository, nor to any member or agent thereof, nor to any other individual except to such person or persons as have a partnership or other financial interest with said bidder in his general business.

Date _____, 20____

Signature of Bidder's Representative

Printed Name of Representative

Title of Bidder's Representative

INSTRUCTIONS FOR NON-COLLUSION AFFIDAVIT

1. This Non-Collusion Affidavit is material to any contract awarded pursuant to this bid. According to the Ohio Revised Code, governmental agencies may require Non-Collusion Affidavits to be submitted together with bids.
2. This Non-Collusion Affidavit must be executed by the member, officer or employee of the bidder who makes the final decision on prices and the amount quoted in the bids.
3. Bid rigging and other efforts to restrain competition, and the making of false sworn statements in connection with the submission of bids are unlawful and may be subject to criminal prosecution. The person who signs the Affidavit should examine it carefully before signing and assure himself or herself that each statement is true and accurate, making diligent inquiry, as necessary, of all other persons employed by or associated with the bidder with responsibilities for the preparation, approval or submission of the bid.
4. In the case of a bid submitted by a joint venture, each party to the venture must be identified in the bid documents, and an Affidavit must be submitted separately on behalf of each party.
5. The term "complimentary bid" as used in the Affidavit has the meaning commonly associated with that term in the bidding process, and includes the knowing submission of bids higher than the bid of another firm, any intentionally high or noncompetitive bid, and any other form of bid submitted for the purpose of giving a false appearance of competition.
6. Failure to file an Affidavit in compliance with these instructions will result in disqualification of the bid.

END OF SECTION

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SECTION 00450

CORPORATE RESOLUTION

I, _____, Secretary of _____,
[NAME] [COMPANY]
a _____, hereby certifies that the following is a true and
[CORPORATION, PARTNERSHIP, OR SOLE PROPRIETORSHIP]
correct copy of a resolution duly adopted by the Board of Directors of _____,
[COMPANY]
on _____, 20_____, to wit:
[DATE]

"Resolved, that _____ of this Company,
[NAME]
namely, _____ is hereby
[COMPANY]
authorized and directed to enter into any and all contracts, bid guaranty and
performance bonds with _____ for the
[MUNICIPALITY]
purpose of furnishing labor and materials as to _____ at
[PROJECT]
such price and upon such terms and conditions, including any amendments or
modifications thereto, as said _____ in his
[NAME]
sole discretion shall deem best, and that said actions shall be binding upon the
Corporation.

Resolved, further, that said _____
[NAME]
is hereby authorized and directed to execute and deliver unto said
_____ other instruments which in his
[OWNER]
discretion he shall deem necessary to carry out the foregoing resolution."

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the seal of said Corporation at _____
_____, this _____ day of _____, 20_____, and I further
[ADDRESS] [MONTH]
certify that said resolution is still in full force and effect.

SECRETARY

SEAL

END OF SECTION

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CONFLICT OF INTEREST AFFIDAVIT**AFFIDAVIT IN COMPLIANCE WITH SECTION 3517.13
OF THE OHIO REVISED CODE****STATE OF OHIO****VILLAGE OF WESTFIELD CENTER IN THE COUNTY OF MEDINA:**

Personally appeared before me the undersigned, as an individual or as a representative of

_____ for a contract for _____
 (Name of Vendor/Entity) (Type of Product or Service)

To be let by the Village of Westfield Center in the County of Medina, who, being duly cautioned and sworn, makes the following statement with respect to prohibited activities constituting a conflict of interest or other violations under Ohio Revised Code Section 3517.13, and further states that the undersigned has the authority to make the following representation on behalf of himself or herself or of the business entity:

1. That none of the following has individually made within the two previous calendar years and that, if awarded a contract for the purchase of goods or services in excess of \$10,000.00, none of the following **individually** will make, beginning on the date the contract is awarded and extending until one year following the conclusion of the contract, as an individual, one or more campaign contributions totaling in excess of \$1,000.00 to any member of the Council of the Village of Westfield Center or the Mayor of the Village of Westfield Center or their individual campaign committees:
 - Myself;
 - Any partner or owner or shareholder of the partnership (if applicable);
 - Any owner of more than 20% of the corporation or business trust (if applicable);
 - Each spouse of any person identified in (a) through (c) of this section;
 - Each child seven years of age to seventeen years of age of any person identified in divisions (a) through (c) of this section (only applicable to contributions made on or after January 1, 2007).
2. That none of the following have **collectively** made since January 1, 2007, and that, if awarded a contract for the purchase of goods or services in excess of \$10,000.00, none of the following **collectively** will make, beginning on the date the contract is awarded and extending until one year following the conclusion of the contract, one or more campaign contributions totaling in excess of \$2,000.00, to any member of the Council of the Village of Westfield Center or the Mayor of the Village of Westfield Center or their individual campaign committees:
 - Myself;
 - Any partner or owner or shareholder of the partnership (if applicable);
 - Any owner of more than 20% of the corporation or business trust (if applicable);
 - Each spouse of any person identified in (a) through (c) of this section;
 - Each child seven years of age to seventeen years of age of any person identified in divisions (a) through (c) of this section

Signature _____

Title: _____

Sworn to before me and subscribed in my presence the _____ day of _____, 20____.

Notary Public: _____

May Commission Expires: _____

END OF SECTION

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***** FOR INSTRUCTIONAL USE ONLY *****

READ BEFORE COMPLETING YOUR DMA FORM

Forms not conforming to the specifications listed below or not submitted to the appropriate agency or office will not be processed.

- To complete this form, you will need a copy of the Terrorist Exclusion List for reference. The Terrorist Exclusion List can be found on the Ohio Homeland Security Web site at the following address:

<http://www.homelandsecurity.ohio.gov/dma.asp>

- Be sure you have the correct DMA form. If you are applying for a state issued license, permit, certification or registration, the "State Issued License" DMA form must be completed (HLS 0036). If you are applying for employment with a government entity, the "Public Employment" DMA form must be completed (HLS 0037). If you are obtaining a contract to conduct business with or receive funding from a government entity, the "Government Business and Funding Contracts" DMA form must be completed (HLS 0038). The Pre-certification form (HLS 0035) should only be completed if you are specifically instructed to do so by the agency or office requesting the form.
- Your DMA form is to be submitted to the issuing agency or entity. "Issuing agency or entity" means the government agency or office that has requested the form from you or the government agency or office to which you are applying for a license, employment or a business contract. For example, if you are seeking a business contract with the Ohio Department of Commerce's Division of Financial Institutions, then the form needs to be submitted to the Department of Commerce's Division of Financial Institutions. Do NOT send the form to the Ohio Department of Public Safety UNLESS you are seeking a license from or employment or business contract with one of its eight divisions listed below.

| | |
|---|--------------------------------|
| • <u>Department of Public Safety Divisions:</u> | |
| Administration | Ohio Homeland Security* |
| Ohio Bureau of Motor Vehicles | Ohio Investigative Unit |
| Ohio Emergency Management Agency | Ohio Criminal Justice Services |
| Ohio Emergency Medical Services | Ohio State Highway Patrol |
- * DO **NOT** SEND THE FORM TO OHIO HOMELAND SECURITY UNLESS OTHERWISE DIRECTED. FORMS SENT TO THE WRONG AGENCY OR ENTITY WILL NOT BE PROCESSED.

***** FOR INSTRUCTIONAL USE ONLY *****



Ohio Department of Public Safety
DIVISION OF HOMELAND SECURITY
<http://www.homelandsecurity.ohio.gov>

PUBLIC EMPLOYMENT

In accordance with section 2909.34 of the Ohio Revised Code

DECLARATION REGARDING MATERIAL ASSISTANCE/NO ASSISTANCE TO A TERRORIST ORGANIZATION

This form serves as a declaration of the provision of material assistance to a terrorist organization or organization that supports terrorism as identified by the U.S. Department of State Terrorist Exclusion List (see the Ohio Homeland Security Division Web site for the Terrorist Exclusion List).

Any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided. Failure to disclose the provision of material assistance to such an organization or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree.

For the purposes of this declaration, "material support or resources" means currency, payment instruments, other financial securities, funds, transfer of funds, and financial services that are in excess of one hundred dollars, as well as communications, lodging, training, safe houses, false documentation or identification, communications equipment, facilities, weapons, lethal substances, explosives, personnel, transportation, and other physical assets, except medicine or religious materials.

| | | | | |
|-------------------------|-------|-------------------------|--------|----------------|
| LAST NAME | | FIRST NAME | | MIDDLE INITIAL |
| HOME ADDRESS | | | | |
| CITY | STATE | ZIP | COUNTY | |
| HOME PHONE () | | WORK PHONE () | | |

DECLARATION

In accordance with section 2909.32 (A)(2)(b) of the Ohio Revised Code

For each question, indicate either "yes," or "no" in the space provided. Responses must be truthful to the best of your knowledge.

- Are you a member of an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you used any position of prominence you have with any country to persuade others to support an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you knowingly solicited funds or other things of value for an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you solicited any individual for membership in an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you committed an act that you know, or reasonably should have known, affords "material support or resources" to an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you hired or compensated a person you knew to be a member of an organization on the U.S. Department of State Terrorist Exclusion List, or a person you knew to be engaged in planning, assisting, or carrying out an act of terrorism? ☐ Yes ☐ No

In the event of a denial of licensure due to a positive indication that material assistance has been provided to a terrorist organization, or an organization that supports terrorism as identified by the U.S. Department of State Terrorist Exclusion List, a review of the denial may be requested. The request must be sent to the Ohio Department of Public Safety's Division of Homeland Security. The request forms and instructions for filing can be found on the Ohio Homeland Security Division Web site.

CERTIFICATION

I hereby certify that the answers I have made to all of the questions on this declaration are true to the best of my knowledge. I understand that if this declaration is not completed in its entirety, it will not be processed and I will be automatically disqualified. I understand that I am responsible for the correctness of this declaration. I understand that failure to disclose the provision of material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List, or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree. I understand that any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided by myself or my organization. If I am signing this on behalf of a company, business or organization, I hereby acknowledge that I have the authority to make this certification on behalf of the company, business or organization referenced above.

| | |
|----------------------------|-------------|
| X | |
| _____ | _____ |
| APPLICANT SIGNATURE | DATE |

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***** FOR INSTRUCTIONAL USE ONLY *****

READ BEFORE COMPLETING YOUR DMA FORM

Forms not conforming to the specifications listed below or not submitted to the appropriate agency or office will not be processed.

- To complete this form, you will need a copy of the Terrorist Exclusion List for reference. The Terrorist Exclusion List can be found on the Ohio Homeland Security Web site at the following address:

<http://www.homelandsecurity.ohio.gov/dma/dma.asp>

- Be sure you have the correct DMA form. If you are applying for a state issued license, permit, certification or registration, the "State Issued License" DMA form must be completed (HLS 0036). If you are applying for employment with a government entity, the "Public Employment" DMA form must be completed (HLS 0037). If you are obtaining a contract to conduct business with or receive funding from a government entity, the "Government Business and Funding Contracts" DMA form must be completed (HLS 0038).
- Your DMA form is to be submitted to the issuing agency or entity. "Issuing agency or entity" means the government agency or office that has requested the form from you or the government agency or office to which you are applying for a license, employment or a business contract. For example, if you are seeking a business contract with the Ohio Department of Commerce's Division of Financial Institutions, then the form needs to be submitted to the Department of Commerce's Division of Financial Institutions. Do NOT send the form to the Ohio Department of Public Safety UNLESS you are seeking a license from or employment or business contract with one of its eight divisions listed below.
- Department of Public Safety Divisions:

| | |
|----------------------------------|--------------------------------|
| Administration | Ohio Homeland Security* |
| Ohio Bureau of Motor Vehicles | Ohio Investigative Unit |
| Ohio Emergency Management Agency | Ohio Criminal Justice Services |
| Ohio Emergency Medical Services | Ohio State Highway Patrol |
- * DO **NOT** SEND THE FORM TO OHIO HOMELAND SECURITY UNLESS OTHERWISE DIRECTED. FORMS SENT TO THE WRONG AGENCY OR ENTITY WILL NOT BE PROCESSED.

***** FOR INSTRUCTIONAL USE ONLY *****



OHIO DEPARTMENT OF PUBLIC SAFETY
DIVISION OF HOMELAND SECURITY

GOVERNMENT BUSINESS AND FUNDING CONTRACTS

In accordance with section 2909.33 of the Ohio Revised Code

DECLARATION REGARDING MATERIAL ASSISTANCE/NONASSISTANCE TO A TERRORIST ORGANIZATION

This form serves as a declaration by an applicant for a government contract or funding of material assistance/nonassistance to an organization on the U.S. Department of State Terrorist Exclusion List ("TEL"). Please see the Ohio Homeland Security Division Web site for a copy of the TEL.

Any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided. Failure to disclose the provision of material assistance to such an organization or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree.

For the purposes of this declaration, "material support or resources" means currency, payment instruments, other financial securities, funds, transfer of funds, financial services, communications, lodging, training, safe houses, false documentation or identification, communications equipment, facilities, weapons, lethal substances, explosives, personnel, transportation, and other physical assets, except medicine or religious materials.

COMPLETE THIS SECTION ONLY IF YOU ARE AN INDEPENDENT CONTRACTOR

| | | | | |
|--------------|-------|------------|--------|----|
| LAST NAME | | FIRST NAME | | MI |
| HOME ADDRESS | | | | |
| CITY | STATE | ZIP | COUNTY | |
| HOME PHONE | | WORK PHONE | | |

COMPLETE THIS SECTION ONLY IF YOU ARE A COMPANY, BUSINESS OR ORGANIZATION

| | | | |
|---|-------|-----|--------|
| BUSINESS/ORGANIZATION NAME | | | PHONE |
| BUSINESS ADDRESS | | | |
| CITY | STATE | ZIP | COUNTY |
| BUSINESS/ORGANIZATION REPRESENTATIVE NAME | | | TITLE |

DECLARATION

In accordance with section 2909.32 (A)(2)(b) of the Ohio Revised Code

For each question, indicate either "yes," or "no" in the space provided. Responses must be truthful to the best of your knowledge.

- Are you a member of an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you used any position of prominence you have with any country to persuade others to support an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you knowingly solicited funds or other things of value for an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you solicited any individual for membership in an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you committed an act that you know, or reasonably should have known, affords "material support or resources" to an organization on the U.S. Department of State Terrorist Exclusion List? ☐ Yes ☐ No
- Have you hired or compensated a person you knew to be a member of an organization on the U.S. Department of State Terrorist Exclusion List, or a person you knew to be engaged in planning, assisting, or carrying out an act of terrorism? ☐ Yes ☐ No

If an applicant is prohibited from receiving a government contract or funding due to a positive indication on this form, the applicant may request the Ohio Department of Public Safety to review the prohibition. Please see the Ohio Homeland Security Web site for information on how to file a request for review.

CERTIFICATION

I hereby certify that the answers I have made to all of the questions on this declaration are true to the best of my knowledge. I understand that if this declaration is not completed in its entirety, it will not be processed and I will be automatically disqualified. I understand that I am responsible for the correctness of this declaration. I understand that failure to disclose the provision of material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List, or knowingly making false statements regarding material assistance to such an organization is a felony of the fifth degree. I understand that any answer of "yes" to any question, or the failure to answer "no" to any question on this declaration shall serve as a disclosure that material assistance to an organization identified on the U.S. Department of State Terrorist Exclusion List has been provided by myself or my organization. If I am signing this on behalf of a company, business or organization, I hereby acknowledge that I have the authority to make this certification on behalf of the company, business or organization referenced above on of this declaration.

| | |
|---------------------------------|------|
| APPLICANT SIGNATURE X | DATE |
|---------------------------------|------|

CONTRACTOR EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

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

1. The undersigned will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The undersigned will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion 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 undersigned agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this equal opportunity (federally assisted construction) clause.
2. The undersigned will, in all solicitations or advertisements for employees placed by or on behalf of the undersigned, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex or national origin.
3. The undersigned 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' representative of the undersigned's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The undersigned will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
5. The undersigned will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the 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 of the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
6. In the event of the undersigned's non-compliance with the equal opportunity (federally assisted construction) clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole in part, and the undersigned may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulations, or order of the Secretary of Labor, or as provided by law.
7. The undersigned will include this equal opportunity (federally assisted construction) clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The undersigned 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 non-compliance: 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 undersigned may request the United States to enter into such litigation to protect the interest of the United States.

(Signature)

(Date)

(Name and Title of Signer, Please type)

(Firm name)

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

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SPECIFICATION FOR MBE/WBE FAIR SHARE UTILIZATION

- I. In accordance with the terms and conditions of receiving capitalization grants from U.S. EPA for both the Water Pollution Control Loan Fund (WPCLF) and the Water Supply Revolving Loan Account (WRSLA), the Ohio EPA negotiates "fair share" Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) objectives with U.S. EPA regarding each fiscal year's funding. The current negotiated goals for the Federal Fiscal Year construction-related activities are as follows:

- 3.0% of all contracts to MBEs
- 3.7% of all contracts to WBEs Definitions

II. Definitions

A. Minority Business Enterprise (MBE)

The term "Minority Business Enterprise" means a business, at least 51 percent of which is owned and controlled/operated by minority group member(s). The minority ownership must exercise actual day-to-day management of the business.

The "MBE" is a member of one or more of the following groups:

| | |
|-----------------|-------------------|
| Black American | Hispanic American |
| Asian American | American Indian |
| American Eskimo | American Aleut |

B. Women's Business Enterprise (WBE)

The term "WBE" means a business, at least 51 percent of which is owned and controlled/operated by a woman or women. The woman-ownership must exercise actual day-to-day management of the business.

C. Control and Operation

"Control" means exercising the power to make executive decisions, and "operation" means being actively involved in day-to-day management of the business.

III. Ownership and Control/Operation

A. Some factors to be considered in determining whether real ownership and control/operation exist are:

1. The percentage of stock owned in a corporation or the proportion of capital invested in a partnership by a woman (or women) or a minority person(s)
2. Whether ownership is meaningful (e.g., whether the minority or woman's ownership interest is such that the minority or woman owner can sell the business or liquidate at will, or whether the minority or woman ownership interest is subject to a controlling lien on that interest).
3. The provisions' for sharing income and losses.
4. Whether there is evidence that the woman or minority owner participates significantly in business policy development and decisions of importance to the business, such as the right to sign checks, etc.
5. Whether corporate history indicates that the business is, in fact, minority or woman controlled.

Note to Prime Contractors and Subcontractors:

A PRIME CONTRACTOR'S FIRM WILL NOT RECEIVE MBE/WBE CREDIT FOR WORK PERFORMED BY MBEJWBE SUBCONTRACTING FIRMS IN WHICH THE PRIME CONTRACTOR'S FIRM HAS A FINANCIAL INTEREST OR INVESTMENT.

IV. Bidder's Responsibilities

A. As a prerequisite to demonstrate MBE and WBE "fair share" goal achievement, all bidders must provide the following data:

1. Whether or not they intend to meet the fair share goals of 3.0% for MBE and 3.7.0% for WBE.
2. Name, title, address, and telephone number of a specific individual within the bidder's company who should be contacted on all MBE and WBE matters.

NOTE: Use MBE/WBE Data Sheet 1 to provide this information.

Data Sheet 1 is to be filled out by all bidders and submitted with the bid. Failure to supply this information will be considered non-responsive, relative to the MBE/WBE fair share goals.

B. For bidders assured of achieving the fair share goals:

1. Within 15 days of the date on which the owner notifies a bidder that its bid is the apparent low responsive bid, the bidder shall provide documentation to meet the following:
 - a. List of MBEs and WBEs planned for utilization.
 - b. Type of work and dollar amount of each subcontract.

NOTE: Use Data Sheet II to provide this information. Failure to supply this information will be considered non-responsive; relative to MBE/WBE fair share goals.

C. For bidders not assured of achieving the fair share goals:

1. Within 15 days of the date on which the owner notifies a bidder that its bid is the apparent low responsive bid, the bidder shall provide the following:
 - a. List of MBEs WBEs planned for utilization.
 - b. Type of work and dollar amount of each subcontract.
 - c. Specific documentation (as follows) of efforts made to achieve the fair share goals.
 - 1) Solicitation of MBEs and WBEs through a newspaper of general circulation and/or a minority oriented publication. Advertisement must appear in publication for 5 consecutive days commencing no later than 21 days before the bid date.
 - 2) Written notification to a local minority contractor association(s). This notification should indicate the type of work available for subcontracting, a definite date when responses are due, and list the person and telephone number to contact for information.
 - 3) Copies of solicitation letters sent to no less than 50 viable and functioning MBEs and WBEs. In general, solicitation letters should be postmarked no later than fifteen (15) days before the responses are due from the MBE and WBEs.

NOTE: Use Data Sheet III to provide this information. Data Sheet III is to be used by all bidders not committed to achieving the fair share goals. Failure to supply this information shall be considered non-responsive, relative to the MBE/WBE fair share goals.

V. Determination of MBE Fair Share Utilization

All documentation submitted by bidders not assured of achieving the fair share goals will be reviewed by the Procedural Compliance Unit, Division of Environmental and Financial Assistance. Based on the feasibility of subcontracting, the availability of MBEs and WBEs in-the area (generally a 100-mile radius), and the contractor's history of compliance, the Procedural Compliance Unit will determine whether the contractor has made a good faith effort to achieve the fair share goals. If the effort is not satisfactory, the contractor will be required to provide additional or sufficient minority and Women's business participation, within 15 days, to demonstrate a good faith effort to achieve the fair share goals.

VI. Sanctions

- A. The Owner may reject one or all bids for non-compliance with this policy.
- B. The Owner will invoke sanctions as it deems appropriate for non-compliance with this policy.
- C. The Owner reserves the right to waive minor deficiencies in all bids taken.

MBE/WBE DATA SHEET 1

MINORITY AND WOMEN'S BUSINESS ENTERPRISE FAIR SHARE UTILIZATION

1. Does bidder intend to meet the "fair share" goals?

_____ Yes

_____ No

2. Name, address and telephone number of person to contact on all MBE, WBE matters.

Name: _____

Address: _____

Telephone Number: _____

3. If less than the owner's stated goal, provide a narrative summary of the bidder's inability to achieve the stated goal.

MBE/WBE DATA SHEET II

MINORITY AND WOMEN'S BUSINESS ENTERPRISE FAIR SHARE UTILIZATION

1. Total dollar amount of MBE participation: _____

2. Percent of MBE participation: _____

3 Total dollar amount of WBE participation: _____

4. Percent of WBE participation: _____

5. List of MBE Subcontractors: _____

Name: _____

Address: _____

Phone: _____

Contact Person: _____

Type of Contract: _____

Amount: _____

Work to be Done: _____

Name: _____

Address: _____

Phone: _____

Contact Person: _____

Type of Contract: _____

Amount: _____

Work to be Done: _____

6. List of WBE Subcontractors: _____

Name: _____

Address: _____

Phone: _____

Contact Person: _____

Type of Contract: _____

Amount: _____

Work to be Done: _____

MBE/WBE SHEET III

MINORITY AND WOMEN'S BUSINESS ENTERPRISE FAIR SHARE UTILIZATION

1. Information concerning the subcontractor(s) who will be used

Name: _____

Address: _____

Phone: _____

Contact Person: _____

Amount of subcontract quotation: _____

Segment of work to be subcontracted: _____

2. Information to be submitted by the bidder concerning good faith efforts taken.

- a. **Announcement:** List each publication in which an announcement or notification was placed and attach a copy of each announcement from each publication.

Name of publication: _____

Address: _____

Dates of announcement: _____

Specific subcontract amount: _____

- b. **Contractor Associations:** List all Minority and Women's Business contractor associations, construction supply associations, or general business associations notified - attached a copy of each notification letter:

- c. **Minority and Women's Businesses:** List each Minority and Women's Business, construction firm or supplier, to which a letter of solicitation was sent, or with whom negotiations were held.

Company name and phone number: _____

Area of Minority and Women's Business expertise: _____

Date of follow-up call and person contacted: _____

BASIS AND METHOD OF AWARD

1. Owner reserves the right to reject any and all Bids, to waive any and all informalities and to negotiate contract terms with the successful Bidder, and the right to disregard all nonconforming, nonresponsive or conditional bids. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
2. In evaluating Bids, Owners shall consider the qualifications of the Bidder, whether or not the Bids comply with the prescribed requirements and alternates and unit prices if requested in the Bid forms. The Owner intends to accept alternates (if any are accepted) in the order in which they are listed in the Bid Form but Owner may accept them in any order or combination.
3. Owner may consider the qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the Work as to which the identity of Subcontractors and other persons and organizations must be submitted as provided in the Supplementary Conditions. Operating costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by Owner.
4. Owner may conduct investigations he deems necessary to assist in the evaluation of any Bid and to establish the responsibility, qualifications and financial ability of the Bidders, proposed Subcontractors, and other persons and organizations to do the Work in accordance with the Contract Documents to Owner's satisfaction within the prescribed time.
5. Owner reserves the right to reject the bid of any Bidder who does not pass investigations or evaluations to Owner's satisfaction. Owner may reject any Proposal where the unit price or individual lump sum prices are unbalanced and/or unfavorable to the Owner's interest.
6. Owner will not make any award or permit any award (subgrant or contract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in Federal assistance programs under Executive Order 12549, "Debarment and Suspension". Each Contractor and supplier (over \$25,000) shall complete Form 5700-49.
7. If Contract is awarded, it will be awarded to the lowest responsive responsible Bidder whose evaluation by Owner indicates to Owner that the award will be in the best interest of the Project.
8. If the Contract is awarded, Owner will give the Successful Bidder a "Notice of Award" within the time stated in the advertisement after the day of the Bid opening.
9. When Owner gives a "Notice of Award" to the Successful Bidder, it will be accompanied by at least three unsigned counterparts of the Agreement and three copies of all other Contract Documents. Within ten days thereafter, Contractor shall sign and deliver at least three counterparts of the Agreement to Owner with three copies of all other Contract Documents attached. Within fifteen days thereafter, Owner will deliver one copy of all fully signed counterparts to the Contractor.

END OF SECTION

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CONTRACT AGREEMENT FORM

CONTRACT AGREEMENT FORM
FOR
CITY OF CLYDE

EAST STREET IMPROVEMENTS

THIS AGREEMENT is dated the ____ day of _____, 20____.

BY AND BETWEEN _____, hereinafter called CONTRACTOR and the CITY OF CLYDE, OHIO, hereinafter called the OWNER.

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

1. SCOPE OF WORK

The CONTRACTOR shall furnish all labor, materials, supplies, equipment and other facilities and things necessary or proper or incidental to complete performances of the work under this Contract for the OWNER as required by and in strict accordance with the applicable Contract Documents entitled, EAST STREET IMPROVEMENTS for Clyde, Ohio, and shall complete everything required by the Contract and Contract Documents.

2. ENGINEER

This project has been designed by GGJ, INC., 35585 Curtis Blvd., Unit C, Eastlake, Ohio 44095, who is hereinafter called ENGINEER and who will assume all duties and responsibilities and will have the rights and authority assigned to ENGINEER in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

3. CONTRACT TIME

3.1 The Work will be substantially completed within 120 calendar days after the date when the contract Time commences to run as provided in Paragraph 2.3 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 14.13 of the General Conditions within 30 calendar days after substantial completion.

3.1.1 Commencement of the demolition of existing facilities shall not commence without written authorization of the Engineer.

3.2 OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not complete within the time specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. They 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 complete on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER Seven Hundred Fifty Dollars (\$750.00) for each day that expires after the time specified in Paragraph 3.1 for Substantial Completion until the Work is substantially complete. After Substantial Completion if CONTRACTOR shall neglect, refuse or fail to complete the remaining work within the Contract Time or any proper extension thereof granted by OWNER, CONTRACTOR shall pay OWNER One-Thousand Dollars (\$1,000.00) for each day that expires after the time specified in paragraph 3.1 for completion and readiness for final payment.

4. CONTRACT PRICE

4.1 OWNER shall pay CONTRACTOR for performance of the Work in accordance with the Contract

Documents, in current funds, the sum of _____ \$ _____
(The amount shall be shown in both words and figures; in the case of discrepancy, the amount shown in words will govern.) in accordance with Article 14 of the General Conditions.

- 4.2 The following percentages shall be used to calculate CONTRACTOR'S Fee (overhead and profit) for changes in the value of work per Article 11.6 of the General Conditions as modified by the Supplementary Conditions.

4.2.1 Labor and Material (paragraph 11.6.1.1) 6.5 percent

4.2.2 Subcontractors (paragraph 11.6.1.2) 5 percent

5. PAYMENT PROCEDURES

CONTRACTOR shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by ENGINEER as provided in the General Conditions.

- 5.1 Progress Payments - OWNER shall make progress payments on account of the Contract Price on the basis of CONTRACTOR'S Applications for Payment as recommended by ENGINEER, once each month during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the Schedule of Values provided for in Paragraph 14.1 of the General Conditions.

5.1.1 Until the Work is 50% complete, progress payments will be in an amount equal to 92% of the work completed and 90% of materials and equipment not incorporated in the Work but delivered and suitably stored, less in each case the aggregate of payments previously made.

5.1.2 When the work is 50% complete, progress payments will be in the amount equal to 100% of all Work satisfactorily completed to date (excluding retainage held for work described in 5.1.1) will be made to the CONTRACTOR.

5.1.3 Upon substantial Completion, OWNER shall pay an amount sufficient to increase total payments to CONTRACTOR to 100% of the contract price, less only 1-1/2 times such amount as is required to complete any then remaining, uncompleted, minor items, which amount shall be certified by the ENGINEER.

- 5.2 Final Payment - Upon final completion and acceptance of the Work in accordance with Paragraph 14.13 of the General Conditions, OWNER shall pay the remainder of the Contract Price as recommended by ENGINEER.

6. INTEREST

All monies not paid when due hereunder shall bear interest at the maximum rate allowed by law in Ohio for public contracts.

7. CONTRACTOR'S REPRESENTATIONS

In order to induce OWNER to enter into this Agreement, CONTRACTOR makes the following representations:

7.1 CONTRACTOR has familiarized himself with the nature and extent of the Contract Documents, Work, locality and with all local conditions and federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the Work.

7.2 CONTRACTOR has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the Work which were relied upon by ENGINEER in the preparation of the Drawings and Specifications and which have been identified in the Supplementary Conditions.

7.3 CONTRACTOR has made or caused to be made examinations, investigations and tests and studies of such reports and related data in those referred to in Paragraph 7.2 as he deems necessary for the

performance of the Work at the Contract Price, within the Contract Time and in accordance with the other items and conditions of the Contract Documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by CONTRACTOR for such purpose.

- 7.4 CONTRACTOR has correlated the results of all such observations, examination, investigations, tests, reports and data with the terms and conditions of the Contract Documents.
- 7.5 CONTRACTOR has given ENGINEER written notice of all conflicts, errors or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR.

8. CONTRACT DOCUMENTS

The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR are attached to this Agreement, and made a part hereof and consists of the following:

- 8.1 This Agreement identified as Section 00500.
- 8.2 Contract Bonds, identified as Section 00610.
- 8.3 Workmen's Compensation Certification, identified as Section 00630.
- 8.4 Certificate of Owner's Fiscal Officer, identified as Section 00635.
- 8.5 Certificate of Owner's Legal Counsel, identified as Section 00640.
- 8.6 Notice of Commencement, identified as Section 00645.
- 8.7 Notice of Award, identified as Section 00680.
- 8.8 Notice to Proceed, identified as Section 00681.
- 8.9 Standard General Conditions of the Construction Contract, identified as Section 00700.
- 8.10 Supplementary Conditions, identified as Section 00800.
- 8.11 Evidence of insurance.
- 8.12 Specifications bearing the title Project Manual, including specifications for construction of: EAST STREET IMPROVEMENTS FOR CLYDE, OHIO.
- 8.13 Drawings consisting of a Cover Sheet and Drawings numbered inclusive with each sheet bearing the general title as outlined in the Drawings Index of the Project Manual.
- 8.14 Addenda numbers _____ to _____ inclusive.
- 8.15 CONTRACTOR'S Bid, identified as Sections 00300, 00410, 00420, 00430, 00440, and 00450.
- 8.16 Documentation submitted by CONTRACTOR prior to Notice of Award.
- 8.17 Any Modification, including Change Orders, duly delivered after execution of Agreement.

There are no Contract Documents other than those listed above in this Article 8. The Contract Documents may only be altered, amended or repealed by a Modification (as defined in Section 1 of the General Conditions).

9. MISCELLANEOUS

- 9.1 Terms used in this Agreement which are defined in Article 1 of the General Conditions shall have the meanings indicated in the General Conditions.

9.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, monies that may become due and monies that are 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 Documents.

9.3 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns and legal representatives to the other party hereto, his partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement in triplicate. One counterpart each has been delivered to OWNER, CONTRACTOR and ENGINEER. All portions of the Contract Documents have been signed or identified by OWNER and CONTRACTOR or by ENGINEER on their behalf.

This Agreement will be effective on _____, 20____

_____(SEAL)
(Owner's Representative)

_____(SEAL)
(Contractor's Representative)

Paul Fiser
(Printed Name of Representative)

(Printed Name of Representative)

Witness _____

Address for giving notices to OWNER

Address for giving notices to CONTRACTOR

City of Clyde

222 North Main Street

Clyde, Ohio 43410

END OF SECTION

SECTION 00610

BID GUARANTY AND CONTRACT BOND

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

(Name and Address of Principal)

as Principal, and

(Name and Address of Surety)

as Surety, are hereby held and firmly bound unto

City of Clyde, 222 North Main Street, Clyde, Ohio 43410

(Name and Address of Obligee/Owner)

hereinafter called the Obligee, in the penal sum of the dollar amount of the bid submitted by the Principal to the

Obligee on _____

to undertake the project known as: East Street Improvements

The penal sum referred to herein shall be the dollar amount of the Principal's bid to the Obligee, incorporating any additive or deductive alternate proposals made by the Principal on the date referred to above to the Obligee, which are accepted by the Obligee. In no case shall the penal sum exceed the amount of

_____ dollars (\$_____).

(IF THE ABOVE LINES ARE LEFT BLANK, THE PENAL SUM WILL BE THE FULL AMOUNT OF THE PRINCIPAL'S BID, INCLUDING ALTERNATES. ALTERNATIVELY, IF COMPLETED, THE AMOUNT STATED MUST NOT BE LESS THAN THE FULL AMOUNT OF THE BID, INCLUDING ALTERNATES, IN DOLLARS AND CENTS. A PERCENTAGE IS NOT ACCEPTABLE.) For the payment of the penal sum well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that whereas the above named Principal has submitted a bid on the above referred to project;

NOW THEREFORE, if the Obligee accepts the bid of the Principal and the Principal fails to enter into a proper contract in accordance with the bid, plans, details, specifications, and bills of material; and in the event the Principal pays to the Obligee the difference not to exceed ten percent (10%) of the penalty hereof between the amount specified in the bid and such larger amount for which the Obligee may in good faith contract with the next lowest bidder to perform the work covered by the bid; or in the event the Obligee does not award the contract to the next lowest bidder and resubmits the project for bidding, the Principal will pay the Obligee the difference not to exceed ten percent (10%) of the penalty hereof between the amount specified in the bid, or the costs, in connection with the resubmission, of printing new contract documents, required advertising and printing and mailing contract documents, required advertising and printing and mailing notices to prospective bidders, whichever is less, then this obligation shall be void, otherwise to remain in full force and effect. If the Obligee accepts the bid of the Principal and the Principal within ten (10) days after the awarding of the contract, enters into a proper contract in accordance with the bid, plans, details, specifications, and bills of material which said contract is made a part of this bond the same as though set forth herein, and IF THE SAID Principal shall well and faithfully perform each and every condition of such contract; and indemnify the Obligee against all damage suffered by failure to perform such contract according to the provisions thereof and in accordance with the plans, details, specifications, and bills of material therefore; and shall pay all lawful claims of subcontractors, material suppliers, and laborers, for labor performed and materials furnished in the carrying forward performing, or completing of said contract; we agreeing and assenting that this undertaking shall be for the benefit of any material supplier or laborer having a just claim, as well as for the Obligee herein; then this obligation shall be void; otherwise the same shall remain in full force and effect; it being expressly understood

and agreed that the liability of the Surety for any and all claims hereunder shall in no event exceed the penal amount of this obligation as herein stated.

THE SAID Surety hereby stipulates and agrees that no modification, omissions or additions, in or to the terms of said contract or in or to the plans and specifications therefore shall in any way affect the obligations of said Surety on this bond, and it does hereby waive notice of any such modifications, omissions or additions to the terms of the contract or to the work or to the specifications.

SIGNED AND SEALED this ____ day of _____, 20____.

| | | |
|---------|-----------|------------------------|
| | _____ | Principal |
| _____ | By: _____ | Title |
| Witness | | |
| | _____ | Surety |
| _____ | By: _____ | |
| Witness | | |
| | _____ | Attorney-In-Fact |
| | _____ | Surety Agents Address: |
| | _____ | |

END OF SECTION

SECTION 00620

PAYMENT BOND

Know all men by these presents, that we, _____, as PRINCIPAL, and _____, as sureties are held and firmly bound unto the **City of Clyde**, its certain attorney, successors, or assigns (hereinafter called the OBLIGEE) in the sum of _____ Dollars (\$_____) lawful money of the United State, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally firmly by these presents:

WHEREAS, said PRINCIPAL has entered into a certain contract with said OBLIGEE, dated _____20 __, hereinafter called the Contract) for **East Street Improvements** which contract and the specifications for said work shall be deemed a part thereof as fully as if set out herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if said PRINCIPAL and all subcontractors to whom any portion of the work provided for in said contract is sublet and all assignees of said PRINCIPAL and of such subcontractors shall promptly make payment for all material furnished, labor supplied or performed, rental for equipment employed, and services rendered by public utilities in or in connection with the prosecution of the work, whether or not the said material, labor, equipment, or services enter into and become component parts of the work or improvement contemplated in said contract, of in any amendment or extension of or addition to said Contract, then the above obligation shall be void; otherwise to remain in full force and effect, PROVIDED, however, that this bond is subject to the following conditions and limitations:

- (a) All persons who have performed labor, rendered services or furnished materials or machinery, shall have a direct right of action against the PRINCIPAL and surety on this bond, which right of action shall be asserted in proceedings instituted in the State in which labor was performed, services rendered or materials furnished under said contract in more than one state, then in any such state). Insofar as permitted by laws of such state, such right of action shall be asserted in a proceeding instituted in the name of the OBLIGEE to the right and benefit of the person instituting such action and any or all other persons having claims hereunder, and any other person having a claim hereunder shall have the right to be made a party to such proceedings (but not later than 2 years after the complete performance of said Contract and final settlement thereof) and to have such claim adjudicated in such action and judgment rendered thereon.
- (b) The surety shall not be liable hereunder for any damages or compensation recoverable under any workmen's compensation or employer's liability statute.
- (c) In no event shall the surety be liable for a greater sum than the penalty of this bond, or subject to any suit, action or proceeding thereon that is instituted later than 2 years after the complete performance of said Contract and final settlement thereof.
- (d) As used herein: The term "person" refers to any individual, firm or corporation who have furnished materials or machinery or public utility services to be used on or incorporated in the work or the prosecution thereof provided for in said Contract or in any amendment or extension of or addition to said Contract, and/or to any person engaged in the prosecution of the work provided for in said Contract of in any amendment or extension of or addition to said Contract who is an agent, servant or employee of the PRINCIPAL or of any subcontractor, or of any assignee of said PRINCIPAL, or any subcontractor, or any assignee of said principal or of said subcontractor, and such labor or mechanic, but shall not include office employees not regularly stationed at the site of the work.

The said surety, for value received, hereby stipulates and agrees that no charge, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder or the Specifications accompanying the same, shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time alteration of addition to the terms of the Contract or to the work or to the Specifications.

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL COUNTERPARTS THIS _____ day of _____, 20 ____.

(Individual Principals sign here)

BY: _____

TITLE: _____ (SEAL)

BY: _____

TITLE: _____ (SEAL)

Attest:

By: _____

Title: _____

Attest:

By: _____

Title: _____

BY: _____

TITLE: _____ (SEAL)

(Corporate Principal sign here)

BY: _____

TITLE: _____ (SEAL)

(Surety Sign Here)

BY: _____

TITLE: _____ (SEAL)

The rate of premium charges is \$ _____ per thousand.

The total amount of the premium charged \$ _____.

(The above must be filled in by the Corporate Surety.)

NOTE: Date of Bond must not be prior to date of NOTICE OF AWARD. If CONTRACTOR is Partnership, all partners should execute Bond.

Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 70 as amended) and be authorized to transact business in the State where the Project is located.

END OF SECTION

SECTION 00630

WORKERS' COMPENSATION CERTIFICATION

The undersigned CONTRACTOR, _____, being duly sworn according to law deposes and accepts the provisions of Workers Compensation for the State of Ohio, with its supplements and amendments, and provides insured liability thereunder in accordance with the terms of said Act with

(Name of Insurance Company, with Policy Number)

Date _____, 20 ____

(Signature of Contractor's Representative)

(Printed Name of Representative)

(Title of Contractor's Representative)

END OF SECTION

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SECTION 00635

CERTIFICATE OF FISCAL OFFICER

I, _____, duly appointed and acting Fiscal Officer of the
_____, do hereby certify that a copy of the foregoing CONTRACT has been
received by me from the Auditor of _____ and that I hereby certify that the
amount of _____ Dollars required to meet the payment of this CONTRACT has been
lawfully appropriated or authorized or directed for such purpose of complying with the terms and conditions of the
foregoing CONTRACT, and is on deposit or in the process of collection to the credit of the appropriate fund and the same
is free from any previous encumbrances.

WITNESS MY HAND this _____ day of _____, 20____, at _____.
(Day) (Month) (Year)

Fiscal Officer

(Printed Name of Fiscal Officer)

END OF SECTION

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SECTION 00640

CERTIFICATE OF LEGAL COUNSEL

On this _____ day of _____, 20_____, I, **Barry Bova**, Solicitor of the **City of Clyde** do hereby
(Month) (Year)

approve the foregoing CONTRACT with _____ as to form.
(Contractor)

(Legal Counsel)

Barry Bova
(Printed Name of Legal Counsel)

END OF SECTION

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OWNER'S NOTICE OF COMMENCEMENT

State of Ohio,)
) ss.
County of Sandusky)

NOTICE OF COMMENCEMENT
00645-1

6. For the purpose of serving an affidavit pursuant to Revised Code §1311.26, service may be made upon the

following representative of the Public Authority: Paul Fiser City Manager at
Name Title
222 North Main Street, Clyde, Ohio 43410 .
Address

FURTHER AFFIANT SAYETH NAUGHT.

Signature

SWORN TO BEFORE ME and subscribed in my presence this _____ day of _____, 20__.

Notary Public

[SEAL]

SECTION 00650

ONE-YEAR GUARANTEE

Contractor shall guarantee all work, labor, materials, and equipment provided for a period of one year from the date that final payment is due. The following shall be completed as part of the project closeout process.

Project: East Street Improvements

Owner: City of Clyde

Contractor: _____

Contractor Address: _____

Project Manager: _____

Phone Number: _____

Contract Start _____

Contract Completion Date: _____

One-Year Guarantee
Start Date: _____ (Date of Contract Completion Certificate)

One-Year Guarantee
Completion Date: _____

The undersigned hereby guarantees all material and labor for work performed for a period of one (1) year from the date of the final completion certificate by the Owner, **City of Clyde**, or its representative and acceptance of the property owner(s). All available manufacturers' warranties and suppliers' guarantees covering materials and equipment, under subject contract are attached. This guarantee shall include all labor, equipment, materials, or other items required to correct defects or deficiencies in the work provided. The contractor will not, however, guarantee any damage caused by improper use, extremely heavy wear, vandalism, or "Acts of God" such as high winds, extremely heavy snow storms, ice storms or flooding if the specifications or design criteria was exceeded.

The undersigned hereby certifies that all work required under this contract has been performed in accordance with terms thereof. The undersigned further certifies that all payments due for materials, supplies, equipment; and all payments due to sub-contractors, laborers or mechanics for subject work, have been made or will be made within fifteen (15) days of receipt of requested final payment.

Upon receipt of final payment, the undersigned does hereby release the property owner(s) and the Owner, **City of Clyde**, from any and all claims which may arise under or by virtue of this contract.

Contractor (Company Name)

Signature and Title of Officer, Partner or Individual

Date

Witness

END OF SECTION

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SECTION 00655

DELINQUENT PERSONAL PROPERTY STATEMENT

Name of Bidder: _____

Address: _____

Having been awarded a contract by City of Clyde, Ohio, hereby affirms under oath, pursuant to the Ohio Revised Code Section 5719.042 (see Section 00610-2) that at the time this bid was submitted, my company (was) (was not) charged with delinquent personal property taxes on the general tax list of personal property for Sandusky County, Ohio. If such charge for delinquent personal property tax exists on the general tax list of personal property of Sandusky County, Ohio the amount of such due and unpaid delinquent taxes, including due and unpaid penalties and interest shall be set forth below.

A copy of this statement shall be transmitted by the Bidder to the county treasurer within thirty days of the date it is submitted. A copy of this statement shall also be incorporated into the contract made between the

(Name of Owner) City of Clyde and _____
(Name of Bidder)

and no payment with respect to any contract shall be made unless such a statement has been so incorporated as a part thereof.

Delinquent Personal Property Tax: \$ _____

Penalties: \$ _____

Interest: \$ _____

Bidder: _____

By: _____

Title: _____

Subscribed in my presence, and sworn to me this _____ day of _____, 20 ____.

Notary Public

SEAL

Ohio Revised Code Section 5719.042

5719.042 Successful bidders on contract with a taxing district to disclose any delinquent personal property taxes.

After the award by a taxing district of any contract let by competitive bid and prior to that time the contract is entered into, the person making a bid shall submit to the district's fiscal officer a statement affirmed under oath that the person with whom the contract is to be made was not charged at the time the bid was submitted with any delinquent personal property taxes on the general tax list of personal property of any county in which the taxing district has territory or that such person was charged with delinquent personal property taxes on any such tax list, in which case the statement shall also set for the amount of such due and unpaid delinquent taxes and any due and unpaid penalties and interest thereon. If the statement indicates that the taxpayer was charged with any such taxes, a copy of the statement shall be transmitted by the fiscal officer to the county treasurer within thirty days of the date it is submitted.

A copy of the statement shall also be incorporated into the contract, and no payment shall be made with respect to any contract to which this section applies unless such statement has been so incorporated as a part thereof.

HISTORY: 1982 H 379, eff. 9-21-82

CROSS REFERENCES

See Baldwin's Ohio School Law, Text 105.07

END OF SECTION

SECTION 00660

ESCROW AGREEMENT

Section 153.13 of the Ohio Revised Code states that for contracts of \$15,000 or greater, all funds retained pursuant to Sections 153.12 and 153.14 of the Revised Code for faithful performance of the work shall be deposited in the Escrow Account designated in Section 153.63 of the Revised Code. After the contract is 50% complete, no further funds can be retained.⁽¹⁾

PER 1980 CASE NOTES AND OA6 IN SECTION 153.13 OF ⁽¹⁾ A CHARTER MUNICIPALITY, IN EXERCISE OF LOCAL SELF GOVERNMENT MAY ENACT RETAINAGE PROVISIONS FOR A CONTRACT FOR IMPROVEMENTS TO MUNICIPAL PROPERTY WHICH DIFFER FROM THE RETAINAGE PROVISIONS DESCRIBED IN O.R.C. 153.23.

We are proposing to hold the retained amount of your contract and invest it with other City funds in order to take advantage of maximum yields. Upon notice from the Department of Public Service, the retainage with interest from the date of escrow will be released to you. We are in no way guaranteeing any minimum interest earnings; however the City's earnings rates have been competitive.

Project: East Street Improvements

Current Earnings Rate: _____

Amount of Retainage Held: _____

Date of Escrow: _____

I accept the proposed escrow agreement for retainage held.

Signature _____

Title _____

END OF SECTION

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SECTION 00680

NOTICE OF AWARD

EFFECTIVE DATE _____ 20____

TO: _____
[BIDDER]

ADDRESS: _____

PROJECT: East Street Improvements

CONTRACT FOR: City of Clyde, Ohio

You are hereby notified that your Bid dated _____, 20____ for the above Contract has been considered. You are the apparent successful bidder and have been awarded a contract for the above named project.

The Bid Price of your contract is \$ _____

Six (6) copies of each of the proposed Contract Documents accompany this Notice of Award. Three sets of the Drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within 14 days of the Effective Date of this Notice of Award.

1. You must deliver to the Owner six (6) fully executed counterparts of the Agreement, including all the Contract Documents.
2. You must deliver with the executed Agreement, the Payment and Performance Bonds and the Insurance Certificate as specified in the Instructions to Bidders, The General Conditions (Article 5), and the Supplementary Conditions.

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

Within 10 days after you comply with the foregoing conditions, the Owner will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

OWNER: City of Clyde, Ohio

By: _____

Title: _____

Copy to Engineer by Certified Mail

_____ Return Receipt Requested

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by _____, this
(Bidder)
_____ day of _____, 20 ____.

By: _____

Title _____

END OF SECTION

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SECTION 00681

NOTICE TO PROCEED

EFFECTIVE DATE _____ 20 _____

To: City of Clyde

Address: 222 North Main Street

Clyde, Ohio 43410

Project Title: East Street Improvements

Owner's Project No. _____

Contract for: City of Clyde, Ohio

You are hereby notified that the Contract Time under the above Contract will commence to run on the Effective Date of this Notice to Proceed. By that date, you are to start performing your obligations under the Contract Documents, in accordance with the provisions in Section 3.1 of the Contract Agreement.

The Time or Date of Final Completion is _____ on _____, 20 _____, which is _____ calendar days after the Effective Date of this Notice to Proceed.

Section 3.2 of the Contract Agreement provides for an assessment of liquidated damages for each calendar day after the above-established contract completion date that the Work remains incomplete.

Before starting any Work at the site, Paragraph 2.5 of the General Conditions provides that the Contractor must study the Contract Documents and verify figures and field dimensions, and must report any observed errors or discrepancies.

Also, before starting any Work at the site, Contractor must:

1. Submit to the Engineer the Proposed Schedule called for in Section 01300 Submittals.

CITY OF CLYDE

By: _____

Title: _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

_____, this the _____ day of _____, 20_____
(month) (year)

Bidder _____

By _____

Title _____

Copy to Engineer (Use Certified Mail, Return Receipt Requested)

END OF SECTION

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CONTRACTOR'S PAY REQUEST

| | |
|----------------|---|
| OWNER: | APPLICATION NO.: _____ WORK COMPLETED TO: _____ JOB NUMBER: _____ |
| CONTRACTOR: | ENGINEER: GGJ., INC. 35585 Curtis Boulevard, Unit C Eastlake, Ohio 44836 |
| PROJECT: _____ | |

| | |
|--|-------|
| 1 ORIGINAL CONTRACT PRICE | _____ |
| 2 APPROVED CHANGE ORDERS | _____ |
| 3 CURRENT CONTRACT PRICE (Line 1 + 2) | _____ |
| 4 CONTRACT COMPLETED TO DATE | _____ |
| 5 CHANGE ORDER COMPLETED TO DATE | _____ |
| 6 STORED MATERIAL | _____ |
| 7 TOTAL COMPLETED TO DATE (Line 4 + 5 + 6) | _____ |
| 8 RETAINAGE | |
| a. 8% of completed work | _____ |
| b. 10% of stored work | _____ |
| Total Retainage (Line 8a + 8b) | _____ |
| 9 TOTAL EARNED LESS RETAINAGE (Line 7 less Line 8 total) | _____ |
| 10 LESS PREVIOUS PAYMENTS (Line 9 from prior certificate) | _____ |
| 11 CURRENT PAYMENT DUE | _____ |

| CHANGE ORDER SUMMARY | ADDITIONS | DEDUCTIONS |
|--|-----------|------------|
| Total changes approved in previous months by Owner | | |
| Total approved this Month | | |
| TOTALS | | |
| NET CHANGES by Change Order | | |

CONTRACTOR:

CONTRACTOR'S CERTIFICATE: I hereby certify that the above materials and services have been furnished and performed in accordance with the conditions of the contract for the above work, and that payment has not been received and therefore is due and to be paid on said contract

BY: _____

DATE: _____

ENGINEER: **GGJ., INC.**

ENGINEER'S CERTIFICATE FOR PAYMENT: In accordance with the Contract Documents based on on-site observations and the data comprising the above application, the Engineer certifies to the Owner that to the best of the Engineer's knowledge, information and belief, the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

BY: _____

DATE: _____

OWNER:

BY: _____

DATE: _____

APPLICATION FOR PAYMENT UNIT PRICE BREAKDOWN

Cut Off Date:
Pay Request No.:

[illegible]

SECTION 00683CHANGE ORDER

| | | | |
|----------------------|--|-------------|--|
| PROJECT NAME: | | ENGINEER: | |
| | | | |
| GGJ NO. | | OWNER: | |
| OWNER'S CONTRACT NO. | | | |
| EFFECTIVE DATE: | | CONTRACTOR: | |
| DATE OF ISSUANCE: | | | |

| |
|--------------------------|
| Description: |
| Reason for change Order: |
| Attachments: |

| | | |
|---|---|--|
| Net Changes From Previous Change Orders: | No. _____ To No. _____ | |
| CHANGE IN CONTRACT PRICE: | CHANGE IN CONTRACT TIMES: | |
| Original Contract Price: | Original Contract Times: <i>(days or dates)</i> | |
| | Final Completion: | |
| Contract Price prior to this Change Order: | Contract Times prior to this Change Order: <i>(days or dates)</i> | |
| | Final Completion: | |
| Net Increase of this Change Order: | Net Increase of this Change Order: <i>(days or dates)</i> | |
| | Final Completion: | |
| Contract Price with all approved Change Orders: | Contract Times with all approved Change Orders: | |
| | Final Completion: | |

| | | |
|--------------|-----------|-----------|
| RECOMMENDED: | APPROVED: | ACCEPTED: |
| By: | By: | By: |
| Date: | Date: | Date: |

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CERTIFICATE OF SUBSTANTIAL COMPLETION

PROJECT _____

DATE OF ISSUANCE _____

OWNER _____

OWNER'S CONTRACT NO. _____

CONTRACTOR _____ ENGINEER _____

This Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

TO _____
OWNER

AND TO _____
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on

DATE OF SUBSTANTIAL COMPLETION

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ days of the above date of Substantial Completion.

EJCDC No. 1910-8-D (1990 Edition)

Prepared by the engineers Joint Contract Documents Committee and endorsed by the Associated General Contractors of America.

END OF SECTION

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SECTION 00686

CERTIFICATE OF FINAL COMPLETION

CONTRACT: _____

PROJECT TITLE: _____

LOCATION: _____

OWNER: _____

DATE OF CONTRACT: _____

The undersigned CONTRACTOR hereby certifies that all work included in the above-captioned contract has been completed in accordance with the requirements of the CONTRACT DOCUMENTS including approved modifications thereto, and requests that the work be accepted.

I understand that neither the determination by the Engineer that the work is completed, nor the acceptance thereof by the Owner, shall operate as a bar to claim against the Contractor under the terms of the guarantee provisions of the Contract Documents.

Signed _____
(Title)

Date _____

The undersigned ENGINEER has inspected the work included in the above-captioned contract, finds it to have been completed in general accordance with the requirements of the CONTRACT DOCUMENTS including approved modifications thereto, and accordingly recommends that the work be accepted.

Signed _____
Engineer

(Title)

Date _____

Upon the above representation of the CONTRACTOR and the above recommendation of the ENGINEER, the undersigned hereby accepts the work included in the above-captioned contract.

Signed _____
Owner

(Title)

Date _____

END OF SECTION

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PARTIAL WAIVER OF LIEN

To All Whom It May Concern:

WHEREAS, the undersigned has been employed by (A) _____

to furnish labor and materials for (B) _____

under a contract (C) _____

for the improvement of the premises described as (D) _____

in the _____ (City-Village) of _____

County of _____, State of _____

of which _____

_____ is the Owner.

NOW, THEREFORE, this _____ day of _____, 20 _____.

for and in consideration of the sum of (E) _____ Dollars paid simultaneously herewith, the receipt whereof is hereby acknowledged by the undersigned, the undersigned does hereby waive and release to the extent only of the aforesaid amount, any lien rights to, or claim of lien with respect to and on said above-described premises, and the improvements thereon, and on the monies or other considerations due or to become due from the owner, by virtue of said contract, on account of labor, services, materials, fixtures, apparatus or machinery furnished by the undersigned to or for the above-described premises, but only to the extent of the payment aforesaid.

(F) _____ (SEAL)
(Name of sole ownership, corporation or partnership)

**(Affix Corporate
Seal Here)**

_____ (SEAL)
(Signature of Authorized Representative)

_____ TITLE

INSTRUCTIONS FOR PARTIAL WAIVER:

- A) Name person or firm with whom you agreed to furnish either labor, or services, or materials, or both.
- B) Fill in nature and extent of work; strike the work labor or the word materials if not in your contract.
- C) If you have more than one contract on the same premises, describe the contract by number if available, date and extent of work.
- D) Furnish an accurate enough description of the improvements and location of the premises so that it can be distinguished from any other property.
- E) Amount shown should be the amount actually received on that date.
- F) If waiver is for a corporation, corporate name should be used, corporate seal affixed and title of officer signing waiver should be set forth; if waiver is for a partnership, the partnership name should be used, partner should sign and designate himself as partner.
- G) To be prepared and submitted with each estimate; preparation to be by Prime, Sub-Contractors, and Suppliers that are included in the estimate.

Construction Industry Affairs Committee of Chicago

END OF SECTION

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FINAL WAIVER OF LIEN

To All Whom It May Concern:

WHEREAS, the undersigned has been employed by (A) _____

to furnish labor and materials for (B) _____

under a contract (C) _____

for the improvement of the premises described as (D) _____

in the _____ (City-Village) of _____

County of _____, State of _____

of which _____

_____ is the Owner.

NOW, THEREFORE, this _____ day of _____, 20 ____.

for and in consideration of the sum of (E) _____ Dollars paid simultaneously herewith, the receipt whereof is hereby acknowledged by the undersigned, the undersigned does hereby waive and release any lien rights to, or claim of lien with respect to and on said above-described premises, and the improvements thereon, and on the monies or other considerations due or to become due from the owner, on account of labor, services, materials, fixtures, apparatus or machinery heretofore or which may hereafter be furnished by the undersigned to or for the above-described premises by virtue of said contract.

(F) _____ (SEAL)
(Name of sole ownership, corporation or partnership)

**(Affix Corporate
Seal Here)**

_____ (SEAL)
(Signature of Authorized Representative)

_____ TITLE

INSTRUCTIONS FOR FINAL WAIVER:

- (A) Name person or firm with whom you agreed to furnish either labor, or services, or materials, or both.
- (B) Fill in nature and extent of work; strike the word labor or the word materials if not in your contract.
- (C) If you have more than one contract on the same premises, describe the contract by number if available, date and extent of work.
- (D) Furnish an accurate enough description of the improvements and location of the premises so that it can be distinguished from any other property.
- (E) Amount shown should be the amount actually received and equal to total amount of contract as adjusted.
- (F) If waiver is for a corporation, corporate name should be used, corporate seal affixed and title of officer signing waiver should be set forth; if waiver is for a partnership, the partnership name should be used, partner should sign and designate himself as partner.

Construction Industry Affairs Committee of Chicago

END OF SECTION

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SECTION 00700

**STANDARD
GENERAL CONDITIONS
OF THE
CONSTRUCTION CONTRACT**

Prepared by
Engineers Joint Contract Documents Committee
And
Issued and Published Jointly By

PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE
A Practice division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

AMERICAN CONSULTING ENGINEERS COUNCIL

AMERICAN SOCIETY OF CIVIL ENGINEERS

CONSTRUCTION SPECIFICATIONS INSTITUTE

This document has been approved and endorsed by

The Associated General

Contractors of America

These General Conditions have been prepared for use with the Owner-Contractor Agreements (No. 1910-A-1 or 1910-8-A-2) (1990 Editions). Their provisions are interrelated and a change in one may necessitate a change in the others. Comments concerning their usage are contained in the Commentary on Agreements for Engineering Services and Contract Documents (No. 1910-9) (1986 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (No. 1910-17) (1990 Edition). When bidding is involved, the Standard Form of Instructions to Bidders (No. 1910-12) (1990 Edition) may be used.

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GENERAL CONDITIONS

ARTICLE 1 – DEFINITIONS

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

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

1.2 *Agreement*—The written contract between OWNER and CONTRACTOR covering the Work to be performed: other Contract Documents are attached to the Agreement and made a part thereof as provided therein.

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

1.4 *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

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

1.6 *Bidding Documents*—The advertisement or invitation to Bid, instructions to bidders, the Bid form, and the proposed Contract Documents (including all Addenda issued prior to receipt of Bids).

1.7 *Bidding Requirements*—The advertisement of invitation to Bid, instructions to bidders and the Bid Form.

1.8 *Bonds*—Performance and Payment bonds and other instruments of security.

1.9 *Change Order*—A document recommended by ENGINEER, which is signed by CONTRACTOR and OWNER and authorizes an addition, deletion or revision in the Work, or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

1.10 *Contract documents*—The Agreement, Addenda (which pertain to the Contract Documents), CONTRACTOR's Bid (including documentation accompanying the Bid and any post Bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Agreement, the Notice to Proceed, the Bonds, these General Conditions, the Supplementary

Conditions, the Specifications and the Drawings as the same are more specifically identified in the Agreement, together with all Written Amendments, Change Orders, Work Change Directives, Field Orders and ENGINEER's written interpretations and clarifications issued pursuant to paragraphs 3.5, 3.6.1 and 3.6.3 on or after the Effective Date of the Agreement. Shop Drawing submittals approved pursuant to paragraphs 6.26 and 6.27 and the reports and drawings referred to in paragraphs 4.2.1.1 and 1.2.2.2 are not Contract Documents.

1.11 *Contract Price*—The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of paragraph 11.9.1 in the case of Unit Price Work).

1.12 *Contract Times*—The numbers of days or the dates stated in the Agreement: (i) to achieve Substantial Completion, and (ii) to complete the Work so that it is ready for final payment as evidenced by ENGINEER's written recommendation of final payment in accordance with paragraph 14.13.

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

1.14 *Defective*—An adjective which when notifying the word Work refers to Work that is unsatisfactory, faulty or deficient, in that it does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents, or has been damaged prior to ENGINEER's recommendation of final payment (unless responsibility for the protection thereof has been assumed by OWNER at Substantial Completion in accordance with paragraph 14.8 or 14.10).

1.15 *Drawings*—The drawings which show the scope, extent and character of the Work to be furnished and performed by CONTRACTOR and which have been prepared or approved by ENGINEER and are referred to in the Contract Documents. Shop drawings are not Drawings as so defined.

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

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

1.18 *ENGINEER's Consultant*—A person, firm or corporation having a contract with ENGINEER to furnish services as ENGINEER's independent professional associate or consultant with respect to the Project and who is identified as such in the Supplementary Condition.

1.19 *Field Order*—A written order issued by ENGINEER which orders minor changes in the Work in

accordance with paragraph 9.5 but which does not involve a change in the contract Price or the Contract Times.

1.20 *General Requirements*—Sections of Division 1 of the Specifications.

1.21 *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

1.22 *Laws and Regulations: Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes and orders of any and all governmental bodies, agencies, authorities and courts having jurisdiction.

1.23 *Liens*—Liens, charges, security interests or encumbrances upon real property or personal property.

1.24 *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

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

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

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

1.28 *Partial Utilization*—Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work.

1.29 *PCB's*—Polychlorinated biphenyls.

1.30 *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene and oil mixed with other non-Hazardous Wastes and crude oils.

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

1.32 *Radioactive Material*—Source, special nuclear, or by-product material as defined by the Atomic Energy Act of

1954 (42 USC Section 2011 et seq.) as amended from time to time.

1.33 *Resident Project Representative*—The Authorized representative of ENGINEER who may be assigned to the site or any part thereof.

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

1.35 *Shop Drawings*—All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR to illustrate some portion of the Work.

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

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

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

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

1.40 *Supplier*—A manufacturer, fabricator, supplier, distributor, material man or vendor have a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

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

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

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

1.44 *Work Change Directive*—A written directive to CONTRACTOR, issued on or after the Effective Date of the Agreement and signed by OWNER and recommended by ENGINEER, ordering an addition, deletion or revision in the Work, or responding to differing or unforeseen physical conditions under which the Work is to be performed as provided in paragraph 4.2 or 4.3 or to emergencies under paragraph 6.23. A Work Change Directive will not change the Contract Price or the Contract times, but is evidence that the parties expect that the change directed or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times as Provided in Paragraph 10.2.

1.45 *Written Amendment*—A written amendment of the Contract Documents, signed by OWNER and CONTRACTOR on or after the Effective Date of the Agreement and normally dealing with the non-engineering or non-technical rather than strictly construction-related aspects of the Contract Documents.

ARTICLE 2—PRELIMINARY MATTER

Delivery of Bonds:

2.1 When CONTRACTOR delivers the executed Agreements to OWNER, CONTRACTOR shall also deliver to OWNER such Bonds as CONTRACTOR may be required to furnish in accordance with paragraph 5.1.

Copies of Documents:

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

Commencement of Contract Times; Notice to Proceed:

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

Starting the Work:

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

Before Starting Construction:

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

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

2.6.1 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 Documents.

2.6.2 A preliminary schedule of Shop Drawing and Sample submittals which will list each required submittal and the times for submit, reviewing and processing such submittal.

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

2.7 Before any Work at the site is started, CONTRACTOR and OWNER shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which CONTRACTOR and OWNER respectively are required to purchase and maintain in accordance with paragraphs 5.4, 5.6 and 5.7.

Preconstruction Conference:

2.8 Within twenty days after the Contract Times start to run, but before any Work at the site is started, a conference attended by 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 2.6, procedures for handling Shop Drawings and other submittals, processing Applications for Payment and maintaining required records.

Initially Acceptable Schedules:

2.9 Unless otherwise provided in the Contract Documents, at least ten days before submission of the first Application for Payment a conference attended by CONTRACTOR, ENGINEER and others as appropriate will be held to review for acceptability to ENGINEER as provided below the schedules submitted in accordance with paragraph 2.6, CONTRACTOR shall have an additional ten days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to CONTRACTOR until the schedules are submitted to and acceptable to ENGINEER as provided below. The progress schedule will be acceptable to ENGINEER as providing an orderly progression of the Work to completion within any specified Milestones and the Contract Times, but such acceptance will neither impose on ENGINEER responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility therefore, CONTRACTOR's schedule of shop Drawing and Sample submissions will be acceptable to ENGINEER as providing a workable arrangement for reviewing and processing the required submittals. CONTRACTOR's schedule of values will be acceptable to ENGINEER as to form and substance.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

Intent:

3.1 The Contract Documents comprise the entire agreement between OWNER and CONTRACTOR

concerning the Work. The Contract Documents are complementary; what is called for by one is as binding as if called for by all. The Contract Documents will be construed in accordance with the law of the place of the Project.

3.2 It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any Work, materials or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be furnished and performed whether or not specifically called for. When words or phrases, which have a well-known technical or construction industry or trade meaning, are used to describe Work, materials or equipment, such words or phrases shall be interpreted in accordance with that meaning. Clarifications and interpretations of the Contract Documents shall be issued by ENGINEER as provided in paragraph 9.4.

3.3 Reference to Standards and Specifications of Technical Societies: Reporting and Resolving Discrepancies:

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

3.3.2 If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy with the Contract Documents or between the Contract Documents and any provision of any such Law or Regulation applicable to the performance of the Work or of any such standard, specification, manual or code or of any instruction of any Supplier referred to in paragraph 6.5, CONTRACTOR shall report it to ENGINEER in writing at once, and, CONTRACTOR shall not proceed with the Work affected thereby (except in an emergency as authorized by paragraph 6.23) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.5 or 3.6; provided, however, that CONTRACTOR shall not be liable to OWNER or ENGINEER for failure to report any such conflict, error, ambiguity or discrepancy unless CONTRACTOR knew or reasonably should have known thereof.

3.3.3 Except as otherwise specifically stated in the Contract Documents or a may be provided by amendment or supplement thereto issued by one of the methods indicated in paragraph 3.5 or 3.6, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity or

discrepancy between the provisions of the Contract Documents and:

3.3.3.1 The provisions of any such standard, specification, manual, code or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

3.3.3.2 The provisions of any such 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).

No provision of any such standard, specification manual, code or instruction shall be effective to change the duties and responsibilities of OWNER, CONTRACTOR or ENGINEER or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents, nor shall it be effective to assign to OWNER, ENGINEER or any of ENGINEER's Consultants, agents or employees any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of paragraph 9.13 or any other provision of the Contract Documents.

3.4 Whenever in the Contract Documents the terms "as ordered", "as directed", "as require", "as allowed", "as approved" or terms of like effect or import are used, or the adjectives "reasonable", "suitable", "acceptable", "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of ENGINEER as to the Work, it is intended that such requirement, direction, review or judgment will be solely to evaluate, in general, the completed Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed 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 shall not be effective to assign to ENGINEER any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of paragraph 9.13 or any other provision of the Contract Documents.

Amending and Supplementing Contract Documents:

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

3.5.1 A Formal Written Amendment.

3.5.2 A Change Order (pursuant to paragraph 10.4), or

3.5.3 A Work change Directive (pursuant to paragraph 10.1).

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

3.6.1 A Field Order (pursuant to paragraph 9.5).

3.6.2 ENGINEER's approval of a Shop Drawing or Sample (pursuant to paragraphs 6.26 and 6.27), or

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

Reuse of Documents:

3.7 CONTRACTOR and any subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER (i) shall not 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 ENGINEER's Consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of OWNER and ENGINEER and specific written verification or adaptation by ENGINEER.

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

Availability of Lands:

4.1 OWNER shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of CONTRACTOR. Upon reasonable written request, OWNER shall furnish CONTRACTOR with a correct statement of record legal title and legal description of the lands upon which the Work is to be performed and OWNER's interest therein as necessary for giving notice of or filing a mechanic's lien against such lands in accordance with applicable Laws and Regulations. OWNER shall identify any encumbrances of restrictions not of general application but specifically related to use of lands so furnished with which CONTRACTOR will have to comply in performing the Work. Easements for permanent structures of permanent changes in existing facilities will be obtained

and paid for by OWNER, unless otherwise provided in the Contract Documents. If CONTRACTOR and OWNER are unable to agree on entitlement to or the amount or extent of any adjustments in the Contract Price or the Contract Times as a result of any delay in OWNER's furnishing these lands, rights-of-way or easements, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. CONTRACTOR shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.2 *Subsurface and Physical Conditions:*

4.2.1 *Reports and Drawings:* Reference is made to the Supplementary Conditions for identification of:

4.2.1.1 *Subsurface Conditions:* Those reports of explorations and tests of subsurface conditions at or contiguous to the site that have been utilized by ENGINEER in preparing the Contract Documents: and

4.2.1.2 *Physical Conditions:* Those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) that have been utilized by ENGINEER in preparing the Contract Documents.

4.2.2 *Limited Reliance by CONTRACTOR Authorized: Technical Data:* CONTRACTOR may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions, except for such reliance on such "technical data." CONTRACTOR may not rely upon or make any claim against OWNER, ENGINEER or any of ENGINEER's Consultants with respect to:

4.2.2.1 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, or

4.2.2.2 Other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings, or

4.2.2.3 Any CONTRACTOR interpretation of or conclusion drawn from any "technical data" or any such data, interpretations, opinions or information.

4.2.3 *Notice of Differing Subsurface or Physical Conditions:* If CONTRACTOR believes that any

subsurface or physical condition at or contiguous to the site that is uncovered or revealed either:

4.2.3.1 Is of such a nature as to establish that any "technical data" on which CONTRACTOR is entitled to rely as provided in paragraphs 4.2.1 and 4.2.2 is materially inaccurate, or

4.2.3.2 Is of such a nature as to require a change in the Contract Document, or

4.2.3.3 Differs materially from that shown or indicated in the Contract Documents, or

4.2.3.4 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 conditions affected thereby or performing any Work in connection therewith (except in an emergency as permitted by paragraph 6.23), notify OWNER and ENGINEER in writing about such condition. CONTRACTOR shall not further disturb such conditions or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

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

4.2.5 *Possible Contract Documents Change:* If ENGINEER concludes that a change in the Contract Documents is required as a result of a condition that meets one or more of the categories in paragraph 4.2.3, a Work Change Directive or a Change Order Will be issued as provided in Article 10 to reflect and document the consequences of such change.

4.2.6 *Possible Price and Times Adjustments:* An equitable adjustment in the Contract Price or in the Contract Times, or both, will be allowed to the extent that the existence of such uncovered or revealed condition causes an increase or decrease in CONTRACTOR's cost of, or time, required for performance of the Work: Subject, however, to the following:

4.2.6.1 Such condition must meet any one or more of the categories described in paragraphs 4.2.3.1 through 4.2.3.4 inclusive:

4.2.6.2 A change in the Contract Documents pursuant to paragraph 4.2.5 will not be an automatic authorization or nor a condition

precedent to entitlement to any such adjustments:

4.2.6.3 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 9.10 and 11.9: and

4.2.6.4 CONTRACTOR shall not be entitled to any adjustment in the Contract Price or times if:

4.2.6.4.1 CONTRACTOR knew of such conditions at the time CONTRACTOR made a final commitment to OWNER in respect of Contract Price and Contract times by the submission of a bid or becoming bound under a negotiated contract: or

4.2.6.4.2 The existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test or study of the site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for CONTRACTOR prior to CONTRACTOR's making such final commitment: or

4.2.6.4.3 CONTRACTOR failed to give the written notice within the time and as required by paragraph 4.2.3.

If OWNER and CONTRACTOR are unable to agree on entitlement to or as to the amount or length of any such equitable adjustment in the Contract Price or Contract Times, a claim may be made therefore as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages sustained by CONTRACTOR on or in connection with any other or anticipated project.

4.3 *Physical Conditions—Underground Facilities:*

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

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

4.3.1.2 The cost of all of the following will be included in the Contract Price and

CONTRACTOR shall have full responsibility for: (i) reviewing and checking all such information and data, (ii) locating all Underground Facilities shown or indicated in the Contract Documents, (iii) coordination of the Work with the owners of such Underground Facilities during construction, and (iv) the safety and protection of all such Underground Facilities as provided in paragraph 6.20 and repairing any damage thereto resulting from the Work.

4.3.2 *Not shown or Indicated:* If an Underground Facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the Contract Documents, 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 6.23), identify the owner of such Underground Facility and give written notice to that owner and to OWNER and ENGINEER. ENGINEER will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence of the Underground Facility. If ENGINEER concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued as provided in Article 10 to reflect and document such consequences. During such time, CONTRACTOR shall be responsible for the safety and protection of such Underground Facility as provided in paragraph 6.20. CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, to the extent that they are attributable to the existence of any Underground Facility that was not shown or indicated in the Contract Documents and that CONTRACTOR did not know of and could not reasonably have been expected to be aware of or to have anticipated. If OWNER and CONTRACTOR are unable to agree on entitlement to or the amount or length of any such adjustment in Contract Price or Contract Times, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12. However, OWNER, ENGINEER and ENGINEER's Consultants shall not be liable to CONTRACTOR for any claims, costs, losses or damages incurred or sustained by CONTRACTOR on or in connection with any other project or anticipated project.

Reference Points:

4.4 OWNER shall provide engineering surveys to establish reference points for construction, which in ENGINEER's judgment are necessary to enable CONTRACTOR to proceed with the Work. CONTRACTOR shall be responsible for laying out the Work, shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of OWNER. CONTRACTOR shall report to ENGINEER whenever any reference point is lost or destroyed or

requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocations of such reference points by professionally qualified personnel.

4.5 Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material:

4.5.1 OWNER shall be responsible for any Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. OWNER shall not be responsible for any such materials brought to the site by CONTRACTOR, Subcontractor, Suppliers or anyone else for whom CONTRACTOR is responsible.

4.5.2 CONTRACTOR shall immediately: (i) stop all Work in connection with such hazardous condition and in any area affected thereby (except in an emergency as required by paragraph 6.23), and (ii) notify OWNER and ENGINEER (and 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 hazardous condition or take corrective action, if any. CONTRACTOR shall not be required to resume Work in connection with such hazardous condition or in any such affected area until after OWNER has obtained any required permits related thereto and delivered to CONTRACTOR special written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (ii) specifying any special conditions under which such Work may be resumed safely. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of such Work stoppage or such special conditions under which Work is agreed by CONTRACTOR to be resumed, either party may make a claim therefore as provided in Articles 11 and 12.

4.5.3 If after receipt of such special written notice CONTRACTOR does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then OWNER may order such portion of the Work that is in connection with such hazardous condition or in such affected area to be deleted from the Work. If OWNER and CONTRACTOR cannot agree as to entitlement to or the amount or extent of an adjustment, if any, in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a claim therefore as provided in Articles 11 and 12. OWNER may have such deleted portion of

the Work performed by OWNER's own forces or others in accordance with Article 7.

4.5.4 To the fullest extent permitted by Laws and Regulations, OWNER shall indemnify and hold harmless CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents, other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from such hazardous condition, provided that: (i) any such claim, cost, loss or damage is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, and (ii) nothing in this subparagraph 4.5.4 shall obligate OWNER to indemnify any person or entity from and against the consequences of that person's or entity's own negligence.

4.5.5 The provisions of paragraphs 4.2 and 4.3 are not intended to apply to Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Material uncovered or revealed at the site.

ARTICLE 5—BONDS AND INSURANCE

Performance, Payment and Other Bonds:

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

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

5.3 Licensed Sureties and Insurers; Certificates of Insurance:

5.3.1 All Bonds and insurance required by the Contract Documents to be purchased and maintained by OWNER or CONTRACTOR shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue Bonds or insurance policies for the limits and coverage's so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the supplementary Conditions.

5.3.2 CONTRACTOR shall deliver to OWNER, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by OWNER or any other additional insured) which CONTRACTOR is required to purchase and maintain in accordance with paragraph 5.4. OWNER shall deliver to CONTRACTOR, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by CONTRACTOR or any other additional insured) which OWNER is required to purchase and maintain in accordance with paragraphs 5.6 and 5.7 hereof.

CONTRACTOR's Liability Insurance:

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

5.4.1 Claims under Worker's Compensation, disability benefits and other similar employee benefit acts:

5.4.2 Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees:

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

5.4.4 Claims for damages insured by customary personal injury liability coverage which are sustained: (i) by any person as a result of an offense directly or indirectly related to the employment of such

person by CONTRACTOR, or (ii) by any other person for any other reason:

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

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

The policies of insurance so required by this paragraph 5.4 to be purchased and maintained shall:

5.4.7 With respect to insurance required by paragraphs 5.4.3 through 5.4.6 inclusive, include as additional insured's (subject to any customary exclusion in respect of professional liability) OWNER, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insured's, and include coverage for the respective officers and employees of all such additional insured's:

5.4.8 Include specific coverages and be written for not less than the limits of liability provided in the Supplemental Conditions or required by Laws or regulations, whichever is greater:

5.4.9 Include completed Operations insurance:

5.4.10 Include contractual liability insurance covering CONTRACTOR's indemnity obligations under paragraphs 6.12, 6.16 and 6.31 through 6.33:

5.4.11 Contain a provision of endorsement that the coverage afforded will not be cancelled, materially changed or renewal refused until at least thirty days prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured identified in the Supplemental Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the CONTRACTOR pursuant to paragraph 5.3.2 will so provide):

5.4.12 Remain in effect at least until final payment and at all times thereafter when CONTRACTOR may be correcting, removing or replacing *defective work* in accordance with paragraph 13.12 and:

5.4.13 With respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment (and CONTRACTOR shall furnish OWNER and each other additional insured identified in the Supplementary Conditions to whom a

certificate of insurance has been issued evidence satisfactory to OWNER and any such additional insured of continuation of such insurance at final payment and one year thereafter).

OWNERS's Liability Insurance:

5.5 In addition to the insurance required to be provided by CONTRACTOR under paragraph 54. OWNER, at OWNER's option, may purchase and maintain at OWNER's expense OWNER's own liability insurance as will protect OWNER against claim which may arise from operations under the Contract Documents.

Property Insurance:

5.6 Unless otherwise provided in the Supplementary Conditions, OWNER shall purchase and maintain property insurance upon the Work at the site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

5.6.1 Include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured:

5.6.2 Be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false-work and Work in transit and shall insure against at least the following perils: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, and such other perils as may be specifically required by the Supplementary Conditions:

5.6.3 Include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects):

5.6.4 Cover materials and equipment stored at the site or at another location that was agreed to in writing by OWNER prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by ENGINEER, and;

5.6.5 Be maintained in effect until final payment is made unless otherwise agreed to in writing by OWNER, CONTRACTOR and ENGINEER with thirty days written notice to each other additional

insured to whom a certificate of insurance has been issued.

5.7 OWNER shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and any other persons or entities identified in the Supplementary Conditions, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

5.8 All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained by OWNER in accordance with paragraphs 5.6 and 5.7 will contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least thirty days' prior written notice has been given to OWNER and CONTRACTOR and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with paragraph 5.11.

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

5.10 If CONTRACTOR requests in writing that other special insurance be included in the property insurance policies provided under paragraphs 5.6 or 5.7, OWNER shall, if possible, include such insurance and the cost thereof will be charged to CONTRACTOR by appropriate Change Order or Written Amendment, prior to commencement of the Work at the site. OWNER shall in writing advise CONTRACTOR whether or not such other insurance has been procured by OWNER.

5.11 Waiver of Rights:

5.11.1 OWNER and CONTRACTOR intend that all policies purchased in accordance with paragraphs 5.6 and 5.7 will protect OWNER, CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insured or additional insured in such policies and will provide primary coverage for all losses and damages caused by the perils covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insured or additional insured thereunder. OWNER

and CONTRACTOR waive all rights against each other and their respective officers, directors, employees and agents for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, ENGINEER, ENGINEER's Consultants and all other persons or entities identified in the Supplementary Conditions to be listed as insured or additional insured under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by OWNER as trustee or otherwise payable under any policy so issued.

5.11.2 In addition, OWNER waives all rights against CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees and agents of any of them, for:

5.11.2.1 Loss 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 peril, whether or not insured by OWNER, and:

5.11.2.2 Loss or damage to the completed Project or part thereof caused by, arising out of or resulting from fire or other insured peril covered by any property insurance maintained on the completed Project or part thereof by OWNER during partial utilization pursuant to paragraph 14.10, after substantial completion pursuant to paragraph 14.8 or after final payment pursuant to paragraph 14.13.

Any insurance policy maintained by OWNER covering any loss, damage or consequential loss referred to in this paragraph 5.11.2 shall contain provisions to the effect that in the event of payment of any such loss, damage or consequential loss, the insurers will have no rights of recovery against any of CONTRACTOR, Subcontractors, ENGINEER, ENGINEER's Consultants and the officers, directors, employees and agents of any of them.

Receipt and Application of Insurance Proceeds

5.12 Any insured loss under the policies of insurance required by paragraphs 5.6 and 5.7 will be adjusted with OWNER and made payable to OWNER as fiduciary for the insured, as their interests may appear, subject to the requirements of any applicable mortgage clause and of paragraph 5.13, OWNER shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the moneys so received applied on account

thereof and the Work and the cost thereof covered by an appropriate Change Order or Written Amendment.

5.13 OWNER as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within fifteen days after the occurrence of loss to OWNER's exercise of this power. If such objection be made, OWNER as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, OWNER as fiduciary shall adjust and settle the loss with insurers and, if required in writing by any party in interest, OWNER as fiduciary shall give bond for the proper performance of such duties.

Acceptance of Bonds and Insurance: Option to Replace:

5.14 If either party (OWNER or CONTRACTOR) has any objection to the coverage afforded by or other provisions of the Bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within ten days after receipt of the certificates (or other evidence requested) required by paragraph 2.7, OWNER and CONTRACTOR shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the Bonds and insurance required or such party by the Contract Documents, 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. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent Bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

Partial Utilization—Property Insurance:

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

ARTICLE 6—CONTRACTOR'S RESPONSIBILITIES

Supervision and Superintendence:

6.1 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. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction, but CONTRACTOR shall not be responsible for the negligence of others in the design or specification of a specific means, method, technique, sequence of procedure of construction which is shown or indicated in and expressly required by the Contract Documents. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

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

Labor, Materials and Equipment:

6.3 CONTRACTOR shall provide competent, suitably qualified personnel to survey, lay out and construct the Work as required by the Contract Documents. CONTRACTOR shall at all times maintain good discipline and order at the site. 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 indicated in the Contract Documents, all Work at the site shall be performed during regular working hours and CONTRACTOR will not permit overtime work or the performance of Work on Saturday, Sunday or any legal holiday without OWNER's written consent given after prior written notice to ENGINEER.

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

6.5 All materials and equipment shall be of good quality and new, except as otherwise provided in the

Contract Documents. All warranties and guarantees specifically called for by the Specifications shall expressly run to the benefit of OWNER. If required by ENGINEER, CONTRACTOR shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

Progress Schedule:

6.6 CONTRACTOR shall adhere to the progress schedule established in accordance with paragraph 2.9 as it may be adjusted from time to time as provided below:

6.6.1 CONTRACTOR shall submit to ENGINEER for acceptance (to the extent indicated in paragraph 2.9) proposed adjustments in the progress schedule that will not change the Contract Times (or Milestones). Such adjustments will conform generally to the progress schedule then in effect and additionally will comply with any provisions of the General Requirements applicable thereto.

6.6.2 Proposed adjustments in the progress schedule that will change the Contract Times (or Milestones) shall be submitted in accordance with the requirements of paragraph 12.1. Such adjustments may only be made by a Change Order or Written Amendment in accordance with Article 12.

6.7 Substitutes and "Or-Equal" Items:

6.7.1 Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be accepted by ENGINEER under the following circumstances:

6.7.1.1 "Or-Equal": If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by ENGINEER as an "or-equal" item, in which case review and approval of the proposed item may, in ENGINEER's sole discretion, be accomplished without compliance with some or all of the requirements for acceptance of proposed substitute items.

6.7.1.2 *Substitute Items:* If in ENGINEER's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "or-equal" item under subparagraph 6.7.1.1, it will be considered a proposed substitute item. CONTRACTOR shall submit sufficient information as provided below to allow ENGINEER to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefore. The procedure for review by the ENGINEER will include the following as supplemented in the General Requirements and as ENGINEER may decide is appropriate under the circumstances. Requests for review of proposed substitute items of material or equipment will not be accepted by ENGINEER from anyone other than CONTRACTOR. If CONTRACTOR wishes to furnish or use a substitute item of material or equipment, CONTRACTOR shall first make written application to ENGINEER for acceptance thereof, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar in substance to that specified and be suited to the same use as that specified. The application will state the extent, if any, to which the evaluation and acceptance of the proposed substitute will prejudice CONTRACTOR's achievement of Substantial Completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents for in the provisions of any other direct contract with OWNER for work on the Project, to adapt the design to the proposed substitute and whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated. The application will also contain an itemized estimate of all costs or credits that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which will be considered by ENGINEER in evaluating the proposed substitute. ENGINEER may require CONTRACTOR to furnish additional data about the proposed substitute.

6.7.1.3 *CONTRACTOR's Expense:* All data to be provided by CONTRACTOR in support of any proposed "or-equal" or substitute item will be at CONTRACTOR's expense.

6.7.2 *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence of procedure of construction is shown or indicated in and expressly required by the Contract

Documents, CONTRACTOR may furnish or utilize a substitute means, method, technique, sequence or procedure of construction acceptable to ENGINEER. CONTRACTOR shall submit sufficient information to allow ENGINEER, in ENGINEER's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by ENGINEER will be similar to that provided in subparagraph 6.7.1.2.

6.7.3 *ENGINEER's Evaluation:* ENGINEER will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to paragraphs 6.7.1.2 and 6.7.2. ENGINEER will be the sole judge of acceptability. No "or-equal" or substitute will be ordered, installed or utilized without ENGINEER's prior written acceptance, which will be evidenced, by either a Change Order or an approved Shop Drawing. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety with respect to any "or-equal" or substitute. ENGINEER will record time required by ENGINEER and ENGINEER's Consultants in evaluating substitutes proposed or submitted by CONTRACTOR pursuant to paragraphs 6.7.1.2 and 6.7.2 and in making changes in the Contract Documents (or in the provisions of any other direct contract with OWNER for work on the Project) occasioned thereby. Whether or not ENGINEER accepts a substitute item so proposed or submitted by CONTRACTOR. CONTRACTOR shall reimburse OWNER for the charges of ENGINEER and ENGINEER's Consultants for evaluating each such proposed substitute item.

6.8-6.11 *Concerning Subcontractors, Suppliers and Others:*

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

6.8.2 If the Supplementary Conditions require the identify of certain Subcontractors, Suppliers or other persons or organizations (including those who are to furnish the principal items of materials or equipment) to be submitted to OWNER in advance of the specified date prior to the Effective Date of the Agreement for acceptance by OWNER and ENGINEER, and if CONTRACTOR has submitted a list thereof in accordance with the Supplementary Conditions, OWNER's or ENGINEER's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or

objection in the bidding documents or the Contract Documents) of any such Subcontractor, Supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case CONTRACTOR shall submit an acceptable substitute, the Contract Price will be adjusted by the difference in the cost occasioned by such substitution and an appropriate Change Order will be issued or Written Amendment signed. No acceptance by OWNER or ENGINEER of any such Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER or ENGINEER to reject *defective Work*.

6.9.1 CONTRACTOR shall be fully responsible to OWNER and ENGINEER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or Indirect contract with CONTRACTOR just as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between OWNER or ENGINEER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or ENGINEER to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by Laws and Regulations.

6.9.2 CONTRACTOR shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR. CONTRACTOR shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with the ENGINEER through CONTRACTOR.

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

6.11 All Work performed for CONTRACTOR by a Subcontractor or Supplier will be pursuant to an appropriate agreement between CONTRACTOR and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and ENGINEER. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in paragraph 5.6 or 5.7, the agreement between the CONTRACTOR and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against OWNER, CONTRACTOR, ENGINEER,

ENGINEER's Consultants and all other additional insured for all losses and damages caused by, arising out of or resulting from any of the perils covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, CONTRACTOR will obtain the same.

Patent Fees and Royalties:

6.12 CONTRACTOR shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of OWNER or ENGINEER its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by OWNER in the Contract Documents. To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants of each and any of them from and against all claims, costs, losses and damages arising out of or resulting from 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.

Permits:

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

Laws and Regulations:

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

6.14.2 If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, CONTRACTOR shall bear all claims, costs, losses and damages caused by, arising out of or resulting therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve CONTRACTOR or CONTRACTOR's obligations under paragraph 3.3.2.

Taxes:

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

Use of Premises:

6.16 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by Laws and Regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. CONTRACTOR shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultant and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages arising out of or resulting from 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 by or based upon CONTRACTOR's performance of the Work.

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

6.18 CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

Record Documents:

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

Safety and Protection:

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

6.20.1 All persons on the Work site or who may be affected by the Work:

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

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

CONTRACTOR shall comply with all applicable Laws and Regulations of any public body having jurisdiction for safety or persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of Underground Facilities and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.20.2 or 6.20.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, any Subcontractor, Supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings

or Specifications or to the acts or omissions of OWNER or ENGINEER or ENGINEER's Consultant 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 person or organization directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and ENGINEER has issued a notice to OWNER and CONTRACTOR in accordance with paragraph 14.13 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

Safety Representative:

6.21 CONTRACTOR shall designate a qualified and experienced safety representative at the site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

Hazard Communication Programs:

6.22 CONTRACTOR shall be responsible for coordinating any exchange of 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 and Regulations.

Emergencies:

6.23 In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or ENGINEER, is obligated to act to prevent threatened damage, injury or loss. CONTRACTOR shall give ENGINEER prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If ENGINEER determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Work Change Directive or Change Order will be issued to document the consequences of such action.

6.24 Shop Drawings and Samples:

6.24.1 CONTRACTOR shall submit Shop Drawings to ENGINEER for review and approval in accordance with the accepted schedule of Shop Drawings and Sample submittals (see paragraph 2.9). All submittals will be identified as ENGINEER may require and in the number of copies specified in the General Requirements. The data shown on the Shop Drawings will be complete with respect to quantities,

dimensions, specified performance and design criteria, materials and similar data to show ENGINEER the materials and equipment CONTRACTOR proposes to provide and to enable ENGINEER to review the information for the limited purposes required by paragraph 6.26.

6.24.2 CONTRACTOR shall also submit Samples to ENGINEER for review and approval in accordance with said accepted schedule of Shop Drawings and Sample submittals. Each Sample will be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended and otherwise as ENGINEER may require to enable ENGINEER to review the submittal for the limited purposes required by paragraph 6.26. The numbers of each Sample to be submitted will be as specified in the Specifications.

6.25 Submittal Procedures:

6.25.1 Before submitting each Shop Drawing or Sample, CONTRACTOR shall have determined and verified:

6.25.1.1 All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto.

6.25.1.2 All materials and respect to intended use, fabrication, shipping, handling, storage, assembly and installation pertaining to the performance of the Work, and

6.25.1.3 All information relative to CONTRACTOR's sole responsibilities in respect of means, methods, techniques, sequences and procedures of construction and safety precautions and programs incident thereto.

CONTRACTOR shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the Requirements of the Work and the Contract Documents.

6.25.2 Each submittal will bear a stamp or specific written indication that CONTRACTOR has satisfied CONTRACTOR's obligations under the Contract Documents with respect to CONTRACTOR's review and approval of that submittal.

6.25.3 At the time of each submission, CONTRACTOR shall give ENGINEER specific written notice of such variations, if any, that the Shop Drawing of Sample submitted may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal; and, in addition, shall cause a specific notation to be made on each Shop Drawing and Sample submitted to

ENGINEER for review and approval of each such variation.

6.26 ENGINEER will review and approve Shop Drawings and Samples in accordance with the schedule of Shop Drawings and Sample submittals accepted by ENGINEER as required by paragraph 2.9. 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, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER's review and approval will not extend to means, methods, techniques, sequences of procedures of construction (except where a particular means, method, technique, sequence or procedure of construction is specifically and expressly called for by the Contract Documents) or, to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions. CONTRACTOR shall make corrections required by ENGINEER, and shall return the required number of corrected copies of Shop Drawings and submit as required new Samples for review and approval. CONTRACTOR shall direct specific attention in writing to revisions other than the corrections called for by ENGINEER on previous submittals.

6.27 ENGINEER's review and approval of Shop Drawings or Samples shall not relieve CONTRACTOR from responsibility for any variation from the requirements of the Contract Documents unless CONTRACTOR has in writing called ENGINEER's attention to each such variation at the time of submission as required by paragraph 6.25.3 and ENGINEER has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing of Sample approval; nor will any approval by ENGINEER relieve CONTRACTOR from responsibility for complying with the requirements of paragraph 6.25.1.

6.28 Where a Shop Drawing or Sample is required by the Contract Documents or the schedule of Shop Drawings and Sample submissions accepted by ENGINEER as required by paragraph 2.9, 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.

Continuing the Work:

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

6.30 CONTRACTOR's General Warranty and Guarantee:

6.30.1 CONTRACTOR warrants and guarantees to OWNER, ENGINEER and ENGINEER's Consultants that all Work will be in accordance with the Contract Documents and will not be *defective*. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

6.30.1.1 Abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or Suppliers; or

6.30.1.2 Normal wear and tear under normal usage.

6.30.2 CONTRACTOR's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:

6.30.2.1 Observations by ENGINEER;

6.30.2.2 Recommendation of any progress or final payment by ENGINEER;

6.30.2.3 The issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;

6.30.2.4 Use of occupancy of the Work or any part thereof by OWNER;

6.30.2.5 Any acceptance by OWNER or any failure to do so;

6.30.2.6 Any review and approval of a shop Drawing or Sample submittal or the issuance of a notice of acceptability by ENGINEER pursuant to paragraph 14.13;

6.30.2.7 Any inspection, test or approval by others; or

6.30.2.8 Any correction or *defective* Work by OWNER.

Indemnification:

6.31 To the fullest extent permitted by Laws and Regulations, CONTRACTOR shall indemnify and hold harmless OWNER, ENGINEER, ENGINEER's Consultants and the officers, directors, employees, agents and other consultants 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) caused by, arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage: (i) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, and (ii) is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of a person or entity indemnified hereunder or whether liability is imposed upon such indemnified party by Laws and Regulations regardless of the negligence of any such person or entity.

6.32 In any and all claims against OWNER or ENGINEER or any of their respective consultants, agents, officers, directors or employees by any employee (or the survivor of personal representative of such employee) of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the work, or anyone for whose acts any of them may be liable, the indemnifications obligation under paragraph 6.31 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

6.33 The indemnification obligations of CONTRACTOR under paragraph 6.31 shall not extend to the liability of ENGINEER and ENGINEER's Consultants, officers, directors, employees or agents caused by the professional negligence, errors or omissions of any of them.

Survival of Obligations:

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

ARTICLE 7—OTHER WORK

Related Work at Site:

7.1 OWNER may perform other work related to the Project at the site by OWNER's own forces, or let other direct contracts therefore which shall contain General Conditions similar to these, or have other work performed by utility owners. If the fact that such other work is to be

performed was not noted in the Contract Documents, then; (i) written notice thereof will be given to CONTRACTOR prior to starting any such other work, and (ii) CONTRACTOR may make a claim therefore as provide in Articles 11 and 12 if CONTRACTOR believes that such performance will involve additional expense to CONTRACTOR or requires additional time and the parties are unable to agree as to the amount or extent thereof.

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

7.3 If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, 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 so to report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent non-apparent defects and deficiencies in such other work.

Coordination:

7.4 If OWNER contracts with others for the performance of other work on the Project at the site, the following will be set forth in Supplementary Conditions:

7.4.1 The person, firm or corporation who will have authority and responsibility for coordination of the activities among the various prime contractors will be identified;

7.4.2 The specific matters to be covered by such authority and responsibility will be itemized; and

7.4.3 The extent of such authority and responsibilities will be provided.

Unless otherwise provided in the Supplementary Conditions, OWNER shall have sole authority and responsibility in respect of such coordination.

ARTICLE 8-OWNER'S RESPONSIBILITIES

8.1 Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through ENGINEER.

8.2 In case of termination of the employment of ENGINEER, OWNER shall appoint an engineer against whom CONTRACTOR makes no reasonable objection, whose status under the Contract Documents shall be that of the former ENGINEER.

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

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

8.5 OWNER's responsibilities in respect of purchasing and maintaining liability and property insurance are set forth in paragraphs 5.5 through 5.10.

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

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

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

8.9 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 furnishing or performance of the Work. OWNER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

8.10 OWNER's responsibility in respect of undisclosed Asbestos, PCBs, Petroleum, Hazardous Waste or Radioactive Materials uncovered or revealed at the site is set forth in paragraph 4.5.

8.11 If and to the extent OWNER has agreed to furnish CONTRACTOR reasonable evidence that financial arrangements have been made to satisfy OWNER's obligations under the Contract Documents, OWNER's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9—ENGINEER'S STATUS DURING CONSTRUCTION

OWNER's Representative:

9.1 ENGINEER will be OWNER's representative during the construction period. The duties and responsibilities and the limitations of authority of ENGINEER as OWNER's representative during construction are set forth in the Contract Documents and shall not be extended without written consent of OWNER and ENGINEER.

Visits to Site:

9.2 ENGINEER will make visits to the site at intervals appropriate to the various stages of construction, 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 will endeavor for the benefit of OWNER to determine, in general, if the Work is proceeding in accordance with the Contract Documents. ENGINEER will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. ENGINEER's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and on-site observations, ENGINEER will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work. ENGINEER's visits and on-site observations are subject to all the limitations on ENGINEER's authority and responsibility set forth in paragraph 9.13, and particularly, but without limitation, during or as a result of ENGINEER's on-site 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 furnishing or performance of the Work.

Project Representative:

9.3 If OWNER and ENGINEER agree, ENGINEER will furnish a Resident Project Representative to assist ENGINEER in providing more continuous observation of the Work. The responsibilities and authority and limitations thereon of any such Resident Project Representative and assistants will be as provided in paragraph 9.13 and in the Supplementary Conditions. If OWNER designates another representative or agent to represent OWNER at the site who is not ENGINEER's Consultant, agent or employee, the responsibilities and authority and limitations thereon of such other person will be as provided in the Supplementary Conditions.

Clarifications and Interpretations:

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

Authorized variations In Work:

9.5 ENGINEER may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on OWNER and also on CONTRACTOR who shall perform the Work involved promptly. If OWNER or CONTRACTOR believes that a Field Order justifies an adjustment in the Contract Price of the Contract Times and the parties are unable to agree as to the amount or extent thereof, OWNER or CONTRACTOR may make a written claim therefore as provided in Article 11 or 12.

Rejecting Defective work:

9.6 ENGINEER will have authority to disapprove or reject Work which ENGINEER believes to be *defective*, or that ENGINEER believes will not produce a completed Project that conforms to the Contract Documents or that will

prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. ENGINEER will also have authority to require special inspection or testing of the Work as provided in paragraph 13.9, whether or not the Work is fabricated, installed or completed.

Shop Drawings, Change Orders and Payments:

9.7 In connection with ENGINEER's authority as to Shop Drawings and Samples, see paragraphs 6.24 through 6.28 inclusive.

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

9.9 In connection with ENGINEER's authority as to Applications for Payment, see Article 14.

Determinations for Unit Prices:

9.10 ENGINEER will determine the actual quantities and classifications of Unit Price Work performed by CONTRACTOR. ENGINEER will review with CONTRACTOR the ENGINEER's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). ENGINEER's written decision thereon will be final and binding upon OWNER and CONTRACTOR, unless, within ten days after the date of any such decision, either OWNER or CONTRACTOR delivers to the other and to ENGINEER written notice of intention to appeal from ENGINEER's decision and; (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the procedures set forth in Exhibit GC-A, "Dispute Resolution Agreement" entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement as been entered into, a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to ENGINEER's decision, unless otherwise agreed in writing by OWNER and CONTRACTOR. Such appeal will not be subject to the procedures of paragraph 9.11.

Decisions on Disputes:

9.11 ENGINEER will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work and Claims under Articles 11 and 12 in respect of changes in the Contract Price or Contract Times will be referred initially to ENGINEER in writing with a request for a formal decision in accordance with this paragraph. Written notice of each such claim, dispute or other matter will be

delivered by the claimant to ENGINEER and the other party to the Agreement promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise thereto, and written supporting data will be submitted to ENGINEER and the other party within sixty days after the start of such occurrence or event unless ENGINEER allows an additional period of time for the submission of additional or more accurate data in support of such claim, dispute or other matter. The opposing party shall submit any response to ENGINEER and the claimant within thirty days after receipt of the claimant's last submittal (unless ENGINEER allows additional time). ENGINEER will render a formal decision in writing within thirty days after receipt of the opposing party's submittal, if any, in accordance with this paragraph. ENGINEER's written decision of such claim, dispute or other matter will be final and binding upon OWNER and CONTRACTOR unless; (i) an appeal from ENGINEER's decision is taken within the time limits and in accordance with the Procedures set forth in EXHIBIT GC-A, "Dispute Resolution Agreement" entered into between OWNER and CONTRACTOR pursuant to Article 16, or (ii) if no such Dispute Resolution Agreement has been entered into, a written notice of intention to appeal from ENGINEER's written decision is delivered by OWNER or CONTRACTOR to the other and to ENGINEER within thirty days after the date of such decision and a formal proceeding is instituted by the appealing party in a forum of competent jurisdiction to exercise such rights or remedies as the appealing party may have with respect to such claim, dispute or other matter in accordance with applicable Laws and Regulations within sixty days of the date of such decision, unless otherwise agreed in writing by OWNER and CONTRACTOR.

9.12 When functioning as interpreter and judge under paragraphs 9.10 and 9.11, ENGINEER will not show partiality to OWNER or CONTRACTOR and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity. The rendering of a decision by ENGINEER pursuant to paragraphs 9.10 or 9.11 with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment as provided in paragraph 14.16) will be a condition precedent to any exercise by OWNER or CONTRACTOR of such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any such claim, dispute or other matter pursuant to Article 16.

9.13 Limitations on ENGINEER's Authority and Responsibilities:

9.13.1 Neither ENGINEER's authority or responsibility under this Article 9 or under any other provision of the Contract Documents 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 shall create, impose or give rise to any duty owed by ENGINEER to CONTRACTOR, any Subcontractor, any Supplier, any

other person or organization, or to any surety for or employee or agent of any of them.

9.13.2 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 furnishing or performance of the Work. ENGINEER will not be responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents.

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

9.13.4 ENGINEER's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and other documentation required to be delivered by paragraph 14.12 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.

9.13.5 The limitations upon authority and responsibility set forth in this paragraph 9.13 shall also apply to ENGINEER's Consultants, Resident Project Representative and assistants.

ARTICLE 10—CHANGES IN THE WORK

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

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

10.3 CONTRACTOR shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.5 and 3.6 except in the case of an emergency as provided in paragraph 6.23 or in the case of uncovering Work as provided in paragraph 13.9.

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

10.4.1 Changes in the Work which are (i) ordered by OWNER pursuant to paragraph 10.1, (ii) required because of acceptance of *defective* Work under paragraph 13.13 or correcting *defective* Work under paragraph 13.14 or (iii) agreed to by the parties;

10.4.2 Changes in the Contract Price or Contract Times which are agreed to by the parties; and

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

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

10.5 If notice of any change affecting the general scope of the Work or the provisions of the contract Documents (including, but not limited to, Contract Price or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

ARTICLE 11—CHANGE OF CONTRACT PRICE

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

11.2 The Contract Price may only be changed by a Change Order or by a Written Amendment. Any claim for an adjustment in the Contract Price shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the start of the occurrence or event giving rise to the claim and stating the general nature

of the claim. Notice of the amount of the claim with supporting data shall be delivered within sixty days after the start of such occurrence or event (unless ENGINEER allows additional time for claimant to submit additional or more accurate data in support of the claim) and shall be accompanied by claimant's written statement that the adjustment claimed covers all known amounts to which the claimant is entitled as a result of said occurrence or event. All claims for adjustment in the Contract Price shall be determined by ENGINEER in accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree on the amount involved. No claim for an adjustment in the Contract Price will be valid if not submitted in accordance with this paragraph 11.2.

11.3 The value of any Work covered by a Change Order or of any claim for an adjustment in the Contract Price will be determined as follows:

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

11.3.2 Where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under paragraph 11.3.2 on the basis of the Cost of the Work (determined as provided in paragraphs 11.4 and 11.5) plus a CONTRACTOR's fee for overhead and profit (determined as provided in paragraph 11.6).

Cost of the Work:

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

11.4.1 Payroll costs for employees in the direct employ of CONTRACTOR in the performance of the Work under schedules of the job classifications agreed upon by OWNER and CONTRACTOR. Such employees shall include without limitation superintendents, foremen and other personnel employed full-time at the site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work after regular working hours, on Saturday, Sunday or

legal holidays shall be included in the above to the extent authorized by OWNER.

11.4.2 Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection herewith. All cash discounts shall accrue to CONTRACTOR unless OWNER deposits funds with CONTRACTOR with which to make payments, in which case the cash discounts shall accrue to OWNER. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to OWNER, and CONTRACTOR shall make provisions so that they may be obtained.

11.4.3 Payments made by CONTRACTOR to the Subcontractors for Work performed or furnished 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 who will then determine, with the advice of ENGINEER, which bids, if any, will be accepted. 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 shall be determined in the same manner as CONTRACTOR's cost of the Work and fee as provided in paragraphs 11.4, 11.5, 11.6 and 11.7. All subcontracts shall be subject to the other provisions of the Contract Documents insofar as applicable.

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

11.4.5 Supplemental costs including the following:

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

11.4.5.2 Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, off and temporary facilities at the site and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost less market value of such items used but not consumed which remain the property of CONTRACTOR.

11.4.5.3 Rentals of all construction equipment and machinery and the parts thereof whether rented from CONTRACTOR or others in accordance with rental agreements approved by OWNER with the advice of ENGINEER, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof—all

in accordance with the terms of said rental agreements. The rental of any such equipment, machinery or parts shall cease when the use thereof is no longer necessary for the Work.

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

11.4.5.5 Deposits lost for causes other than negligence of CONTRACTOR, any Subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

11.4.5.6 Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance of otherwise, sustained by CONTRACTOR in connection with the performance and furnishing of the Work (except losses and damages within the deductible amounts of property insurance established by OWNER in accordance with paragraph 5.9), provided they have resulted from causes other than the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of OWNER. No such losses, damages and expenses shall be included in the Cost of the Work for the purpose of determining CONTRACTOR's fee. If, however, any such loss or damage requires reconstruction and CONTRACTOR is placed in charge thereof, CONTRACTOR shall be paid for services a fee proportionate to that stated in paragraph 11.6.2.

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

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

11.4.5.9 Cost of premiums for additional Bonds and insurance required because of changes in the Work.

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

11.5.1 Payroll costs and other compensation of CONTRACTOR's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other

personnel employed by CONTRACTOR whether at the site or in CONTRACTOR's principal or a branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in paragraph 11.4.1 or specifically covered by paragraph 11.4.4—all of which are to be considered administrative costs covered by the CONTRACTOR's fee.

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

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

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

11.5.5 Costs due to the negligence of CONTRACTOR, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied and making good any damage to property.

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

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

11.6.1 A mutually acceptable fixed fee; or

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

11.6.2.1 For costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR's fee shall be fifteen percent;

11.6.2.2 For costs incurred under paragraph 11.4.3, the CONTRACTOR's fee shall be five percent;

11.6.2.3 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 11.4.1, 11.4.2, 11.4.3 and 11.6.2 is that the Subcontractor who actually performs or furnishes the Work, at whatever tier, will be paid a fee of fifteen percent of the costs incurred by such Subcontractor under paragraphs

11.4.1 and 11.4.2 and that any higher tier Subcontractor and CONTRACTOR will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

11.6.2.4 No fee shall be payable on the basis of costs itemized under paragraphs 11.4.4, 11.4.5 and 11.5;

11.6.2.5 The amount of credit to be allowed by CONTRACTOR to OWNER for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in CONTRACTOR's fee by an amount equal to five percent of such net decrease; and

11.6.2.6 When both additions and credits are involved in any one change, the adjustment in CONTRACTOR's fee shall be computed on the basis of the net change in accordance with paragraphs 11.6.2.1 through 11.6.2.5 inclusive.

11.7 Whenever the cost of any Work is to be determined pursuant to paragraphs 11.4 and 11.5, CONTRACTOR will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in form acceptable to ENGINEER an itemized cost breakdown together with supporting data.

Cash Allowances:

11.8 It is understood that CONTRACTOR has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be furnished and performed for such sums as may be acceptable to OWNER and ENGINEER. CONTRACTOR agrees that:

11.8.1 The allowances include the cost to CONTRACTOR (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the site and all applicable taxes; and

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

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

11.9 Unit Price Work:

11.9.1 Where the Contract Documents provide that all or part of the Work is to be Unit Price Work,

initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by CONTRACTOR will be made by ENGINEER in accordance with paragraph 9.10.

11.9.2 Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

11.9.3 OWNER or CONTRACTOR may make a claim for an adjustment in the Contract Price in accordance with Article 11 if:

11.9.3.1 The quantity of any item of Unit Price Work performed by CONTRACTOR differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

11.9.3.2 There is no corresponding adjustment with respect to any other item of Work; and

11.9.3.3 If CONTRACTOR believes that CONTRACTOR is entitled to an increase in Contract Price as a result of having incurred additional expense or OWNER believes that OWNER is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12—CHANGE OF CONTRACT TIMES

12.1 The Contract Times (or Milestones) may only be changed by a Change Order or a Written Amendment. Any claim for an adjustment of the Contract Times (or Milestones) shall be based on written notice delivered by the party making the claim to the other party and to ENGINEER promptly (but in no event later than thirty days) after the occurrence of the event giving rise to the claim and stating the general nature of the claim. Notice of the extent of the claim with supporting data shall be delivered within sixty days after such occurrence (unless ENGINEER allows an additional period of time to ascertain more accurate data in support of the claim) and shall be accompanied by the claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant has reason to believe it is entitled as a result of the occurrence of said event. All claims for adjustment in the Contract Times (or Milestones) shall be determined by ENGINEER in

accordance with paragraph 9.11 if OWNER and CONTRACTOR cannot otherwise agree. No claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph 12.1.

12.2 All time limits stated in the Contract Documents are of the essence of the Agreement.

12.3 Where CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of CONTRACTOR, the Contract Times (or Milestones) will be extended in an amount equal to the time lost due to such delay if a claim is made therefore as provided in paragraph 12.1. Delays beyond the control of CONTRACTOR shall include, but not be limited to, acts or neglect by OWNER, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions or acts of God. Delays attributable to and within the control of a subcontractor or Supplier shall be deemed to be delays within the control of CONTRACTOR.

12.4 Where CONTRACTOR is prevented from completing any part of the work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. In no event shall OWNER be liable to CONTRACTOR, any Subcontractor, any Supplier, any other person or organization, or to any surety for or employee or agent of any of them, for damages arising out of or resulting from (i) delays caused by or within the control of CONTRACTOR, or (ii) delays beyond the control of both parties including but not limited to fires, floods, epidemics, abnormal weather conditions, acts of God or acts or neglect by utility owners or other contractors performing other work as contemplated by Article 7.

ARTICLE 13—TESTS AND INSPECTIONS: CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.1 *Notice of Defects:* Prompt notice of all defective Work of which OWNER or ENGINEER has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected or accepted as provided in this Article 13.

Access to Work:

13.2 OWNER, ENGINEER, ENGINEER's Consultants, other representatives and personnel of

OWNER, independent testing laboratories and governmental agencies with jurisdictional interests will have access to the Work at reasonable times for their observation, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

Tests and Inspections:

13.3 CONTRACTOR shall give ENGINEER timely notice of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

13.4 OWNER shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

13.4.1 For inspections, tests or approvals covered by paragraph 13.5 below;

13.4.2 That costs incurred in connection with tests or inspections conducted pursuant to paragraph 13.9 below shall be paid as provided in said paragraph 13.9; and

13.4.3 As otherwise specifically provided in the Contract Documents.

13.5 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. CONTRACTOR shall also be responsible for arranging and obtain and shall pay all costs in connections with any inspections, tests or approvals required for OWNER's and ENGINEER's acceptance of materials or equipment to be incorporated in the Work, or of materials, mix designs, or equipment submitted for approval prior to CONTRACTOR's purchase thereof for incorporation in the Work.

13.6 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, it must, if requested by ENGINEER, be uncovered for observation.

13.7 Uncovering Work as provided in paragraph 13.6 shall be at CONTRACTOR's expense unless CONTRACTOR has given ENGINEER timely notice of CONTRACTOR's intention to cover the same and ENGINEER has not acted with reasonable promptness in response to such notice.

Uncovering Work:

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

13.9 If ENGINEER considers it necessary or advisable that covered Work be observed by ENGINEER or inspected or tested by other. CONTRACTOR, at ENGINEER's request, shall uncover, expose or otherwise make available for observation, inspection or testing as ENGINEER may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is *defective*, CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from 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 OWNER shall be entitled to an appropriate decrease in the Contract Price and, if the parties are unable to agree as to the amount thereof, may make a claim therefore as provided in Article 11. If, however, such Work is not found to be *defective*, CONTRACTOR shall be allowed an increase in the Contract Price or an extension of the Contract Times (or Milestones), or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, CONTRACTOR may make a claim therefore as provided in Articles 11 and 12.

OWNER May Stop the Work:

13.10 If the Work is *defective*, or CONTRACTOR fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any surety or other party.

Correction or Removal of Defective Work:

13.11 If required by ENGINEER, CONTRACTOR shall promptly, as directed, either correct all *defective* Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by ENGINEER, remove it from the site and replace it with Work that is not *defective*. CONTRACTOR shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.12 Correction Period:

13.12.1 If within one year after the date of Substantial Completion or such longer period of time as may be prescribed by Laws or Regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents, any Work is found to be *defective*, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions: (i) correct such *defective* Work, or, if it has been rejected by OWNER, remove it from the site and replace it with Work that is not *defective*, and (ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting therefrom. If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the *defective* Work corrected or the rejected Work removed and replaced, and all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR.

13.12.2 In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications or by Written Amendment.

13.12.3 Where *defective* Work (and damage to other Work resulting therefrom) has been corrected, removed or replaced under this paragraph 13.12, 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.

Acceptance of Defective Work:

13.13 If, instead of requiring correction or removal and replacement of *defective* Work, OWNER (and, prior to ENGINEER's recommendation of final payment, also ENGINEER) prefers to accept it, OWNER may do so. CONTRACTOR shall 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). If any such acceptance occurs prior to ENGINEER's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER.

OWNER May Correct Defective Work:

13.14 If CONTRACTOR fails within a reasonable time after written notice from ENGINEER to correct *defective* Work or to remove and replace rejected Work as required by ENGINEER in accordance with paragraph 13.11, or if CONTRACTOR fails to perform the Work in accordance with Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER, may, after seven days' written notice to CONTRACTOR, correct and remedy and such deficiency. In exercising the rights and remedies under this paragraph OWNER shall proceed expeditiously. In connection with such corrective and 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, take possession of CONTRACTOR's tools, appliances, construction equipment and machinery at the site and incorporate in the Work all materials and equipment stored at the site 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. All claims, costs, losses and damages incurred or sustained by OWNER in exercising such rights and remedies will be charged against CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and OWNER shall be entitled to an appropriate decrease in the Contract Price, and, if the parties are unable to agree as to the amount thereof, OWNER may make a claim therefore as provided in Article 11. 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. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones) because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14—PAYMENTS TO CONTRACTOR AND COMPLETION

Schedule of Values:

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

Application for Progress Payment:

14.2 At least twenty days before the date established 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. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that OWNER has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect OWNER's interest therein, all of which will be satisfactory to OWNER. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

CONTRACTOR's Warranty of Title:

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

Review of Applications for Progress Payment:

14.4 ENGINEER will, within ten days after receipt of each Application for Payment, 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. Ten days after presentation of the Application for Payment to OWNER with ENGINEER's recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

14.5 ENGINEER's recommendation of any payment requested in an Application for Payment will constitute a representation by ENGINEER to OWNER, based on ENGINEER's on-site observations of the 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:

14.5.1 The Work has progressed to the point indicated,

14.5.2 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, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under paragraph 9.10, and to any other qualifications stated in the recommendation), and

14.5.3 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.

However, by recommending any such payment, ENGINEER will not thereby be deemed to have represented that: (i) exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work beyond the responsibilities specifically assigned to ENGINEER in the Contract Documents or (ii) that 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.

14.6 ENGINEER's recommendation of any payment, including final payment, shall not mean that ENGINEER is 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 furnishing or performance of Work, or for any failure of CONTRACTOR to perform or furnish Work in accordance with the Contract Documents.

14.7 ENGINEER may refuse to recommend the whole or any part of any payment if, in ENGINEER's opinion, it would be incorrect to make the representations to OWNER referred to in paragraph 14.5. ENGINEER may also refuse to recommend any such payment, or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in ENGINEER's opinion to protect OWNER from loss because:

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

14.7.2 The Contract Price has been reduced by Written Amendment or Change Order,

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

14.7.4 ENGINEER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 15.2.1 through 15.2.4 inclusive.

OWNER may refuse to make payment of the full amount recommended by ENGINEER because:

14.7.5 Claims have been made against OWNER on account of CONTRACTOR's performance or furnishing of the Work.

14.7.6 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.

14.7.7 There are other items entitling OWNER to a set-off against the amount recommended, or

14.7.8 OWNER has actual knowledge of the occurrence of any of the events enumerated in paragraphs 14.7.1 through 14.7.3 or paragraphs 15.2.1 through 15.2.4 inclusive;

but OWNER must give CONTRACTOR immediate written notice (with a copy to ENGINEER) stating the reasons for such action and promptly pay CONTRACTOR the amount so withheld, or any adjustment thereto agreed to by OWNER and CONTRACTOR, when CONTRACTOR corrects to OWNER's satisfaction the reasons for such action.

Substantial Completion:

14.8 When CONTRACTOR considers the entire Work ready for its intended use CONTRACTOR shall notify OWNER and ENGINEER in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as incomplete) and request that ENGINEER issue a certificate of Substantial Completion. Within a reasonable time thereafter, OWNER, CONTRACTOR and ENGINEER shall make an inspection of the Work to determine the status of completion. If ENGINEER does not consider the Work substantially complete, ENGINEER will notify CONTRACTOR in writing giving the reasons therefore. If ENGINEER considers the Work substantially complete, ENGINEER will prepare and deliver to OWNER a tentative certificate of Substantial Completion, which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. OWNER shall have seven days after receipt of the tentative certificate during which to make written objection to ENGINEER as to any provisions of the certificate or attached list. If, after considering such objections, ENGINEER concludes that the Work is not substantially complete, ENGINEER will within fourteen days after submission of the tentative certificate to OWNER notify CONTRACTOR in writing, stating the reasons therefore. If, after consideration of OWNER's objections, ENGINEER considers the Work substantially complete, ENGINEER will within said fourteen days execute and deliver to OWNER and CONTRACTOR a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected)

reflecting such changes from the tentative certificate as ENGINEER believes justified after consideration of any objections from OWNER. At the time of delivery of the tentative certificate of Substantial Completion, ENGINEER will deliver to OWNER and CONTRACTOR a written recommendation as to division of responsibilities pending final payment between OWNER and CONTRACTOR with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties and guarantees. Unless OWNER and CONTRACTOR agree otherwise in writing and so inform ENGINEER in writing prior to ENGINEER's issuing the definitive certificate of Substantial Completion, ENGINEER's aforesaid recommendation will be binding on OWNER and CONTRACTOR until final payment.

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

Partial Utilization:

14.10 Use by OWNER at OWNER's option of any substantially completed part of the Work which; (i) has specifically been identified in the Contract Documents, or (ii) OWNER, ENGINEER and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work subject to the following:

14.10.1 OWNER at the time may request CONTRACTOR in writing to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR will certify to OWNER and ENGINEER that such part of the work is substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. CONTRACTOR at any time may notify OWNER and ENGINEER in writing that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request ENGINEER to issue a certificate of Substantial Completion for that part of the Work. Within a reasonable time after either such request, OWNER, CONTRACTOR and ENGINEER shall make an inspection of that part of the Work to determine its status of completion. If ENGINEER does not consider that part of the Work to be substantially complete, ENGINEER will notify OWNER and CONTRACTOR in writing giving the reasons therefore. If ENGINEER considers that part of the Work to be substantially complete, the provisions of paragraphs 14.8 and 14.9 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

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

Final Inspection:

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

Final Application for Payment:

14.12 After CONTRACTOR has completed all such corrections to the satisfaction of ENGINEER and delivered in accordance with the Contract Documents all maintenance and operating instructions, schedules, guarantees, Bonds, certificates of other evidence of insurance required by paragraph 5.4, certificates of inspection, marked-up record documents (as provided in paragraph 6.19) and other documents, CONTRACTOR may make application for final payment following the procedure for progress payments. The final Application for Payment shall be accompanied (except as previously delivered) by: (i) all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by subparagraph 5.4.13, (ii) consent of the surety, if any, to final payment, and (iii) complete and legally effective releases or waivers (satisfactory to OWNER) of all Liens arising out of or filed in connection with the Work. In lieu of such releases or waivers of Liens and as approved by OWNER, CONTRACTOR may furnish receipts of releases in full and an affidavit of CONTRACTOR THAT: (i) the releases and receipts include all labor, services, material and equipment for which a Lien could be filed, and (ii) all payrolls, material and equipment bills and other indebtedness connected with the Work for which OWNER or OWNER's property might in any way be responsible have been paid or otherwise satisfied. 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.

Final Payment and Acceptance:

14.13 If, on the basis of ENGINEER's observation of the Work during construction and final inspection, and ENGINEER's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, ENGINEER is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled, ENGINEER will, within ten days after receipt of the

final Application for Payment, indicate in writing ENGINEER's recommendation of payment and present the Application to OWNER for payment. At the same time ENGINEER will also give written notice to OWNER and CONTRACTOR that the Work is acceptable subject to the provisions of paragraph 14.15. Otherwise, ENGINEER will return the Application to CONTRACTOR, indicating in writing the reasons for refusing to recommend final payment, in which case CONTRACTOR shall make the necessary corrections and resubmit the Application. Thirty days after the presentation to OWNER of the Application and accompanying documentation, in appropriate form and substance and with ENGINEER's recommendation and notice of acceptability, the amount recommended by ENGINEER will become due and will be paid by OWNER to CONTRACTOR.

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

Waiver of Claims:

14.15 The making and acceptance of final payment will constitute:

14.15.1 A waiver of all claims by OWNER against CONTRACTOR, except claims arising from unsettled Liens, from *defective* Work appearing after final inspection pursuant to paragraph 14.11, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from CONTRACTOR's continuing obligations under the Contract Documents; and

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

ARTICLE 15—SUSPENSION OF WORK AND TERMINATION

OWNER May Suspend Work:

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

OWNER May Terminate:

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

15.2.1 If CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established under paragraph 2.9 as adjusted from time to time pursuant to paragraph 6.6);

15.2.2 If CONTRACTOR disregards Laws or Regulations of any public body having jurisdiction;

15.2.3 If CONTRACTOR disregards the authority of ENGINEER; or

15.2.4 If CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if any,) seven days' written notice and to the extent permitted by Laws and Regulations, terminate the services of CONTRACTOR, exclude CONTRACTOR from the site and take possession of the Work and of all CONTRACTOR's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by CONTRACTOR (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract Price exceeds all claims, costs, losses and damages sustained by OWNER arising out of or resulting from completing the Work such excess will be paid to CONTRACTOR. If such claims, costs losses and damages exceed 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, provided that when exercising any rights or remedies under this paragraph OWNER shall not be required to obtain the lowest price for the Work performed.

15.3 Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability.

15.4 Upon seven days' written notice to CONTRACTOR and ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy of OWNER, elect to terminate the Agreement. In such case, CONTRACTOR shall be paid (without duplication of any items):

15.4.1 For 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;

15.4.2 For 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;

15.4.3 For all claims, costs, losses and damages incurred in settlement of terminated contracts with Subcontractors, suppliers and others; and

15.4.4 For reasonable expenses directly attributable to termination.

CONTRACTOR shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

CONTRACTOR May Stop Work or Terminate:

15.5 If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within thirty days after it is submitted or OWNER fails for thirty days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon seven days' written notice to OWNER and ENGINEER, and provided OWNER or ENGINEER do not remedy such suspension or failure within that time, terminate the Agreement and recover from OWNER payment on the same terms as provided in paragraph 15.4. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if ENGINEER has failed to act on an Application for Payment within thirty days after it is submitted, or OWNER has failed for thirty days to pay CONTRACTOR any sum finally determined to be due, CONTRACTOR may upon seven day's written notice to OWNER and ENGINEER stop the Work until payment of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.5 are not intended to preclude CONTRACTOR from making claim

under Articles 11 and 12 for an increase in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping Work as permitted by this paragraph.

ARTICLE 16—DISPUTE RESOLUTION

If and to the extent that OWNER and CONTRACTOR have agreed on the method and procedure for resolving disputes between them that may arise under this Agreement, such dispute resolution method and procedure, if any, shall be as set forth in Exhibit GC-A, "Dispute Resolution Agreement," to be attached hereto and made a part hereof. If no such agreement on the method and procedure for resolving such disputes has been reached, and subject to the provisions of paragraphs 9.10, 9.11 and 9.12, OWNER and CONTRACTOR may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

ARTICLE 17—MISCELLANEOUS

Giving Notice:

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

Computation of Times:

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

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

Notice of Claim:

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

Cumulative Remedies:

17.4 The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto, and, in particular but without limitation, the warranties, guarantees and obligations imposed upon CONTRACTOR by paragraphs 6.12, 6.16, 6.30, 6.31, 6.32, 13.1, 13.12, 13.14, 14.3 and 15.2 and all of the rights and remedies available to OWNER and ENGINEER there under, are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply.

Professional Fees and Court Costs Included:

17.5 Whenever reference is made to "claims, costs, losses and damages," it shall include in each case, but not be limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

**EXHIBIT GC-A to General Conditions of
the Agreement Between OWNER and
CONTRACTOR Dated _____
For use with EJCDC No. 1910-8 (1990 ed.)**

DISPUTE RESOLUTION AGREEMENT

OWNER and CONTRACTOR hereby agree that Article 16 of the General Conditions to the Agreement between OWNER and CONTRACTOR is amended to include the following agreement of the parties:

16.1 All claims, disputes and other matters in question between OWNER and CONTRACTOR arising out of or relating to the Contract documents or the breach thereof (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 14.15) will be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining, subject to the limitations of this Article 16. This agreement so to arbitrate and any other agreement of consent to arbitrate entered into in accordance herewith as provided in this Article 16 will be specifically enforceable under the prevailing law of any court having jurisdiction.

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

16.3 Notice of the demand for arbitration will be filed in writing with the other party to the Agreement and with the American Arbitration Association, and a copy will be sent to ENGINEER for information. The demand for arbitration will be made within the thirty-day or ten-day period specified in paragraph 16.2 as applicable, and in all other cases within a reasonable time after the claim, dispute or other matter

question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

16.4 Except as provided in paragraph 16.5 below, no arbitration arising out of or relating to the Contract Documents shall include by consolidation, joinder or in any other manner any other person or entity (including ENGINEER, ENGINEER's Consultant and the officers, directors, agents, employees or consultants of any of them) who is not a part to this contract unless:

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

16.4.2 Such other person or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings, and

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

16.5 Notwithstanding paragraph 16.4 if a claim, dispute or other matter in question between OWNER and CONTRACTOR involves the Work of a Subcontractor, either OWNER or CONTRACTOR may join such Subcontractor as a party to the arbitration between OWNER and CONTRACTOR hereunder. CONTRACTOR shall include in all subcontracts required by paragraph 6.11 a specific provision whereby the Subcontractor consents to being joined in an arbitration between OWNER and CONTRACTOR involving the Work of such Subcontractor. Nothing in this paragraph 16.5 nor in the provision of such subcontract consenting to joinder shall create any claim, right or cause of action in favor of Subcontractor and against OWNER, ENGINEER or ENGINEER's Consultants that does not otherwise exist.

16.6 The award rendered by the arbitrators will be final, judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal.

16.7 OWNER and CONTRACTOR agree that they shall first submit any and all unsettled claims, counterclaims, disputes and other matters in question between them arising out of or relating to the Contract Documents or the reach thereof ("disputes"), to mediation by The American Arbitration Association under the Construction Industry Mediation Rules of the American

Arbitration Association prior to either of them initiating against the other a demand for arbitration pursuant to paragraphs 16.1 through 16.6, unless delay in initiating arbitration would irrevocable prejudice one of the parties. The respective thirty and ten day time limits within which to files a demand for arbitration as provided in paragraphs 16.2 and 16.3 above shall be suspended with respect to a dispute submitted to mediation within those same applicable time limits and shall remain suspended until ten days after the termination of the mediation. The mediator of any dispute submitted to mediation under this Agreement shall not serve as arbitrator of such dispute unless otherwise agreed.

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1420 King Street, Alexandria, VA 22314

American Consulting Engineers Council
1015 15th Street, N.W., Washington, DC 20005

American Society of Civil Engineers
345 East 47th Street, New York, NY 10017

Construction Specifications Institute
601 Madison St., Alexandria, VA 22314

SECTION 00800**SUPPLEMENTARY CONDITIONS**

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These Supplementary Conditions Amend or Supplement the Standard General Conditions of the Construction Contract (No. 1910-8, 1990 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

SC-1 DEFINITIONS

The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract (No. 1910-8, 1990 Edition) have the meanings assigned to them in the General Conditions, with the following exception. The term Contract Documents shall also include the Invitation to Bid and the Instructions to Bidders.

SC-2.2 COPIES OF DOCUMENTS

The OWNER shall furnish to the CONTRACTOR the number of sets of Contract Documents as stipulated in the "Instruction to Bidders".

SC-2.3 COMMENCEMENT OF CONTRACT TIMES: NOTICE TO PROCEED

Delete the last sentence of paragraph 2.3 of the General Conditions in its entirety and insert the following in its place:

The Contract time will commence to run on one of the following dates:

2.3.1 The day stipulated in the "Notice to Proceed".

2.3.2 If no "Notice to Proceed" is given, the thirtieth (30th) day after the "Effective Date of the Agreement".

SC-2.7 EXCHANGE OF INSURANCE DATA

Delete Paragraph 2.7 of the General Conditions in its entirety and insert the following in its place:

- 2.7 As an attachment to the Agreement, the successful BIDDER shall deliver to the OWNER all certificates and other evidence of insurance that are required in the General Conditions as modified by the Supplementary Conditions. Contractor shall provide the Engineer certificates to evidence that all required insurance is obtained and maintained throughout the Contract period.

SC-5.4 CONTRACTOR'S LIABILITY INSURANCE

The limits of liability for the insurances required by paragraph 5.4 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Law or Regulations.

- A. **Worker's Compensation:** Insurance shall be provided for all employees engaged in the Work who may come within the protection of the Workers' Compensation law, and where applicable, employer's General Liability Insurance for employees not so protected and shall require all sub-contractors to provide corresponding insurance. The Contractor shall indemnify the Owner and the Engineer against all liabilities, costs and expenses due to accidents or other occurrences covered by the Workers' Compensation law.

Under Paragraphs 5.4.1 of the General Conditions, the limits shall be not less than:

- | | |
|--------------------------|---|
| 1. State of Ohio: | Statutory |
| 2. Employer's Liability: | \$100,000.00 Each Accident \$500,000.00 Disease Policy Limit \$100,000.00 Disease Each Employee |

- B. **Comprehensive General Liability:** Insurance shall be provided to cover all damages arising out of bodily injuries, including accidental death to one person and for all damages arising out of bodily injuries, including accidental death, to two or more persons in any one occurrence. Insurance shall protect against all property damage arising out of damages to or destruction of property. Coverage shall include collapse or damage to any structure, building or its contents, public or private utility, or pavement during construction and for two (2) years thereafter. Whenever work is to be done by blasting, coverage shall also include all damage of any kind whatsoever that may result from the blasting operation. Insurance shall insure Contractor and all sub-contractors.

Under Paragraphs 5.4.2 through 5.4.5 of the General Conditions:

- | | |
|---|--|
| 1. Bodily Injury: | |
| | \$1,000,000.00 Each Occurrence |
| | \$1,000,000.00 Annual Aggregate, Products and Completed Operations |
| 2. Property Damages: | |
| | \$1,000,000.00 Each Occurrence |
| | \$1,000,000.00 Annual Aggregate |
| 3. Property Damage liability insurance shall provide Explosion, Collapse and Underground coverages. | |
| 4. Personal Injury, with employment exclusion deleted | |
| | \$1,000,000.00 Annual Aggregate |

- C. **Comprehensive Automobile Liability:** insurance shall be provided to cover liability arising from the use and operation of motor vehicles in connection with the performance of the Contract (as customarily defined in liability insurance policies), whether they be owned, hired, or non-owned by the Contractor.

Under Paragraph 5.4.6 of the General Conditions:

1. Bodily Injury:

| | |
|----------------|---------------|
| \$1,000,000.00 | Each Person |
| \$1,000,000.00 | Each Accident |

2. Property Damages:

| | |
|----------------|-----------------|
| \$1,000,000.00 | Each Occurrence |
|----------------|-----------------|

SC-5.5 OWNER'S & ENGINEER'S PROTECTIVE LIABILITY INSURANCE

Delete Paragraph 5.5 of the General Conditions in its entirety and insert the following in its place:

5.5.1 The CONTRACTOR shall purchase and maintain additional liability insurance coverage for OWNER and ENGINEER. Contractor's general liability carrier shall issue a separate Protective Liability Policy covering OWNER, ENGINEER and Engineer's Consultants with the following minimum coverages:

1. Bodily Injury:

| | |
|----------------|-----------------|
| \$1,000,000.00 | Each Occurrence |
|----------------|-----------------|

2. Property Damages:

| | |
|----------------|------------------|
| \$1,000,000.00 | Each Occurrence |
| \$1,000,000.00 | Annual Aggregate |

5.5.2 Additional coverage pertaining to paragraphs 5.1 through 5.5 shall be provided by the contractor in the form of blanket protection consisting of \$1,000,000.00 umbrella compensation with general liability providing excess coverage over the limits set forth in said paragraphs.

SC-5.6 PROPERTY INSURANCE

Delete Paragraph 5.6 of the General Conditions in its entirety and insert the following in its place:

5.6 The CONTRACTOR shall purchase and maintain property insurance upon the Work at the site to the full insurable value thereof subject to such deductible amounts as may be required by laws and regulations. This insurance shall include the interests of OWNER, CONTRACTOR and Subcontractors in the Work, shall insure against the perils of the fire and extended coverage, shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided in these Supplementary Conditions, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including fees and charges of engineers, architects, attorneys and other professionals). Such fees will be subject to a deductible amount of \$1,000.00. If not covered under the "all risk" insurance or otherwise provided in these Supplementary Conditions, CONTRACTOR shall purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit when such portions of the Work are to be included in an Application for Payment. The policies of insurance required to be purchased and maintained by CONTRACTOR in accordance with Paragraphs 5.6 shall contain a provision that the coverage afforded will not be canceled or materially changed until at least thirty days' prior written notice has been given to OWNER.

SC-5.7 BOILER, MACHINERY AND OTHER INSURANCE

Delete Paragraph 5.7 of the General Conditions in its entirety and insert the following in its place:

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

SC-5.8 INSURANCE CANCELLATION PROVISIONS

Delete Paragraph 5.8 of the General Conditions in its entirety and insert the following in its place:

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

SC-5.10 OTHER SPECIAL INSURANCE

Delete Paragraph 5.10 of the General Conditions in its entirety and add the following:

Railroad Protective Liability Insurance shall be provided when the Work is on railroad right-of-way to protect the railroad company against bodily injury, death, and/or property damage. Limits shall not be less than that required by the railroad company and in no case less than the following:

Bodily Injury

\$2,000,000 per occurrence

\$6,000,000 aggregate per annum

SC-6 CONCERNING SUBCONTRACTORS, SUPPLIERS AND OTHERS

Add the following language at the end of the last sentence of paragraph 6.9.1 of the General Conditions: OWNER or ENGINEER may furnish to any such Subcontractor, Supplier or other person or organization, to the extent practicable, evidence of amounts paid to CONTRACTOR in accordance with CONTRACTOR'S Applications for Payment.

Add the following language at the end of the last sentence of paragraph 6.11 of the General Conditions:

In advance of the Notice of Award, the apparent Successful Bidder, and any other Bidder(s) so requested, will, within seven days after the day of the Bid opening, submit to the OWNER a list of all Subcontractors and other persons and organizations (including those who are to furnish the principal items of material and equipment) proposed for those portions of the Work as to which such identification is so required. Such list shall be accompanied by an experience statement with pertinent information as to similar projects and other evidence of qualification for each such Subcontractor, persons and organization if requested by OWNER. If OWNER or ENGINEER after due investigation has reasonable objection to any proposed Subcontractor, other person or organization, either may, before giving the Notice of Award, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid price. If the apparent Successful Bidder declines to make any such substitution, the contract shall not be awarded to such Bidder, but declining to make any such substitution will not constitute grounds for sacrificing the Bid Security. Any Subcontractor, other persons or organization so listed and to whom OWNER or ENGINEER does not make written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER and ENGINEER.

SC-6.13 PERMITS

Delete Paragraph 6.13 of the General Conditions in its entirety and insert the following in its place:

- 6.13 The OWNER will procure and pay for all permits (excluding inspection fees) which may be required by the Ohio Department of Transportation. CONTRACTOR shall obtain and pay for all other construction permits and licenses. OWNER shall assist CONTRACTOR, when necessary, in obtaining such permits and licenses. CONTRACTOR shall pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of opening of Bids. CONTRACTOR shall pay all charges of utility service companies for connections to the Work and for all charges of such companies for capital costs related thereto.

SC-6.14 LAWS AND REGULATIONS

Regulations regarding additional applicable laws and regulations required under this contract are shown in other sections of these specifications.

SC-7.4 CONSTRUCTION COORDINATOR

The GENERAL CONSTRUCTION CONTRACTOR shall be referred to and defined as the CONSTRUCTION COORDINATOR.

Duties of the CONSTRUCTION COORDINATOR include the following:

1. Safety precautions and procedures at the site.
2. See that permits are obtained.
3. Monitoring compliance with Laws and Regulations.
4. Keeping the site clean during construction.
5. Use of temporary construction facilities.
6. Scheduling purchase and delivery times.
7. Scheduling and coordinating the work of the Prime Contractors.
8. Inspect materials and equipment as received for damage.
9. Inspect installed material and equipment for mechanical, electrical, piping and instrument connections, for correct rotation and lubrication and readiness for delivery to OWNER'S operating personnel.

SC-8.2 OWNER'S RESPONSIBILITIES

Delete Paragraph 8.2 of the General Conditions in its entirety and insert the following in its place:

- 8.2 In the case of termination of the employment of ENGINEER, OWNER shall appoint an engineer whose status under the Contract Documents shall be that of the former ENGINEER.

SC-9.3 PROJECT REPRESENTATION

The duties, responsibilities and limitations of authority of the Resident Project Representative and assistants as described in paragraph 9.3 of the General Conditions are appended and hereby made a part of these Supplementary Conditions as Appendix A.

SC-11.4 & 11.6 COST OF WORK

Delete paragraphs 11.4.1, 11.4.5.9, 11.6.2.1, 11.6.2.2, 11.6 and 11.6.2.4 of the GENERAL CONDITIONS in their entirety and insert the following in its place

- 11.4.1 Payroll costs for employees in the direct employment of CONTRACTOR in the performance of the Work under schedules of job classifications agreed upon by OWNER and CONTRACTOR. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits which shall include social security contributions, unemployment, excise and payroll taxes, workers' or workmen's compensation, health and welfare pension benefits, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing Work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by the OWNER.

The rate of wage and labor for each employee classification is to be submitted to the ENGINEER prior to beginning work. The rate of wage and labor shall be detailed to show the base hourly rate plus the fringe benefits as herein defined for payroll costs. The defined rate of wage and

Labor cost for each employee classification shall be used for all CHANGE ORDERS not covered under paragraph 11.3.1.

The rate of wage shall be the current rate of wage as determined by the State prevailing wage office.

- 11.4.5.9 Cost of premiums for additional BONDS and INSURANCES required because of changes in work shall not be included in CHANGE ORDER costs but shall be reevaluated and if required adjusted accordingly upon issuance of the certificate of substantial completion by the ENGINEER. Premiums directly relating to property insurance coverage, in accordance with paragraph 5.9, shall be evaluated and adjusted as determined by the ENGINEER for each change order.

SC-11.6 CONTRACTOR'S FEE

Delete Paragraph 11.6 in the General Conditions in its entirety and insert the following in its place:

- 11.6 The CONTRACTOR'S fee allowed to CONTRACTOR for overhead and profit shall be determined as follows:
- 11.6.1 A fee based on the following percentages of the various portions of the cost of the work:
- 11.6.1.1 For costs incurred under paragraphs 11.4.1 and 11.4.2, the CONTRACTOR'S fee shall be the percentage negotiated by the OWNER and CONTRACTOR and limited to a maximum of three and one-quarter percent (3-1/4%) profit and three and one-quarter percent (3-1/4%) for overhead and included in the Contract Agreement Form under overhead and profit percentage for Labor and Material.
- 11.6.1.2 For costs incurred under paragraph 11.4.3, the CONTRACTOR'S fee shall be the percentage negotiated by the OWNER and CONTRACTOR and limited to a maximum of five percent (5%) of the Subcontractor's cost of work and included in the Contract Agreement Form under overhead and profit percentage for Subcontractors.
- 11.6.1.3 No fee shall be payable on the basis of costs itemized under paragraphs 11.4.1 and 11.4.5.9.
- 11.6.1.4 The amount of credit to be allowed by CONTRACTOR to OWNER for any such change which results in a net decrease in cost will be the amount of the actual net decrease plus a decrease in the CONTRACTOR'S fee of the percentage negotiated by the OWNER and CONTRACTOR and included in the Contract Agreement Form.
- 11.6.1.5 When both additions and credits are involved in any one change; the adjustment in CONTRACTOR'S fee shall be completed on the basis of the net change in accordance with paragraphs 11.6.1.1 through 11.6.1.4 inclusive.

SC-13.4 TESTS AND INSPECTIONS

Delete the last sentence of Paragraph 13.4 of the General Conditions in its entirety and insert the following in its place:

The cost of all other inspections, tests and approvals required by the Contract Documents shall be paid by CONTRACTOR (unless otherwise specified).

SC-14.2.1 PAYMENT FOR STORED MATERIALS

- 14.2.1.1 Subsequent to the inclusion of a payment for delivered materials in a progress payment, CONTRACTOR shall submit to the ENGINEER no later than the next payment submission, a partial waiver of liens from each and every supplier for whom delivered materials were paid. If no such waiver is submitted prior to or along with the next payment, the ENGINEER may automatically deduct the amount of delivered materials paid commensurate with that particular item. There shall be no variance to this policy and unless the waiver is in hand, the money shall be deducted.
- 14.2.1.2 No payment for delivered materials shall be made for any items that are scheduled to be incorporated in the work within the next 30 days.
- 14.2.1.3 Delivered materials will not be paid in any given month for a total amount less than \$5,000.00.
- 14.2.1.4 Payment for delivered materials for such items as pipe backfill and roadway sub-base will not be

routinely considered.

- 14.2.2 In case the CONTRACTOR fails to comply with the terms of these specifications or fails to comply with the orders or directions of the ENGINEER herein provided for, the OWNER reserves the right, and the CONTRACTOR hereby assents to the same, to withhold the payment of any estimate that may otherwise be due, until the said terms, orders or directions are complied with to the satisfaction of the ENGINEER.
- 14.2.3 Payment shall be made in accordance with the provisions of the Ohio Revised Code as follows:
 - 14.2.3.1 Acceptable materials delivered to the site but not incorporated in the work will be paid for at ninety percent (90%) of the invoice value of same. Until the job is fifty percent (50%) completed, the contractor will be paid ninety percent (90%) of the estimated value of labor and material completed in estimated form. This ten percent (10%) retention of the first fifty percent (50%) of the job will be held by the Owner until 30 days after completion. After the job is fifty percent (50%) completed, material incorporated in the work and labor will be paid for at one-hundred percent (100%) of the estimated value of same as bid.
 - 14.2.3.2 When the work is completed to the satisfaction of the Owner, the Contractor shall be paid an amount which will bring the total payments to him up to ninety-five percent (95%) of the contract price.
 - 14.2.3.3 Estimates and payments shall be made about the twentieth day of each month unless, as provided by the Act, "When the rate of work and amounts involved are so large that it is deemed advisable by the Owner or Contractor, estimates and payments shall be made twice each month".
 - 14.2.3.4 The Act makes reference to payments of estimates "Unless the Contractor does not prosecute the work with diligence and with the force specified or intended in the contract".
 - 14.2.3.5 Upon approval of the Engineer, the five percent (5%) retainer may be reduced commensurate with partial acceptance of facilities completed and placed in operation.
 - 14.2.3.6 In case the Contractor fails to comply with the terms of these specifications or fails to comply with the orders or directions of the Engineer herein provided for, the Owner reserves the right, and the Contractor hereby assents to the same, to withhold the payment of any estimate that may otherwise be due, until the said terms, orders or directions are complied with and to the satisfaction of the Engineer.

SC-14.4 REVIEW OF APPLICATION FOR PROGRESS PAYMENT

Delete the last sentence of Paragraph 14.4 of the General Conditions in its entirety and insert the following in its place:

Thirty (30) days after presentation of Application for Payment with ENGINEER'S recommendation, the amount recommended will (subject to the provisions of the last sentence of paragraph 14.7) become due and when due will be paid by OWNER to CONTRACTOR.

SC-14.8 SUBSTANTIAL COMPLETION

- 14.8.1 The ENGINEER will conduct one (1) inspection for the Substantial Completion Certificate for each contract when requested to by the CONTRACTOR if the ENGINEER determines that certification can not be issued the CONTRACTOR will be assessed for each additional inspection.

SC-14.11 FINAL INSPECTION

- 14.11.1 The ENGINEER will conduct one (1) inspection for the final payment application review when requested to by the CONTRACTOR. If the ENGINEER determines that the contract is not complete in accordance with the approved contract documents the CONTRACTOR will be assessed for each addition inspection.

SC-15 TERMINATION

Amend the first sentence of Paragraph 15.2.9 of the General Conditions by striking out the words "seven days" and replacing with the words "ten days". As so amended Paragraph 15.2.9 remains in effect.

Amend the first sentence of Section 15.4 of the General Conditions by striking out the words "seven days" and replacing with the words "ten days". As so amended Paragraph 15.4 remains in effect.

Delete the first sentence of Section 15.5 of the General Conditions in its entirety and insert the following in its place:

If, through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety days by OWNER or under an order of court or other public authority, or ENGINEER fails to act on any Application for Payment within forty-five days after it is submitted, or OWNER fails for forty-five days to pay CONTRACTOR any sum finally determined to be due, then CONTRACTOR may, upon ten days' written notice to OWNER and ENGINEER, terminate the Agreement and recover from OWNER payment for all Work executed and any expense sustained plus reasonable termination expenses.

SC-18 PRICE BREAKDOWN

Add the following paragraph under a new Article 18 entitled Price Breakdown to the General Conditions:

18.1 The CONTRACTOR shall furnish a price breakdown for the Contract itemized as required by the ENGINEER. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, sub-contract and overhead costs as well as profit for each item in the contract and shall cover supported by similar price breakdowns.

SC-21 OVERTIME PAYMENT FOR ENGINEERING AND INSPECTION

Add the following paragraph under a new Article 21 entitled Overtime Payment for Engineering and Inspection to the General Conditions:

21.1 The OWNER shall charge to CONTRACTOR and may deduct from the periodical and final payment for the work all engineering and inspection expenses incurred by OWNER as a result of any overtime work. Charges for various personnel for any such overtime during the regular specified construction period beyond the regular 8 hour day for any time worked on Saturday, Sunday or any legal holiday will be as shown in the following Schedule:

| <u>Personnel Class</u> | <u>Charge/Hour</u> |
|---------------------------|--------------------|
| Officer | \$200.00 |
| Sr. Engineer | \$110.00 |
| Engineer II | \$100.00 |
| Technician | \$ 90.00 |
| Draftsman I | \$ 80.00 |
| Draftsman II | \$ 85.00 |
| Construction Manager | \$ 90.00 |
| Construction Engineer | \$ 80.00 |
| Construction Inspector I | \$ 80.00 |
| Construction Inspector II | \$ 90.00 |
| 2 Person Survey Crew | \$150.00 |
| 3 Person Survey Crew | \$225.00 |

SC-22 MOBILIZATION REQUIREMENTS

Description

This work shall consist of the performance of construction preparatory operations, including the movement of personnel and equipment to the project site, placement of project identification signs, payment of Department of Highways Inspection Fees and cost of Railroad Protective Liability Insurance as applicable, the cost of providing a field office for the resident observer, if required, and for the establishment of the CONTRACTOR'S offices, buildings and other facilities necessary to begin work on a substantial phase of the contract.

Basis of Payment

Total Original Contract Amount,
Including Mobilization

Total Limits for Partial Payments

More Than To & Including

| | | |
|-------------|--------------|--|
| \$ 0 | \$ 100,000 | 10 percent of total contract amount |
| \$ 100,000 | \$ 500,000 | \$10,000 plus 3 percent of total contract over \$100,000 |
| \$ 500,000 | \$ 1,500,000 | \$22,000 plus 2 percent of total contract over \$500,000 |
| \$1,500,000 | More | \$42,500 plus 1 percent of total contract over \$1,500,000 |

Partial payments shall be as follows:

- (1) One-third (1/3) of the amount established above as the total limit for partial payment, or one-third (1/3) of the amount BID for mobilization, whichever is less, will be released to the CONTRACTOR as the first estimate, payable not less than 15 days after the start of work at the project site.
- (2) The second one-third (1/3) of the amount established above as the total limit for partial payment, or one-third (1/3) of the amount BID for mobilization, whichever is less, shall be released with the estimate payable 30 days after the first estimate.
- (3) The final one (1/3) of the amount established above as the total limit for partial payment, or one-third (1/3) of the amount BID for mobilization, whichever is less, shall be released with the estimate payable 30 days later than the estimate in which the second one-third (1/3) has been paid.

Upon completion of all work on the project, payment of any amount BID for mobilization in excess of the total limit for partial payment will be released.

Nothing herein shall be construed to limit or preclude partial payments otherwise provided for by the contract.

No deduction will be made, nor will any increase be made, in the lump sum mobilization item amount regardless of decreases or increases in the final total contract amount or for any other cause.

END OF SECTION

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DUTIES, RESPONSIBILITIES, & LIMITS OF AUTHORITYDUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY
OF RESIDENT PROJECT REPRESENTATIVE
(SC-9.3)**A. GENERAL**

Resident Project Representative is ENGINEER's Agent, will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding his actions. Resident Project Representative's dealings in matters pertaining to the on-site Work shall in general be only with ENGINEER and CONTRACTOR. Written communication with OWNER will be only through or as directed by ENGINEER.

B. DUTIES AND RESPONSIBILITIES

Resident Project Representative will:

1. Schedules: Review the progress schedule, schedule of Shop Drawing submissions and schedule of values prepared by CONTRACTOR and consult with ENGINEER concerning their acceptability.
2. Liaison:
 - a. Serve as ENGINEER's liaison with CONTRACTOR, working principally through CONTRACTOR's superintendent and assist him in understanding the intent of the Contract Documents. Assist ENGINEER in serving as OWNER's liaison with CONTRACTOR when CONTRACTOR's operations affect OWNER's on-site operations.
 - b. As requested by ENGINEER, assist in obtaining from OWNER additional details or information, when required at the job site for proper execution of the Work.
4. Shop Drawings and Samples:
 - a. Receive and record date of receipt of Shop Drawings and samples, receive samples which are furnished at the site by CONTRACTOR, and notify ENGINEER of their availability for examination.
 - b. Advise ENGINEER and CONTRACTOR or its superintendent immediately of the commencement of any Work requiring a Shop Drawing or sample submission if the submission has not been approved by ENGINEER.
5. Review of Work, Rejection of Defective Work, Inspections and Tests:
 - a. Conduct on-site observations of the Work in progress to assist ENGINEER in determining if the Work is proceeding in accordance with the Contract Documents and that completed Work will conform to the Contract Documents.
 - b. Report to ENGINEER whenever he believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or does not meet the requirements of any inspections, tests or approval required to be made or has been damaged prior to final payment; and advise ENGINEER when he believes Work should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
 - c. Verify that tests, equipment and systems startups and operating and maintenance instructions are conducted as required by the Contract Documents and in presence of the required personnel, and that CONTRACTOR maintains adequate records thereof; observe, record and report to ENGINEER appropriate details relative to the test procedures and startups.
 - d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the outcome of these inspections and report to ENGINEER.
6. Interpretation of Contract Documents: Transmit to CONTRACTOR ENGINEER's clarifications and interpretations of the Contract Documents.
7. Modifications: Consider and evaluate CONTRACTOR's suggestions for modifications in Drawings or Specifications and report them with recommendations to ENGINEER.

8. Records:

- a. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and samples submissions, reproductions of original Contract Documents including all addenda, change orders, field orders, additional Drawings issued subsequent to the execution of the Contract, ENGINEER's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
- b. Keep a diary or log book recording hours on the job site, weather conditions, data relative to questions of extras or deductions, list of visiting officials and representatives of manufacturers, fabricators, suppliers and distributors, daily activities, decisions, observations in general and specific observations in more detail as in the case of observing test procedures. Send copies to ENGINEER.
- c. Record names, addresses and telephone numbers of all CONTRACTORS, subcontractors and major suppliers of materials and equipment.

9. Reports:

- a. Furnish ENGINEER periodic reports as required of progress of the Work and Contractor's compliance with the approved progress schedule and schedule of Shop Drawing submissions.
- b. Consult with ENGINEER in advance of scheduled major tests, inspections or start of important phases of the work.
- c. Report immediately to ENGINEER upon the occurrence of any accident.

10. Payment Requisitions: Review applications for payment with CONTRACTOR for compliance with the established procedure for their submission and forward them with recommendations to ENGINEER, noting particularly their relation to the schedule of values, Work completed and materials and equipment delivered at the site but not incorporated in the Work.

11. Certificates, Maintenance and Operation Manuals: During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by CONTRACTOR are applicable to the items actually installed; and deliver this material to ENGINEER for his review and forwarding to OWNER prior to final acceptance of the Work.

12. Completion:

- a. Before ENGINEER issues a Certificate of Substantial Completion, submit to CONTRACTOR a list of observed items requiring completion or correction.
- b. Conduct final inspection in the company of ENGINEER, OWNER and CONTRACTOR and prepare a final list of items to be completed or corrected.
- c. Verify that all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance.

C. LIMITATIONS OF AUTHORITY

Except upon written instructions of ENGINEER, Resident Project Representative:

1. Shall not authorize any deviation from the Contract Documents or approve any substitute materials or equipment.
2. Shall not exceed limitations on ENGINEER's authority as set forth in the Contract Documents.
3. Shall not undertake any of the responsibilities of CONTRACTOR, subcontractors or CONTRACTOR's superintendent, or expedite the Work.
4. Shall not advise on or issue directions relative to any aspect of the means, methods, techniques, sequences or procedures of construction unless such is specifically called for in the Contract Documents.
5. Shall not advise on or issue directions as to safety precautions and programs in connection with the Work.
6. Shall not authorize OWNER to occupy the Project in whole or in part.
7. Shall not participate in specialized field or laboratory tests.

END OF SECTION

SECTION 00820

WAGE DETERMINATION SCHEDULE

THE FOLLOWING LIST IS THE CURRENT PREVAILING WAGE RATES FOR THIS PROJECT. PLEASE REFER TO GGJ WEBSITE (WWW.GGJENGINEERS.COM) TO LINK TO EACH INDIVIDUAL WAGE SCHEDULE.

HARD COPY TO BE PROVIDED UPON REQUEST

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| County | Classification | Effective | Posted | Union |
|----------|---------------------------|-------------------|-------------------|--|
| SANDUSKY | <u>Asbestos Worker</u> | <u>9/7/2011</u> | <u>9/7/2011</u> | <u>Asbestos Local 207 MI</u> |
| SANDUSKY | <u>Asbestos Worker</u> | <u>10/12/2011</u> | <u>10/12/2011</u> | <u>Asbestos Local 45 Heat & Frost Insulators</u> |
| SANDUSKY | <u>Boilermaker</u> | <u>3/28/2012</u> | <u>3/28/2012</u> | <u>Boilermaker Local 85</u> |
| SANDUSKY | <u>Carpenter</u> | <u>7/27/2011</u> | <u>7/27/2011</u> | <u>Carpenter Floorlayer Local 351</u> |
| SANDUSKY | <u>Carpenter</u> | <u>6/17/2010</u> | <u>6/17/2010</u> | <u>Carpenter Local 509 NE District Interior Systems</u> |
| SANDUSKY | <u>Carpenter</u> | <u>5/30/2012</u> | <u>5/30/2012</u> | <u>Carpenter Local 744</u> |
| SANDUSKY | <u>Carpenter</u> | <u>6/1/2012</u> | <u>5/30/2012</u> | <u>Carpenter Millwright & Pile Driver Light Commercial Local 1090</u> |
| SANDUSKY | <u>Carpenter</u> | <u>10/27/2010</u> | <u>10/27/2010</u> | <u>Carpenter NE District Industrial Dock & Door</u> |
| SANDUSKY | <u>Carpenter</u> | <u>9/6/2007</u> | <u>9/6/2007</u> | <u>Carpenter NW District Overhead Door</u> |
| SANDUSKY | <u>Carpenter</u> | <u>7/28/2010</u> | <u>7/28/2010</u> | <u>Carpenter Statewide Office Systems</u> |
| SANDUSKY | <u>Bricklayer</u> | <u>8/18/2011</u> | <u>8/18/2011</u> | <u>Cement Mason Bricklayer Local 97 HevHwy A</u> |
| SANDUSKY | <u>Bricklayer</u> | <u>8/18/2011</u> | <u>8/18/2011</u> | <u>Cement Mason Bricklayer Local 97 HevHwy B</u> |
| SANDUSKY | <u>Cement Mason</u> | <u>7/13/2011</u> | <u>7/13/2011</u> | <u>Cement Mason Local 132 HvyHwy District II (A)</u> |
| SANDUSKY | <u>Cement Mason</u> | <u>7/13/2011</u> | <u>7/13/2011</u> | <u>Cement Mason Local 132 HvyHwy District II (B)</u> |
| SANDUSKY | <u>Cement Mason</u> | <u>9/21/2011</u> | <u>9/21/2011</u> | <u>Cement Mason Local 886 HevHwy II Water and Sewage Treatment Plant, Amusement Parks, ETC</u> |
| SANDUSKY | <u>Cement Mason</u> | <u>9/21/2011</u> | <u>9/21/2011</u> | <u>Cement Mason Local 886 HevHwy II</u> |
| SANDUSKY | <u>Cement</u> | <u>7/28/2009</u> | <u>7/28/2009</u> | <u>Cement Mason Local 886 (Toledo)</u> |
| SANDUSKY | <u>Cement Mason</u> | <u>7/21/2010</u> | <u>7/21/2010</u> | <u>Cement Mason & Plasterer Local 46</u> |
| SANDUSKY | <u>Lineman</u> | <u>9/14/2011</u> | <u>9/14/2011</u> | <u>Electrical Local 245 High Tension Pipe Type Cable</u> |
| SANDUSKY | <u>Lineman</u> | <u>11/30/2011</u> | <u>11/30/2011</u> | <u>Electrical Local 245 Outside Toledo Chapter</u> |
| SANDUSKY | <u>Lineman</u> | <u>9/14/2011</u> | <u>9/14/2011</u> | <u>Electrical Local 245 Outside Utility Power</u> |
| SANDUSKY | <u>Electrician</u> | <u>6/27/2012</u> | <u>6/27/2012</u> | <u>Electrical Local 8 Inside</u> |
| SANDUSKY | <u>Electrician</u> | <u>6/6/2012</u> | <u>6/6/2012</u> | <u>Electrical Local 8 Lt Commercial Northern</u> |
| SANDUSKY | <u>Voice Data Video</u> | <u>9/7/2011</u> | <u>9/7/2011</u> | <u>Electrical Local 8 Voice Data Video</u> |
| SANDUSKY | <u>Elevator</u> | <u>1/1/2012</u> | <u>11/2/2011</u> | <u>Elevator Local 44</u> |
| SANDUSKY | <u>Glazier</u> | <u>7/13/2011</u> | <u>7/13/2011</u> | <u>Glazier Local 948</u> |
| SANDUSKY | <u>Ironworker</u> | <u>7/7/2010</u> | <u>7/7/2010</u> | <u>Ironworker Local 55</u> |
| SANDUSKY | <u>Laborer Group 1</u> | <u>5/1/2012</u> | <u>4/25/2012</u> | <u>Labor HevHwy 2</u> |
| SANDUSKY | <u>Laborer</u> | <u>6/20/2012</u> | <u>6/20/2012</u> | <u>Labor Local 480 Building</u> |
| SANDUSKY | <u>Operating Engineer</u> | <u>2/15/2012</u> | <u>2/15/2012</u> | <u>Operating Engineers - Building Local 18 - Zone III</u> |
| SANDUSKY | <u>Operating Engineer</u> | <u>5/1/2012</u> | <u>4/25/2012</u> | <u>Operating Engineers - Building Local 18 - Zone III</u> |
| SANDUSKY | <u>Operating Engineer</u> | <u>5/1/2012</u> | <u>4/25/2012</u> | <u>Operating Engineers - HevHwy II</u> |
| SANDUSKY | <u>Painter</u> | <u>1/3/2006</u> | <u>1/3/2006</u> | <u>Painter Local 639 (Cleveland Area) Sign</u> |
| SANDUSKY | <u>Painter</u> | <u>8/1/2007</u> | <u>12/9/2005</u> | <u>Painter Local 639 (E) Sign</u> |
| SANDUSKY | <u>Painter</u> | <u>6/1/2012</u> | <u>5/30/2012</u> | <u>Painter Local 788</u> |
| SANDUSKY | <u>Drywall Finisher</u> | <u>6/1/2012</u> | <u>5/30/2012</u> | <u>Painter Local 788</u> |
| SANDUSKY | <u>Plasterer</u> | <u>9/22/2011</u> | <u>9/22/2011</u> | <u>Plasterer & Drywall Finisher Local 886</u> |
| SANDUSKY | <u>Plumber/Pipefitter</u> | <u>7/2/2012</u> | <u>6/6/2012</u> | <u>Plumber Pipefitter Local 50</u> |

| | | | | |
|-----------------|---------------------------|------------------|------------------|---|
| <u>SANDUSKY</u> | <u>Plumber Pipefitter</u> | <u>7/2/2012</u> | <u>6/20/2012</u> | <u>Plumber Pipefitter Local 50 HVAC Service Mechanics</u> |
| <u>SANDUSKY</u> | <u>Roofer</u> | <u>7/5/2012</u> | <u>7/5/2012</u> | <u>Roofer Local 44 Sheet 1</u> |
| <u>SANDUSKY</u> | <u>Roofer</u> | <u>6/6/2012</u> | <u>6/6/2012</u> | <u>Roofer Local 44 Sheet 2</u> |
| <u>SANDUSKY</u> | <u>Sheet Metal Worker</u> | <u>6/29/2011</u> | <u>6/29/2011</u> | <u>Sheet Metal Local 33 (Vermilion)</u> |
| <u>SANDUSKY</u> | <u>Sheet Metal Worker</u> | <u>9/24/2009</u> | <u>9/24/2009</u> | <u>Sheet Metal Local 33 (Vermilion) Decking</u> |
| <u>SANDUSKY</u> | <u>Sprinkler Fitter</u> | <u>6/20/2012</u> | <u>6/20/2012</u> | <u>Sprinkler Fitter Local 669</u> |
| <u>SANDUSKY</u> | <u>Truck Driver</u> | <u>6/29/2011</u> | <u>6/29/2011</u> | <u>Truck Driver Bldg & HevHwy Class 1 Locals</u> <u>20,40,92,92b,100,175,284,438,377,505,637,908,957</u> |
| <u>SANDUSKY</u> | <u>Truck Driver</u> | <u>6/29/2011</u> | <u>6/29/2011</u> | <u>Truck Driver Bldg & HevHwy Class 2 Locals</u> <u>20,40,92,92b,100,175,284,438,377,505,637,908,957</u> |
| <u>SANDUSKY</u> | <u>Bricklayer</u> | <u>6/1/2011</u> | <u>5/11/2011</u> | <u>Bricklayer Local 46</u> |
| <u>SANDUSKY</u> | <u>Bricklayer Cement</u> | <u>6/1/2011</u> | <u>5/11/2011</u> | <u>Bricklayer Local 46</u> |
| <u>SANDUSKY</u> | <u>Bricklayer</u> | <u>6/1/2011</u> | <u>5/11/2011</u> | <u>Bricklayer Local 46</u> |

SECTION 00900

ADDENDA

1. All Addenda issued by the Owner/Engineer shall be inserted into this section.
2. If Addenda is issued, all prospective bidders are hereby notified that the Addenda forms a part of the Bidding and Contract documents and modifies the original bidding and contract documents issued. Acknowledge receipt of this addendum in the space provided in the bid proposal section of the specifications. Failure to do so may subject the bidder to disqualification.

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SECTION 00940

NON-DISCRIMINATION IN EMPLOYMENT

TO: _____
(Name of union or organization of workers)

The undersigned currently hold contract(s) with _____ involving funds or credit of the U.S. Government of subcontractor(s) with a prime contractor holding such contract(s).

You are advised that under the provisions of the above contract(s) or subcontract(s) and in accordance with Executive Order No. 11246, Section 202, dated September 24, 1965, the undersigned is obliged not to discriminate against any employee or applicant for employment because of race, color, religion, sex, handicap, familial status, or national origin. This obligation not to discriminate in employment includes, but is not limited to, the following:

HIRING, PLACEMENT, UPGRADING, TRANSFER OR DEMOTION, RECRUITMENT, ADVERTISING, OR SOLICITATION FOR EMPLOYMENT, TRAINING DURING EMPLOYMENT, RATES OF PAY OR OTHER FORMS OF COMPENSATION, SELECTION FOR TRAINING INCLUDING APPRENTICESHIP, LAYOFF OR TERMINATION.

This notice is furnished to you pursuant to the provisions of the above contract(s) or subcontract(s) and Executive Order No. 11246.

(Contractor or Subcontractor)

END OF SECTION

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SECTION 00950

RESPONSIBILITY OF THE CONTRACTORS

1. A copy of the wage determination must be posted by the contractor and maintained where it can be seen easily by all of the employees.
2. All employees working on the site must be paid at least once a week.
3. Rates of pay shall be at least the minimum shown on the wage determination for each classification.
4. Employees must be paid for overtime at 1-1/2 the regular rate for all time over 8 hours any day or over 40 hours in a week, whichever is the greater overtime.
5. Each employee must be paid the full amount earned less only those deductions approved, allowed, or required by Federal, State or Local statutes or ordinances.
6. No classification of employee shall be employed on the project unless the classification appears on the wage determination.
7. Each week as work progresses, the contractor must submit to the Authority a copy of all weekly payrolls and required attachments stipulated therein.
8. All weekly payrolls shall contain or have attached the following:
 - (a) Name of each employee. Also show address when employee is first entered on payrolls and whenever his address changes thereafter.
 - (b) Classification of employees (same as shown on wage determination or provisional approval).
 - (c) Rate of pay not less than that shown on the wage determination.
 - (d) Hours worked each day and total for each week for each employee.
 - (e) All deductions made.
 - (f) Net amount paid employee.
 - (g) The following certification:

"I certify that the payroll is correct and complete, that the wage rates contained therein are not less than the applicable rates contained in the Wage Determination decision of the Secretary of Labor, and that the classification set forth for each laborer or mechanic conforms to the work he performs."

Signature

Title

(h) The following weekly anti-kickback statement:

I _____, _____ do hereby state: I pay or
(Name of Signatory Party) (Title)
supervise the payment of the persons employed by _____
(Contractor or Subcontractor)

on the _____ that during the payroll period commencing
(Building or Work)

on the _____ day of _____, 20____, and ending on the _____ day of _____,
20____, all persons employed on said project have been paid the full weekly wages earned, that no rebates
have been or will be made either directly or indirectly from the full weekly wages earned by any person, other
than permissible deductions, as defined in Regulations, Part 3 (29 CFR Part 3) issued by the Secretary of
Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967) "(paragraph describing
deductions, if any)."

9. All prime contractors shall include the wage determination and all labor standards provision in all subcontractors as herein specified.
10. The contractor shall make employment records available for inspection by authorized representatives of the Department of Housing and Urban Development, and the Department of Labor, and will permit employees to be interviewed during working hours by these representatives. Payroll records will be maintained during the course of the work by the General Contractor, including a copy of the payroll of each subcontractor, and they shall be preserved for a period of 3 years thereafter.
11. Each monthly engineering estimate must be accompanied by the following certificate executed by each prime contractor employing mechanics and laborers at the site on the work in which the Federal Government is the participant:

Principal Contractor - _____

Project Name - _____

I, _____, as official representative of the above name and
(Name and Title)

principal contractor, do hereby certify as follows:

- () All Labor Standards Requirements have been fulfilled by the principal contractor and all subcontractors under this contract; or
- () There is an honest dispute regarding the required provisions, Explanation:

_____, _____
(Signature) (Title) (Date)

END OF SECTION

DIVISION 1

GENERAL REQUIREMENTS

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PART ONE -GENERAL

1.01 PROJECT LOCATION & CONTACTS

- A. The Project is located at: Located in the City of Clyde, on East Street from its intersections with Duane Street to its intersection with East Forest Street. All work within right-of-way.
- B. The Engineer is GGJ, Inc. 35585 Curtis Blvd., Unit C, Eastlake, OH 44095; tele 440-953-1567 fax 440-953-0580, Engineer's contact person is: **John Sabo, P.E.**
- C. The Owner's contact person is: **Paul Fiser, City Manager**

1.02 PROJECT DESCRIPTION

- A. The Project includes all work required to complete the improvements indicated by the Contract Drawings, specified, or required for a complete, operating facility. The required work generally includes, but is not limited to, the following brief summary of the work.

SUMMARY OF THE WORK: The project consists of the complete replacement and widening of East Street from Duane Street to East Forest Street. The proposed project also includes the replacement and/or installation of the sanitary, water and Storm Utility improvements within the construction limits.

1.03 SPECIFICATIONS

- A. The Contract Specifications are intended to supplement the Drawings and to further describe the Contractor's required work. All work shall be performed by the appropriate trades. Unless included under another trade's work or specifically excluded, it shall be the responsibility of the Contractor(s) to perform all incidental work, whether or not specific mention is made of each item.
- B. It is advised that the Contractor(s) and their subcontractors familiarize themselves with the complete contents of the project Specifications.

1.04 DRAWING SCHEDULE

N/A

PART TWO - PRODUCTS

N/A

PART THREE – EXECUTION

- A. It is the sole responsibility of the Contractor to complete the project in the allotted time. Unless otherwise agreed to in writing by the Engineer, construction activities shall conform to the Construction Schedule as submitted and approved. If the Contractor deviates from the approved schedule, the Contractor shall notify the Engineer in writing as to the extent of the deviation, the reason(s) for the deviation, and what actions the Contractor intends to take to assure that the project is completed before the project completion date.

END OF SECTION

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PART ONE - GENERAL

1.01 GENERAL CONTENTS AND ASSIGNMENTS

- A. This Section contains general project administrative items and required coordination including:

- 1.02 Work Changes & Modification Procedures
- 1.03 Coordination
- 1.04 Pre-construction Meeting
- 1.05 Progress Meetings
- 1.06 Pre-installation Meetings
- 1.07 Construction Cooperation
- 1.08 Contract Closeout
- 1.09 Emergency Maintenance Supervisors
- 1.10 Application for Payment
- 1.11 Measurement & Payment
- 1.12 Project Closeout

- B. The General Contractor shall serve as a Construction Coordinator.

1.02 WORK CHANGES & MODIFICATION PROCEDURES

- A. The Engineer will advise Contractor of minor variations in the Work not involving an adjustment to Contract Price or Contract Time as authorized by EJCDC, 1990 Edition, Paragraph 9.5 by issuing supplemental instructions on AIA Form G710.
- B. The Engineer may issue a Proposal Request that includes a detailed description of a desired change and the Owner's desired method of payment with appropriate supplementary or revised Drawings and specifications. Contractor shall prepare and submit a proposal to perform the desired change within ten (10) days stating the fixed price or other basis for performing the work change as requested, any time extension requirements, the last date for Owner's acceptance, plus any other pertinent information.
- C. The Contractor may propose a change by submitting a request for change to the Engineer. The request shall describe the proposed change and its full effect on the Work and the work being performed by others. Included shall be a statement describing the reason for the change, any proposed substitutions, the fixed price or basis for determining the change in the Contract Price, and the effect on the Contract Time, if any.
- D. When work changes involve bid unit prices, the change in Contract Price shall be based on the bid unit prices and the number of measured, approved units performed by the Contractor in completing the work change. When work changes do not involve bid unit prices, the change in Contract Price shall be a negotiated fixed price or based on a negotiated basis for determining the Change in Contract Price, as requested by the Owner. If Owner and Contractor cannot agree on the change in price or time, they shall be determined in accordance with the General Conditions.
- E. Change Orders, Work Change Directives, or Written Amendments will be issued in accordance with the General Conditions.
- F. Any claims made by the Contractor shall be made within 14 days of the completion of a claim event and shall be sufficiently supported in detail by documented costs, quantities, employee time and payment records, paid invoices, the justification for any Contract time extension, and other relevant data to allow a complete evaluation of the claim.

1.03 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various Sections of the Contract Specifications to assure the efficient and orderly sequencing of all interdependent construction elements. Include provisions for accommodating items installed later, if applicable.
- B. Verify that the space and utility requirements and characteristics of operating equipment are compatible with the building space and building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing such equipment into operation.
- C. Verify and coordinate space requirements for all mechanical and electrical work that is indicated diagrammatically on Drawings, noted, or specified. Follow routing shown for pipes, ducts, and conduit, as closely as practical; place runs parallel with lines of building. Utilize space efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. Except as otherwise indicated, in finished areas, conceal pipes, ducts, and wiring. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work in preparation for Substantial Completion.
- F. When Owner obtains occupancy of premises, coordinate access to site to minimize disruption of Owner's activities while correcting defective Work and Work not in accordance with Contract Documents.

1.04 PRE-CONSTRUCTION MEETING

- A. Engineer will schedule a Pre-construction meeting shortly after giving Notice of Award.
- B. Required Attendees at Pre-construction Meeting: Owner, Engineer, Affected Utilities, and Contractor's Construction Manager and Superintendent.
- C. The Contractor is responsible for review of the standard agenda items listed below and all other contract documents prior to this meeting.
- D. Standard Pre-construction Meeting Agenda Items:
 - 1. Execution of Owner-Contractor Agreement
 - 2. Submission of executed bonds and insurance certificates
 - 3. Distribution of Contract Documents
 - 4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 - 5. Designation of individuals representing the Contract parties and the Engineer
 - 6. Procedures, processing of field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract closeout procedures
 - 7. Scheduling
 - 8. Scheduling activities of testing laboratories and special consultants
 - 9. Requirements and Preparation for Monthly Progress Meetings
 - 10. Utility Relocation Coordination
 - 11. Use of premises by Owner and Contractor
 - 12. Owner's requirements and occupancy
 - 13. Construction facilities and controls provided by Owner
 - 14. Temporary utilities provided by Owner
 - 15. Survey and layout of structures
 - 16. Security and housekeeping procedures
 - 17. Testing procedures
 - 18. Procedures for maintaining record documents
 - 19. Requirements for start-up of equipment
 - 20. Inspection and acceptance of equipment placed into service during construction period
- E. Engineer will record minutes and distribute copies within 5 working days after the Pre-construction Meeting to participants, with copies to Engineer, Owner, Contractor, and those affected by the discussions or decisions made.

1.05 PROGRESS MEETINGS

- A. Schedule and attend progress meetings at monthly intervals maximum.
- B. Engineer will arrange for progress meetings, prepare agendas with copies for participants, preside at meetings, record minutes of the meeting, and distribute the minutes to all participants within 5 working days.
- C. Attendance Required: Contractor's Superintendent, major Subcontractors and suppliers, Owner, Engineer, as appropriate to agenda items.
- D. The Contractor is responsible for preparing for all Agenda items prior to the meeting.
- E. Standard Agenda Items:
 - 1. Discussion of challenges to previous meeting minutes
 - 2. Review of Work progress
 - 3. Field observations, problems, concerns, and decisions
 - 4. Identification of problems that may impede planned progress.
 - 5. Review of submittals schedule and status of submittals
 - 6. Review of off-site fabrication and delivery schedules
 - 7. Maintenance of progress schedule
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress
 - 11. Maintenance of quality and work standards
 - 12. Effect of proposed changes on progress schedule and coordination
 - 13. Review of construction photographs and as-built drawing status
 - 14. Other business relating to Work
- F. Revisions to Minutes:
 - 1. Unless the distributed minutes are challenged in writing prior to the next regularly scheduled progress meeting, they shall be considered complete, correctly stated, and accepted.
 - 2. Anyone challenging the distributed minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular minutes.
 - 3. Challenges to the prior meeting minutes shall be entertained as a priority item at the next regularly scheduled meeting.

1.06 PRE-INSTALLATION MEETINGS

- A. When required by specific specification Sections, Contractor shall coordinate, schedule and convene a pre-installation meeting at work site a minimum of 10 working days prior to commencing work of the Section.
- B. Required attendance shall be the Engineer, the Contractor's Superintendent, and any other parties directly affecting, or affected by, the Section work.
- C. Notify Engineer 10 days in advance of meeting date.
- D. Contractor shall prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- E. Engineer shall record minutes and distribute copies within 5 work days after meeting to participants.

1.07 CONSTRUCTION COOPERATION

- A. All Contractors and sub-contractors shall cooperate with the Construction Coordinator in the allocation of site mobilization areas for field offices and sheds, for existing building access, traffic, and parking facilities.
- B. During construction, all contractors and sub-contractors shall coordinate their use of the site and facilities through the Construction Coordinator.
- C. All contractors shall comply with the Construction Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, recommendations; and resolution of ambiguities and conflicts.
- D. All contractors shall comply with instructions of the Construction Coordinator for use of temporary utilities and construction facilities.
- E. All contractors shall coordinate field engineering and layout work with the Construction Coordinator.

1.08 CONTRACT CLOSEOUT

- A. Procedures:
 - 1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Engineer's review.
 - 2. Provide submittals to Engineer that are required by governing or other authorities.
 - 3. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Final Cleaning:
 - 1. Perform final cleaning prior to final project assessment.
 - 2. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, [vacuum carpeted and soft surfaces.]
 - 3. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
 - 4. Clean or Replace filters of operating equipment.
 - 5. Clean debris from roofs, gutters, downspouts, and drainage systems.
 - 6. Clean site; sweep paved areas, rake clean landscaped surfaces.
 - 7. Remove waste and surplus materials, rubbish, and construction facilities from the site. Waste removal shall be handled in such a way as to comply with relevant state or local solid waste regulations.
- C. Adjusting:
 - 1. Adjust operating Products and equipment to ensure smooth and unhindered operation.
- D. Project Record Documents:
 - 1. Throughout the progress of the Work, maintain on site and record actual revisions to the Work on one set of the following record documents:
 - a. Drawings.
 - b. Specifications.

- c. Addenda.
 - d. Change Orders and other modifications to the Contract.
 - e. Reviewed Shop Drawings, Product Data, and Samples.
 - f. Manufacturer's instruction for assembly, installation, and adjusting.
2. Ensure entries are complete and accurate, enabling future reference by Owner.
 3. Store record documents separate from documents used for construction.
 4. Record information concurrent with construction progress.
 5. In the Specifications, legibly mark and record at each Product section a description of actual Products installed, including the following:
 - a. Manufacturer's name and product model and number.
 - b. Product substitutions or alternates utilized.
 - c. Changes made by Addenda and modifications.
 6. Record Drawing Requirements – As Built locations of all structures visible at or above grade shall be supplied by a registered surveyor, using data collection equipment.
 - a. AutoCAD base information will be provided by the City/Village or City/Village Engineer to the contractor.
 - b. As-Built data shall use the same horizontal and vertical control as the proposed construction documents.
 - i. Data shall include:
 1. All structures visible at grade installed by the contractor, including but not limited to manholes, curb inlets, catch basins, water valves, hydrants, blow-off assembly's, cleanouts and any other objects deemed pertinent to the the project.
 2. As-Built rim and invert elevation of all structures shall be provided.
 3. Contractor shall keep detailed records of all sewer wye's, tee's, blind connections, or any other below grade features. These records should include measurements from structures that will be visible at grade, in order to accurately show the locations of these below grade objects relative to the data collected by the surveyor.
 4. Earthwork intensive projects shall have spot grades collected in order to verify the accuracy of all earthwork and to verify all related pay items.
 - a. Interval of spot grades should be sufficient to generate As-Built contours.
 5. Roadway resurfacing or roadway replacement projects shall have spot grades collected at the approximate location of the profile grade line to verify the accuracy relative to the proposed finished grade profile.
 - a. Maximum interval of profile grade elevations is 50'.
 - c. Plan requirements:
 - i. Spot Grades where applicable
 - ii. As-Built locations of all structures visible at grade
 - iii. Rim/Inverts identified for each structure
 - iv. As-Built contours where applicable
 - d. Plans should be submitted to the City/Village Engineer for review prior to final acceptance.
 - i. Plans will be submitted in AutoCAD (.dwg) form along with the appropriate pen setting file to the City/Village Engineer.
 - ii. Submittal should also include Adobe Acrobat (.pdf) files of the As-Built drawings signed and sealed by the registered surveyor.
 - iii. Point files, breaklines and any other data used to generate the As-Built drawings will be provided at the Engineer's request.

7. Submit documents to Engineer with claim for final Application for Payment.

E. Spare Parts and Maintenance Materials:

1. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.
2. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.09 EMERGENCY MAINTENANCE SUPERVISOR

- A. The Contractor shall submit to the Engineer the names, addresses, and telephone numbers of two employees responsible for performing emergency maintenance and repairs when the Contractor is not working. These employees shall be designated in writing by the Contractor as his representatives and shall have full authority to act on his behalf as specified in the General Conditions. At least one of the designated employees shall be available for contacting by telephone any time an emergency arises.

1.10 APPLICATION FOR PAYMENT

- A. Submit Applications on form AIA G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet, including continuation sheets when required.

B. Preparation of Applications

1. Present required information in typewritten form.
2. Execute certification by signature of authorized officer.
3. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed [and for stored Products].
4. List each authorized Change Order as an extension on AIA G703 - Continuation Sheet, listing Change Order number and dollar amount as for an original item of Work.
5. Prepare Application for Final Payment as specified in Section 01700.

C. Submittal Procedures

1. Submit a minimum of four (4) copies of each Application for Payment and Schedule of Values
2. Submit an updated construction schedule with each Application for Payment.
3. Payment Period: Submit Application for Payment at the end of each month to the Engineer.
4. Submit with transmittal letter as specified for Submittals in Section 01300.
5. Submit two (2) waivers for partial payment.
6. Submit two (2) certified payroll reports for payroll period.
7. If requesting payment for stored materials, submit two (2) payments for stored material form.
8. Submit any other documentation as requested by the Engineer.

D. Substantiating Data

1. When Engineer requires substantiating information, submit data justifying dollar amounts in question.
2. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1.11 MEASUREMENT & PAYMENT

- A. Measurement and Payment of Lump Sum Items will be based on Contractor's substantiated estimate of the total Item value completed as accepted by Engineer. Measurement and payment criteria applicable to the unit price Items follows.

1. Use measurement methods delineated in the basis of payment section of the bid proposal forms.
2. Take all measurements and compute quantities. Engineer will verify measurements and quantities.
3. Provide necessary equipment, workers, and survey personnel as required.

- B. The quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work in accordance with the Drawings and Specifications and verified by the Engineer determine payment.

1. If the actual Work performed in accordance with the Drawings and Specifications requires greater or fewer quantities than those indicated, provide the required quantities at the unit price bid.

- C. Quantities shall be measured using the following devices and methods.

1. Measurement Devices:

- a. Weigh Scales: Inspected, tested and certified by the applicable state Weights and Measures department within the past year and the Engineer.
- b. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
- c. Metering Devices: Inspected, tested and certified by the applicable state department within the past year and the Engineer.

2. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.

3. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

4. Measurement by Area: Measured by square dimension using mean length and width or radius.

5. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord. Underground piping shall be measured by the horizontal projection of the longitudinal axis of the pipe.

6. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

- D. Payment Includes the Following:

1. Full compensation for all required labor, Products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.
2. Final payment for unit price Work will be made on the basis of the actual measurements and quantities accepted by the Engineer multiplied by the unit price for Work incorporated in or made necessary by the Work.

E. Defective Work shall be handled as follows:

1. Replace the Work, or portions of the Work, not conforming to specified requirements.
2. If, in the opinion of the Engineer and/or Owner, it is not practical to remove and replace the Work, the Engineer and/or Owner will direct one of the following remedies:
 - a. The defective Work may remain, but the unit price will be adjusted to a new price at the discretion of the Engineer.
 - b. The defective Work will be partially repaired to the instructions of the Engineer and/or Owner, and the unit price will be adjusted to a new price at the discretion of the Engineer.
3. When an individual specification section identifies a different method, formula, or percentage price reduction, it shall control.
4. The authority of the Engineer and/or Owner to assess defects and make appropriate payment adjustment is final.
5. Payment will not be made for:
 - a. Products wasted or disposed of in a manner that is not acceptable.
 - b. Products determined unacceptable.
 - c. Products not completely unloaded from the transporting vehicle.
 - d. Products placed beyond the lines and levels of the required Work.
 - e. Products not incorporated in the Work.
 - f. Loading, hauling, and disposing of rejected Products.

1.12 CONSTRUCTION CLOSEOUT

- A. Provide an orderly and efficient transfer of the completed Work to the Owner. Comply with requirements stated in Conditions of the Contract and in Specifications for Administrative procedures in closing out the Work.
- B. Prior to requesting inspection by the Engineer, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.
- C. When the Work is substantially complete, the Contractor shall submit to Engineer the following:
 1. A written notice that the Work, or designated portion thereof, is substantially complete.
 2. A list of items that remain to be completed or corrected.
 - a. Within a reasonable time after receipt of such notice, Engineer will make an inspection to determine the status of completion.
 - b. Should Engineer determine that the Work is not substantially complete:
 - 1) Engineer will promptly notify the Contractor in writing, giving the reasons therefore.
 - 2) Contractor shall remedy the deficiencies in the Work, and send another written notice of substantial completion to the Engineer.
 - 3) Engineer will, within a reasonable time after receipt of such notice, re-inspect the Work.
 - c. When the Engineer finds that the Work is substantially complete, Engineer will:
 - 1) Prepare and deliver to the Owner a tentative Certificate of Substantial Completion on a form with a tentative list of items to be completed or corrected before final payment is made.
 - 2) After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when the Engineer considers the Work substantially complete, the Engineer will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected.

D. FINAL INSPECTION

1. When the Work is complete, Contractor shall submit written certification that:
 - a. The Contract Documents have been reviewed.
 - b. The Work has been inspected for compliance with Contract Documents.
 - c. Work has been completed in accordance with Contract Documents.
 - d. The Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 - e. The Work is completed and ready for final inspection.
2. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to verify that status of completion.
 - a. Should the Engineer consider that the Work incomplete or defective:
 - 1) The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.
 - 2) The Contractor shall take immediate steps to remedy the stated deficiencies, and send another written certification to Engineer that the Work is complete.
 - 3) Within a reasonable time after receipt of such notice, the Engineer will re-inspect the Work.
3. When the Engineer finds that the Work is acceptable under the Contract Documents, the Engineer will request the Contractor to make closeout submittals.

E. REINSPECTION FEES

1. Should Engineer be required to perform re-inspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:
 - a. The Owner will compensate Engineer for such additional services.
 - b. The Owner will deduct the amount of such compensation from the final payment due the Contractor.

F. CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

1. Closeout submittals shall include, but are not necessarily limited to:
 - a. Project Record Documents
 - b. Operation and maintenance data for items so listed in pertinent other Sections of these Specifications, and for other items when so directed by the Engineer.
 - c. Warranties and bonds.
 - d. Keys and keying schedule.
 - e. Spare parts and materials
 - f. Evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:
 - 1) Certificates of Inspection.
 - 2) Certification of Occupancy.
 - 3) Certificates of Insurance for products and completed operations.

- 4) Evidence of payment of all subcontractors, material suppliers, and laborers having a just claim, and the release of all associated liens.
- 5) List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency services at all times including nights, weekends, and holidays.

G. FINAL ADJUSTMENT OF ACCOUNTS

1. Submit a final statement of accounting to Engineer.
2. The Statement shall reflect all adjustments to the Contract Sum:
 - a. The original Contract Sum.
 - b. Additions and deductions resulting from:
 - 1) Previous Change Orders.
 - 2) Allowances.
 - 3) Unit Prices.
 - 4) Deductions for uncorrected Work.
 - 5) Penalties and Bonuses.
 - 6) Deductions for liquidated damages.
 - 7) Deductions for re-inspection payments.
 - 8) Other adjustments.
 - c. Total Contract Sum, as adjusted.
 - d. Previous payments.
 - e. Sum remaining due.
3. The Engineer will prepare a final Change Order, reflecting approved adjustments to the Contract Sum that were not previously made by Change Orders.

H. FINAL APPLICATION FOR PAYMENT

1. The Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

I. INSTRUCTION

1. The Contractor shall instruct the Owner's personnel in the proper operation and maintenance of systems, equipment, and similar items which were provided as part of the Work.

PART TWO - PRODUCTS

- 2.01 Provide specified products as required.

PART THREE - EXECUTION

- 3.01 Comply with requirements

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

SECTION 01013

OBSTRUCTIONS ENCOUNTERED

PART ONE - GENERAL

1.01 OBSTRUCTIONS ENCOUNTERED

- A. In addition to showing the improvements to be constructed under this Contract, the drawings show certain information obtained by the Owner regarding the pipes, conduits, and other structures which exist along the site of the work, both at and below the surface of the ground. The Owner expressly disclaims any responsibility for the accuracy and completeness of the information given on the drawings with regard to existing structures, and the Contractor will not be entitled to any extra compensation on account of inaccuracy or incompleteness of such information, said structures being shown only for the convenience of the Contractor, who must verify the information to his own satisfaction. The giving of this information upon the contract drawings will not relieve the Contractor of his obligation to support and protect all pipes, conduits, and other structures which may be encountered during the construction of this Contract.

PART TWO - PRODUCTS

Not Used

PART THREE - EXECUTION

Not Used

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

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CONTRACT CONSIDERATIONS

PART ONE - GENERAL

1.01 SECTION INCLUDES

- A. Cash allowances.
- B. Contingency allowance
- C. Schedule of values

1.02 RELATED SECTIONS

- A. Section 01011 – Summary of Project
- B. Section 00682- Applications for Payment
- C. Section 01030 - Alternates

1.03 SCHEDULE OF VALUES

- A. Submit a type printed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet.
- B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- C. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Identify site mobilization, bonds and insurance, and any item as requested by the Engineer.
- D. Include in each line item, the amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.
- E. Include within each line item, a direct proportional amount of Contractor's overhead and profit.
- F. Revise schedule to list approved Change Orders, with each Application for Payment.

PART TWO - PRODUCTS

Not Used.

PART THREE - EXECUTION

Not Used.

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

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SECTION 01030

ALTERNATES

PART ONE - GENERAL

1.01 SECTION INCLUDES

- A. Submission procedures.
- B. Documentation of changes to Contract Price and Contract Time.

1.02 RELATED SECTIONS

- A. Agreement: Incorporating monetary value of accepted Alternates.
- B. Instructions To Bidders, Bid Form, Supplements to Bid Forms: Requirements for Alternates.

1.03 SUBMISSION REQUIREMENTS

- A. Submit Alternates identifying the effect on adjacent or related components.
- B. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- C. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.04 SELECTION AND AWARD OF ALTERNATES

- A. Indicate variation of Bid Price for Alternates described below and listed in the [SUPPLEMENTS TO] BID FORM document. This form requests a "difference" in Bid Price by adding to or deducting from the base Bid Price.
- B. Bids will be evaluated on the base bid price plus alternate(s) when required, that yields the lowest combined total needed for the project.

PART TWO - PRODUCTS

Not Used

PART THREE - EXECUTION

Not Used

PART FOUR - SPECIAL PROVISIONS

None

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PART ONE - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Throughout the Contract Documents, references are made to trade and association codes and standards that define qualities and types of workmanship and materials, and establish methods for testing and reporting on pertinent characteristics.
2. Where materials or workmanship are required by the Contract Documents to meet or exceed the specifically named codes or standards, it is the Contractor's responsibility to provide materials and workmanship that meet or exceed the latest edition of the specifically named code or standard.
3. It also is the Contractor's responsibility, when required by the Contract Documents or requested by the Engineer, to deliver to the Engineer all required proof that the materials and workmanship meet or exceed the edition requirements on the date that bids are received of the specifically named code or standard. Such proof shall be in the form of a certified report of tests conducted by a testing agency approved for that purpose by the Engineer.

- B. Related work described elsewhere:** Specifically named codes or standards occurring on the Drawings and in other Sections of the Specifications.

1.02 QUALITY ASSURANCE

A. Familiarity with pertinent codes and standards:

In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the referenced named codes and standards and to verify that the items procured for use in this Work meet or exceed the project Specification requirements. Except when a specific publication date is specified, the publication in effect on the date of Contract Document signing shall be considered the latest edition and shall apply. Contractor shall maintain a copy of the applicable referenced codes and standards on the project site. Any conflicts between the association codes and standards, and the project Specifications, shall be brought to the attention of the Engineer for resolution. Engineer's decision shall be final.

B. Rejection of non-complying items:

The Engineer reserves the right to reject items incorporated into the Work that fail to meet the specified minimum requirements. The Engineer further reserves the right, and without prejudice to other recourse the Engineer may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Engineer and the Owner.

C. Applicable standards listed in these Specifications include, but are not necessarily limited to standards promulgated by the following agencies and organizations:

1. AASHTO - American Association of State Highway and Transportation Officials, 444 North Capital Street, N.W., Washington, D.C. 20001
2. ACI - American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48129
3. AGMA - American Gear Manufacturers Association
4. AI - Asphalt Institute, Asphalt Institute Building, College Park, MD 20740
5. AISC - American Iron and Steel Construction, Inc. 1221 Avenue of the Americas, New York, New York 10020

6. AISI - American Iron and Steel Institute, 1000 16th Street, N.W., Washington, D.C. 20036
7. AMCA - Air Movement and Control Association, 30 West University Drive, Arlington Heights, IL 60004
8. ANSI - American National Standards Institute (successor to USASI and ASA), 1430 Broadway, New York, New York 10018
9. ARI - Air-Conditioning and Refrigeration Institute, 1815 North Fort Myer Drive, Arlington, VA 22209
10. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers, 345 East 47th Street, New York, NY 10017
11. ASME - American Society of Mechanical Engineers, 345 East 47th Street, New York, NY 10017
12. ASTM - American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103
13. AWWA - American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235
14. AWS - American Welding Society, 2501 N.W. 7th Street, Miami, Florida 33125
15. AWWA - American Water Works Association, 6666 West Quincy Avenue, Denver, Colorado 80235
16. CLFMI - Chain Link Fence Manufacturers Institute, 1101 Connecticut Avenue, Washington, D.C. 20036
17. CRSI - Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610
18. FM - Factory Mutual System, 1151 Boston-Providence Turnpike, Norwood, MA 02062
19. FS - Federal Specifications, General Services Administration, Specifications and Consumer Information Distribution Section (WFSIS), Washington Navy Yard, Building 197, Washington, D.C. 20407
20. GA - Gypsum Association, 1603 Orrington Avenue, Evanston, IL 60201
21. IEEE - Institute of Electrical and Electronic Engineers
22. ISA - Instrument Society of America
23. MIL - Military Specifications, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120
24. MLSFA - Metal Lath/Steel Framing Association, 221 North LaSalle Street, Chicago, IL 60601
25. NAAMM - National Association of Architectural Metal Manufacturers, 221 North LaSalle Street, Chicago, IL 60601
26. NEC - National Electrical Code, 470 Atlantic Avenue, Boston, Massachusetts 02210
27. NEMA - National Electrical Manufacturers Association, 2101 L Street, N.W., Washington, D.C. 20037
28. NFPA - National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210
29. NFPA - National Forest Products Association, 1619 Massachusetts Avenue, N.W., Washington, D.C. 20036
30. NTMA - National Terrazzo and Mosaic Association, 3166 Des Plaines Avenue, Des Plaines, IL 60018
31. ODOT - Ohio Department of Transportation, 1980 W. Broad Street, Columbus, OH 43223
32. OSHA - Occupational Safety and Health Act
33. PCA - Portland Cement Association, 5420 Old Orchard Road, Skokie, Illinois 20076

34. PCI - Prestressed Concrete Institute, 20 North Wacker Drive, Chicago, IL 60606
35. PENNDOT – Pennsylvania Department of Transportation, Keystone Building, 400 North Street, Harrisburg, PA 17120
36. PS - Product Standard, U.S. Department of Commerce, Washington, D.C. 20203
37. SDI - Steel Deck Institute, Box 3812, St. Louis, MO 63122
38. SDI - Steel Door Institute, 712 Lakewood Center North, Cleveland, OH 44107
39. SJI - Steel Joist Institute, 1703 Parham Road, Suite 204, Richmond, VA 23229
40. SSPC - Steel Structures Painting Council
41. TCA - Title Council of America, Inc., Box 326, Princeton, NJ 08540
42. UL - Underwriters' Laboratories, Inc., 333 Pfingston Road, Northbrook, IL 60062
43. Uni-B - Uni-Bell Plastic Pipe Association, 2655 Villa Creek Drive, Suite 164, Dallas, Texas 75234
44. WVDOH – West Virginia Department of Highways, Contract Administration Division, West Virginia Division of Highways, 1900 Kanawha Boulevard, East, Building 5, Room 737, Charleston, WV 25305-0430

PART TWO - PRODUCTS

N/A

PART THREE - EXECUTION

N/A

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

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PART ONE - GENERAL

1.01 SECTION 01300 INCLUDES:

- A. 1.02 Related Sections
- B. 1.03 Submittal Procedures (For the Record, Shop Drawings for Review & Approval, General Information, and For Operation and Maintenance Requirements)
- C. 1.04 Proposed Products list
- D. 1.05 Substitutions
- E. 1.06 Samples
- F. 1.07 Manufacturer's installation instructions
- G. 1.08 Manufacturers' certificates
- H. 1.09 Operation & Maintenance Manuals
- I. 1.10 Construction Schedule
- J. 1.11 Schedule of Values
- K. 1.12 Workers' Compensation Certificates
- L. 1.13 Product and Work Item Warranties and Bonds

1.02 RELATED SECTIONS

- A. When specific or more comprehensive submittals are required than are described herein, they are specified in stand alone Sections or within other technical Sections.

1.03 SUBMITTAL PROCEDURES

- A. The Contractor shall transmit all submittals (except for laboratory testing results) to the Engineer using AIA Form G810 or approved equal. Submittals from subcontractors, suppliers, or others will not be accepted. Laboratory testing results shall be sent directly from the Laboratory to the Engineer, as specified in Section 01410 Testing Laboratory Services.
- B. Sequentially number the transmittal form. Mark revised submittals with the original number plus a sequential alphabetical extension.
- C. The Contractor shall stamp and clearly identify Submittal Date, Project Title and Location; Contractor's Name and Address, Specification Section, Purpose of the Submittal (Record Purposes, Review & Approval, General Information, and Operation & Maintenance requirements); the person who performed the submittal review, and other identification that may be appropriate.
 - 1. Submittals for Record Purposes include laboratory test results, licenses, permits, and installation and calibration certificates. Laboratory test results shall be signed by an authorized agent of the independent laboratory performing the tests and will be used for comparing to the specification requirements. The Contractor shall obtain all licenses and permits required by Local, State, and Federal laws. Where requested, the Contractor shall submit installation and calibration certificates from manufacturers indicating the manufacturer's satisfaction with the installation, the calibration, and the operation of the manufacturer's equipment.
 - 2. Submittals for Review & Approval include Construction Schedules, Construction Drawings, Shop Drawings, Manufacturer's literature and certifications, Supplier's literature and certifications, Design data, Samples, Schedule of values, and other related or requested data.

Shop Drawings: Submittals for Review

- a. Submit scaled, accurate drawings for review. After found to be in general conformance with the Drawings and Specifications, Engineer will distribute in accordance with PART THREE - EXECUTION

- b. Submit the number of opaque reproductions desired by the Contractor, plus three (3) copies, which will be retained by Engineer for distribution. If Contractor requires more than four copies for its use, Contractor shall reimburse Engineer for the time required to markup the extra copies requested.
- c. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.
- d. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- e. All Shop Drawings submitted for review shall be stamped with the review block shown below:

| | |
|---|--|
| <input type="checkbox"/> | REVIEWED AND FOUND TO BE IN GENERAL CONFORMANCE WITH THE DRAWINGS AND SPECIFICATIONS. |
| <input type="checkbox"/> | REVIEWED AND FOUND, AS NOTED, TO BE IN GENERAL CONFORMANCE WITH THE DRAWINGS AND SPECIFICATIONS. |
| <input type="checkbox"/> | SUBMITTAL DOES NOT CONFORM TO THE DRAWINGS AND SPECIFICATIONS AND THE CONTRACTOR WILL ASSUME ALL LIABILITY FOR ITS FUNCTIONAL PERFORMANCE. |
| <input type="checkbox"/> | REVISE AND RE-SUBMIT |
| <input type="checkbox"/> | REJECTED |
| REVIEW IS ONLY FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT AND THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. ANY CORRECTIONS OR COMMENTS MADE DO NOT RELIEVE THE CONTRACTOR FROM COMPLIANCE WITH THE REQUIREMENTS OF THE CONTRACT DRAWINGS AND SPECIFICATIONS. REVIEW OF A SPECIFIC ITEM DOES NOT INCLUDE THE REVIEW OF AN ASSEMBLY OF WHICH THE ITEM IS A COMPONENT. CONTRACTOR IS RESPONSIBLE FOR: DIMENSIONS, WHICH SHALL BE CONFIRMED AND CORRELATED AT THE JOB SITE; INFORMATION PERTAINING TO FABRICATION PROCESSES; THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES OF CONSTRUCTION; THE COORDINATION OF THE WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING ALL WORK IN A SAFE AND SATISFACTORY MANNER. | |
| GGJ, INC. CONSULTING ENGINEERS | |
| DATE _____ BY _____ | |

- 3. General Information is typically additional information requested to meet the general needs of the project.
- 4. Operation & Maintenance information is required for all equipment. See OPERATION & MAINTENANCE MANUALS below.
- D. Prior to making submittals to the Engineer, the Contractor shall verify important field measurements and product dimensions. Carefully review for correctness, suitability, and fit.
- E. Apply Contractor's stamp and sign, thereby certifying that Contractor has carefully reviewed the material submitted, verified the products & product dimensions, checked field measurements and product dimensions, reviewed adjacent construction Work, coordinated related information, and that the product or material for which it is seeking Engineer's approval is in accordance with the requirements of Contract Documents.
- F. The Contractor shall make its submittals in an order that expedites the Project. Deliver to Engineer - Attention [Project Name] Construction Manager at 35585 Curtis Blvd., Unit C, Eastlake, Ohio 44095. Coordinate submission of related items.

- G. For each submittal for review, allow 20 working days excluding delivery time to and from the contractor. If certain submittals require expediting, the Contractor may request that the submittal be expedited. The Engineer will place the requested expedited submittal ahead of the other project submittals and make a reasonable effort to assist in completing the review as soon as possible. The Engineer, however, shall not be responsible for any delays to the un-expedited project submittals caused by its reviewing of the expedited submittals first.
 - H. Identify all variations from the Contract Documents. Note any product or system limitations that may be detrimental to the successful performance of the completed Work.
 - I. Provide space for Contractor's and Engineer's review stamps.
 - J. When a submittal is being resubmitted, identify all changes made since the previous submission, and identify submittal with original section number followed by an alphabetical letter extension e.g. A, B, C . . . to identify the re-submittal level.
 - K. Distribute copies of reviewed submittals as appropriate. Engineer will distribute reviewed submittals to Owner and Project Field Representative. Instruct parties to promptly report any inability to comply with provisions.
 - L. Maintain an accurate submittal log for the duration of the Work, including mailing and received dates, the status of each submittal, and the resulting outcome of each submittal. Make the submittal log available to the Engineer for review upon request. Notify Engineer in writing if any of Contractor's submittals have not been responded to in a timely manner.
- 1.04 PROPOSED PRODUCTS LIST
- A. Within 15 days from the effective date of the Owner-Contractor Contract, submit a list of all manufacturers' major equipment and products proposed for use, identifying the name of the manufacturer, trade name and model number of each product or piece of equipment.
 - B. For products specified only by referenced standards, give manufacturer, trade name, model or catalog designation and referenced standards.
- 1.05 SUBSTITUTIONS
- A. Unless otherwise specified, substitutions will be considered only when substantiated by the Contractor's submittal of a complete request for substitution within forty-five (45) calendar days after the Contractor has received Owner's Notice to Proceed. The request for substitution shall include any proposed deduct or increase in price offered for Owner accepting the substitution.
 - B. The Contractor shall accompany any request for substitution with such drawings, specifications, samples, manufacturer's literature, performance data, and other information necessary to describe and completely evaluate the proposed substitution. The burden of proof shall be on the Contractor.
 - C. If any substitution will affect a correlated function, adjacent construction, or the work of other trades or contractors, the necessary changes and modifications to the affected work shall be identified and included in the request for substitution.
 - D. Approval of any request for substitution shall not relieve the Contractor from the responsibility for any deficiency that may exist in the substitution or for any departures or deviations from the requirements of the Contract Documents. Except as otherwise expressly specified by the Contractor in the request for substitution and expressly approved in writing by the Engineer, the Contractor shall be deemed to warrant by the request that the proposed substitution will satisfy all standards and requirements satisfied by the originally specified products or procedure and that the approval of the request for substitution shall not be deemed to modify the Contract Documents with respect thereto.
 - E. Major Equipment Evaluation:
 - 1. Any request for substitution of equipment identified elsewhere in the Drawings or Specifications as being subject to "Major Equipment Evaluation" shall identify five (5) installations similar to that proposed. The following information regarding each installation shall be provided.

- a. Name and location of facility.
 - b. Brief description (size, number, performance, etc.).
 - c. Names, addresses and telephone numbers of owner, operator, design engineer and general contractor responsible for equipment installation.
 - d. The following dates: Order placed, delivery, start-up and full operation.
2. Provide the manufacturer's standard published Operation and Maintenance Manual. Identify any modifications to the procedures identified that are specific to the equipment to be supplied. For the specific equipment proposed, provide the frequency of scheduled maintenance procedures and the total expected time required for routine maintenance.
 3. A performance evaluation will be conducted by the Engineer and will include interviews with people other than those identified by the Contractor, manufacturer, or supplier. At a minimum, the following questions will be asked:
 - a. Were there any delays or problems with delivery of equipment attributable to the manufacturer?
 - b. Describe any equipment breakdowns.
 - c. Describe manufacturer's service responsiveness during warranty.
 - d. Describe manufacturer's service responsiveness following warranty.
 - e. Describe any costs (whether covered by manufacturer or not) associated with equipment failures following installation.
 - f. Is/was operation and maintenance, as recommended by manufacturer/supplier, adequate?
 - g. Describe the equipment process performance. How long to achieve satisfactory performance? How do actual and manufacturer performance compare? How long has required/satisfactory performance been continuously achieved?

1.06 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- B. Submit samples of finishes from the full range of manufacturers' standard colors or in custom colors selected by Owner/Engineer, textures, and patterns for Engineer's review.
- C. Include identification on each sample, with full Project information.
- D. Submit the number of samples specified in individual specification sections, one of which will be retained by Engineer.
- E. Reviewed samples that may be used in the Work are indicated in individual specification sections.

1.07 MANUFACTURER INSTALLATION INSTRUCTIONS

- A. Manufacturer installation instructions shall be submitted for owner information, prior to installation.
- B. When appropriate, submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing to Engineer.
- C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.08 MANUFACTURER CERTIFICATES

- A. When appropriate or specified in individual specification sections, submit manufacturer certifications to Engineer.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results of material or Product, but must be acceptable to Engineer.

1.09 OPERATION & MAINTENANCE MANUALS

- A. Contractor shall compile and furnish three (3) finalized copies of the reviewed Manual covering all equipment as follows:
 - 1. Submittals shall include but not be limited to descriptive literature, bulletins and spec sheets that describe the equipment, system, or item; the operation of the equipment, system, or item; a detailed list of equipment components and appurtenances including manufacturer & model number where appropriate; notice of any items required for operation that are not included; utility requirements; general arrangement drawings; materials of construction, assembly data, dimensional data; performance curves, certifications and guarantees; parts lists with ordering numbers and suppliers, assembly drawings, recommended spare parts to keep on site; lubrication and routine maintenance requirements; schematic wiring and piping diagrams; calibration procedures and specifications; related data on instrumentation and control equipment; drive data; operation & maintenance data; equipment supplier's name & address; and other pertinent data as is applicable.
 - a. When the data submitted includes more than one model or item, the Contractor shall clearly mark the items and model that is being submitted for review.
 - b. Manuals shall be tailored for the contract work and be prepared by the Contractor. The manuals shall have a heavy plastic or fiberboard cover and contain all data associated with the equipment or system, as installed, including a copy of the material found by the Engineer to be in general accordance with the Drawings and Specifications. Manuals shall be printed on or be folded to 8-1/2 x 11 in. size whenever practical. Drawings shall be reduced, when practical, or provided in full size and placed in an envelope or pocket bound into the manual. The Contractor shall include clearly marked divider tabs to separate specification section equipment and to improve the ease of use. Provide a detailed Table of Contents, and use a manual title label identifying the contents of the manual. Label shall include "O & M Manual for [Project Name]", the General Contractor's Name, and the Year project was placed into service. Manuals shall be submitted in completed form and be approved by the Engineer not less than 30 days prior to the date of final acceptance.

1.10 CONSTRUCTION SCHEDULE

- A. Immediately after signing the Contract, each prime Contractor shall prepare a graphic construction schedule, indicating the work to be executed during each month and the rate of expected progress to secure completion on or before the project completion date. Copies of the construction schedule, upon which has been indicated the actual progress, shall be furnished to the Engineer with each requisition for payment.
- B. Should the rate of progress fall materially behind the scheduled rate of progress, and unless the delay is authorized by the Engineer in writing, each offending Contractor shall furnish additional labor, work overtime, or take other necessary means required to complete the work on or before the project completion date. No additional compensation beyond the set Contract price shall be paid for action taken or overtime expense incurred in maintaining scheduled progress.
- C. Each prime Contractor on the project shall give its progress schedule to the General Contractor for incorporation in a combined project schedule.
- D. The General Contractor shall prepare a combined Project Progress Schedule and shall update it monthly for presentation at project progress meetings. A copy of the combined Project Progress Schedule shall be submitted with the respective periodic estimate.
- E. All project schedules shall be on 11" x 17" or smaller size paper to facilitate ease of reproduction.

1.11 SCHEDULE OF VALUES

- A. Provide a detailed breakdown of the agreed Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.
A Schedule of values is required to be compatible with the "continuation sheet" accompanying applications for payment.
- B. Type dated schedule on 8 1/2 in. X 11 in. white paper; Contractor's standard forms and computer printouts will be considered for approval by Engineer upon Contractor's request. Identify schedule with Project title, Name & Address of Contractor, and date of submission.
- C. Schedule shall list separately the installed labor and material value of the component parts of the Work in sufficient detail to serve as a basis for computing values for progress payments during construction.
 - 1. Identify each line item with the number and title of the respective major section of the specifications.
 - 2. Each item shall include a directly proportional amount of the Contractor's overhead and profit.
 - 3. For items where progress payments will be requested for stored materials, breakdown the value into the cost of the materials, delivered and unloaded; and the total installed value.
 - 4. For completed construction, subdivide as needed to identify costs for audit, inventory, insurance and replacement cost purposes.
- D. When so required by the Engineer, provide copies of the subcontracts or other data acceptable to the Engineer, substantiating the sums described.
- E. Use required means to assure arithmetical accuracy of the sums described.

1.12 INSURANCE CERTIFICATES

- A. Submit a copy of the Contractor's current Workers' Compensation Certificate and all renewal Certificates until the date that Final payment is due. Coverage shall not lapse for any reason.

1.13 PRODUCT AND WORK ITEM WARRANTIES AND BONDS

- A. Form of Submittals
 - 1. Bind in commercial quality 8-1/2 x 11 inch three D side ring binders with durable plastic covers.
 - 2. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor [and equipment supplier]; and name of responsible company principal.
 - 3. Table of Contents: Neatly type Table of Contents of the binder manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.
 - 4. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- B. Preparation of Submittals
 - 1. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial completion is determined.
 - 2. Verify that documents are in proper form, contain full information, and are notarized.
 - 3. Co-execute submittals when required.
 - 4. Retain warranties and bonds until time specified for submittal.

C. Time of Submittals

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing the date of acceptance as the beginning of the warranty period.

PART TWO - PRODUCTS

N/A

PART THREE - EXECUTION

3.01 DISTRIBUTION

- A. Distribution of reviewed and approved submittals will be made by the Engineer in accordance with PART FOUR of the individual specifications if addressed there, otherwise distribution will be as follows:
 1. Information for Record - One copy to Owner, Engineer, and Resident Project Representative.
 2. Review and Approval - After finding to be in general accordance with the Drawings and Specifications, the Engineer will issue a Construction Bulletin and distribute copies to the Contractor (the number submitted for its needs); one copy each for Owner, Engineer, and Resident Project Representative.

3.02 PERFORMANCE OF WORK

- A. Complete all work associated with submittals or required above.

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

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TESTING LABORATORY SERVICES

PART ONE - GENERAL

1.01 SECTION INCLUDES

- A. Selection and payment.
- B. Contractor submittals.
- C. Laboratory responsibilities.
- D. Laboratory reports.
- E. Limits on testing laboratory authority.
- F. Contractor responsibilities.
- G. Schedule of inspections and tests.

1.02 RELATED SECTIONS

- A. Information Available to Bidders: Soil investigation data.
- B. General Conditions: Inspections, testing, and approvals required by public authorities.
- C. Section 01300 - Submittals: Manufacturer's certificates.
- D. Section 01700 - Contract Closeout: Project record documents.
- E. Individual Specification Sections: Inspections and tests required, and standards for testing.

1.03 REFERENCES

- A. ASTM C802 - Practice for Conducting an Inter-laboratory Test Program to Determine the Precision of Test Methods for Construction.
- B. ASTM C1021 - Practice for Laboratories Engaged in the Testing of Building Sealants.
- C. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- D. ASTM C1093 - Practice for Accreditation of Testing Agencies for Unit Masonry.
- E. ASTM D290 - Recommended Practice for Bituminous Mixing Plant Inspection.
- F. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- G. ASTM D4561 - Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.
- H. ASTM E329 - Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.
- I. ASTM E543 - Practice for Determining the Qualification of Nondestructive Testing Agencies.
- J. ASTM E548 - Practice for Preparation of Criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies.
- K. ASTM E699 - Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

1.04 SELECTION AND PAYMENT

- A. Include within the Contract Price an amount sufficient to cover all testing and inspecting required under this Section and other pertinent Sections of these Specifications, and to cover all testing and inspecting required by governmental agencies having jurisdiction and other tests and inspections as are directed by the Engineer.
- B. When initial tests requested by the Engineer indicate non-compliance with the Contract Documents, subsequent retesting occasioned by the non-compliance shall be performed by the same testing laboratory and the costs thereof shall be paid by the Contractor.
- C. Employment of testing laboratory in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of ASTM C301, ASTM C425, ASTM D2412, ASTM C802, ASTM D2444, ASTM C1021, ASTM C1077, ASTM C1093, ASTM D290, ASTM D3740, ASTM D4561, ASTM E329, ASTM E543, ASTM E548, ASTM E699, and ACI 613, ASTM C42, ASTM C39, and all applicable reference standards in these specifications.
- B. Laboratory: Authorized to operate in State in which Project is located.
- C. Laboratory Staff: Maintain a full time registered Engineer or certified specialist on staff to review services.
- D. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.06 CONTRACTOR SUBMITTALS

- A. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer or specialist and responsible officer.
- B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.07 LABORATORY RESPONSIBILITIES

- A. Test samples of mixes submitted by Contractor.
- B. Provide qualified personnel at site. Cooperate with Engineer and Contractor in performance of services.
- C. Perform specified inspecting, sampling, and testing of Products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Engineer and Contractor of observed irregularities or non-conformance of Work or Products.
- F. Perform additional inspection and tests required by Engineer.
- G. Attend pre-construction meetings and progress meetings.

1.08 LABORATORY REPORTS

- A. After each inspection and test, promptly submit two copies of laboratory report to Engineer, and to Contractor.
- B. Include:
 - 1. Date issued
 - 2. Project title and number
 - 3. Name of inspector

4. Date and time of sampling or inspection
5. Identification of product and specifications section
6. Location in the Project
7. Type of inspection or test
8. Date of test
9. Results of tests
10. Conformance with Contract Documents.

C. When requested by Engineer, provide interpretation of test results.

1.09 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop the Work.

1.10 CONTRACTOR RESPONSIBILITIES

- A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
- B. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
- C. Provide incidental labor and facilities:
 1. To provide access to Work to be tested
 2. To obtain and handle samples at the site or at source of Products to be tested
 3. To facilitate tests and inspections
 4. To provide storage and curing of test samples.
- D. Notify Engineer and laboratory 24 hours prior to expected time for operations requiring inspecting and testing services.

1.11 SCHEDULE OF INSPECTIONS AND TESTS

A. SOIL INSPECTION AND TESTING

1. Make required inspections and tests including, but not necessarily limited to:
 - a. Visually inspect on-site and imported fill and backfill, making such tests and retests as are necessary to determine compliance with the Contract requirements and suitability for the proposed purpose.
 - b. Make field density tests on samples from in-place material.
 - c. As pertinent, inspect the progress of excavating, filling and grading; make density tests at fills and backfills; and verify compliance with provisions of the Contract Documents and governmental agencies having jurisdiction.
2. Make and distribute necessary reports and certificates.

B. CONCRETE INSPECTING AND TESTING

1. Portland cement:

- a. Secure from the cement manufacturer Certificates of Compliance delivered directly to the concrete producer for further delivery directly to the testing laboratory.
- b. Require the Certificates of Compliance to positively identify the cement as to production lot, bin or silo number, dating and routing of shipment, and compliance with the specified standards.
- c. If so required by the Engineer, promptly provide such other specific physical and chemical data as requested.

2. Aggregate:

- a. Provide one test unless character of material changes, material is substituted, or additional test is requested by the Engineer.
- b. Sample from conveyor belts or batching gates at the ready-mix plant:
 - 1) Sieve analysis to determine compliance with specified standards and grading.
 - 2) Specify gravity test for compliance with specified standards.

3. Laboratory design mix:

- a. After approval of aggregate, and whenever character or source of material is changed, provide mix design in accordance with ACI 613.
- b. Provide designs for all mixes prepared by a licensed civil engineer.

4. Molded concrete cylinders:

- a. Provide three test cylinders for each 150 cubic yard, or fraction thereof, of each class of concrete of each day's placement.
- b. Test one cylinder at seven (7) days, one at twenty-eight (28) days, and one when so directed.
- c. Report the mix, slump, gauge, location of concrete in the structure and test results.
- d. Take specimens and make tests in accordance with the applicable ASTM standard specifications.

5. Core tests:

- a. Provide only when specifically so directed by the Engineer because of low cylinder test results.
- b. Cut from locations directed by the Engineer, securing in accordance with ASTM C42, and prepare and test in accordance with ASTM C39.

6. Placement inspections:

- a. On concrete over 2000 psi, provide continuous or other inspection as required by governmental agencies having jurisdiction.
- b. Throughout progress of concrete placement, make slump tests to verify conformance with specified slump.
- c. Using all required personnel and equipment throughout progress of concrete placement, verify that finished concrete surfaces will have the level or slope that is required by the Contract Documents.

C. CONCRETE REINFORCEMENT INSPECTING AND TESTING

1. Prior to use, test all reinforcement steel bars for compliance with the specified standards.

- a. Material identified by mill test reports, and certified by the testing laboratory, does not require additional testing. Require the supplier to furnish mill test reports to the testing laboratory for certification.
 - b. Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as unidentified steel.
2. Unidentified steel:
- a. Have testing laboratory select samples consisting of two (2) pieces of each size, each 18" long.
 - b. Have the testing laboratory make one tensile test and one bend test for each 2-1/2 tons or fraction thereof of each size of unidentified steel.
3. Provide continuous inspection for all welding of reinforcement steel.

D. STRUCTURAL STEEL INSPECTING AND TESTING

1. Prior to use, test all structural steel for compliance with the specified standards.
- a. Material identified by mill test reports and certified by the testing laboratory does not require additional testing. Require the supplier to furnish mill test reports to the laboratory for certification.
 - b. Tag identified steel at the supplier's shop. When steel arrives at the job site without such tags, test it as unidentified steel.
2. Unidentified steel:
- a. Have testing laboratory make one tensile test and one bend test for each five (5) tons or fraction thereof of each shape and size of unidentified structural steel.
3. Shop Welding:
- a. Provide qualified testing laboratory inspector.
 - b. On single pass welds, inspect after completion of welding and prior to painting.
 - c. On multiple pass welds, and on butt welds with cover pass on the back side, provide continuous inspection.
4. Field welding:
- a. Provide continuous inspection by a qualified testing laboratory inspector.

E. SEWER PIPE AND JOINT MATERIAL TESTING

1. Vitrified Clay Pipe
- a. Tests for clay pipe shall be made on four (4) specimens of each size and type of pipe as selected by the Engineer which pipe shall be furnished by the manufacturer. Tests shall be made by an independent testing laboratory approved by the Engineer and shall be at the Contractor's expense. Tests shall be made in accordance with current standards of ASTM C301 and ASTM C425.
 - b. All clay sewer pipe shall be subject to inspection on the job by the Engineer. The purpose of the inspection shall be to cull and reject pipe that, independent of the physical tests, fails to conform to the requirements of these specifications.
2. PVC Pipe
- a. Test for PVC gravity sewer pipe shall be made by an independent testing laboratory, approved by the Engineer and shall be at the Contractor's expense.
 - b. Drop Impact Test: Pipe (6" long section) shall be subjected to impact from a free falling tup (20 lb. Tup

A.) in accordance with ASTM Method of Test D2444. No shattering or splitting shall be evident when the following energy is impacted.

| <u>Nominal Size</u> | <u>Ft. - lbs.</u> |
|---------------------|-------------------|
| 4 | 150 |
| 6 | 210 |
| 8 | 210 |
| 10 | 220 |

- c. Pipe Stiffness: Minimum pipe stiffness (F/Y) at 5% deflection shall be 46 psi for all sizes when tested in accordance with ASTM Methods of Test D2412, "External Loading Properties of Plastic Pipe by Parallel Plate Loading."
- d. Joint Tightness: Two (2) sections of pipe shall be assembled in accordance with the manufacturer's recommendation. Joints shall be tested in accordance with ASTM D3212, "Joints for Drain and Sewer Plastic Pipe Using Flexible Elastomeric Seals."
- e. Flattening: There shall be no evidence of splitting, cracking or breaking when the pipe is tested as follows: Flatten specimen of pipe six (6) inches long between parallel plates in a suitable press until the distance between the plates is 40 percent of the outside diameter of the pipe. The rate of loading shall be uniform and such that the compression is completed within two to five (2-5) minutes.

3. C900 Pipe

- a. Testing: See Section 02634 PVC PIPE (AWWA C900)

4. Ductile Iron Pipe

- a. Testing: See Section 02625 DUCTILE IRON PIPE & FITTINGS

F. WAIVER OF INSPECTION AND/OR TESTS

- 1. Specified inspections and/or tests may be waived only by the specific approval of the Engineer, and such waivers will be expected to result in credit to the Owner equal to normal cost of such inspection and/or test.

PART TWO - PRODUCTS

Not Used

PART THREE - EXECUTION

Not Used

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

TEMPORARY WORK FACILITIES AND PROJECT CONTROLS**PART ONE - GENERAL****1.01 DESCRIPTION**

- A. Section 01500 specifies requirements related to preliminary work and temporary items, facilities, and control of the project Work including:
- 1.02 Conformity with Drawings & Specifications (incl. Field Engineering)
 - 1.03 Cutting & Patching Existing Structures and Buried Improvements
 - 1.04 Maintenance of Existing Operations
 - 1.05 Cooperation of Contractor(s)
 - 1.06 Road Maintenance and Restoration
 - 1.07 Temporary Parking, Access Roads, and Paving of Trenches
 - 1.08 Maintaining Traffic & Utilities in Right-Of-Ways
 - 1.09 Barricades, Signs, Lights, & Site Safety
 - 1.10 Environmental Protection
 - 1.11 Night, Sunday and Holiday Work
 - 1.12 Specific Contractor Responsibilities
 - General Contractor
 - Electrical Contractor
 - Prime Contractors
 - 1.13 Unauthorized Work
 - 1.14 Use of Site
 - 1.15 Use of Explosives
 - 1.16 Construction Photographs
 - 1.17 Construction Audio-Color Video Taping
 - 1.18 Quality Assurance
 - 3.01 Maintenance and Removal
 - 3.02 Water Control
 - 3.03 Erosion and Sediment Control
 - 3.04 Notification of Utility Owners
 - 3.05 Failure to Perform Section Provisions
- B. Other related Sections that may or may not be part of this project work include, Section 01410 Testing Laboratory Services, Section 01590 Field Offices, and others.

1.02 CONFORMITY WITH DRAWINGS & SPECIFICATIONS

- A. All Work shall conform to the lines, grades, cross sections, dimensions, and directions shown on the Drawings and specified unless altered by the Engineer. Alterations and deviations, as may be required or desired, shall be approved in writing by the Engineer.
- B. Field engineering shall be performed by Professional Engineers registered in the State of the project location. Surveying shall be performed by Professional Surveyors registered in the State of the Project location. Engineers and Surveyors, acceptable to the Engineer, shall submit Insurance Certificates giving evidence that they have current Errors and Omissions insurance coverage. The Contractor's Engineers and Surveyors shall,
- 1. Verify and protect all survey control and reference points before starting field construction work. Establish two or more permanent benchmarks on site that are referenced to established control points. Record benchmark location descriptions, with horizontal and vertical data, on Project Record Documents. If a survey control or reference point is disturbed, notify the Owner's Engineer prior to re-establishing. Any discrepancies shall be promptly reported to the Owner's Engineer for resolution.
 - 2. Establish and periodically verify elevations, lines, grades, and levels. Locate and lay out all improvements by surveying or other appropriate instruments. Verify that all proposed improvements are constructed on Owner's property and that dimensions, locations, angles, and elevations of the constructed work are in accordance with the Drawings. On unit price items, determine and certify quantities for payment requests.

- C. Contractor shall maintain a set of Contract Documents solely for use as the Project Record Documents. The Project Record Documents shall note all deviations from the original bid documents and reflect actual constructed conditions. Contractor shall have said documents available at each progress meeting to verify that deviations are being recorded as they are encountered.

1.03 CUTTING & PATCHING STRUCTURES AND BURIED IMPROVEMENTS

- A. Where existing surface structures and buried improvements are shown on the Drawings, their location, depth, configuration, and dimensions are believed to be reasonably representative based on the data used in preparing the Drawings, but such representations are not guaranteed. Such improvements are shown for general informational purposes and shall not be construed to represent that in all cases, the improvements will be as shown on the Drawings.
- B. Where cutting and patching to structures or other buried improvements are noted or required, examine and assess existing conditions prior to commencing the Work, including elements subject to damage or movement during cutting and patching. Beginning to cut or patch shall be Contractor's acceptance of existing conditions.

1. PREPARATION

- a. Provide temporary supports to ensure structural integrity of the Work. Provide devices and methods to protect other improvements from damage.
- b. Provide protection from elements for areas that may be exposed by uncovering work.
- c. Maintain excavations safe and free of water.

2. CUTTING

- a. Execute excavation and backfill as required in accordance with Section 02220 and perform cutting and patching Work.
- b. Uncover work to install improperly sequenced work.
- c. Remove and replace defective or non-conforming work.
- d. Remove samples of installed work for testing when requested.
- e. Provide openings in the Work for the penetration of mechanical and electrical work, or for other purposes.
- f. Employ original installer or qualified equal to perform cutting for weather exposed and moisture resistant elements, and sight-exposed surfaces.
- g. Cut rigid materials using masonry saw, core drill, or other appropriate cutter. Pneumatic tools are not allowed without prior approval.

3. PATCHING

- a. Execute patching to complement adjacent Work.
- b. Fit products together so they properly integrate with other Work.
- c. Execute work by methods that avoid damage to other Work, and that will provide appropriate surfaces to receive patching and finishing.
- d. Employ original installer or qualified equal to perform patching for weather exposed and moisture resistant elements, and sight-exposed surfaces.
- e. Restore work with new products in accordance with requirements of Contract Documents.
- f. Fit work air and water tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

- g. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

1.04 MAINTENANCE OF EXISTING OPERATIONS

- A. The function of all critical existing piping systems, collection systems, treatment facilities, and pumping facilities shall be maintained throughout the construction of the Work. When construction requires interruption of any critical operation or function, the contractor(s) shall first seek written approval from the Owner through the Engineer. Unless approval is secured in writing to the contrary, the contractor(s) shall do whatever is required to maintain continuous operation of the existing systems and facility functions. This may require, but is not limited to bypass pumping, overland piping, temporary treatment units, auxiliary power, and supporting appurtenances. All interruptions shall be kept to a minimum.

1.05 COOPERATION OF CONTRACTOR(S)

- A. The contractor(s) shall plan and perform their work to minimize interference with the operation of the Owner, other contractors, utilities, or public facilities on or near the Work.
- B. The Owner reserves the right to perform other work by contract or otherwise, and to permit other public entities, utilities, or others to perform work on or near the Work site during the construction period. If a conflict arises that cannot be resolved by the conflicting parties, the Owner will determine when and how the Work will proceed. Claims for delay or inconvenience due to such other parties working on the site will not be considered.

1.06 ROAD MAINTENANCE & RESTORATION

- A. Temporary road paving shall be provided and maintained on all pavements disturbed by the Work. Where the Work site is a pumping, treatment, similar, or related facility, and suitable access roads for operating personnel and deliveries shall be provided and maintained, as required.
- B. Permanent pavement and final restoration shall be performed as the project approaches completion but no later than the last paving season prior to the Contract completion date.

1.07 TEMPORARY PARKING, ACCESS ROADS, AND PAVING OF TRENCHES

- A. The Contractor shall provide and maintain adequate temporary parking spaces at locations approved by the Engineer on or near the Work site. The parking spaces shall be used for the contractors' personnel and their visitors. Upon completion of the Work, remove and restore the disturbed area, as required.
- B. Construct temporary all-weather access roads, including bridges and culverts as necessary, to serve the construction area. Width and load bearing capacity of the roads shall be sufficient to provide low maintenance and safe unimpeded traffic flow during construction.
- C. Temporary paving, consisting of a gravel base and a 2-inch wearing course, shall be applied to all trench excavations in paved areas immediately after the excavation trench has been backfilled and compacted. Temporary paving shall be installed and maintained to the level of the surrounding roadway.

1.08 MAINTAINING TRAFFIC & UTILITIES IN RIGHT-OF-WAYS

- A. Where the Work is located on or in public streets, roads, or highways, the Contractor shall perform the work to minimize danger and inconvenience to the public. Roadways and pedestrian paths, affected by the construction work, shall be maintained and kept clean and safe. This includes providing free access to hospitals, schools, and other such facilities, and providing temporary driveways, bridges, stream crossings, and walkways as necessary.
- B. Emergency vehicle access shall be provided to the Work site and to adjacent property at all times. If the work requires closure to vehicle access, the Contractor shall notify and obtain the approval of the Engineer, fire, police, and emergency medical providers of such closure. Closure time shall be kept to a minimum.
- C. Provide free access to all fire hydrants, water valves, gas valves, traffic control panels, and other important utility improvements located on the site and along the line of the work.

- D. Maintain gutters, waterways, and sewer systems affected by the work.

1.09 BARRICADES, SIGNS, LIGHTS & SITE SAFETY

- A. The Contractor shall employ guards for the work, when and as necessary to provide site safety. The Contractor shall erect and maintain such strong and suitable barriers, signs, and warning lights as will effectively prevent accidents and injury to people and property. Adequate lighting shall be maintained between the hours of one-half (1/2) hour before sunset and one-half (1/2) hour after sunrise.
- B. No excavation shall be left open for any significant period awaiting further work by the Contractor's forces or by others. Excavations shall be temporarily backfilled and resurfaced if applicable with a temporary pavement passable to traffic.
- C. In addition to other safety requirements, a fence at least four (4) feet high shall surround any excavation left open at the end of the day.
- D. The Contractor shall be responsible for complying with all local, State, and Federal regulations pursuant to maintaining traffic, safety notification, construction methods and obtaining all necessary construction permits.
- E. Construction safety measures shall comply with Department of Labor Occupational Safety and Health Regulations for Construction.

1.10 ENVIRONMENTAL PROTECTION

- A. When the Work includes an existing sanitary sewerage collection system or a treatment facility, the General Contractor shall be responsible for maintaining all sanitary and process flow streams, and plant functions. Provisions shall be made for the temporary piping, pumping, storage and/or disposal of flow streams during periods when the operation of the sewers or treatment facilities are hindered or disrupted by the Work.
- B. Provide on-site sanitary facilities for project workers.
- C. All prime contractors shall perform their work in such a manner as to eliminate all unnecessary noise, dust, and odors.
- D. Maintain all equipment in compliance with all standards as required by the Occupational Safety and Health Act.
- E. Take whatever action is necessary and provide all labor, tools, equipment, and machinery to adequately handle all wastewater, surface, and flood flows that may be encountered during the performance of the work. At no time shall any contractor cause the discharge of untreated wastewater to the environment.
- F. It shall be the responsibility of each contractor to prevent or limit unnecessary loud noise and the pollution of air and water resulting from the construction operations.
- G. The Contractor shall perform work required to prevent soil from eroding or otherwise entering onto all paved areas and into natural watercourses, ditches, and public sewer systems, and to prevent dust attributable to the construction operations from entering the atmosphere.
- H. Construction sequencing shall be planned to minimize the size and time of exposure of disturbed areas. Scheduling of clearing, grading and stabilization shall reflect the construction capabilities of the Contractor as well as climate factors.
- I. Trenches shall be backfilled at the end of each working day. Backfilling shall be conducted in a manner appropriate to avoid accelerated erosion until temporary and/or permanent stabilization is affected.
- J. Dust from unpaved streets or parking areas and dust remaining after sweeping paved streets shall be controlled with calcium chloride dust palliative or as otherwise directed by the Engineer.
- K. Existing vegetation shall be protected as much as possible during construction.
- L. During construction, all contractors are prohibited from unnecessarily disturbing or uprooting trees and vegetation. Special care shall be taken so as not to disturb trees and vegetation along stream banks and in the

vicinity of streams; dumping soil or debris into streams or on stream banks; changing the course of streams without encroachment permits; leaving coffer dams in streams; leaving temporary stream crossings for equipment; operating equipment in streams; or discharging silt laden water into streams.

- M. All stockpiled topsoil and fill materials shall be protected from soil erosion by the use of a filter fabric or straw bale barrier constructed around the perimeter of the stockpiled material. The stockpiled material shall not be placed within fifty feet of any stream or channel bank.
- N. Stockpiling excavated material shall not be allowed on roadways or right-of-ways unless written permission is received by the Contractor, and transmitted to the Owner, from the legislative agency or property owner responsible for the maintenance of the area where the material is to be stockpiled.
- O. All top soil, excavated from areas where cuts and fills are to be made, shall be stockpiled on a level area enclosed in an erosion barrier and stabilized for use after the final sub grade is completed.
- P. All disturbed unpaved areas that are to be exposed for more than thirty days shall be provided with a seed and mulch cover. The seed shall be a blend of 40% Kentucky bluegrass, 40% Creeping Red Fescue, and 20% Perennial Rye applied at a rate of 5 pounds per 1000 S.F. The seeding shall include a uniform application of 12-12-12 fertilizer applied at a rate of 20 pounds per 1000 square feet and covered by 1/4 inch of soil and straw mulch applied at a rate of three tons per acre or approved equal.
- Q. Mulch shall be used on all areas where temporary or final stabilization cannot be performed due to unfavorable weather conditions. Mulching materials shall be straw, wood, or wood cellulose fibers, or erosion control fabric in conformance with the requirements of the project specifications.
- R. All temporary and final plantings shall be maintained for thirty calendar days after all planting is complete and approved by the Engineer. Maintenance shall include necessary watering, weeding, cultivating, spraying and pruning to keep plant materials in a healthy growing condition, and to keep planted areas neat and attractive during the maintenance period. At the end of the maintenance period, all plant materials shall be in healthy growing condition.
- S. Final stabilization of all disturbed areas shall be performed in compliance with the project Specifications.
- T. Water containing suspended material from any part of the Contractor's operations shall be clarified before discharging to storm sewers, channels, or streams.
- U. The Contractor shall construct and maintain filters, sedimentation traps, or stilling basins with overflows to clarify waters containing suspended materials from fill areas, excavations, deep wells, well points, and disposal sites before discharging to drains or streams.
- V. The Contractor shall carry out cleanup, grading, seeding, planting and restoration of the work area as early as practical as the construction proceeds.
- W. After the construction is completed, the temporary paving and seeding shall be replaced with final paving and seeding as specified.
- X. If rodents are found to be present, provide appropriate rodent control.

1.11 NIGHT, SUNDAY AND HOLIDAY WORK

- A. No work will be permitted at night, Sunday or legal holidays except in the case of emergency. Except for emergency work, the written authorization of the Engineer shall be required. Where no emergency exists, but the Contractor feels it advantageous to work at night, Sunday or legal holidays, the Contractor shall notify the Engineer at least two days in advance, requesting written permission. Any work performed during the absence of the Engineer will be done at the Contractor's risk and responsibility, and may be subject to rejection upon later inspection.

1.12 SPECIFIC CONTRACTOR RESPONSIBILITIES

- A. The General Contractor shall provide all temporary water, heating, lighting, and power required to construct the Work that is not specifically specified to be provided by others, until such time as the Owner takes beneficial use of the work.

1. Pay all utility charges related to providing temporary electrical power and lighting that is required to construct the Work until the Work is placed into the beneficial service of the Owner.
 2. Provide fuel for building/structure temporary heating, if any.
 3. Provide temporary building or structure heat, heating equipment, and security lighting to protect the work until it is complete and ready for Owner's occupancy. Such equipment shall meet all requirements of the N.E.C., O.B.B.C. and the local codes for temporary construction services.
 - a. Any prime contractor that has special, out of the ordinary heating, lighting, or power requirements for the work of its trades, shall provide those special needs including any related equipment.
 4. Provide Resident Engineer's Office (see Section 01590, if included in this project)
 5. Project Sign (see Section 01580, if included in this project)
 6. Provide adequate water for drinking and for construction needs including supply lines as necessary to such locations that will expedite construction.
 7. Provide and maintain barricades, signs, signal lights, fences, guards, flaggers and all other security and safety equipment required to protect the public, the Work, and the Owner's Work-related facilities and operations. Restrict entry to the Work site to authorized people and vehicles. Maintain, and make available to Engineer and Owner upon request, a log of workers and visitors.
 8. Provide environmental protection
 9. Provide temporary paving
 10. Provide temporary construction required to maintain the operation of the existing facilities or existing facility function.
 11. Provide temporary plugs, blind flanges, bulkheads, piping, connections, pumping, valves, sheeting, shoring, bracing, sanitary facilities, treatment process function, and similar work or items that may be needed while constructing the Work.
 12. Provide a temporary Contractor's office located on the Work site until completion of the Contract. An authorized agent shall be present at all times while the work is in progress.
 13. Provide all articles necessary for giving "First Aid to the Injured" on the job site. Maintain and display an adequate plan for the immediate removal and emergency treatment of anyone injured or who becomes critically ill on the work site.
 14. Arrange for the installation of temporary electrical service for construction purposes as well as make provisions to adequately protect all transformers and any associated temporary power equipment throughout the course of construction.
 15. Protect the Work against weather damage and the operations of other trades. The General Contractor shall be responsible for the proper use of all temporary wiring systems until they are removed.
- B. The Electrical Contractor shall provide all temporary electrical service and power distribution, except as specifically excluded, for the Work as called for herein or required.
1. Provide, maintain, and remove when no longer needed, all temporary power service required to maintain all critical treatment processes and operations during the construction of the Work.
 2. Provide and maintain temporary power installations as required by all of the prime contractors for construction purposes (including extending temporary service from the utility supply to the various project construction areas). Required installations and maintenance includes general lighting, power, and telephone requirements; connections for temporary heat; and power installations and telephone hookups to the Engineer's field office and to all prime contractors' trailers and work sheds.

3. Power for any electric arc welding shall be excluded from the requirements for temporary power service. Power for any electric arc welding equipment shall be furnished complete by the contractor whose trades require the welding.
 4. Provide power in accordance with the General Contractor's construction schedule.
 5. Pay all utility charges for step down transformers, metering or other materials.
 6. Provide at least one full-time electrician to satisfy temporary electrical service needs. The electrician shall be on site when any trade is working that requires temporary power. The electrician may be engaged in other phases of the Work while on site. When electrical services are required to serve the needs of other prime contractors outside of normal working hours, payment for the temporary power electrician shall be negotiated between the Electrical Contractor and the prime contractor(s) requiring the extended-time service.
 7. Conform all electrical work for construction purposes to Federal and State (Ohio Safety Code IC-3) requirements as well as the requirements of the National Electrical Code. The cost to obtain and pay for required applications, permits and inspection pertaining to this work shall be included in the Electrical Contractor's bid.
 8. Install temporary work in such a manner as not to interfere with the permanent construction. If interferences do occur, it shall be the responsibility of the Electrical Contractor to make such changes as may be required to overcome the interferences.
 9. Furnish and install not less than 200 watt lamps for general lighting, and all fuses as may be required for a complete job. Replacement of lamps, fuses, including that caused by theft, will be the responsibility of the Electrical Contractor throughout the life of the project.
- C. Any prime contractor that has special heating, lighting, or power requirements for the work of its trades, shall provide the special needs including any related equipment. Power for electric arc welding equipment shall be furnished complete by the trades requiring the welding. Each prime contractor shall provide and pay for its own extensions for lights or power tools beyond the receptacle outlets provided by the Electrical Contractor.
1. Each prime contractor shall properly dispose of all debris removed or resulting from its work.
- 1.13 UNAUTHORIZED WORK
- A. Work done beyond the lines shown on the Drawings, specified, or ordered; work done without required inspection; or any Extra work performed without written authorization will be considered unauthorized work and will not be paid for under the provisions of the Contract. Work so performed may be ordered removed at Contractor's expense.
- 1.14 USE OF SITE
- A. Owner will make a reasonable effort to accommodate the needs of the Contractor for his operation so long as his operation does not materially interfere with the safety or required operation of the site facilities.
 - B. Where the work is to be constructed upon or within a temporary or permanent easement, the easement(s) shown on the Drawings will be secured by the Owner without cost to the Contractor. When the work is constructed in or within 10 feet of an easement, the Contractor shall adequately stake the easement limits and shall not enter upon or occupy any private property that it does not have a written agreement to do so.
 - C. All improvements and surfaces disturbed by the Contractor's work shall be properly maintained during construction and be returned to their original or better condition upon completion of the project.
- 1.15 USE OF EXPLOSIVES
- A. When the use of explosives is authorized by the Engineer, the storage, handling, protection methods, and firing of the explosives shall be performed only by people highly experienced in such work. The Contractor agrees and warrants that when explosives are used, all State laws, local ordinances, and applicable safety

requirements will be strictly met. Contractor shall be responsible for all damage resulting from the use of the explosives.

1.16 CONSTRUCTION PHOTOGRAPHS

- A. Unless excluded in PART FOUR, provide photographs by an experienced photographer, acceptable to Engineer, of the site and construction throughout the progress of Work.
- B. Take photographs at least 15 days prior to each application for payment and as necessary to provide the clear, chronological record of construction steps performed in constructing the proposed facilities. Specifically, photographs shall document,
 - 1. Site clearing
 - 2. Excavations and buried pipe installations
 - 3. Foundations and below-ground structures
 - 4. Structural framing
 - 5. Enclosure of building
 - 6. Equipment
 - 7. All other work
 - 8. Final Completion
- C. Take the following photographs to evidence existing conditions when applicable,
 - 1. Interior views: From points that show all locations of proposed work.
 - 2. Exterior views:
 - a. To view each structure and/or all locations of utility and underground services, and to show all work adequately. The average distance between photograph shots along the route of a utility or underground service shall be 50 feet unless otherwise approved by the Engineer.
 - b. Include in photographic coverage all driveways, sidewalks, curbs, ditches, streets, landscaping, trees, shrubs, culverts, catch basins, retaining walls, visible utilities and building exteriors within the zones of influence.
- D. Take photographs of soil erosion and sedimentation controls on a routine basis.
- E. Prints requirements:
 - 1. Full color; three prints of each view; Smooth Paper Surface; High Contrast; Minimum size 4 inch x 6 inch
 - 2. Identify each print on back. Identify name of Project, contract number, phase, orientation of view, name and address of photographer, and photographer's numbered identification of exposure.
 - 3. Identify the date and time of print on front, lower right corner.
 - 4. Photographs shall be inserted into clear vinyl carrier sheets (8-3/8" x 11-3/16") chronologically in numerical order and bound in "D" ring type binders. Each binder shall contain an index identifying each photograph and coordinating it with its specific location.
- F. Digital Files:
 - 1. Deliver Digital Files on disk to Engineer with project record documents. Catalog and index digital files in chronological sequence; provide typed table of contents.

G. Technique:

1. Provide factual presentation.
2. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

H. Views:

1. Provide photographs from locations as necessary to provide diversified overall views of all the performed work from positions that are to remain accessible throughout the progress of the work
2. Consult with Engineer for instructions on specific views required.

I. Deliver prints with each Application for Payment with transmittal letter specified under Section 01300.

1.17 CONSTRUCTION AUDIO- COLOR DIGITAL RECORDING

A. Unless excluded in PART FOUR, provide audio-color digital video recording on DVD of the project construction site.

1. Provide Pre-Construction, during construction and completion of construction videos of the construction site and existing facilities (interior and exterior) to be affected by the Work.

B. Quality Assurance

1. Secure the services of a professional videographer who is skilled and experienced in construction audio-color video recording and whose work samples are acceptable to the Engineer.
2. Do not replace the videographer without the Engineer's written approval.

C. Submittals

1. Comply with pertinent provisions of Section 01300.
2. Except as otherwise directed and separately paid for, submit three copies of each audio-video DVD.

D. Preliminary Video Record

1. Prior to beginning construction, the General Contractor shall video the construction area to provide a true and accurate video record of the project site. The video shall be a high resolution DVD that will provide for a clear and concise picture playback and for "still" frame reviews.

E. System Description

1. Prior to the start of any construction activities, audio-video recording is required along water and sewer line routes, roadways, and at structures that will or may be affected by the work.
2. The recording equipment must be able to produce quality color pictures for the purpose of providing permanent documentation of existing condition of construction areas.
3. The video portion of the recording shall reproduce a bright, sharp, clear picture with accurate color, free from distortion, drop out, tearing or other forms of picture imperfection.
4. The audio portion of the recording shall be clear, at a proper volume, and free from distortion.

F. Product Data, Samples and Certificates

1. Submit product data on camera and type of DVD to be used, including name, make and model number.
2. Submit sample of work on a prior project, demonstrated for Engineer, to assure quality requirements.

3. Submit written certificate that all requirements of the audio-video color recording were accomplished in accordance with this Section.

G. Equipment

1. Audio-Video Color DVD: Standard Full size 800mb DVD.
2. Camera: Video output from camera capable of producing a minimum of 300 lines of horizontal resolution at center with minimum light lag; produce optimum color imagery with a minimum of 7 foot-candles of illumination; provide a video signal-to-noise ratio of at least 49 Db; produce quality color picture of images at varying distances and angles as required for this project.
3. Alpha-Numeric Displays: Video recording must contain continuous display of simultaneously generated transparent digital information including date and time of recording, engineering stationing, name of street/easement/building, direction of travel, and viewing side.

H. Digital Recording

1. Investigate visually all areas prior to recording, making notation of features not readily visible on DVD. This would include, but not be limited to, culverts, catch basins, manholes, and any obstruction that may be partially buried.
2. Record all measurements including size, type, and condition of features observed during inspection.
3. All recording must be done during times of good visibility. No outside recording will be allowed during periods of visible precipitation or when ground is covered with snow, leaves or debris without written approval of Engineer.
4. Furnish all power for auxiliary lighting required to fill in shadow areas caused by trees, utility poles, road signs, and other such objects, as well as other conditions requiring artificial illumination in order to produce the proper detail and perspective on the recordings.
5. Do not exceed forty-eight (48) feet per minute (15 meter per minute) average rate of speed in the direction of travel during recording. Control direction of travel during recording. Control panning rates and zoom-in, zoom-out rates in a manner that produces clarity of subject during playback.
6. When conventional wheeled vehicle is used for recording, provide eight (8) foot (2.4 m) minimum camera lens to ground distance to insure proper perspective. In areas not accessible to conventional wheeled vehicles, provide coverage by walking or special conveyance but with the same requirement for recorded quality and content as specified herein.
7. Properly identify all DVD's and associated cases by number, location and project name under direction of the Engineer.
8. Begin each recording with the current date, project name, and municipality, general location and viewing side and direction of progress.
9. Conduct all recording in the presence of the Engineer unless waived by the Engineer. The Engineer or a person approved by the Engineer will conduct the audio portion.
10. Include recorded coverage of, but not limited to, all existing driveways, sidewalks, curbs, ditches (drainage pattern is of particular concern), streets (including full width paving condition), landscaping, trees, shrubbery, culverts, catch basins, headwalls, retaining walls, fences, visible utilities, and all building exteriors located within the zone of influence of construction. Of particular concern are existing faults, fractures, defects, or other imperfections. The term street is understood to mean street, highway, avenue, boulevard, road, alley, lane, driveway, parking lot, etc., and all adjacent areas within the possible zone of influence.
11. Houses and buildings to be identified both visibly and audibly by house or building number, when possible, in such a manner that the progress of the recording and the proposed route of construction may be located by reference to houses and buildings.

12. Record by audio-video all easements for the full width of permanent and temporary easements and all other adjacent areas within the zone of influence. Easements are understood to mean all areas not in streets that require recorded coverage by walking or other special conveyance as opposed to normal wheeled conveyance in street areas. Also include in this coverage, areas that are intended to be used for construction access, storage or waste areas, and other Contractor activities.

I. Delivery of DVD's

1. Deliver DVD's to Engineer prior to construction work within area of influence.
 - a. DVD's must be submitted prior to the Contractor's request for the initial progress payment.
2. Supply with DVD's a record of the contents of each DVD on a run sheet identifying each segment in the tape by location; street or easement viewing side, traveling direction, engineering station; referenced to counter numbers. Include a report reviewing findings of visual inspection.
3. Furnish brief report and inventory of all DVD's completed, referenced by location and tape number.
4. All DVD's and written records must be delivered to the Engineer. This information becomes the property of the Owner.
5. The video expense shall be part of the Contractor's obligation.

J. Video Records of Sewers

1. All sewers installed under this contract shall be video recorded in accordance with the following at no additional cost to the Owner:
 - a. After cleaning, manhole sections shall be visually inspected by means of closed-circuit video. The inspection shall be done one manhole section at a time and the flow in the section being inspected will be suitably controlled.
 - b. The video camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, video monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of the Engineer.
 - c. The camera shall be moved through the line either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case shall the video camera be pulled at a speed greater than 30 feet per minute. Manual winches, power winches, video cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the video camera will not pass through the entire manhole section, the Contractor shall set up his equipment so that the inspection can be performed from the opposite manhole. If again, the camera fails to pass through the entire manhole section, the inspection shall be considered complete and no additional inspection work will be required.
 - d. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be used to set up between the two manholes of the section being inspected to insure good communication between members of the crew.
 - e. Measurement for location of defects and lateral connections shall be above ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device. Accuracy shall be satisfactory to the Engineer.
2. Documentation shall be as follows:
 - a. Video Inspection Logs: Printed location records shall be kept by the Contractor that clearly shows the location in relation to an adjacent manhole of each infiltration point observed during inspection. In addition, other points of significance such as locations of building sewers, unusual conditions, roots,

storm sewer connection, broken pipe, presence of scale and corrosion, and other discernible features will be recorded and a copy of such records will be supplied to the Owner.

- b. Photographs: Instant developing, 35 mm, or other standard-size photographs of the video picture of problems shall be taken by the Contractor upon request of the Owner's Representative, as long as such photographing does not interfere with the Contractor's operations.
- c. DVD Recording: The purpose of DVD recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed. DVD recording playback shall be at the same speed that it was recorded.

1.18 QUALITY ASSURANCE

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
 - 1. Comply with manufacturers' instructions, including each step in sequence.
 - 2. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
 - 3. Comply with specified allowances and standards as minimum quality for the Work except where more stringent codes or specified requirements indicate higher standards or more precise workmanship.
 - 4. Perform work with people qualified to produce quality workmanship.
 - 5. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
- B. Monitor Tolerances:
 - 1. Monitor tolerance control of installed products to produce acceptable quality Work. Do not permit tolerances to accumulate.
 - 2. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
 - 3. Adjust products to appropriate dimensions; position before securing in place.
- C. Prepare Mock-Ups:
 - 1. Tests will be performed under provisions identified in product specification sections.
 - 2. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
 - 3. Accepted mock-ups are representative of the quality required for the Work.
 - 4. Where mock-up has been accepted by the Engineer and was specified to be removed; remove mock-up and clear area when directed to do so.
- D. Manufacturers' Field Services and Reports:
 - 1. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.
 - 2. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer shall be subject to the approval of Engineer.

3. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
4. Submit a report in duplicate within 30 days of observation to Engineer for information.

E. Workers and Equipment:

1. The Contractor shall employ only competent and efficient workers for each type of work performed. Anyone employed on the Work that is deemed incompetent, disorderly, or who commits trespass upon public or private property adjacent to the work, shall be dismissed when the Engineer so orders. No one, so dismissed, shall be re-employed unless express permission is given by the Engineer. The methods, equipment, and appliances used and the labor employed on the work shall produce an Owner-acceptable quality finished product and shall be sufficient to complete the Contract within the specified time limit.
2. In hiring employees to perform work under this Contract, or any subcontract hereunder, no Contractor, Subcontractor, nor any person acting on their behalf shall discriminate against anyone performing work under this Contract, because of race, sex, creed, color or national origin.

PART TWO - PRODUCTS

- 2.01 Provide specified products as required.

PART THREE - EXECUTION

3.01 MAINTENANCE AND REMOVAL

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.
- B. Remove the temporary facilities and controls as rapidly as progress of the Work will safely permit, or as directed by the Engineer.

3.02 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from ponding or running water. Provide water barriers as required to protect site from soil erosion.

3.03 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize amount of bare soil exposed at one time.
- C. Provide temporary measures such as berms, dikes, and drains, to prevent or control water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
- F. Site clearing and grubbing shall not commence until such time that the contractor is prepared to start construction. Remove only those trees, shrubs, and grasses that must be removed for construction; protect the remainder to preserve aesthetic, habitat, and erosion control values. Install sedimentation controls immediately following access and site clearing and maintain them in effective operating condition during construction until final seeding and site restoration occurs.
- G. Construct diversion channels when required to collect runoff and prevent silt and other eroded materials from entering local drainage courses. Diversion channels will flow to temporary sediment basins, and are to be stabilized through seeding, riprap, or lining with plastic.

- H. Silt fences shall be trenched six to twelve inches deep, the fabric laid in the trench and the soil properly backfilled into the trench to prevent undercutting.
- I. Straw bales shall be trenched a minimum of four inches deep and placed on their ends with the binding material off the ground. Drive two stakes through the bales and into the ground 1-1/2' to 2' deep to secure the bale. Fill the spaces between the bales with loose straw, and properly backfill the trench with soil.
- J. Where a trench excavation occurs parallel to a waterway, a vegetated barrier shall be maintained between the stream and the construction area. All trench soils shall be stockpiled on the side of the trench away from the waterway, and a line of silt barriers established along the edge of construction on the contour between the trench and the waterway.
- K. Any disturbed area that will not be actively under construction for a period of 30 days or more shall be stabilized immediately by seeding and mulching or by anchored straw mulch.
- L. Storm sewer inlets shall be surrounded with silt barriers to prevent silting.
- M. Slopes exceeding 15 percent or that tend to be unstable shall be provided special treatment such as water diversion berms, sod, jute blankets, or excelsior blankets.
- N. If work is suspended for any reason, the contractor shall maintain the soil erosion and sedimentation controls in good operating condition during the suspension of the work. When seasonal conditions permit and the suspension of work is expected to exceed 30 days, the Contractor shall seed, fertilize, and mulch all disturbed areas left exposed when the work is suspended.

3.04 NOTIFICATION OF UTILITY OWNERS

- A. Not less than five (5) days in advance of commencing excavation, notify in writing all utility companies, such as gas, water, electric power, transmission, cable, and telephone, which have installations that could be disturbed by the Work; and make proper provisions for locating, removing, relocating, or otherwise protecting said installations. Make additional utility company contacts and provisions to locate and protect utility company installations, as necessary, as the Work progresses.
- B. Unless shown on the Drawings or otherwise specified to be removed, protect or relocate all active utility installations or improvements encountered by the Work. Service interruptions should be avoided whenever possible but when unavoidable, interruptions should be kept to a minimum. In such cases, promptly notify all those affected
- C. If a utility installation or improvement is damaged, promptly notify those affected, repair or replace to utility standards. Restore service as soon as possible at no additional cost to Owner
- D. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure appropriate instructions.
- E. Do not proceed with the permanent relocation of utilities until written instructions are received from the Engineer.

3.05 FAILURE TO PERFORM SECTION PROVISIONS

- A. If the Contractor fails to comply with the provisions of this Section, the Owner may, but is not obligated to, cause the unperformed provisions to be completed and deduct the related cost of such work from any monies due the Contractor. If Owner causes unperformed work to be completed, it shall in no way release the Contractor from his liability for the safety of the public and the work.

PART FOUR - PROJECT SPECIFIC REQUIREMENTS

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

- A. This Section includes the requirements for project identification and miscellaneous informational signs.
- B. The Contractor shall provide and erect a project sign readable from both sides plus miscellaneous informational signs as may be needed (to direct deliveries, locate Contractor's and Engineer's offices, etc.) at locations required or designated by the Engineer.

PART TWO - PRODUCTS

2.01 PROJECT IDENTIFICATION SIGN

- A. The sign shall be new and be made from minimum 3/8-in. thick exterior grade plywood with high density overlay approximately 8 ft wide by 4 ft high.
- B. The sign shall be framed with 2 in. x 6 in. wood with mitered corners. The edge of the sign shall fit 3/4 in. into grooves cut off-centerline in the 6-in. dimension of the frame. The frame shall be bolted to posts with galvanized bolts.
- C. The sign shall have 4 in. x 4 in. x 8 ft. wood posts that are imbedded 3 feet into the ground.
- D. The sign shall be painted by an experienced professional sign painter using exterior quality paint that is adequate to withstand weathering, fading, chipping and peeling for the duration of the construction. Unless specified to the contrary in PART FOUR, the sign shall have a white background and royal blue lettering and border. Lettering shall be Series C of Standard Alphabet for Highway Signs, Public Roads Administration, and Federal Works Agency.
- E. The sign shall be approved by the Engineer and include, in general, the Project title and name of Owner as indicated on Contract Documents, names and titles of authorities, names and titles of Engineer and Consultants, and the Names and field phone numbers of the Prime Contractors. The sign shall resemble and provide the information shown in PART FOUR, if included.

2.02 PROJECT INFORMATION SIGNS

- A. Painted informational signs shall be of the same materials, colors, and lettering as the Project Identification Sign, or standard commercial products with letter sizing adequate to provide legibility at 150 feet distance.
- B. Provide signs on each field office and storage shed, and to direct visitors and traffic into and within the site. Relocate as Work progress requires.
- C. Provide municipal/state traffic agency directional traffic signs to and within site.

PART THREE - EXECUTION

3.01 INSTALLATION

- A. Install project identification sign within 30 days after the date that Contractor is given the Notice to Proceed.
- B. Erect project sign at the designated location or a location with high public visibility adjacent to main entrance to site as approved by Engineer.
- C. Erect supports and framing on secure foundation.
- D. Install sign surface plumb and level. Anchor securely.
- E. Paint all exposed surfaces of sign, supports, and framing.

- F. Install all informational signs as required.

3.02 MAINTENANCE

- A. Maintain signs and supports clean, repair deterioration and damage.

3.03 REMOVAL

- A. Remove signs, framing, supports, and foundations and restore the disturbed area at completion of Project.

PART FOUR - SPECIAL PROVISIONS

None

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and the other Sections in the Specifications.
 - 2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.

1.02 QUALITY ASSURANCE

- A. Conduct daily inspections, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of the Engineer and the governmental agencies having jurisdiction.

PART TWO - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment, and materials needed to maintain the specified standards of cleanliness.

2.02 COMPATIBILITY

- A. Use only the cleaning materials and equipment that are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART THREE - EXECUTION

3.01 PROGRESS CLEANING

- A. General:
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
 - 2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
 - 3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
 - 4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the environment.

B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of material stored on the site. Restack, tidy, or otherwise service arrangements to meet the above requirements.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
 - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
 - a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material that, in the opinion of the Engineer, may be injurious to the finish floor material.

3.02 FINAL CLEANING

- A. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. Prior to Completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described above.

C. Site:

1. Exterior:
 - a. Inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed materials from adjacent surfaces.
 - c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
 - d. In the event of stubborn stains not removable with water, the Engineer may require light abrasive blasting or other cleaning at no additional cost to the Owner.
2. Interior:
 - a. Inspect interior surface and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed material from adjacent surfaces.

- c. Remove paint droppings, spots, stains, and dirt from finished surfaces.
- 3. Glass: Clean inside and outside.
- E. Schedule final cleaning as approved by the Engineer to enable the Owner to accept a completely clean Work.

PART FOUR - SPECIAL PROVISIONS

None

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DIVISION 2

SITE WORK

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PART ONE GENERAL

1.01 DESCRIPTION

- A. Work Included: Grubbing, scalping and otherwise clearing of the construction site in accordance with the drawings and as specified herein or ordered.
- B. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions and Sections of Division 1.
 - 2. All applicable Divisions of the Technical Specifications.
- C. Definitions:
 - 1. Clearing is defined as the removal of trees, stumps, bushes, timber, rubbish and any other vegetation, walkway or retaining walls, or debris as necessary to accommodate new construction or recontouring of site. Clearing also involves the removal of fences walls, guard posts, guardrail, signs and other obstructions interfering with the proposed work.
 - 2. Grubbing is defined as the removal from below the surface of the natural ground of stumps, roots and stubs, organic materials and debris.

1.02 QUALITY ASSURANCE

- A. State and local code requirements shall control the disposal of trees, stumps, vegetation and debris. The Contractor shall comply with the requirements of the following:
 - 1. Ohio Department of Transportation
 - 2. Ohio Department of Natural Resources

1.03 SUBMITTALS

- A. Material and debris resulting from the clearing and grubbing operations shall be disposed of off the project site by the Contractor, unless a disposal site is designated on the Drawings. The Contractor shall obtain and submit to the Engineer written permission from the Owner of the property upon which the material and debris are to be placed.

1.04 JOB CONDITIONS

- A. The Contractor may clear all obstructions within the PERMANENT RIGHT-OF-WAY and the CONSTRUCTION EASEMENT OF 15 FEET AS NECESSARY for the completion of the contract and as approved by the Engineer.
- B. The Contractor shall not remove any yard walkway, building access stairs, stone or concrete support wall in excess of the trench width without the approval of the Engineer.
- C. Streets, roads, adjacent property and other facilities to remain shall be protected against damage throughout the work.
- D. Existing trees, shrubs and other objects located outside the trench width shall not be disturbed unless authorized by the Engineer.

PART TWO - PRODUCTS

2.01 MATERIALS

A. Security Fencing:

1. Undamaged picket snow fence, 4' high, formed of wooden slits, tightly woven wire or galvanized chain link fence 4' high.

B. Silt Fence:

1. Install silt fence in accordance with information provided in the Rainwater and Land Development Manual, current edition, Ohio Department of Natural Resources.

C. Tree Wound Dressing:

1. Antiseptic, waterproof asphaltum base paint.

PART THREE - EXECUTION

3.01 PREPARATION

- A. Mark areas to be cleared and grubbed with stakes, flags or plastic colored ribbon for the approval by the Engineer. The Engineer reserves the right to order additional trees or shrubs removed at no additional cost to the Owner, if, in his opinion, they cannot be maintained or have been damaged by the Contractors operation.
- B. Protect benchmarks, utilities, existing trees, shrubs or other landscape features designated for preservation with temporary fencing or barricades satisfactory to the Engineer. No material shall be stored within twenty (20) feet or construction operation carried on within four (4) feet of any tree to be saved or within the protection fencing.

3.02 UTILITY RELOCATIONS

- A. Inform all companies, individuals and others owning or controlling facilities or structures within the limits of the work which have to be relocated, adjusted or reconstructed, in sufficient time for the utility to organize and perform such work in conjunction with or in advance of the Contractor's operations.
- B. The Contractor shall be responsible for the maintenance of all utility service connections.

3.03 CLEARING AND GRUBBING

- A. Only those trees and shrubs shall be removed that are in actual interference with excavation or grading work and such removal shall be subject to approval by the Engineer. The Engineer reserves the right to order additional trees or shrubs removed and/or replaced at no additional cost to the owner if, in his opinion, they cannot be maintained or have been damaged by the Contractor's operations.
- B. All trees, stumps, vegetation and debris not designated to remain shall be cleared and/or grubbed, except for special treatment as follows:
 1. In locations to be seeded, stumps, roots and other protruding obstructions shall be removed to a minimum of six (6) inches below the final ground surface.
 2. The top of the back slope and/or toe of embankment unless otherwise indicated on the plans.
- C. At all times, the Contractor shall remain within the property lines and/or easement areas.
- D. Except in areas to be excavated, all holes resulting from the clearing and grubbing operations shall be backfilled and compacted in accordance with Sections 02130 and 02222.

3.04 STRIPPING AND STOCKPILING TOPSOIL

- A. Strip topsoil to whatever depth it may occur from areas to be excavated, filled or graded and stockpile at a location approved by the Engineer for use in finish grading.
- B. The topsoil is the property of the Owner and shall not be used as backfill or removed from the site.

3.05 DEBRIS DISPOSAL

- A. Trees, logs, branches, brush, stumps, and other debris resulting from clearing and grubbing operations shall become the property of the Contractor and shall be legally disposed of.
- B. Do not deposit or bury on the site debris resulting from the clearing and grubbing work.
- C. Debris may be burned on-site if local ordinances allow open-air burning, if required permits are obtained, and if burning operations are conducted in compliance with local ordinances and regulations.

3.06 RESTORATION

- A. Repair all injuries to bark, trunk, limbs, and roots of remaining plants by properly dressing, cutting, tracing and painting, using approved agricultural practices and materials.
- B. Replace trees, shrubs and plants designated to be saved which are permanently injured or die during the life of the Contract as a result of construction operations with like species acceptable to the project Owner.
- C. Remove protective fences, enclosures and guards upon the completion of the project.
- D. Restore walkways, lawns, guard posts, guardrail, signs and other interferences to the condition equal to that existing before construction operations.
- E. Restoration of all surfaces shall be in accordance with all applicable Sections of the Specifications.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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TRENCH EXCAVATING, BEDDING & BACKFILL

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work Included: All trench excavations and fills to the lines and grades given for conduits, pipe lines, etc. as required for the proper completion of the work of this contract as shown on the Contract Drawings.
- B. The trench excavation work item in this contract shall include the removal, handling, re-handling, filling, and disposal of any and all materials (whether they be wet or dry) found unsuitable by the Engineer encountered within the limits of the work and the transportation and placing thereof, and shall include all pumping, bailing, draining, sheeting and shoring, backfill, refill and protection, and sand backfill, together with rolling and tamping where such is required by these specifications and is not specifically included in another item of work in this contract.
- C. Existing ground elevations of the work site(s) are shown by figures and/or by contours on the contract drawings. The contours and elevations of the present ground are believed to be reasonably correct, but do not purport to be absolutely so, and are presented only as an approximation. The Contractor shall satisfy himself, however, by his own actual examination of the site of the work, as to both the existing elevations and the amount of work required under this Section. If the Contractor is not willing to accept the ground surface elevations indicated upon the drawings for payment, he shall notify the Engineer prior to the starting of any excavation work.
- D. Profiles, as shown on the drawings, are generally centerline of pavement and the Contractor, in his site examination, shall determine the variance in elevations over the pipelines.
- E. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions and Section of Division 1.
 - 2. All applicable Divisions of the Technical Specifications.

1.02 QUALITY ASSURANCE

- A. State and local code requirements shall control the construction specified herein.
- B. Compaction testing shall be performed by a soil testing laboratory engaged and paid for by the Contractor. Testing shall be in accordance with ASTM Standards:
 - 1. C33 Specification for Concrete Aggregates.
 - 2. D698 Tests for Moisture - Design of Relations of Soils.
 - 3. D1556 Test for Density of Soil-in-Place by the Sand Cone Method.
 - 4. D2922 Test for Density of Soil and Soil Aggregates in Place by Nuclear Methods.

1.03 SUBMITTALS

- A. Certification attesting that the composition analysis of pipe protection and material stone backfill materials meets specification requirements.

1.04 JOB CONDITIONS

- A. Control of Traffic

1. The Contractor shall provide all traffic control measures in accordance and with the approval of the State and local authorities.

B. Utility Services

1. The Contractor shall be responsible for maintaining all building utility service connections during the excavation and backfill process.
2. Immediately report to the utility company and the Engineer any break, leak or other damage to the lines or protective coatings made or discovered.
3. Allow free access to utility company personnel at all times for purposed of maintenance, repair and inspection.

1.05 DEFINITIONS

- A. The term "Excavation" in these specifications shall be construed to mean the proper removal of all materials encountered in making the cut to receive the pipeline and appurtenance, and including earth, shale and rock in accordance with the following:

1. Excavation not in Rock

- a. Excavation not in rock shall be defined as all excavation that does not satisfy the definition of "Rock Excavation" which follows.

2. Rock Excavation

- a. Rock excavation shall be defined as the excavation of solid rock or boulders greater than one-fourth (1/4) cubic yard in volume, or solid ledge rock and masonry which, in the opinion of the Engineer, requires for its removal, drilling and blasting, wedging, sledging, barring, or breaking up with a power operated hand tool. Any material which can be excavated using a hand pick and shovel, power operated excavator, power operated backhoe or power operated shovel shall not be defined as rock.

PART TWO - PRODUCTS

2.01 PIPE BEDDING MATERIAL

- A. Gravel, crushed limestone, or crushed slag can be utilized as bedding material for all underground piping except in areas where metallic pipe is proposed for use. In such instances, crushed slag shall not be used as a bedding material for metallic pipe. The material shall be free from dirt and shall be of an aggregate size conforming to Number 56, 6, 67 or 68 specified in AASHTO M43 and as shown in ODOT Specifications Table 703-1.

2.02 BACKFILL MATERIAL

A. Paved Roadway, Driveway and Similar Structures

The sub-base material for construction, which crosses beneath, paved and unpaved state highways, state highway shoulders, local roadways, driveways and sidewalks, shall be backfilled with granular backfill as specified by Section 02225.

B. Unpaved Areas

1. The sub-base material for construction which occurs in areas other than those described in Subsection 2.02.A shall be:
 - a. From the top of pipe bedding to twenty-four (24) inches over the top of pipe material excavated from the trench if free of stones larger than two (2) inches in size and free of wet, frozen or organic materials.
 - b. From twenty-four (24) inches above the pipe to sub-grade elevation material excavated from the trench if

free of stones larger than eight (8) inches in size and free of wet, frozen or organic material.

c. Imported material approved by the Engineer.

C. Granular Backfill:

Granular backfill material shall conform to the requirements of ODOT 304.

D. Controlled Density Fill Material:

Controlled density fill material shall be a cement base fill material that can be deposited in a fluid state. It shall be composed of Portland cement and approved filler material. The mixture shall meet the following requirements:

| | | |
|-----------------------|----------|-------|
| Cement: | 100 | lb/cy |
| Fly Ash: | 250 | lb/cy |
| Sand (S.S.D.): | 2,850 | lb/cy |
| Water: | 500 | lb/cy |
| Compressive Strength: | Min: 100 | psi |
| | Max: 500 | psi |

2.03 TOPSOIL

A. Where shown on the Drawings, specified, or required, provide topsoil consisting of loose, friable, loamy fertile soil, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, peat, muck, roots, heavy or stiff clay, stones larger than two (2) inches in greatest dimension, noxious weeds, sticks, brush, litter, and other deleterious matter.

B. Each load of topsoil shall be subject to approval by the Engineer.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which the work of this Section will be performed. Correct conditions detrimental to the timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 FINISH LINES AND ELEVATIONS

A. Grade and shape the ground surface in accordance with the finish lines and elevations shown on the Drawings, specified or required by the Engineer. Comply with other applicable provisions of the Specifications.

3.03 PROCEDURES

A. Utilities

a. Not less than five (5) days in advance of commencing excavation, notify in writing all utility companies, such as gas, water, electric power, transmission, cable, and telephone, which have installations that could be disturbed by the Work; and make proper provisions for locating, removing, relocating, or otherwise protecting said installations. Make additional utility company contacts and provisions to locate and protect utility company installations, as necessary, as the Work progresses.

b. Unless shown on the Drawings or otherwise specified to be removed, protect or relocate all active utility installations or improvements encountered by the Work. Service interruptions should be avoided whenever possible but when unavoidable, interruptions should be kept to a minimum. In such cases, promptly notify all those affected

c. If a utility installation or improvement is damaged, promptly notify those affected, repair or replace to utility

standards. Restore service as soon as possible at no additional cost to Owner

- d. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure appropriate instructions.
- e. Do not proceed with the permanent relocation of utilities until written instructions are received from the Engineer.

3.04 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. Coordinate the work to insure the least inconvenience to traffic and maintain traffic in one or more unobstructed lanes
- B. Maintain access to all streets and private drives.
- C. Provide and maintain signs, flashing warning lights, barricades, markers, and other protective devices as required to conform to construction operations and to keep traffic flowing with minimum restrictions.
- D. Comply with state and local codes, permits and regulations.

3.05 CUTTING PAVED SURFACES

- A. Where installation of pipelines, miscellaneous structures, and appurtenances necessitate breaking a paved surface, make cuts in a neat uniform fashion forming straight lines parallel with the centerline of the trench.
- B. Protect edges of cut pavement during excavation to prevent raveling or breaking; square edges prior to pavement replacement.
- C. The requirement for neat line cuts, in other than state highways, may be waived if the final paving restoration indicates overlay beyond the trench width.

3.06 BLASTING

- A. Blasting will not be permitted except at points at least fifty (50) feet distant from any existing structure, and, then, only under such regulations as may be established by the Owner.
- B. Explosives, where used, shall be moved, stored, and handled in a manner to comply with local Ordinances and State Codes, and other pertinent regulations, as specified under these specifications.
- C. The Contractor must use all possible precautions against accidents or damage on account of explosives or use and storage of explosives, and he must assume all risk and responsibility therefore, saving harmless the Owner from any and all claims occasioned thereby. An experienced man shall be employed to carry on the blasting work.
- D. Blasting shall be conducted so as not to endanger persons and property and shall always be covered with mats or otherwise satisfactorily confined.

3.07 SUPPORT OF EXCAVATION

- A. The Contractor shall be responsible for supporting and maintaining all excavations required hereunder utilizing a trench box and even to the extent of sheeting, shoring the sides and ends of excavations with timber or other satisfactory supports. If the sheeting, braces, shores, and stringers or walling timbers or other supports are not properly placed or are insufficient, the Contractor shall provide additional or stronger supports. The requirements of sheeting or shoring, or of the addition of supports, shall not relieve the Contractor of his responsibility for their sufficiency. All trench protection and sheeting and shoring must conform to the regulations of the Federal Occupational Safety and Health Act (OSHA) and will be subject to their respective inspections. All orders of the OSHA representatives must be complied with by the Contractor.
- B. All timbering shall be removed where and when required and, upon its removal, all voids carefully and compactly

filled. If any timber is ordered in writing to be left in place, it shall be cut-off as directed and will be paid for with a Change Order. No payment will be made for wasted ends or for timber left in place without specific written authorization by the Engineer.

3.08 REMOVAL OF WATER

- A. The Contractor shall pump out or otherwise remove and dispose of, as fast as it may collect any water, sewage, or any other liquids which may be found or may accumulate in the excavation, regardless of whether it be water or liquid wastes from his own contract or from existing conduits and works.
- B. Maintain pipe trenches dry until pipe has been jointed, inspected, and backfilled and concrete work has been completed. Preclude trench water from entering pipelines under construction.
- C. Intercept and divert surface drainage away from excavations. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water.
- D. There shall be, upon the work at all times during the construction, proper and approved pumps and machinery of sufficient capacity to meet the maximum requirements for the removal of water or other liquids and their disposal.
- E. Water discharged from the excavation shall be controlled in accordance with all State and Local regulations.

3.09 METHOD OF TRENCH EXCAVATION

- A. All excavation shall be in open cut, unless otherwise permitted by the Engineer. Loosening of material by blasting will not be permitted without written authorization by the Owner specifying both the extent and location of the blasting to be done.
- B. Excavation shall be made to undisturbed finish sub-grade six (6) inches below the bottom of the pipe, unless otherwise shown on the Drawings.
- C. Where unsuitable bearing material is encountered, the trench shall be excavated to an additional depth below the excavation for the bottom of the pipe barrel of six (6) inches for pipe of twenty four (24) inches diameter and smaller and of nine (9) inches for pipe greater than twenty four (24) inches in diameter. This additional excavation is to be refilled with suitable material in a satisfactory manner to provide the proper foundation for the conduit bed.
- D. Trenches must be excavated with vertical sides from the bottom of the trench to one (1) foot above the top of the pipe, from which point sides may slope to ground surface, except that, in streets or roadways, trenches must be excavated with vertical sides to the top of the trench. Width of trench in the vertical section shall be excavated only as wide as necessary to provide free working space on each side of the piping according to the size of the pipe and the character of the ground. In every case there shall be sufficient space between the pipe and the sides of the trench to make it possible to thoroughly compact the backfill around the pipe and to secure tight joints, but in no case less than one (1) foot on either side of pipe. In no case, however, shall the width of the trench at the top of the pipe exceed the dimensions as shown on the Contract Drawings. In no case will it be permitted to excavate pipe trenches with sides sloping to the bottom.
- E. Bottom of trenches must give a full, firm but slightly yielding support to the lower section of the pipe and so that the pipe barrel is firmly supported in the cradle throughout its entire length, in such manner as to prevent any subsequent settlement of the pipe. Boulders or loose rocks which might bear against the pipe will not be permitted in the trench bottom or sides below two (2) feet above the pipe. Bell holes must be excavated to assure full length bearing of the pipe barrel.
- F. Trenches must be kept free from water until the material in the joints has sufficiently set.
- G. At no time shall the Contractor advance trenching operations more than 200' feet ahead of completed pipeline except as approved by the Engineer.
- H. Where the Contractor, by error or intent, excavates beyond the minimum required depth, the trench shall be brought to the required pipeline grade with bedding material.

3.10 BEDDING

- A. Bedding material below the pipe and that under and around the pipe to spring line shall be well tamped. That above spring line shall be placed in six (6) inch layers and be well tamped to a minimum height of twelve (12) inches above the top of the pipe.
- B. Where foundation conditions are such that the above types of bedding cannot be provided, as in quicksand, etc., special provisions shall be made as called for by the Drawings or as directed by the Engineer by providing concrete cradle or lumber foundations.

3.11 UNAUTHORIZED EXCAVATIONS

- A. All excavations carried outside of the lines and grades given or specified, together with the disposal of such material, and all excavations and other work resulting from slides, cave-ins, swellings or upheavals shall be at the Contractor's own cost and expense. All spaces resulting from unauthorized excavations or from slides or cave-ins shall be refilled at the Contractor's expense with concrete or other suitable material.

3.12 ADDITIONAL EXCAVATION

- A. It is expected that satisfactory foundations will be found at the elevations shown on the drawings, but in case the materials encountered are not suitable, or in case it is found desirable or necessary to go to additional depth, the excavation shall be carried to an additional depth as ordered and refilled as directed by the Engineer.
 - 1. Payment for this work shall be by Change Order.

3.13 THRUST RESTRAINT

- A. Provide pressure and vacuum pipe with concrete thrust blocking at all bends, tees, valves, and changes in direction, in accordance with the Contract Drawings and as shown on the standard details.

3.14 BACKFILLING

- A. As the various pipelines, conduits, etc. or parts of same are completed and inspected, the Contractor shall refill the space under, around and over with material as specified herein. Unless otherwise directed, all forms, bracing and lumber shall be removed during backfilling and the cavities and voids resulting from the removal shall be thoroughly backfilled.
- B. The bedding material shall be as specified and placed in accordance with the standard details. The limits of bedding shall be as indicated on the Standard Details for the respective pipes. The Contractor must use special care in placing this portion of the backfill so as to avoid injuring or moving the pipe when compacting the backfill. When the backfill has progressed to the limits shown on the Standard Details for the respective pipe, the work of backfilling shall be stopped, and the backfill in place shall be tamped or puddled as directed. Care shall be taken to prevent floating of the pipe.
- C. No cinders, rubbish, rocks, boulders, shale or other objectionable material shall be used as backfill against the pipe or in any part of the trench when, in the opinion of the Engineer, it will be injurious to the work. No backfilling shall be done with frozen materials or upon frozen materials.
- D. Over sewers and other arched structures built in place and after the structure is completed and before the supports or centers are struck, the trenches shall be carefully filled by depositing without shock and by tamping suitable earth or other selected material at the sides and to a height not less than two (2) feet above the top of the pipe. This backfill shall be graded evenly across the trench. This backfilling must be done as the work progresses, and before any filling is deposited directly from a machine, bucket, cars, wagon, or other vehicles. The backfilling shall then be brought up evenly, and all eccentric loading shall be avoided. In no case shall material dumped from a bucket, truck or bulldozer be allowed to fall directly upon any conduit, pipe or other structure, and, in all cases, the bucket must be lowered so that the shock of the falling material will not injure the structure.
- E. The backfill shall be placed and compacted, using power driven mechanical tampers in layers of six (6) inch

compacted thickness unless otherwise approved by the Engineer. Final paving shall be as specified in Section 02500 and as shown on the Contract Drawings and Standard Details.

3.15 DISPOSAL OF MATERIALS

- A. A selected portion of the excavated materials will be used for backfilling or filling about the pipe as ordered. Excavated material in excess of that needed for backfilling and filling and unsuitable material shall be disposed of by the Contractor at his own expense, and the cost of such disposal shall be deemed as having been included in the unit or lump sum prices bid.
- B. Prior to disposal, the Contractor shall obtain and submit to the Engineer written permission from the owner of the property upon which the material and debris are to be placed.

3.16 COMPACTION REQUIREMENTS

- A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D698.
- B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place, and as approved by the Engineer:
 - 1. Structures, Pavements, Walkways, Curbs and Steps:
 - a. Compact the sub-grade and each layer of fill material or backfill material at 95% of maximum density.
 - 2. Lawn and Unpaved Areas:
 - a. Compact each layer of fill material or backfill material at 90% of maximum density.
- C. Moisture Control:
 - 1. Where sub-grade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of sub-grade or layer of soil material to prevent free water appearing on surface during or subsequent to compacting operations.
 - 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
 - 3. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing, or pulverizing until moisture content is reduced to a satisfactory value as determined by moisture-density relation tests approved by the test laboratory.
- D. Uncompacted Backfill:
 - 1. Where uncompacted backfill is indicated on the Contract Drawings, backfill the trench from one (1) foot above the pipe to the top of the trench with material excavated from the trench, crowned over the trench to a sufficient height to allow for settlement to grade after consolidation.
- E. Unsuitable Backfill Material:
 - 1. Where the Engineer deems backfill material to be unsuitable and rejects all or part thereof due to conditions prevailing at the time of construction, remove the unsuitable material and replace with select material stone backfill or suitable foreign backfill material.
- F. Compaction Tests
 - 1. A set of initial compaction tests on the various layers of trench backfill shall be performed immediately after compaction begins to prove that the method being used attains the required compaction results. If the required results are not attained, make needed adjustments in the method being used and repeat the

process until the specified requirements are met.

2. Once the method of compaction has been proven, Contractor shall not change the method without the approval of the Engineer.
3. Trench backfill compaction tests shall be performed to verify the specified consolidation. Unless otherwise directed, perform one test for every 2000 sq. ft. of layer area of backfill material used.
4. At paved areas, perform at least one field density test for every 2000 sq. ft. of paved area, but not less than three tests.
5. On other compacted sub-grade fill layers, perform at least one field density test for every 2000 sq. ft. of area, but not less than three tests.
6. If the above testing results are below that specified, provide additional compaction and testing as necessary to attain the specified compaction.

3.17 UTILITY MARKING TAPE

- A. Install detectable utility marking tape above all plastic pipelines, eighteen (18) inches below final grade as specified by Section 02663.

3.18 ROUGH GRADING

- A. Rough grade areas disturbed by construction to a uniform finish. Form the bases for terraces, banks, lawns and paved areas.
- B. Grade areas to be paved to depths required for placing sub-base and paving materials.
- C. Rough grade areas to be seeded three (3) inches below indicated finish contours.

3.19 RESTORATION OF UNPAVED SURFACES

- A. Restore unpaved surfaces disturbed by construction to equal the surface condition prior to construction.
- B. Restore grassed areas in accordance with Section 02470, Seeding, Sodding and Mulching.

3.20 MAINTENANCE

- A. Protection of newly graded areas:

1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.
2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.

Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

- B. Protection of people and property:

- a. Barricade open holes, depressions, and other hazards occurring as part of the Work, and post warning lights on property adjacent to or having public access.
- b. Operate warning lights during hours from dusk to dawn each day and as conditions require.
- c. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, or other hazards created by the operations under this Section.
- d. Contractor shall be responsible for damage resulting from the construction activity.

- e. Use whatever means are necessary to prevent dust, dirt, and debris from becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- f. Maintain access to adjacent areas at all times.

PART FOUR – SPECIAL PROVISIONS

4.01 N/A (or state per each individual job)

END OF SECTION

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GRANULAR BACKFILL

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work Included: The Contractor shall furnish all the materials from the top of bedding to the pavement sub-grade for and shall properly place and compact sand and/or gravel backfill, as approved, over conduits, pipelines and elsewhere, when ordered by the Engineer, when they are located under pavement or cross under roads, drives and elsewhere when backfill is required to be accomplished without future settlement, and only when and as called for by the Drawings or as may be ordered by the Engineer.
 - 1. Backfill specified under Trench Excavation, Bedding and Backfill, or under classes of work for cradle and for compacted backfill around and over pipe to the limits indicated on the drawings for polyvinylchloride pipe, reinforced concrete pipe, ductile iron pipe or for other items of this contract when specifically so specified will be included in their respective items and will not be classified as Granular Backfill.
 - 2. Sand, gravel, or other granular material that is excavated from the project area as part of the excavation shall be consumed before granular backfill can be imported unless such "native" material is deemed unsuitable for use in the project by the Engineer.

1.02 RELATED WORK

- A. Including but not limited to the General Conditions, Supplementary Conditions and Sections of Division A.
- B. All applicable Divisions of the Technical Specifications.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Fine aggregates shall be well graded from coarse to fine and be free of dirt and shall be of an aggregate size conforming to Number 56, 6, 67, or 68 specified in AASHTO M 43 and shown in ODOT Specification 703-1.
- B. Approved bank run sand and/or gravel, with clay loam or silt under five percent (5%) in acceptable.

PART THREE - EXECUTION

3.01 INSTALLATION

- A. Granular backfill, when called for by the Drawings or ordered by the Engineer, for trench backfill shall be properly graded and placed in layers not over six (6") inches in depth, with voids reduced to a minimum, and thoroughly compacted with mechanical equipment, or as directed by the Engineer, so as to prevent after settlement. The placing of this material shall be continued until the required depth is compacted, and the top of this backfill shall be finished to the lines and grades called for by the drawings, or as ordered by the Engineer. Should settlement occur, the Contractor must add and compact additional fill, and he must maintain the backfill at the required sub-grade until the project is satisfactorily completed.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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BORED AND JACKED PIPELINE INSTALLATION

PART ONE - GENERAL

1.01 SCOPE

- A. This work shall consist of the underground construction of a pipeline across the roadway right-of-way, or other facility as indicated on the plans and as specified herein without interruption to the use of the roadway. The work shall be performed in accordance with all permits issued by the owner of any facility being crossed by the pipeline. Also included is the excavation by horizontal drilling or by tunneling methods, the removal and disposal of excavated material, the placing and jointing of pipe inside the casing, and the furnishing of all labor, superintendence, tools, equipment, and materials necessary to completely construct the carrier pipe inside the jacked casing pipe. All pits which are constructed to facilitate this work shall be excavated, sheeted, braced, maintained, backfilled, etc. in complete accordance with the provisions of the construction specification for the pipeline of which the pipeline crossing is a part.

PART TWO - PRODUCTS

2.01 MATERIAL

- A. The casing pipe shall be welded steel pipe meeting or exceeding the requirements of ASTM A252, Grade B Specifications, of the thickness and size indicated by the specifications and drawings. The casing must be of adequate thickness to withstand all dead and live loads plus the forces exerted during the jacking process. All joints in the casing shall be welded.

PART THREE - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Bored, jacked or tunneled installations shall have a bore hole essentially the same as the outside diameter of the pipe plus the thickness of the protective coating.
- B. The use of water or other liquids to facilitate casing emplacement and spoil removal is prohibited.
- C. If during installation an obstruction is encountered which prevents installation of the pipe in accordance with this specification, the pipe shall be abandoned in place and immediately filled with grout.

3.03 BORE AND JACK

- A. This method consists of pushing the pipe into the earth with a boring auger rotating within the pipe to remove the spoil.
- B. The boring operation shall be progressed on a 24-hour basis without stoppage (except for adding lengths of pipe) until the leading edge of the pipe has reached the receiving pit.
- C. The front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger from leading the pipe so that no unsupported excavation is ahead of the pipe. The casing shall be carefully aligned and jacked to grade as called for by the drawings.
- D. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. If the obstruction cannot be removed without excavation in advance of the pipe, procedures as outlined in Section 3.01 must be implemented immediately.
- E. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than 1/2 inch (13 mm). If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe (plus coating) by more than approximately 1 inch (25 mm), grouting (see Section 3.05) or other methods approved by the Engineer, shall be employed to fill such voids.
- F. The face of the cutting head shall be arranged to provide a reasonable obstruction to the free flow of soft or poor material.

- G. Plans and description of the arrangement to be used shall be submitted to the Engineer for approval and no work shall proceed until such approval is obtained.
- H. Any method that employs simultaneous boring and jacking for pipes over 8 inches (203 mm) in diameter that does not have the above approved arrangement **will not be permitted.**
- I. Hardwood blocks shall be securely attached to the carrier pipe with stainless steel bands and shall be used as skids and/or pipe supports.
- J. A felt wrapping which is one-quarter inch (1/4") thick shall be provided between each annular masonry closure and the carrier pipe.
- K. The pipe shall be carefully aligned and jacked to grade as called for by the drawings. Contractor shall check to insure line and grade are maintained throughout the boring and jacking operation. Line and grade shall be checked at least a minimum of the 1/3 points of the total length of the bore.
- L. The construction of all pits shall not be terminated more than five (5) working days prior to the commencement of actual casing placement or tunneling operations.
- M. In any event, no pits shall be left open longer than five (5) working days unless tunneling, casing installation, or carrier pipe installation are actively in progress.
- N. Blasting will not be permitted under or near railroad tracks and facilities.

3.05 SUPPORT OF EXCAVATION

- A. Design plans and computations for the pits, stamped by a Professional Engineer, must be submitted by the Contractor at time of application prior to start of construction
- B. The sheeting shall be designed to support all lateral forces caused by the earth, railroad and other surcharge loads.
- C. After construction and backfilling, all sheet piling within 10 feet (3.0 m) of centerline track must be cut off 18 inches (457 mm) below final grade and left in place.
- D. All excavated areas are to be illuminated (flashing warning lights not permitted), fenced and otherwise protected as directed by the Chief Engineer or his designated representative.
- E. The railroad live load used shall be a Cooper E-80 loading. This loading consists of 80 kip (356 kN) axle loads spaced 5 feet (1.5 m) on centers.
- F. An impact factor of 1.75 (multiply live load by the impact factor) shall be used for depth of cover up to 5 feet (1.5 m) on centers.
- G. The values shown in Table 1 shall be used for depth of cover up to 5 feet (1.5 m). Between 5 and 30 feet (1.5 and 9.1 m), the impact factor is reduced by 0.03 per foot (0.1 per m) of depth. Below a depth of 30 feet (9.1 m), the impact factor is 1.

Table 1

Live loads, including impact, for various heights of cover for a Cooper E-80 loading.

| Height of Cover | | Load | |
|-----------------|---------|----------|---------|
| feet | (meter) | lb/sq ft | (kPa) |
| 2 | (0.6) | 3800 | (162.8) |
| 3 | (0.9) | 3150 | (150.8) |
| 4 | (1.2) | 2850 | (136.5) |
| 5 | (1.5) | 2550 | (122.1) |
| 6 | (1.8) | 2250 | (107.7) |
| 7 | (2.1) | 1950 | (93.4) |
| 8 | (2.4) | 1700 | (81.4) |
| 9 | (2.7) | 1500 | (71.8) |
| 10 | (3.0) | 1300 | (62.2) |
| 12 | (3.7) | 1000 | (47.9) |
| 14 | (4.3) | 800 | (38.3) |
| 16 | (4.9) | 625 | (29.9) |
| 18 | (5.5) | 500 | (23.9) |
| 20 | (6.1) | 400 | (19.2) |
| 25 | (7.6) | 250 | (12.0) |
| 30 | (9.1) | 150 | (7.2) |

- H. To determine the horizontal pressure caused by the railroad loading on a sheet pile wall or other structure adjacent to the track, the Boussinesq analysis shall be used. The load on the track shall be taken as a strip load with a width equal to the length of the ties, 8-1/2 feet (2.6 cm). The vertical surcharge, q (psf), caused by each axle, shall be uniform and equal to the axle load divided by the tie length and the axle spacing, 5 feet (1.5 m). For the E-80 loading this results in:

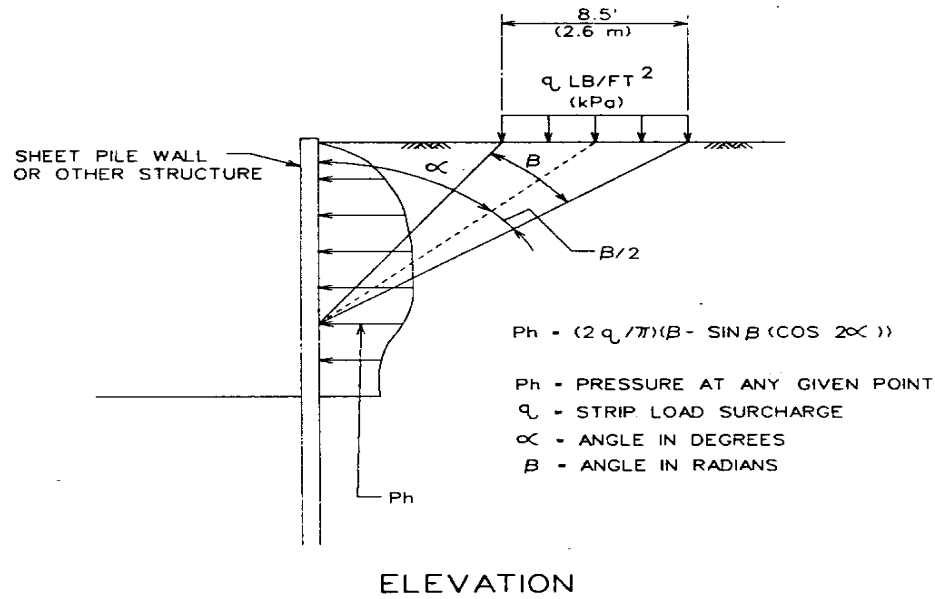
$$q = 80,000 / (8.5 \times 5) = 1882 \text{ psf.}$$

The horizontal pressure due to the live load surcharge at any point on the wall or other structure is P_h and can be calculated by the following:

$$P_h = (2q/\pi)(\beta - \sin \beta(\cos 2\alpha)) \quad (\text{See Plate})$$

- E. The vertical and horizontal pressures given above shall be used unless an alternate design method is approved by the Chief Engineer. Proposals to use an alternate design method must include acceptable references and a statement explaining the justification for choosing the alternate method.

LATERAL PRESSURE DIAGRAM



LATERAL PRESSURE DUE TO STRIP LOAD

3.06 GROUTING

- A. For jacked and tunneled installations a uniform mixture of 1:6 (cement:sand) cement grout shall be placed under pressure through the grout holes to fill any voids which exist between the pipe and the undisturbed earth.
- B. Grouting shall start at the lowest hole in each grout panel and proceed upwards simultaneously on both sides of the pipe.
- C. A threaded plug shall be installed in each grout hole as the grouting is completed at that hole.
- D. When jacking, grout holes tapped for no smaller than 1-1/2 inch (33 mm) pipe, shall be cut into the pipe. Three grout holes, equally spaced around the circumference and 4 feet (12.2 m) longitudinally shall be provided.
- E. Immediately upon completion of jacking operations, the installation shall be pressure grouted.

3.07 EXPERIENCE

- A. Horizontal boring, tunneling, and jacking is a specialized type of construction, and, the Contractor shall demonstrate that he is fully qualified and has satisfactorily completed at least three (3) such projects.

3.08 TESTING

- A. The carrier pipe sewer shall be tested in accordance with the testing specification for the type of pipeline and pipe material installed.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PAVEMENT CONSTRUCTION, REPAIR AND REPLACEMENT

PART ONE - GENERAL

1.01 SCOPE

- A. The Contractor shall furnish all of the equipment, labor and materials necessary to install, replace, and/or restore existing pavement structures together with their respective appurtenances as shown on the plans and as specified herein. This work shall include the entire sub-grade preparation, sub-base, base, intermediate pavement course(s), and finish pavement courses together with guttering, tack and/or prime coating, and other pertinent work as necessary to meet the conditions of this contract.

1.02 REPAIR OR REPLACEMENT WORK

- A. For the repair and/or replacement of all existing pavement structures and their respective appurtenances that are removed and destroyed or otherwise damaged by the Contractor in the course of his performance of the work required under this contract, the Contractor shall furnish all equipment, labor, and materials as necessary to properly restore to a condition equal to that at his entry; and to the satisfaction of the Engineer, the Ohio Department of Transportation, ODOT Item 253, the County Engineer, City Engineer, all cinder, slag, gravel, water-bound macadam, bituminous macadam, asphalt and roadways in strict accordance with the drawings and as specified herein.
- B. In general, this item will include stone, slag, cinders, gravel, asphalt and other bituminous materials and curbs, gutters, driveway culverts, and the demolition, excavation and removal of existing roadways.

1.03 REFERENCE TO OTHER PARTS

- A. Other sections of these specifications shall apply, as and where applicable to this Section and such sections will be the same as though they were included in this section.
- B. For all old work where pavement is being repaired and/or replaced as a result of damages occurring thereto during the course of the work of this contract, all clearing and grubbing, removal and storage of topsoil, excavation and/or placing of compacted fill and granular backfill, shall be done as required under other parts of these specifications.

PART TWO – PRODUCTS

2.01 MATERIALS

- A. Generally, for all repair and replacement work, all new materials shall match the existing and adjoining work in both composition and quality unless otherwise ordered, specified herein, and/or shown on the drawings. In any stone roadway, the material used for stone fill shall conform to the existing material.

PART THREE - EXECUTION

3.01 ROADWAY SUB-GRADE

- A. The entire area to be occupied by the roadways and parking areas shall be cleared, topsoil removed and stored, and the excavation or compacted fill made as required and brought to the proper elevations per ODOT Item 203. Pipe trenches and other excavations shall be backfilled as required, and thoroughly compacted within the limits of the roadways or parking areas.
- B. After the surface of the sub-grade has been properly shaped and before any stone or slag is placed, the entire sub-grade shall be thoroughly rolled and compacted to a depth of 12 inches per ODOT Item 204. Rolling shall be done with an approved type of self-propelled roller, weighing not less than ten (10) tons. All hollows and depressions which develop during the rolling shall be filled with acceptable materials, and the sub-grade re-rolled. The process of filling and rolling shall be repeated until no depressions develop, and the entire sub-grade has

been brought to a uniform condition of stability.

- C. All places which, in the opinion of the Engineer cannot be properly rolled shall be tamped with hand held mechanically or pneumatically powered tampers.
- D. In making the compacted fill and in doing the final sub-grade rolling, the Contractor shall see that the material to be compacted and/or rolled has the proper moisture content to secure maximum compaction. When, in the opinion of the Engineer, the material is too wet, the compacting shall be delayed until the material has dried sufficiently. When, in the opinion of the Engineer, the material is too dry, the material shall be sprinkled with water in an amount to secure the proper moisture content.

3.02 AGGREGATE BASE

- A. Following sub-grade preparation, the Contractor shall spread and fill aggregate base to the depth, grades and lines as shown on the Contract Drawings. The road base material is to conform to ODOT Construction Material 304, consisting of screened crushed stone, crushed slag or approved equal.
- B. After the surface of the aggregate base has been properly shaped, the base is to be compacted. When vibrating equipment is used in conjunction with other methods of compaction, the compacted depth of a single layer shall not exceed 6 inches. When vibrating compaction equipment is not used, the maximum compacted thickness of one layer shall not exceed 3 inches. When the required compacted depth of the base course exceeds 6 inches, the base shall be constructed in two or more layers of approximately equal thickness.

3.03 CONSTRUCTION

- A. All pavement work shall be done in strict accordance with the specifications of the governmental body concerned and the latest ODOT specifications as applicable such as ODOT Item 401, Item 402, Item 403, Item 407, Item 408, Item 409, Item 410, Item 411, Item 421, Item 422, Item 441, Item 442, Item 446 and Item 448, or at the direction of the Engineer.
- B. All pavements disturbed by the Contractor's operations shall be relayed to the thickness of the adjoining pavement and, in all cases; the restoring of pavements shall apply both to foundation courses and to the wearing surface.
- C. Should cracks or settlements appear in adjoining pavements, the paving shall be removed to the extent necessary to secure firm and undisturbed bearing and shall be replaced in a satisfactory manner.
- D. No permanent pavement shall be installed, repaired, and/or restored unless, or until, in the opinion of the Engineer, the condition of the backfill is such as to properly support the pavement.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PART ONE - GENERAL

1.01 SCOPE

- A. The Contractor shall furnish all of the equipment, labor and materials necessary to install, replace, and/or restore existing pavement structures together with their respective appurtenances as shown on the plans and as specified herein. This work shall include all of the sub-grade preparation, sub-base, base, intermediate pavement course(s), and finish pavement courses together with curbing, guttering, tack and/or prime coating, sealing and other pertinent work as necessary to meet the conditions of this contract.
- B. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. Section 02235: Trench Excavation

1.02 NEW WORK

- A. For all new pavement installations, the Contractor shall furnish all equipment, labor and materials as necessary to properly construct, at the locations shown on the drawings and as specified herein, all required pavement structures.

1.03 REPAIR OR REPLACEMENT WORK

- A. For the repair and/or replacement of all existing pavement structures and their respective appurtenances that are removed and destroyed or otherwise damaged by the Contractor in the course of his performance of the work required under this contract, the Contractor shall furnish all equipment, labor, and materials as necessary to properly restore to a condition equal to that at his entry, and to the satisfaction of the Engineer, the Ohio Department of Transportation, the County Engineer, City Engineer, all cinder, slag, gravel, water-bound macadam, bituminous macadam, asphalt and brick or concrete driveways, curbs, sidewalks and roadways in strict accordance with the drawings and as specified herein.
- B. In general, this item will include concrete, steel reinforcement, brick, stone, slag, cinders, gravel, asphalt and other bituminous materials and curbs, gutters, driveway culverts, road and curb drains and the demolition, excavation and removal of existing driveways, sidewalks and roadways.

1.04 REFERENCE TO OTHER SECTIONS

- A. Other sections of these specifications shall apply, as and where applicable to this Section and such sections will be the same as though they were included in this section.
- B. For all new work, all clearing and grubbing, removal and storage of topsoil, excavation and/or placing of completed fill as required for the roadways, parking areas, and walks that are to be built under this contract shall be accomplished by the Contractor. Special backfill, in addition to that which is specified for inclusion with other work under this contract (such as an underground conduit or piping installation), shall be provided and installed under these specifications when ordered by the Engineer.
- C. For all old work where pavement is being repaired and/or replaced as a result of damages occurring thereto during the course of the work of this contract, all clearing and grubbing, removal and storage of topsoil, excavation and/or placing of compacted fill and special backfill, shall be done as required under other parts of these specifications .

1.05 QUALITY ASSURANCE

- A. All pavement work shall be placed upon properly prepared sub-grade.
 - 1. Bearing capacity and/or other properties of the sub-grade, may be tested by the Owner at the Owner's direction.

- B. Each pavement base and pavement course shall be subject to testing for material quality, compaction, compressive strengths, thickness and/or other properties by the Owner and at the Owner's discretion.
- C. The testing procedures and practices set forth in respective ODOT Specifications will be followed.

PART TWO - PRODUCTS

2.01 MATERIAL

- A. All paving materials shall conform to the herein referenced ODOT Specification respective to each pavement type classification.

PART THREE - EXECUTION

3.01 ROADWAY SUB-GRADE

- A. The entire area to be occupied by the roadways and parking areas shall be cleared, topsoil removed and stored, and the excavation or compacted fill made as required and brought to the proper cross-sections. Pipe trenches and other excavations shall be backfilled as required, and thoroughly compacted within the limits of the roadways or parking areas.
- B. After the surface of the sub-grade has been properly shaped and before any stone or slag is placed, the entire sub-grade shall be thoroughly rolled and compacted to a depth of twelve (12) inches under this section. Rolling shall be done with an approved type of self-propelled roller, weighing not less than ten (10) tons. All hollows and depressions which develop during the rolling shall be filled with acceptable materials, and the sub-grade re-rolled. The process of filling and rolling shall be repeated until no depressions develop, and the entire sub-grade has been brought to a uniform condition of stability.
- C. All places which, in the opinion of the Engineer, cannot be properly rolled, shall be tamped with hand held mechanically or pneumatically powered tampers.
- D. In making the compacted fill and in doing the final sub-grade rolling, the Contractor shall see that the material to be compacted and/or rolled has the proper moisture content to secure maximum compaction. When, in the opinion of the Engineer, the material is too wet, the compacting shall be delayed until the material has dried sufficiently. When, in the opinion of the Engineer, the material is too dry, the material shall be sprinkled with water in an amount to secure the proper moisture content.

3.02 CONSTRUCTION

- A. Generally, for all repair and replacement work, all new materials shall match the existing and adjoining work in both composition and quality unless otherwise ordered, specified herein, and/or shown on the drawings. In any stone driveway or roadway, the material used for stone fill shall conform to the existing material.
- B. All pavements disturbed by the Contractor's operations shall be re-laid to the thickness of the adjoining pavement and, in all cases, the restoring of pavements, shall apply both to foundation courses and to the wearing surface.
- C. Should cracks or settlements appear in adjoining pavements, the paving shall be removed to the extent necessary to secure firm and undisturbed bearing and shall be replaced in a satisfactory manner.
- D. No permanent pavement shall be installed, repaired, and/or restored unless, or until, in the opinion of the Engineer, the condition of the backfill is such as to properly support the pavement.
- E. Where new or replacement concrete pavement or base is placed adjacent to existing concrete pavement or base, contraction joints shall be provided in the new or replacement pavement so as to form a continuous joint with that in the existing pavement.

3.03 PAVEMENT TYPES

- A. For all new and/or repair/replacement work where specific pavement types are shown or called for on the plans, the Contractor shall install according to the typical pavement details, cross-sections and types as shown.

- B. All pavement construction shall be performed in accordance with the Ohio Department of Transportation Manual of Construction and Material Specifications, latest revision and more specifically included, but not limited to the following:

ODOT Item 301 Asphalt Concrete Base
ODOT Item 302 Asphalt Concrete Base
ODOT Item 304 Aggregate Base
ODOT Item 305 Portland Cement Concrete Base
Section 02500: Pavement Construction, Repair and Replacement

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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SECTION 02502

CONCRETE CURBS

PART ONE - GENERAL

1.01 SCOPE

- A. Under this Section the Contractor shall furnish and construct curbing of various, designated types as shown or scheduled on the Drawing or as required to match existing construction.
- B. This Section includes preparation of the base and/or sub-grade construction of curbs, other work and materials incidental to the construction of curbing.
- C. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.

1.02 QUALITY ASSURANCE

- A. All work shall conform to ODOT Standards for the respective type unless otherwise called for by the plans.

PART TWO - PRODUCTS

2.01 CONCRETE

- A. All concrete used shall be Class A.

2.02 CURBING

- A. Other materials for curbing shall meet the applicable requirements of ODOT Item 609.

PART THREE - EXECUTION

3.01 INSTALLATION

- A. All soil sub-grade under curbs shall be compacted.
- B. All construction for curbing shall be in accordance with ODOT Item 609 for the type called for on the Drawings.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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SECTION 02504

CONCRETE CURB RAMPS

PART ONE - GENERAL

1.01 SCOPE

- A. Under this Section the Contractor shall furnish and construct concrete curb ramps of various, designated types as shown or scheduled on the Drawing or as required to match existing construction.
- B. This Section includes preparation of the base and/or sub-grade construction of curb ramps, other work and materials incidental to the construction of curbing.
- C. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.

1.02 QUALITY ASSURANCE

- A. All work shall conform to ODOT Standards for the respective type unless otherwise called for by the plans.

PART TWO - PRODUCTS

2.01 CONCRETE

- A. All concrete used shall be Class A and shall meet the applicable requirements of ODOT Item 608.

PART THREE - EXECUTION

3.01 INSTALLATION

- A. All soil subgrade under curb ramps shall be compacted.
- B. All construction for curb ramps shall be in accordance with ODOT Item 608 for the type called for on the Drawings.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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SECTION 02505

AGGREGATE BASE

PART ONE - GENERAL

1.01 SCOPE

- A. This work shall consist of removal and repair of existing asphalt and sub-base to suitable depth as determined by the Engineer.

PART TWO - PRODUCTS

2.01 AGGREGATE BASE

PART THREE - EXECUTION

3.01 APPLICATION

- A. The contractor shall remove existing asphalt and sub-base in areas shown on the plans or as directed by the Engineer. After removal of the sub-base the contractor will construct Item 304 in 6" lifts and compacted as per ODOT construction and material specification Item 304. An intermediate course of asphalt per ODOT Item 448 shall be installed prior to the application of the surface.
- B. The intermediate course shall begin at the original sub-base - asphalt interface and end at the surface level of the existing asphalt pavement. Flush match all edges. Intermediate course shall be placed and compacted in lifts that are no greater than normal and usual for the ODOT 448 or a substituted asphalt material.
- C. Asphalt shall be cut or trimmed neatly along edges to abut patch.
- D. ODOT 301 may be substituted if approved by the Engineer.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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SECTION 02513

ASPHALT CONCRETE

PART ONE - GENERAL

1.01 SCOPE

- A. This work shall consist of constructing a surface course or aggregate and asphalt cement mixed in a central plant and spread and compacted on a prepared surface in accordance with O.D.O.T. construction and material specification.

PART TWO - PRODUCTS

2.01 ASPHALT CONCRETE

PART THREE - EXECUTION

3.01 INSTALLATION

- A. The surface course will be applied at varying thickness as shown on the plan or as directed by the Engineer.
- B. The contractor shall apply the asphalt and feather the asphalt from the edge of pavement to the existing drives. The contractor shall apply the asphalt at roadway intersection to insure a smooth transition from existing pavement to the new surface coarse.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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WATERLINE CONSTRUCTION

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. This work shall consist of the construction of a potable water pipeline in accordance with these specifications and in reasonably close conformity to the lines and grades indicated on the plans or as established by the Engineer.
2. This work shall include excavating for pipe, fittings, valves, thrust blocks and other appurtenances, clearing and grubbing and the removal of all materials necessary for placing the pipe, except removals listed separately; furnishing and placing granular or concrete bedding and granular backfill as required; constructing and subsequently removing all necessary cofferdams, cribs, and sheeting; pumping and dewatering; making all pipe joints, as required; installing all necessary pipe; joining to existing and proposed appurtenances as required; performing leakage tests as specified; disinfecting and restoration of disturbed facilities and surfaces.
3. Arrangements for and the performance of the adequate and satisfactory disposal of all test and disinfection waters shall be the Contractor's responsibility. The Contractor shall chlorinate the water main as often as necessary to achieve an approved portable water test.

B. Related Work:

1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
2. All applicable Divisions of the Technical Specifications.

PART TWO - PRODUCTS

2.01 MATERIALS

- A.** Pipe, fittings, specials, valves, joint materials, hydrants, thrust blocks, and other appurtenances shall be the size and kind specified in the proposal and shown on the plans.

PART THREE - EXECUTION

3.01 LAYING PIPE

- A.** The Contractor shall furnish all of the proper tools and equipment required for the safe, proper handling and laying of all pipe, fittings, and specials that are to be installed in this work. All storage, handling, laying, and backfill methods shall be performed so as to avoid damaging either the interior or the exterior surfaces of all pipe fittings, specials, joint materials, or other appurtenances, and any such damage shall be remedied at the Contractor's expense, as approved or directed by the Engineer.
- B.** Before any pipe is lowered into the trench, it shall be inspected for damage, and any unsatisfactory lengths shall be rejected. Cast metal pipe and fittings shall be inspected for cracks by ringing with a light hammer while suspended. The interior and exterior of each pipe length used shall be cleaned as necessary to remove all dirt or other foreign material before it is inspected. The interior of the pipe shall be kept clean until the work is accepted.
- C.** No pipe shall be laid in water, mud or when trench conditions or weather is unsuitable for such work, except by permission of the Engineer.

- D. If mud, surface water, leaves and/or other debris have been permitted to enter the strung-out pipe, the inside shall be cleaned with a strong hypochlorite solution as directed by the Engineer after all such foreign materials are completely cleaned from the pipe and before the pipe is lowered into the trench.
- E. Pipe shall not be pushed off the bank nor shall it be permitted to fall into the trench. Each type of pipe fitting, special or other appurtenances shall be handled in strict accordance with recommendations of its respective manufacturer.
- F. No rocks, stones, metal, concrete, bricks, pavement pieces, wood, soil lumps or other hard materials too big to pass through a six (6") inch screen shall be permitted within six (6") inches of the pipe after it is laid in the trench. Any pipe endangered by such debris shall be subject to removal and disposal at the Contractor's expense as and when directed by the Engineer.
- G. When pipe laying is not in progress, the open ends of installed pipe shall be closed by appropriate means to prevent the entrance of dirt and water. In the event ground water, sewage water or other potential contaminants enter any portion of the pipeline after it is laid, cleaning and preliminary disinfection with a strong hypochlorite solution shall be done as directed by the Engineer.
- H. Pipe lengths shall not be deflected at the joint to any greater degree than recommended by the manufacturer of the particular joint being used. Where deflections in excess of such recommendations are necessary, the appropriate specifications for the particular type of pipe being installed shall govern the mode of accomplishing such excessive deflections. All pipe deflections shall be performed only with the Engineer's approval.

3.02 JOINTING PROCEDURES

- A. The particular method of making up pipe joints shall be governed by the type of pipe material and type of joint in accordance with the drawings and/or specifications.

3.03 ANCHORAGE

- A. All hydrants, plugs, caps, tees and bends shall be thrust restrained, anchored, or blocked so as to prevent movement by using restrained joints, anchorage, and blocking shall be as shown on the drawings and/or as specified.
- B. Restrained joints on buried piping shall be Clow Superlock or equal for ductile (or cast) iron pipe and/or Price Bros. Snap Lock or equal for prestressed concrete steel cylinder pipe.
- C. Restrained joints on exposed piping in vaults shall be made by use of steel tie rods.
- D. Restrained joints on buried piping that cannot be made as specified in "B" (above) shall be by tie rods. Concrete anchor collars may be used when feasible, if allowed by the Engineer. Pipe clamps are not to be used unless they are allowed for each specific application by the Engineer. All tie rods and appurtenances shall be painted with three (3) coats of bituminous paint.
- E. Restrained (B above) or anchor type joints systems shall be used for all hydrant installations - main tee branch outlet through watch valve and including hydrant.

3.04 BACKFILLING

- A. Backfilling shall be accomplished in a two-step procedure-partial backfill before leakage tests and completion of backfill after tests. Departure from this procedure due to traffic or other conditions shall be approved by the Engineer.

3.05 LEAKAGE TESTS

- A. All pipeline construction shall be subjected to both low and high-pressure hydrostatic leakage testing of each valved section, as it is completed, unless otherwise directed by the Engineer. All pipes, valves, fittings, etc. shall be laid in such a manner as to leave all joints watertight.

- B. The low-pressure test shall precede the high-pressure test.
- C. Each section of pipe being tested shall be filled slowly with water, and, before applying the specified test pressures, all air shall be expelled from the pipe. The method of obtaining and placing test water(s) into the pipeline shall be approved by the Engineer.
- D. The tests shall be under the direction of the Engineer or his designate. The Engineer will furnish a pressure gauge for measuring the pressure on the water main. The Contractor shall furnish a suitable pump, pipes, bulkheads and all appliances, labor, fuel, and other appurtenances necessary to make these tests.
- E. The test pressures shall be maintained for sufficient length of time to allow for a thorough examination of joints and elimination of leakage where necessary. The pipeline shall be made absolutely tight under the test pressures.
- F. The Contractor shall drain each section of the waterline piping after it has been tested. If the drains are connected to valve or drain vaults, then, within a reasonable period of time after the test has been completed, the Contractor shall pump all water out of the vaults.
- G. In cold weather, immediately after testing a section of the waterline piping, the Contractor shall open all valves, air cocks, by-passes, and drains; shall drain that section of the pipeline, including the bonnets of all valves contained therein, and shall take all other precautions necessary to prevent injury due to freezing to the water main, piping and appurtenances.
- H. Every precaution must be taken to remove valve-off or otherwise protect delicate control equipment in or attached to pipelines to prevent damage or injury thereto.
- I. Leakage is defined as the quantity of water that must be supplied into the newly laid pipe, or any valved section thereof, as required to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled as herein required.
- J. In calculating leakage, the Engineer will not make allowance for any leakage at the valves, the removable bulkheads, etc.
- K. The evaluation of actual leakage to standard pressure leakage is calculated by the application of the ratio determined from the square root of respective pressures, other factors being equal.
- L. The test pressures shall be 10 psi and 250 psi unless otherwise specified elsewhere in these specifications or directed by the Engineer. Testing procedure shall be as specified herein for the particular pipe material contained in the section tested and shall be subject to modification as required by a particular pipeline material specification or part thereof, as contained elsewhere in these specifications.
- M. For asbestos cement pipe (ACP), AWWA C603 shall govern the leakage testing except for leakage rate. Generally, the pipeline shall be filled with water, allowed to stand twenty-four (24) hours and then subjected to the hydrostatic test for two (2) hours at the specified pressure. Allowable leakage, as set by AWWA standard, is based on 150-psi test pressure and a leakage rate of 20 gpd per mile of pipe per inch of pipe diameter.
- N. For cast iron pipe (CIP) or ductile iron pipe (DIP), AWWA C 600 shall govern the test, except that the allowable leakage rate shall be 12 gpd per mile of pipe per inch of diameter.
- O. All defective materials and construction found in the pipeline as a result of leakage tests shall be corrected by removal of the defective materials and reconstruction with sound materials and construction. The entire section shall then be retested in accordance with the foregoing.
- P. Any testing performed without the knowledge of the Engineer shall not be considered a test for the purpose of this specification.
- Q. The lack of hydrants, branch shutoff valves, or any other attachments to the line being tested shall not preclude the testing of each valved section as it is completed. In the event that hydrants, branch shutoff

valves or any other attached appurtenances are not available for installation prior to testing of each valved section, then plugs or other approved means of containing line pressure must be utilized so as to test each valved section of main line as it is completed. The Contractor shall provide air bleed taps as needed to vent high points where the plans do not call for automatic valves. Tap shall be left in place and closed off to exclude dirt and contaminants. A retest of each valved section will then be necessary after all appurtenances are installed. There will be no additional payment for any such retests.

- R. The Contractor shall provide all pressure test equipment. The Owner shall provide all test water required and shall provide test gauges.

3.06 DISINFECTION

- A. Prior to disinfection, all pipeline construction shall be flushed to remove any foreign material. Flushing shall be performed after completion and approval of the leakage tests. The minimum requirements for flushing are as follows:

| <u>Pipe Size</u> | <u>Minimum GPM Required</u> |
|------------------|-----------------------------|
| 6" | 220 |
| 8" | 390 |
| 10" | 610 |
| 12" | 880 |
| 14" | 1,200 |
| 16" | 1,565 |
| 18" | 1,980 |
| 20" | 2,450 |
| 24" | 3,500 |

- B. Flushing at these rates shall be continued for at least five (5) minutes. In the event the foregoing requirements cannot be met due to the Owner's facilities being inadequate, alternate rate(s) and duration(s) of flushing shall be as directed by the Engineer.
- C. Disinfecting water mains shall be in accordance with AWWA C 601 and as specified herein.
- D. The following disinfectants may be used: Chlorine or chlorine water; calcium hypochlorite (HTH, perchloron, pittchlor, etc.); sodium hypochlorite solution, or chlorinated lime-water mixture. Chlorine shall be applied at one extremity of a pipe section via a corporation stop (installed in the top of the pipe by the Contractor) and bled at the opposite extremity of a properly segregated section. Precautions shall be taken to prevent dosed water from flowing into the potable water supply. Contractor shall provide entry and exit taps as needed. Taps shall be left in place, capped or pinched so as to exclude dirt and contaminants. All high points on the section treated shall be properly vented for air escape.
- E. The rate of applying the disinfectant shall provide at least 25 ppm (mg per liter) chlorine dose at the outlet end of the line section being treated. The disinfecting period shall be twenty-four (24) hours, and, at the end of this period, a chlorine residual of at least 10 mg per liter shall exist at the outlet end of the line. In the event of unfavorable or unsanitary conditions of installation, poor packing, or high pH, the period of disinfection may be extended. For shorter periods of disinfection, higher dosages shall be required.
- F. Sterilizing water shall be disposed of in a satisfactory manner by the Contractor. If the foregoing disinfection procedure fails to provide thorough disinfection of the line, it shall be repeated as necessary in the pipeline for a period of twenty to thirty (20-30) days after it is placed into operation.
- G. Tests for efficacy of sterilization shall be made by the Owner, and repeated sterilization shall be carried out by the Contractor when required.
- H. Contractor shall provide all disinfectants and disinfection equipment. **Owner shall provide all test waters needed.**
- I. Testing wastes must be disposed of so as to avoid environmental damage.

3.07 DISINFECTION (ALTERNATE METHOD)

- A. Upon approval by the Engineer, application of disinfectant may be performed as follows:
- B. While installing the main, a powdered calcium hypochlorite compound (HTH, perchloron, monochlor, or equal, as approved by the Engineer) shall be placed in the main at intervals such that the minimum quantity of disinfectant per 100 feet of main is as follows:

| | |
|----------|--------|
| 4" pipe | 1 oz. |
| 6" pipe | 2 oz. |
| 8" pipe | 3 oz. |
| 10" pipe | 5 oz. |
| 12" pipe | 8 oz. |
| 16" pipe | 12 oz. |
| 20" pipe | 18 oz. |
| 24" pipe | 25 oz. |

- C. Although the foregoing alternate method of disinfection precludes the performance of leakage tests and flushing prior to disinfection, the requirements pertaining to the disinfection period, requisite chlorine residual, repeating the disinfection procedure, leakage tests and flushing shall be met.

3.08 MAINTENANCE OF EXISTING DITCHES

- A. The Contractor shall use the utmost care in maintaining ditches and other waterways, and, if either bottoms or banks of such ditches are disturbed, they shall be promptly restored and maintained for the life of the guaranty period. Similar care shall be used in preventing damage to existing paving by caving of trench walls and undermining such paving. If paving is damaged, the Contractor shall repair same at his own expense.

3.09 CLEARING SITE AND RESTORING DAMAGED SURFACES

- A. Upon completion of the backfill work, the Contractor shall immediately remove and dispose of all surplus materials including dirt and rubbish.
- B. Unless otherwise called for on the plans, the Contractor shall replace all pavements, sidewalks, sod, or other surfaces disturbed to a condition equal to that existing before the work was started, furnishing all materials, labor, equipment, etc., at no additional cost to the Owner.
- C. All restoration of lawns shall be performed in accordance with these specifications as a part of performing the work as specified herein.
- D. All restoration of driveways, sidewalks, roadways and shoulders (berms) shall be in accordance with these specifications as a part of performing the work as specified herein.
- E. Upon completion of the foregoing work, all tools and other property belonging to the Contractor shall be removed, and the site shall be left in good condition.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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PART ONE - GENERAL

1.00 SCOPE

- A. The installation of all piping, fittings, valves, hydrants, etc. in the performance of pipeline construction work shall include the making of one or more types of pipe joints as specified herein.
- B. Related Work
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. Section 02625 Ductile Iron Pipe & Fittings
Section 02634 PVC Pipe (AWWA C900)

1.02 QUALITY ASSURANCE

- A. All pipe joints shall conform to their respective ANSI, AWWA and ASTM specifications regarding materials, assembly, etc. as herein after specified.

1.03 SUBMITTALS

- A. Prior to the use or placement of pipe joint materials or products specified herein, the Contractor shall submit manufacturer's material specifications and recommended handling and installation procedures.

PART TWO - PRODUCTS

- 2.01 In general, the pipe joint products shall be a product of (or supplied by) the pipe manufacturer supplying the pipe being jointed.
- 2.02 Under Part Three - Execution of this specification is further product information which may be included for each joint type.

PART THREE - EXECUTION

3.01 PUSH-ON TYPE JOINTS

- A. Push-on type of joints for cast iron and ductile iron pipe and PVC pipe shall be made where shown on the plans and as specified herein in strict accordance with the manufacturer's recommendation.
- B. No more than one joint at a time shall be "pushed home". In the event that two (2) or more joints are "pushed home" simultaneously, the Contractor shall remove all pipe which was not pushed home "one at a time" and remove and discard the "used" gaskets and relay the pipe "one at a time".
- C. Rubber gaskets shall be rubber O-ring type shaped to fit the particular inside configuration of the bells of the pipe being installed and shall produce a leak-free piping system.
- D. Immediately prior to assembly, thoroughly clean all pipe surfaces which the rubber gasket contacts, insert the gasket properly and lubricate the joint surfaces.
- E. All ends shall be square to the pipe barrel and shall be kept in a straight and square alignment to the receiving bell during assembly.
- F. No weight will be allowed for nor payment made for the gasket or lubricant used, but the cost thereof shall include in the unit price bid for compression joint cast iron and/or ductile iron pipe and fittings.

- G. All "job" cut pipe ends shall be ground, filed or otherwise properly worked on so as to be both square to the pipe barrel (longitudinal axis) and beveled similar to "factory" finished pipe ends. There shall be no "burrs" on any part of the cut pipe end.
- H. All push-on type joints for cast iron and ductile iron pipe, including their respective appurtenance shall conform to ANSI 21.1 (AWWA C111).
- I. All push-on type joints for PVC pipe shall be integral bell push-on type meeting the requirements of ASTM D3139. Gaskets shall be rubber ring type meeting the requirements of ASTM F-477.

3.02 COMPRESSION JOINTS FOR PRESTRESSED CONCRETE CYLINDER PIPE

- A. Compression joints for prestressed concrete cylinder pipe shall be made in accordance with AWWA C 301 and with the requirements of the particular item specification(s) for prestressed concrete cylinder pipe.

3.03 COMPRESSION JOINTS FOR ASBESTOS CEMENT PIPE

- A. Compression joints for asbestos cement pipe shall be made in accordance with the requirements of AWWA C 400 for asbestos cement pipe. All pipe ends, pushing home methods, pipe cutting, etc. shall be similar to that specified in the foregoing specifications.

3.04 FLANGED JOINTS FOR CAST IRON/DUCTILE IRON PIPE AND FITTINGS

- A. Flanged joints shall conform to AWWA C 110 or ANSI A21.10. Flanged joints shall not be installed underground except within structures as indicated on plans or directed by the Engineer.
 - 1. All flanged joints shall be thoroughly bolted with through, stud or tap bolts of required size.
- B. Appurtenances used to make flanged joints shall include: 1/8" thick red rubber gaskets, bolts having American Standard Heavy Unfinished Hexagonal Head and Nut dimensions in conformance with ANSI B.18.1, and material for bolts and nuts shall conform to ASTM A 575 or A 576.
 - 1. All bolt heads and nuts shall conform in dimensions to the American Standard heavy series, and nuts shall be hexagonal cold pressed with well fitting threads.
 - 2. Bolts and nuts shall be cadmium plated by an approved process with a plate thickness of 0.0003 to 0.0005 inches.
 - a. In lieu of cadmium plating, galvanizing will be acceptable.
 - 3. All studs shall be made from silicon bronze ASTM B 124 with bronze nuts where used in contact with any liquid or buried underground or as called for on the contract drawings.
- C. All nuts and bolts that come into contact with water shall be painted with two (2) heavy coats of Inertol No. 49 thick, made for bolts, studs, nuts or gaskets used for flanged joints, and the cost thereof shall be included in the unit price bid for flanged cast/ductile iron pipe and flanged cast/ductile iron fittings.

3.05 FLANGED JOINTS FOR PRESTRESSED CONCRETE CYLINDER PIPE

- A. Flanged joints for prestressed concrete cylinder pipe and for steel pipe shall be installed as shown on the drawings. Flanges shall be either cast steel, forged or rolled steel, or properly welded and machined fabricated steel plates welded to pipe cylinder with two (2) continuous welds. They shall have plain faces and shall be faced true and smooth at right angles to the axis of the pipe and shall be spot faced on the back. Drilling shall conform to ANSI one hundred twenty-five (125) pound standards. All bolts for flanges and for other types of bolting shall conform to ASTM A 307, Grade A, except where one or both flanges are cast iron, in which case bolts shall be Grade B.

- B. All bolts used in the finished work for flanges and tied joints for concrete pipe shall be of medium open hearth or electric furnace steel. The ends of all bolts must be finished to a standard radius in an acceptable manner. All screw threads shall be American Standard Coarse Thread (N.C.). Stud bolts shall be used to make the flanged joints on pipe. All nuts shall be hexagonal, cold pressed, semi-finished and made of medium open hearth, electric furnace or Bessemer process steel. All dimensions shall be according to American Standard Heavy. Bolts and nuts shall be galvanized before shipment and not primed. Gaskets for flanged pipe shall be full-faced rubber one-sixteenth (1/16) inch thick equal to Rainbow Style 9 as manufactured by the U.S. Rubber Company.
- C. All forged or rolled steel pipe flanges shall conform to ASTM A 181, Grade 60.
- D. All structural steel shall conform to ASTM A 36.
- E. Iron Castings must be smooth and free from blowholes and other defects and the material shall conform to ASTM A 48, Class 30 B.

3.06 MECHANICAL JOINTS

- A. All mechanical joints including their respective appurtenances shall conform to ANSI 21.11 (AWWA C111).
- B. M.J. Bolts
 - 1. All mechanical joints shall be thoroughly bolted in accordance with the manufacturer's recommendations with cadmium plated tee head bolts and nuts of high strength, heat treated cast iron or other approved materials having minimum yield strength of forty-five thousand (45,000) pounds per square inch and an ultimate tensile strength of seventy thousand (70,000) pounds per square inch.
 - 2. Joint bolts shall be tightened by the use of approved wrenches and to a tension recommended by the pipe manufacturer. Overstressing of bolts to compensate for poor installation practice shall not be permitted.
- C. M.J. Gaskets
 - 1. Gaskets for water service shall be plain rubber gaskets made of first grade plantation rubber in accordance with ANSI 21.11.
 - 2. Gaskets for sludge, gas, waste lines, etc., shall be plain rubber gaskets tipped with Thickol or ASTM D2000, Type SA-710, or equal.
- D. Glands shall be of high strength cast/ductile iron.
- E. Where connections are made between wrought iron pipe and mechanical joints, an approved type of transition gasket and fitting shall be used in the mechanical joint in accordance with the manufacturer's standards and recommendations.
- F. All "job" cut pipe ends shall be ground, filed or otherwise properly worked on so as to be both square to the pipe barrel and beveled similar to "factory" finished pipe ends. There shall be no "burrs" on any part of the cut pipe end.
- G. If sections of pipeline are "pre-assembled" at a location other than the intended final resting location of the piping, so as to include a fitting or line valve, the Contractor shall handle such "pre-assembled" sections so as to avoid deflections greater than allowed in published data normally provided by the respective pipe manufacturer. Such sections shall be limited in length to include no more than a standard length of pipe plus one (1) fitting and shall contain no more than two (2) pre-assembled joints. Any excessively deflected "pre-assembled pipe" shall be disassembled, the gaskets shall be discarded, and all reassembly (if it be repeated) all at the Contractor's risk and expense.
- H. Where joints are underground, bolts and nuts shall be painted with two (2) heavy coats of Inertol No. 49 thick, or an approved equal.
- I. Where shown on the drawings, or ordered, mechanical joints shall be provided with approved harnesses to affect

tied joints.

- J. No special payment will be made for lock type joints, glands, bolts, nuts or gaskets used for mechanical joints, but the cost thereof shall be included in the unit price bid for mechanical joint cast/ductile iron pipe and mechanical joint cast/ductile iron fittings. Payment on a tonnage basis will be based on the body weight of the pipe or fittings only and will not show additional weight of accessories.
- K. Approved harnesses to affect tied joints will be paid for as a part of their respective pipeline construction.

3.07 BALL AND SOCKET JOINTS

- A. Ball and socket joints shall be made where shown on the drawings and shall conform to AWWA C 111 and shall be subject to the approval of the Engineer.
- B. Ball and socket joints (river crossing) shall be restrained, boltless and capable of deflecting up to fifteen (15) degrees and shall be installed in accordance with the manufacturer's recommendations.
- C. Ball and socket joints shall be as manufactured by Clow Corporation, American Cast Iron Pipe Company or equal.

3.08 GROOVED-END JOINT COUPLINGS

- A. Grooved-end joint couplings for ductile iron piping shall be used where indicated on the drawings. Grooved and joint couplings shall be watertight, and designed for the working pressures specified for the piping system with which they are to be used. Couplings shall be self-centering and shall engage and lock in place the grooved pipe and pipe fitting ends, in a positive couple. Where grooved-end joint couplings are shown on the drawings, pipe grooves shall be located such as to provide a flexible-type joint which provides for linear and angular movement. Coupling housing clamps shall be fabricated in two (2) or more sections of malleable iron castings, conforming to the requirements of ASTM A 47, Grade 32510. Coupling gaskets shall be molded synthetic rubber, conforming to ASTM D 2000, Grade 3BA615A14-B13. Bolts and heavy nuts shall conform to ASTM A 183. Grooved, hinged flange adapters with gaskets, shall be furnished for making valve or flanged connections, and shall be constructed of the same materials as used for the couplings.
- B. Pipe grooving shall be done by the manufacturer and in accordance with the pipe coupling manufacturer's specifications.
- C. Field grooving of pipe shall not be permitted, except for occasional field make-up pieces when permitted by the Engineer.
- D. Grooved-end joint couplings shall be Victaulic, Dresser or equal.

3.09 MEGA LUG

Mechanical joint restraint, for ductile iron pipe and/or for C900/C905 PVC pipe, shall be incorporated into the design of the follower gland (Glands shall be manufactured of ductile iron conforming to ASTM A536-80). The restraining mechanism shall consist of individually actuated wedges that increase their resistance to pullout as pressure or external forces increase. The device shall be capable of full mechanical joint deflection during assembly and the flexibility of the joint shall be maintained after burial. The joint restraint ring and its wedging components shall be made of grade 65-45-12 ductile iron conforming to ASTM A536-84. The wedges shall be ductile iron heat treated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of the latest revision. Torque limiting twist-off nuts sized same as tee-head bolts, shall be used to insure proper actuation of the restraining wedges. For ductile iron pipe, the restraint shall be the Series 1100 Megalug restraint as produced by EBAA Iron, Inc. or equivalent and for C900/C905 PVC pipe, the restraint shall be the EBAA Iron Series 2000 PV or equivalent.

Restrained Joint-Features Required

| | | |
|--|---------------------------------|----------------------------|
| Pipe Material | Ductile Iron Pipe | C900/C905 PVC Pipe |
| Joint Type | Mechanical | Mechanical |
| Sizes | 3" thru 48" | 4" thru 24" |
| Rated Water Pressure 350 psi 250 psi | 16" and smaller 18" thru 48" | - - |
| Tested to | - | UNI-B-13-92 |
| UL Listed for Approved | 3" thru 24" 3" thru 12" | Same as DIP Same as DIP |
| Available Product Manufacturer | EBAA Iron | EBAA Iron |
| Catalog I.D. | Series 1100 Megalug | Series 2000 PV |

M.J. PVC Joint Restraints for C900 3" thru 12" shall be pressure rated: 200 psi for DR14, 150 psi for DR 18, 100 psi for DR 25.

M.J. PVC Joint Restraints for C905 14" thru 24" shall be pressure rated: 235 psi for DR18, 165 psi for DR 25.

For C900/C905 PVC pipe bells restraint rings shall be made of ductile iron components. All ductile iron shall conform to ASTM A536. A split ring shall be used behind the bell and a serrated restraint ring shall be used to grip the pipe. A sufficient number of bolts shall be used to connect the bell ring and the pipe ring. The combination shall have a minimum working pressure rating of 150 psi. The restraint shall be the Series 1600 for C900 and Series 2000 for C905 as produced by the EBAA Iron, Inc or equivalent.

When used in lieu of threaded or welded flanged spool pieces, restrained flange adapters shall be made of ductile iron conforming to ASTM A536 and have flange bolt circles that are compatible ANSI/AWWA C115/A21.15. Restraint for the flange adapter shall consist of individually actuated gripping wedges to maximize restraint capability. Torque limiting actuating screws shall be used to insure proper initial lengths of pipe to be field cut to allow a minimum 0.6" gap between the end of the pipe and the mating flange without affecting the integrity of the seal. For PVC pipe, the flange adapters will have a pressure rating equal to the pipe. For Ductile Iron Pipe, the flange adapter shall have a safety factor of 2:1 minimum. The flange adapter shall be the Series 2100 MEGAFLANGE adapter as produced by the EBAA Iron, Inc. or equivalent.

When called for in the plans, flexible expansion joints shall be installed in the location indicated on the drawings and shall be manufactured of ductile iron conforming to the material properties of ANSI/AWWA C153/A21.53. Each flexible expansion joint shall be pressure tested against its own restraint to a minimum of 350 psi (250 psi for flexible expansion joints 30 inches and larger). Each flexible expansion joint shall consist of an expansion joint designee and cast as an integral part of a ball and socket type flexible joint, having a minimum of 15 degrees deflection per ball and 4-inches minimum expansion. All internal surfaces and seal contact surfaces parts shall be lined with a minimum of 15 MILS of fusion bonded epoxy conforming to the application requirements of ANSI/AWWA C213 and shall be holiday tested with a 1500-volt spark test conforming to said specifications. All flexible expansion joints shall be FLEX-TEND as manufactured by EBAA Iron Inc. or equivalent.

3.10 BOLTLESS RESTRAINED JOINT

- A. Boltless restrained joints shall be used where called for on the drawings or as directed by the Engineer to provide restraint against external forces or against separation due to internal pressure.
- B. Types of boltless restrained joints acceptable are "Super-Lock" by Clow Corporation, "Lok-Fast" by American Cast Iron Pipe Company, "Lok-Tyte" by United States Pipe and Foundry Company or equal.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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PART ONE – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes storm drainage.

1.03 DEFINITIONS

- A. **ABS**: Acrylonitrile-butadiene-styrene plastic
- B. **EPDM**: Ethylene-propylene-diene-monomer rubber
- C. **PE**: Polyethylene plastic
- D. **PVC**: Polyvinyl chloride plastic

1.04 PERFORMANCE REQUIREMENTS

- A. Gravity-Flow, Non-pressure-Piping Pressure Ratings: At least equal to system test pressure.
- B. Force-Main Pressure Ratings: At least equal to system operating pressure, but not less than 150 psig (1035 kPa).

1.05 SUBMITTALS

- A. Product Data: For the following:
 - 1. Polymer-concrete, channel drainage systems.
 - 2. Plastic, channel drainage systems.
 - 3. Stainless-steel drainage systems.
 - 4. Backwater valves, cleanouts, and drains.
 - 5. Plastic dry wells.
 - 6. Stormwater disposal systems.
- B. Shop Drawings: Include plans, elevations, details, and attachments for the following:
 - 1. Precast concrete manholes and other structures, including frames, covers, and grates.
 - 2. Cast-in-place concrete manholes and other structures, including frames, covers, and grates.
 - 3. Coordination Drawings: Show manholes and other structures, pipe sizes, locations, and elevations. Include details of underground structures and connections. Show other piping in same trench and clearances from sewerage system piping. Indicate interface and spatial relationship between piping and proximate structures.
 - 4. Coordination Profile Drawings: Show system piping in elevation. Draw profiles at horizontal scale of not less than 1 inch equals 50 feet (1:500) and vertical scale of not less than 1 inch equals 5 feet (1:50). Indicate underground structures and pipe. Show types, sizes, materials, and elevations of other utilities crossing system piping.
- C. Design Mix Reports and Calculations: For each class of cast-in-place concrete.
- D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not store plastic structures, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

1.07 PROJECT CONDITIONS

- A. Site Information: Perform site survey, research public utility records, and verify existing utility locations. Locate existing structures and piping to be closed and abandoned.
Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's written permission.

PART TWO – PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1. Polymer-Concrete, Channel Drainage Systems:
 - a. ABT, Inc.
 - b. ACO Polymer Products, Inc.
 - c. Innovative Plastic Products, Inc.
 - d. Josam Co.; Mea-Josam Div.
 - e. Morrison Molded Fiber Glass Co.; Quazite Div.
- 2. Plastic, Channel Drainage Systems:
 - a. ACO Polymer Products, Inc.
 - b. MultiDrain Corp.
 - c. NDS, Inc.
 - d. Tuf-Tite, Inc.
 - e. Zurn Industries, Inc.; Hydromechanics Div.
- 3. Steel, Trench Drainage Systems:
 - a. Rockford Sanitary Systems, Inc.
- 4. Stainless-Steel Drainage Systems:
 - a. Josam Co.; Blucher-Josam Div.
- 5. Gray-Iron Backwater Valves, Cleanouts, and Drains:
 - a. Josam Co.
 - b. McWane, Inc.; Tyler Pipe; Wade Div.
 - c. MIFAB.
 - d. Smith: Jay R. Smith Mfg. Co.
 - e. Watts Industries, Inc.; Ancon Drain Div.
 - f. Watts Industries, Inc.; Enpoco, Inc. Div.
 - g. Zurn Industries, Inc.; Hydromechanics Div.
- 6. PVC Backwater Valves and Cleanouts:
 - a. Canplas, Inc.
 - b. IPS Corp.
 - c. NDS, Inc.
 - d. Plastic Oddities, Inc.
 - e. Sioux Chief Manufacturing Co., Inc.

7. Plastic Dry Wells:
 - a. Flo-Well Products, Ltd.
8. Stormwater Disposal Systems:
 - a. Advanced Drainage Systems, Inc.
 - b. Cultec, Inc.
 - c. Hancor, Inc.
 - d. Infiltrator Systems, Inc.
 - e. PSA, Inc.

2.02 PIPING MATERIALS

- A. Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

2.03 PIPES AND FITTINGS

- A. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: ASTM A 74, gray iron, for gasketed joints.
 1. Gaskets: ASTM C 564, rubber, compression type, thickness to match class of pipe.
- B. Hubless Cast-Iron Soil Pipe and Fittings: CISPI 301 or ASTM A 888, gray iron, for coupling joints.
 1. Stainless-Steel Shielded Couplings: ASTM C 1277 and CISPI 310, corrugated, stainless-steel shield and clamp assembly, with ASTM C 564 rubber sealing sleeve.
 2. Stainless-Steel, Heavy-Duty Couplings: ASTM C 1277; clamp assembly with housing fabricated from stainless steel complying with ASTM A 666, Type 304; and rubber sealing gasket complying with ASTM C 564. Include housings 3 inches (76 mm) wide in NPS 1-1/2 to NPS 4 (DN40 to DN100) and 4 inches (102 mm) wide in NPS 5 to NPS 10 (DN125 to DN250).
 3. Cast-Iron, Heavy-Duty Couplings: ASTM C 1277, assembly with housing of gray iron complying with ASTM A 48 (ASTM A 48M), stainless-steel bolts, and rubber sealing gasket complying with ASTM C 564.
- C. Ductile-Iron Sewer Pipe: ASTM A 746, for push-on joints.
 1. Standard-Pattern, Ductile-Iron Fittings: AWWA C110, ductile or gray iron, for push-on joints.
 2. Compact-Pattern, Ductile-Iron Fittings: AWWA C153, for push-on joints.
 3. Gaskets: AWWA C111, rubber.
- D. Ductile-Iron Culvert Pipe: ASTM A 716, for push-on joints.
 1. Standard-Pattern, Ductile-Iron Fittings: AWWA C110, ductile or gray iron, for push-on joints.
 2. Gaskets: AWWA C111, rubber.
- E. Stainless-Steel Drainage Pipe and Fittings: ASME A112.3.1; ASTM A 666, Type 304, stainless steel; with socket and spigot ends for gasketed joints.
 1. Gaskets for NPS 3 to NPS 6 (DN80 to DN150): Lip seals shaped to fit socket groove, and with plastic backup ring.
 - a. Seal Material for General Applications: EPDM, unless otherwise indicated.
 - b. Seal Material for Fluids Containing Gasoline or Oil: Nitrile-rubber compound, unless otherwise indicated.
 2. Couplings for NPS 8 to NPS 12 (DN200 to DN300): Stainless steel, mechanical type, with seal.
 - a. Seal Material for General Applications: EPDM, unless otherwise indicated.
 - b. Seal Material for Fluids Containing Gasoline or Oil: Nitrile-rubber compound, unless otherwise indicated.
- F. Corrugated-Steel Pipe: ASTM A 760/A 760M, Type I, made from ASTM A 929/A 929M, zinc-coated steel sheet for banded joints.
 1. Fittings: Fabricated to types indicated and according to same standards as pipe.
 2. Connecting Bands: Standard couplings made for corrugated-steel pipe to form soiltight joints.

- G. Corrugated-Aluminum Pipe: ASTM B 745/B 745M, Type I, made from ASTM B 744/B 744M, aluminum-alloy sheet for banded joints.
1. Fittings: Fabricated to types indicated and according to same standards as pipe.
 2. Connecting Bands: Standard couplings made for corrugated-aluminum pipe to form soiltight joints.
- H. ABS Sewer Pipe and Fittings: ASTM D 2751, for solvent-cemented or gasketed joints.
1. Wall Thickness for NPS 3 to NPS 6 (DN80 to DN150): SDR 35.
 2. Wall Thickness for NPS 8 to NPS 12 (DN200 to DN300): SDR 42.
 3. Gaskets: ASTM F 477, elastomeric seals.
- I. Corrugated PE Drainage Tubing and Fittings: AASHTO M 252, Type S, with smooth waterway for coupling joints.
- J. Soiltight Couplings: AASHTO M 252, corrugated, matching tube and fittings to form soiltight joints.
1. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with tube and fittings to form silttight joints.
- K. Corrugated PE Pipe and Fittings: AASHTO M 294, Type S, with smooth waterway for coupling joints.
1. Soiltight Couplings: AASHTO M 294, corrugated, matching pipe and fittings to form soiltight joints.
 2. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings to form silttight joints.
- L. PVC Pressure Pipe: AWWA C900, Class 150, for gasketed joints.
1. PVC Pressure Fittings: AWWA C907, for gasketed joints.
 2. Gaskets for PVC Piping: ASTM F 477, elastomeric seals.
 3. Ductile-Iron, Compact Fittings: AWWA C153, for push-on joints.
 4. Gaskets for Ductile-Iron Fittings: AWWA C111, rubber.
 5. Cellular-Core PVC Pipe: ASTM F 891, Sewer and Drain Series, PS 50 minimum stiffness, for solvent-cemented joints.
 6. Fittings: ASTM D 2729 or ASTM D 3034, PVC sewer pipe fittings.
- M. PVC Sewer Pipe and Fittings: According to the following:
1. PVC Sewer Pipe and Fittings, NPS 15 (DN375) and Smaller: ASTM D 3034, SDR 35, for solvent-cemented or gasketed joints.
 - a. Gaskets: ASTM F 477, elastomeric seals.
 2. PVC Sewer Pipe and Fittings, NPS 18 (DN450) and Larger: ASTM F 679, T-1 wall thickness, bell and spigot for gasketed joints.
 - a. Gaskets: ASTM F 477, elastomeric seals.
- N. PVC, Ribbed Drain Pipe: AASHTO M 304M, bell and spigot, with smooth waterway for bell-gasketed joints.
1. Fittings: AASHTO M 304M or ASTM F 794 for bell-gasketed joints.
 2. Gaskets: ASTM F 477, elastomeric seals to form soiltight joints.
- O. Nonreinforced-Concrete Sewer Pipe and Fittings: ASTM C 14 (ASTM C 14M), Class 2, for gasketed joints.
1. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
- P. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76 (ASTM C 76M), Class III, Wall B, for gasketed joints.
1. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
- Q. Reinforced-Concrete Arch Pipe: ASTM C 506 (ASTM C 506M), Class IV, for banded joints.
1. Sealing Bands: ASTM C 877 (ASTM C 877M), Type I.
- R. Reinforced-Concrete Elliptical Pipe: ASTM C 507 (ASTM C 507M), Class IV, for banded joints.

1. Pattern: Type HE, horizontal.
2. Pattern: Type VE, vertical.
3. Sealing Bands: ASTM C 877 (ASTM C 877M), Type I.

2.04 SPECIAL PIPE COUPLINGS AND FITTINGS

- A. Sleeve-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric sleeve and band assembly fabricated to mate with OD of pipes to be joined, for nonpressure joints.
 1. Sleeve Material for Concrete Pipe: ASTM C 443 (ASTM C 443M), rubber.
 2. Sleeve Material for Cast-Iron Soil Pipe: ASTM C 564, rubber.
 3. Sleeve Material for Plastic Pipe: ASTM F 477, elastomeric seal.
 4. Sleeve Material for Dissimilar Pipe: Compatible with pipe materials being joined.
 5. Bands: Stainless steel, at least one at each pipe insert.
- B. Bushing-Type Pipe Couplings: ASTM C 1173, rubber or elastomeric bushing fabricated to mate with OD of smaller pipe and ID of adjoining larger pipe, for nonpressure joints.
 1. Material for Concrete Pipe: ASTM C 443 (ASTM C 443M), rubber.
 2. Material for Cast-Iron Soil Pipe: ASTM C 564, rubber.
 3. Material for Plastic Pipe: ASTM F 477, elastomeric seal.
 4. Material for Dissimilar Pipe: Compatible with pipe materials being joined.
- C. Pressure-Type Pipe Couplings: AWWA C219, iron-body sleeve assembly matching OD of pipes to be joined, with AWWA C111 rubber gaskets, bolts, and nuts. Include PE film, pipe encasement.
- D. Ductile-Iron, Flexible Expansion Joints: Compound fitting with combination of flanged and mechanical-joint ends complying with AWWA C110 or AWWA C153. Include two gasketed ball-joint sections and one or more gasketed sleeve sections, rated for 250-psig (1725-kPa) minimum working pressure and for offset and expansion indicated. Include PE film, pipe encasement.
- E. Ductile-Iron Deflection Fittings: Compound coupling fitting with ball joint, flexing section, gaskets, and restrained-joint ends complying with AWWA C110 or AWWA C153. Include rating for 250-psig (1725-kPa) minimum working pressure and for up to 15 degrees deflection. Include PE film, pipe encasement.
- F. Ductile-Iron Expansion Joints: Three-piece assembly of telescoping sleeve with gaskets and restrained-type, ductile-iron, bell-and-spigot end sections complying with AWWA C110 or AWWA C153. Include rating for 250-psig (1725-kPa) minimum working pressure and for expansion indicated. Include PE film, pipe encasement.

2.05 PE FILM, PIPE ENCASEMENT

- A. ASTM A 674 or AWWA C105; PE film, tube, or sheet; 8-mil (0.2-mm) thickness.

2.06 MANHOLES

- A. Normal-Traffic Precast Concrete Manholes: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.
 1. Diameter: 48 inches (1200 mm) minimum, unless otherwise indicated.
 2. Ballast: Increase thickness of precast concrete sections or add concrete to base section, as required to prevent flotation.
 3. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
 4. Riser Sections: 4-inch (100-mm) minimum thickness, and lengths to provide depth indicated.
 5. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 6. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
 7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
 8. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls.

with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.

9. Steps: ASTM C 478 (ASTM C 478M), individual steps or ladder. Omit steps for manholes less than 60 inches (1500 mm) deep.
 10. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- B. Heavy-Traffic Precast Concrete Manholes: ASTM C 913; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for rubber gasketed joints.
1. Ballast: Increase thickness of one or more precast concrete sections or add concrete to structure, as required to prevent flotation.
 2. Gaskets: Rubber.
 3. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
 4. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 5. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 6. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- C. Cast-in-Place Concrete Manholes: Construct of reinforced-concrete bottom, walls, and top; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated.
1. Ballast: Increase thickness of concrete, as required to prevent flotation.
 2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
 3. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 4. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
- D. Fiberglass Manholes: ASTM D 3753, fabricated, glass-fiber-reinforced polyester.
1. Diameter: 48 inches (1200 mm) minimum, unless otherwise indicated.
 2. Ballast: Increase thickness of concrete to base section, as required to prevent flotation.
 3. Base Section: Concrete, 6-inch (150-mm) minimum thickness.
 4. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into base, riser, and top section sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 5. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- E. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch (610-mm) ID by 7- to 9-inch (178- to 229-mm) riser with 4-inch (100-mm) minimum width flange, and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover.

2.07 CATCH BASINS

- A. Normal-Traffic, Precast Concrete Catch Basins: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for rubber gasketed joints.

1. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (100-mm) minimum thickness for walls and base riser section, and having separate base slab or base section with integral floor.
 2. Riser Sections: 4-inch (100-mm) minimum thickness, 48-inch (1220-mm) diameter, and lengths to provide depth indicated.
 3. Top Section: Eccentric-cone type, unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
 4. Gaskets: ASTM C 443 (ASTM C 443M), rubber.
 5. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and grate.
 6. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast steps or anchor ladder into base, riser, and top section sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for catch basins less than 60 inches (1500 mm) deep.
 7. Steps: ASTM C 478 (ASTM C 478M), individual steps or ladder. Omit steps for catch basins less than 60 inches (1500 mm) deep.
 8. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- B. Heavy-Traffic, Precast Concrete Catch Basins: ASTM C 913, precast, reinforced concrete; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for rubber gasketed joints.
1. Gaskets: Rubber.
 2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and grate.
 3. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast steps or anchor ladder into base, riser, and top section sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for catch basins less than 60 inches (1500 mm) deep.
 4. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
 5. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.
- C. Cast-in-Place Concrete, Catch Basins: Construct of reinforced concrete; designed according to ASTM C 890 for structural loading; of depth, shape, dimensions, and appurtenances indicated.
1. Bottom, Walls, and Top: Reinforced concrete.
 2. Channels and Benches: Concrete.
 3. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast steps or anchor ladder into sidewalls at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for catch basins less than 60 inches (1500 mm) deep.
 4. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for manholes less than 60 inches (1500 mm) deep.
- D. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for heavy-duty service. Include flat grate with small square or short-slotted drainage openings.
1. Size: 24 by 24 inches (610 by 610 mm) minimum, unless otherwise indicated.
 2. Grate Free Area: Approximately 50 percent, unless otherwise indicated.
- E. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for heavy-duty service. Include 24-inch (610-mm) ID by 7- to 9-inch (178- to 229-mm) riser with 4-inch (100-mm) minimum width flange, and 26-inch- (660-mm-) diameter flat grate with small square or short-slotted drainage openings.
1. Grate Free Area: Approximately 50 percent, unless otherwise indicated.

2.08 STORMWATER INLETS

- A. Curb Inlets: Made with vertical curb opening, of materials and dimensions according to utility standards.
- B. Gutter Inlets: Made with horizontal gutter opening, of materials and dimensions according to utility standards. Include heavy-duty frames and grates.
- C. Combination Inlets: Made with vertical curb and horizontal gutter openings, of materials and dimensions according to utility standards. Include heavy-duty frames and grates.
- D. Frames and Grates: Heavy-duty frames and grates according to utility standards.
- E. Curb Inlets: Vertical curb opening, of materials and dimensions indicated.
- F. Gutter Inlets: Horizontal gutter opening, of materials and dimensions indicated. Include heavy-duty frames and grates.
- G. Combination Inlets: Vertical curb and horizontal gutter openings, of materials and dimensions indicated. Include heavy-duty frames and grates.
- H. Frames and Grates: Dimensions, opening pattern, free area, and other attributes indicated.
- I. Material: ASTM A 536, Grade 60-40-18 minimum, ductile-iron casting.
- J. Material: ASTM A 48, Class 30 (ASTM A 48M, Class No. 200A) minimum, gray-iron casting.
- K. Grate Free Area: Approximately 50 percent, unless otherwise indicated.

2.09 STORMWATER DETENTION STRUCTURES

- A. Cast-in-Place Concrete, Stormwater Detention Structures: Construct of reinforced-concrete bottom, walls, and top; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, dimensions, and appurtenances indicated.
 - 1. Ballast: Increase thickness of concrete, as required to prevent flotation.
 - 2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch (150- to 229-mm) total thickness, that match 24-inch- (610-mm-) diameter frame and cover.
 - 3. Steps: Fiberglass, individual steps or ladder. Include width that allows worker to place both feet on one step and is designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for structures less than 60 inches (1500 mm) deep.
 - 4. Steps: Manufactured from deformed, 1/2-inch (13-mm) steel reinforcement rod complying with ASTM A 615/A 615M and encased in polypropylene complying with ASTM D 4101. Include pattern designed to prevent lateral slippage off step. Cast or anchor into sidewalls with steps at 12- to 16-inch (300- to 400-mm) intervals. Omit steps for structures less than 60 inches (1500 mm) deep.
- B. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch (610-mm) ID by 7- to 9-inch (178- to 229-mm) riser with 4-inch (100-mm) minimum width flange, and 26-inch- (660-mm-) diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover.

2.10 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
 - 1. Cement: ASTM C 150, Type II.
 - 2. Fine Aggregate: ASTM C 33, sand.
 - 3. Coarse Aggregate: ASTM C 33, crushed gravel.
 - 4. Water: Potable.
- B. Portland Cement Design Mix: 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cementitious ratio.
 - 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.

2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed steel.
- C. Structure Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi (27.6 MPa) minimum, with 0.45 maximum water-cementitious ratio.
 1. Include channels and benches in manholes.
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - 1) Invert Slope: 1 percent through manhole.
 - 2) Invert Slope: 2 percent through manhole.
 - 3) Invert Slope: None.
 - b. Benches: Concrete, sloped to drain into channel.
 - 1) Slope: 8 percent.
 - 2) Slope: 4 percent.
 2. Include channels in catch basins.
 - a. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
 - 1) Invert Slope: 1 percent through catch basin.
 - 2) Invert Slope: 2 percent through catch basin.
 - 3) Invert Slope: None.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi (20.7 MPa) minimum, with 0.58 maximum water-cementitious ratio.
 1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
 2. Reinforcement Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed steel.

2.11 PROTECTIVE COATINGS

- A. Description: One- or two-coat, coal-tar epoxy; 15-mil (0.38-mm) minimum thickness, unless otherwise indicated; factory or field applied to the following surfaces:
 1. Concrete Manholes: On interior surface.
 2. Concrete Manholes: On exterior surface.
 3. Concrete Manholes: On exterior and interior surfaces.
 4. Manhole Frames and Covers: On entire surfaces.
 5. Catch Basins: On interior surface.
 6. Catch Basins: On exterior surface.
 7. Catch Basins: On exterior and interior surfaces.
 8. Catch Basin Frames and Grates: On entire surfaces.
 9. Stormwater Inlets: On interior surface.
 10. Stormwater Inlets: On exterior surface.
 11. Stormwater Inlets: On exterior and interior surfaces.
 12. Stormwater Inlet Frames and Grates: On entire surfaces.
 13. Stormwater Detention Structures: On interior surface.
 14. Stormwater Detention Structures: On exterior surface.
 15. Stormwater Detention Structures: On exterior and interior surfaces.
 16. Stormwater Detention-Structure Manhole Frames and Covers: On entire surfaces.

2.12 POLYMER-CONCRETE, CHANNEL DRAINAGE SYSTEMS

- A. General: Modular system of precast, polymer-concrete channel sections, grates, and appurtenances; designed so grates fit into channel recesses without rocking or rattling. Include number of units required to form total lengths indicated.
- B. Sloped-Invert, Polymer-Concrete Systems: Include the following components:
 1. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 4-inch (100-mm) inside width and deep, rounded bottom, with built-in invert slope of 0.6 percent and with outlets in number, sizes, and locations indicated. Include extension sections necessary for required depth.
 2. Frame: Include gray-iron or steel frame for grate.
 3. Grates with manufacturer's designation "Medium Duty," with slots or perforations that fit recesses in channels.

- a. Material: Stainless steel.
- b. Material: Galvanized steel.
- c. Material: Gray iron.
- d. Material: Fiberglass.
- 4. Grates with manufacturer's designation "Heavy Duty," with slots that fit recesses in channels.
 - a. Material: Stainless steel.
 - b. Material: Galvanized steel.
 - c. Material: Gray iron.
 - d. Material: Ductile iron.
- 5. Covers: Solid gray iron, if indicated.
- 6. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.

C. Narrow-Width, Level-Invert, Polymer-Concrete Systems: Include the following components:

- 1. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 5-inch (127-mm) inside width and 9-3/4-inch (248-mm) deep, rounded bottom, with level invert and with NPS 4 (DN100) outlets in number and locations indicated.
- 2. Grates with slots or perforations that fit recesses in channels.
 - a. Material: Stainless steel.
 - b. Material: Galvanized steel.
 - c. Material: Gray iron.
 - d. Material: Fiberglass.
- 3. Covers: Solid gray iron, if indicated.
- 4. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.

D. Wide-Width, Level-Invert, Polymer-Concrete Systems: Include the following components:

- 1. Channel Sections: Interlocking-joint, precast, modular units with end caps. Include 8-inch (203-mm) inside width and 13-3/4-inch (350-mm) deep, rounded bottom, with level invert and with outlets in number, sizes, and locations indicated.
- 2. Grates with slots or other openings that fit recesses in channels.
 - a. Material: Gray iron.
 - b. Material: Fiberglass.
- 3. Covers: Solid gray iron, if indicated.
- 4. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.

E. Drainage Specialties: Precast, polymer-concrete units.

- 1. Large Catch Basins: 24-by-12-inch (610-by-305-mm) polymer-concrete body, with outlets in number and sizes indicated. Include gray-iron slotted grate.
- 2. Frame: Include gray-iron or steel frame for grate.
- 3. Small Catch Basins: 19- to 24-inch by approximately 150-mm (483- to 610-mm) by approximately 150-mm) polymer-concrete body, with outlets in number and sizes indicated. Include gray-iron slotted grate.
- 4. Frame: Include gray-iron or steel frame for grate.
- 5. Oil Interceptors: Polymer-concrete body with interior baffle and four steel support channels and two 1/4-inch- (6.4-mm-) thick, steel-plate covers.
 - a. Capacity: 140 gal. (530 L).
 - b. Capacity: 200 gal. (757 L).
 - c. Capacity: 260 gal. (984 L).
 - d. Inlet and Outlet: NPS 4 (DN100).
 - e. Inlet and Outlet: NPS 6 (DN150).
- 6. Sediment Interceptors: 27-inch- (686-mm-) square polymer-concrete body, with outlets in number and sizes indicated. Include 24-inch- (610-mm-) square, gray-iron frame and slotted grate.

F. Supports, Anchors, and Setting Devices: Manufacturer's standard, unless otherwise indicated.

G. Channel-Section Joining and Fastening Materials: As recommended by system manufacturer.

2.13 PLASTIC, CHANNEL DRAINAGE SYSTEMS

- A. General: Modular system of plastic channel sections, grates, and appurtenances; designed so grates fit into frames without rocking or rattling. Include number of units required to form total lengths indicated.
- B. Fiberglass Systems: Include the following components:
 - 1. Channel Sections: Interlocking-joint, fiberglass modular units, with built-in invert slope of approximately 1 percent and with end caps. Include rounded or inclined inside bottom surface, with outlets in number, sizes, and locations indicated.
 - a. Width: 6 or 8 inches (150 or 203 mm).
 - b. Width: 6 inches (150 mm).
 - c. Width: 8 inches (203 mm).
 - 2. Factory- or field-attached frames that fit channel sections and grates.
 - a. Material: Manufacturer's standard metal.
 - b. Material: Stainless steel.
 - c. Material: Galvanized steel.
 - 3. Grates with slots or perforations that fit frames.
 - a. Material: Stainless steel.
 - b. Material: Galvanized steel.
 - c. Material: Gray iron.
 - d. Material: Fiberglass.
 - 4. Covers: Solid gray iron, if indicated.
 - 5. Drainage Specialties: Include the following plastic components:
 - a. Large Catch Basins: 24-inch- (610-mm-) square plastic body, with outlets in number and sizes indicated. Include gray-iron frame and slotted grate.
 - b. Small Catch Basins: 12-by-24-inch (305-by-610-mm) plastic body, with outlets in number and sizes indicated. Include gray-iron frame and slotted grate.
- C. PE Systems: Include the following components:
 - 1. Channel Sections: Interlocking-joint, PE modular units, 4 inches (102 mm) wide, with end caps. Include rounded bottom, with level invert and with outlets in number, sizes, and locations indicated.
 - 2. Grates: PE, ladder shaped; with stainless-steel screws.
 - 3. Color: Gray, unless otherwise indicated.
 - 4. Drainage Specialties: Include the following PE components:
 - a. Drains: 4-inch- (102-mm-) diameter, round, slotted top; with NPS 4 (DN100) bottom outlet.
 - b. Drains: 8-inch- (203-mm-) diameter, round, slotted top; with NPS 6 (DN150) bottom outlet.
 - c. Drains: 4-inch- (102-mm-) square, slotted top; with NPS 3 (DN80) bottom outlet.
 - d. Drains: 8-inch- (203-mm-) square, slotted top; with NPS 6 (DN150) bottom outlet.
 - e. Catch Basins: 12-inch- (305-mm-) square plastic body, with outlets in number and sizes indicated. Include PE slotted grate 11-3/4 inches (298 mm) square by 1-1/8 inches (28.6 mm) thick.
- D. Supports, Anchors, and Setting Devices: Manufacturer's standard, unless otherwise indicated.
- E. Channel-Section Joining and Fastening Materials: As recommended by system manufacturer.

2.14 STAINLESS-STEEL DRAINAGE SYSTEMS

- A. General: ASME A112.3.1; ASTM A 666, Type 304, stainless-steel, modular system of trench sections, grates, and specialties; designed so grates fit into trench recesses without rocking or rattling. Include number of units required to form total lengths indicated. Include stainless-steel drainage piping between components.
- B. Refer to "Pipes and Fittings" Article in Part 2 for stainless-steel drainage piping.
- C. Narrow-Width Trench Systems: Include the following stainless-steel components:
 - 1. Trench Sections: Modular units, approximately 5 inches (125 mm) wide, with flanged ends, gaskets, bolts, nuts, and end pieces. Include level invert, with outlets in number, sizes, and locations indicated.
 - 2. Grates: 5.9 by 1 inch (150 by 25 mm), with square perforations and polished finish.
 - 3. Grates: 5.9 by 1 inch (150 by 25 mm), slotted.
 - 4. Grates: 5.9 by 1 inch (150 by 25 mm), ladder shaped.
 - 5. Grates: 5.9-by-1-inch (150-by-25-mm) frame; with deep-pattern, heavy-duty, ladder-shaped-bar, cross members.

6. Vandal-Proof Fasteners: Attachments to secure grates to trench sections.

D. Wide-Width Trench Systems: Include the following stainless-steel components:

1. Trench Sections: Modular units, approximately 11 inches (279 mm) wide, with flanged ends, gaskets, bolts, nuts, and end pieces. Include level invert, with outlets in number, sizes, and locations indicated.
2. Grates: 11.8 by 1 inch (300 by 25 mm), slotted.
3. Grates: 11.8 by 1 inch (300 by 25 mm), ladder shaped.
4. Grates: 11.8-by-1-inch (300-by-25-mm) frame; with deep-pattern, heavy-duty, ladder-shaped-bar, cross members.
5. Vandal-Proof Fasteners: Attachments to secure grates to trench sections.

E. Drainage Specialties: Include the following stainless-steel components:

1. Light-Duty Floor Drains: Adjustable type, with membrane flashing flange and ring, bottom outlet of size indicated, and grate with square perforations.
2. Heavy-Duty Floor Drains: 8.5 by 8.5 inches (216 by 216 mm), with membrane flange and water trap.
 - a. Grate: 8.15 by 8.15 by 0.4 inch (207 by 207 by 10 mm), with round perforations.
 - b. Grate: 8.15 by 8.15 by 1.0 inch (207 by 207 by 25 mm); with heavy-duty, ladder-shaped-bar, cross members.
3. Cleanouts: Square floor plate and EPDM sealing ring.
4. Vandal-Proof Fasteners: Screws or other attachments to secure grates to specialties.

F. Supports, Anchors, and Setting Devices: Manufacturer's standard, unless otherwise indicated.

2.15 BACKWATER VALVES

A. Gray-Iron Backwater Valves: ASME A112.14.1, gray-iron body and bolted cover, with bronze seat.

1. Horizontal Type: With swing check valve and hub-and-spigot ends.
2. Combination Horizontal and Manual Gate-Valve Type: With swing check valve, integral gate valve, and hub-and-spigot ends.
3. Terminal Type: With bronze seat, swing check valve, and hub inlet.

B. PVC Backwater Valves: Similar to ASME A112.14.1, horizontal type; with PVC body, PVC removable cover, and PVC swing check valve.

2.16 CLEANOUTS

A. Gray-Iron Cleanouts: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug. Use units with top-loading classifications according to the following applications:

1. Light Duty: In earth or grass foot-traffic areas.
2. Medium Duty: In paved foot-traffic areas.
3. Heavy Duty: In vehicle-traffic service areas.
4. Extra-Heavy Duty: In roads.
5. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

B. PVC Cleanouts: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.17 DRAINS

A. Gray-Iron Area Drains: ASME A112.21.1M, round, gray-iron body with anchor flange and round, secured, gray-iron grate. Include bottom outlet with inside calk or spigot connection, of sizes indicated. Use units with top-loading classifications according to the following applications:

1. Medium Duty: In paved foot-traffic areas.
 2. Heavy Duty: In vehicle-traffic service areas.
- B. Gray-Iron Trench Drains: ASME A112.21.1M, 6-inch- (150-mm-) wide top surface, rectangular body with anchor flange or other anchoring device, and rectangular, secured grate. Include units of total lengths indicated and number of bottom outlets with inside call or spigot connections, of sizes indicated. Use units with top-loading classifications according to the following applications:
1. Medium Duty: In paved foot-traffic areas.
 2. Heavy Duty: In vehicle-traffic service areas.
 3. Extra-Heavy Duty: In roads.
- C. Steel Trench Drains: Fabricated from ASTM A 242/A 242M steel plate, to form rectangular body with uniform bottom slope of 2 percent down toward outlet, anchor flange, and grate. Include units of total lengths indicated, bottom outlet of size indicated, outlet strainer, and acid-resistant enamel coating on inside and outside surfaces. Include grate openings with total free area at least two times outlet cross-sectional area and with the following features:
1. Plate Thickness: 1/4 inch (6.4 mm).
 2. Plate Thickness: 1/8 inch (3.2 mm).
 3. Overall Width: 7-3/4 inches (197 mm).
 4. Overall Width: 12-1/2 inches (318 mm).
 5. Grate: 3-by-3/8-inch (76-by-9.5-mm) slots.
 6. Grate: 3/8-inch- (9.5-mm-) diameter openings.
 7. Grate: 1/4-inch- (6.4-mm-) diameter openings.
 8. Cover: Solid with diamond pattern, if indicated.
 9. Weep holes in body and flashing clamping ring for units used with waterproof membrane.
- D. Stainless-Steel Trench Drains: Fabricated from ASTM A 666, Type 304, stainless-steel plate; to form rectangular body with uniform bottom slope of 2 percent down toward outlet, anchor flange, and grate. Include units of total lengths indicated, bottom outlet of size indicated, and outlet strainer. Include grate openings with total free area at least two times outlet cross-sectional area and with the following features:
1. Plate Thickness: 1/4 inch (6.4 mm).
 2. Plate Thickness: 1/8 inch (3.2 mm).
 3. Overall Width: 7-3/4 inches (197 mm).
 4. Overall Width: 12-1/2 inches (318 mm).
 5. Grate: 3-by-3/8-inch (76-by-9.5-mm) slots.
 6. Grate: 3/8-inch- (9.5-mm-) diameter openings.
 7. Grate: 1/4-inch- (6.4-mm-) diameter openings.
 8. Cover: Solid with diamond pattern, if indicated.
 9. Weep holes in body and flashing clamping ring for units used with waterproof membrane.

2.18 PIPE OUTLETS

- A. Head Walls: Cast-in-place reinforced concrete, with apron and tapered sides.
- B. Riprap Basins: Broken, irregular size and shape, graded stone.
 1. Average Size: NSA No. R-3, screen opening 2 inches (51 mm).
 2. Average Size: NSA No. R-4, screen opening 3 inches (76 mm).
 3. Average Size: NSA No. R-5, screen opening 5 inches (127 mm).
- C. Filter Stone: NSA No. FS-2, No. 4 screen opening, average-size, graded stone.
- D. Energy Dissipators: NSA No. A-1, 3-ton (2700-kg) average weight armor stone, unless otherwise indicated.

2.19 DRY WELLS

- A. Description: ASTM C 913, precast, reinforced, perforated concrete rings. Include the following:

1. Floor: Cast-in-place concrete.
 2. Cover: Liff-off-type concrete cover with cast-in lift rings.
 3. Wall Thickness: 4 inches (100 mm) minimum with 1-inch (25-mm) diameter or 1-by-3-inch (25-by-75-mm) maximum slotted perforations arranged in rows parallel to axis of ring.
 - a. Total Free Area of Perforations: Approximately 15 percent of ring interior surface.
 - b. Ring Construction: Designed to be self-aligning.
 4. Filtering Material: ASTM D 448, Size No. 24, 3/4- to 2-1/2-inch (19- to 63-mm) washed, crushed stone or gravel.
- B. Description: Manufactured PE side panels and top cover that assemble into 50-gal. (190-L) storage capacity units. Include the following:
1. Side Panels: With knockout ports for piping and seepage holes.
 2. Top Cover: With knockout port for drain.
 3. Filter Fabric: As recommended by unit manufacturer.
 4. Filtering Material: ASTM D 448, Size No. 24, 3/4- to 2-1/2-inch (19- to 63-mm) washed, crushed stone or gravel.
- C. Description: Constructed-in-place aggregate type. Include the following:
1. Lining: Clay or concrete bricks.
 2. Lining: Concrete blocks or precast concrete rings with notches or weep holes.
 3. Filtering Material: ASTM D 448, Size No. 24, 3/4- to 2-1/2-inch (19- to 63-mm) washed, crushed stone or gravel.
 4. Cover: Precast, reinforced-concrete slab, designed for structural loading according to ASTM C 890 and made according to ASTM C 913. Include slab dimensions that will extend 12 inches (300 mm) minimum beyond edge of excavation, with bituminous coating over entire surface. Cast cover with opening for manhole in center.
 5. Manhole: 24-inch- (610-mm-) diameter, reinforced-concrete access lid with steel lift rings. Include bituminous coating over entire surface.
 6. Film: PE sheet with at least 8-mil (0.2-mm) thickness or other equivalent, impervious material.

2.20 STORMWATER DISPOSAL SYSTEMS

- A. Storage and Leaching Chambers: Molded PE with perforated sides and open bottom. Include number of chambers, distribution piping, end plates, and other standard components as required for system total capacity.
- B. Filtering Material: ASTM D 448, Size No. 24, 3/4- to 2-1/2-inch (19- to 63-mm) washed, crushed stone or gravel.
- C. Filter Mat: Geotextile woven or spun filter fabric, in one or more layers, for minimum total unit weight of 4 oz./sq. yd. (135 g/sq. m).

PART THREE – EXECUTION

3.01 EARTHWORK

- A. Excavating, trenching, and backfilling are specified in Division 2 Section "Earthwork."

3.02 IDENTIFICATION

- A. Materials and their installation are specified in Division 2 Section "Earthwork." Arrange for installing green warning tapes directly over piping and at outside edges of underground structures.
 1. Use warning tape or detectable warning tape over ferrous piping.
 2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.03 PIPING APPLICATIONS

- A. General: Include watertight, silttight, or soiltight joints, unless watertight or silttight joints are indicated.

B. Refer to Part 2 of this Section for detailed specifications for pipe and fitting products listed below. Use pipe, fittings, and joining methods according to applications indicated.

C. Gravity-Flow Piping: Use the following:

1. NPS 3 (DN80): Hub-and-spigot, Extra-Heavy class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. NPS 3 (DN80): Hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
3. NPS 3 (DN80): Hubless cast-iron soil pipe and fittings, couplings, and coupled joints.
4. NPS 3 (DN80): Ductile-iron sewer pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints.
5. NPS 3 (DN80): Stainless-steel drainage pipe and fittings, gaskets, and gasketed joints. Use EPDM-compound gaskets, unless otherwise indicated. Use nitrile-rubber-compound gaskets for wastes containing gasoline or oil.
6. NPS 3 (DN80): ABS, SDR 35, sewer pipe and fittings; solvent-cemented joints; or gaskets and gasketed joints.
7. NPS 4 to NPS 6 (DN100 to DN150): Hub-and-spigot, Extra-Heavy class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
8. NPS 4 to NPS 6 (DN100 to DN150): Hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
9. NPS 4 to NPS 6 (DN100 to DN150): Hubless cast-iron soil pipe and fittings, couplings, and coupled joints.
10. NPS 4 and NPS 6 (DN100 and DN150): Stainless-steel drainage pipe and fittings, gaskets, and gasketed joints. Use EPDM-compound gaskets, unless otherwise indicated. Use nitrile-rubber-compound gaskets for wastes containing gasoline or oil.
11. NPS 4 and NPS 6 (DN100 and DN150): Corrugated-steel pipe and fittings, connecting bands, and banded joints.
12. NPS 4 and NPS 6 (DN100 and DN150): Corrugated-aluminum pipe and fittings, connecting bands, and banded joints.
13. NPS 4 and NPS 6 (DN100 and DN150): ABS, SDR 35, sewer pipe and fittings; solvent-cemented joints; or gaskets and gasketed joints.
14. NPS 4 and NPS 6 (DN100 and DN150): Corrugated PE drainage tubing and fittings, solittight couplings, and coupled joints.
15. NPS 4 and NPS 6 (DN100 and DN150): Corrugated PE drainage tubing and fittings, silttight couplings, and coupled joints.
16. NPS 4 and NPS 6 (DN100 and DN150): Cellular-core PVC pipe, PVC sewer pipe fittings, and solvent-cemented joints.
17. NPS 4 and NPS 6 (DN100 and DN150): PVC sewer pipe and fittings, solvent-cemented joints, or gaskets and gasketed joints.
18. NPS 4 and NPS 6 (DN100 and DN150): Nonreinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
19. NPS 8 to NPS 15 (DN200 to DN375): Hub-and-spigot, Extra-Heavy class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
20. NPS 8 to NPS 15 (DN200 to DN375): Hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
21. NPS 8 to NPS 15 (DN200 to DN375): Hubless cast-iron soil pipe and fittings, couplings, and coupled joints in NPS 8 and NPS 10 (DN200 and DN250). Use hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints in NPS 12 and NPS 15 (DN300 and DN375).
22. NPS 8 to NPS 15 (DN200 to DN375): Ductile-iron sewer pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints in NPS 8 to NPS 12 (DN200 to DN300). Use ductile-iron culvert pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints in NPS 14 to NPS 16 (DN350 to DN400).
23. NPS 8 to NPS 15 (DN200 to DN375): Stainless-steel drainage pipe and fittings, mechanical couplings, and coupled joints in NPS 8 to NPS 12 (DN200 to DN300). Use EPDM-compound seal, unless otherwise indicated. Use nitrile-rubber-compound seal for wastes containing gasoline or oil. Use hub-and-spigot, Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints in NPS 15 (DN375).
24. NPS 8 to NPS 15 (DN200 to DN375): Corrugated-steel pipe and fittings, connecting bands, and banded joints.
25. NPS 8 to NPS 15 (DN200 to DN375): Corrugated-aluminum pipe and fittings, connecting bands, and banded joints.
26. NPS 8 to NPS 15 (DN200 to DN375): ABS, SDR 42, sewer pipe and fittings; solvent-cemented joints; or gaskets and gasketed joints in NPS 8 to NPS 12 (DN200 to DN300). Use PVC sewer pipe and fittings, solvent-cemented joints, or gaskets and gasketed joints in NPS 15 (DN375).

27. NPS 8 to NPS 15 (DN200 to DN375): Corrugated PE drainage tubing and fittings, soiltight couplings, and coupled joints in NPS 8 and NPS 10 (DN200 and DN250). Use corrugated PE pipe and fittings, soiltight couplings, and coupled joints in NPS 12 and NPS 15 (DN300 and DN375).
28. NPS 8 to NPS 15 (DN200 to DN375): Corrugated PE drainage tubing and fittings, silttight couplings, and coupled joints in NPS 8 and NPS 10 (DN200 and DN250). Use corrugated PE pipe and fittings, silttight couplings, and coupled joints in NPS 12 and NPS 15 (DN300 and DN375).
29. NPS 8 to NPS 15 (DN200 to DN375): PVC sewer pipe and fittings, solvent-cemented joints, or gaskets and gasketed joints.
30. NPS 8 to NPS 15 (DN200 to DN375): Nonreinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
31. NPS 8 to NPS 15 (DN200 to DN375): NPS 12 and NPS 15 (DN300 and DN375) reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints. Do not use nonreinforced pipe instead of reinforced concrete pipe in NPS 8 and NPS 10 (DN200 and DN250).
32. NPS 18 to NPS 36 (DN450 to DN900): Ductile-iron culvert pipe; standard-pattern, cast-iron or ductile-iron fittings; gaskets; and gasketed joints.
33. NPS 18 to NPS 36 (DN450 to DN900): Corrugated-steel pipe and fittings, connecting bands, and banded joints.
34. NPS 18 to NPS 36 (DN450 to DN900): Corrugated-aluminum pipe and fittings, connecting bands, and banded joints.
35. NPS 18 to NPS 36 (DN450 to DN900): Corrugated PE pipe and fittings; corrugated, soiltight couplings; and coupled joints.
36. NPS 18 to NPS 36 (DN450 to DN900): Corrugated PE pipe and fittings; PE sleeve, silttight couplings; and coupled joints.
37. NPS 18 to NPS 36 (DN450 to DN900): PVC, ribbed drain pipe and fittings; gaskets; and gasketed joints.
38. NPS 18 to NPS 36 (DN450 to DN900): PVC sewer pipe and fittings, gaskets, and gasketed joints.
39. NPS 18 to NPS 36 (DN450 to DN900): Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
40. NPS 18 to NPS 36 (DN450 to DN900): Nonreinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
41. NPS 18 to NPS 36 (DN450 to DN900): Reinforced-concrete arch pipe, sealing bands, and banded joints.
42. NPS 18 to NPS 36 (DN450 to DN900): Reinforced-concrete, elliptical pipe, Type HE, horizontal; sealing bands; and banded joints.
43. NPS 18 to NPS 36 (DN450 to DN900): Reinforced-concrete, elliptical pipe, Type VE, vertical; sealing bands; and banded joints.
44. NPS 42 to NPS 64 (DN1050 to DN1600): Ductile-iron culvert pipe; standard-pattern, ductile-iron fittings; gaskets; and gasketed joints.
45. NPS 42 to NPS 120 (DN1050 to DN3000): Corrugated-steel pipe and fittings, connecting bands, and banded joints.
46. NPS 42 to NPS 120 (DN1050 to DN3000): Corrugated-aluminum pipe and fittings; connecting bands; and banded joints.
47. NPS 42 and NPS 48 (DN1050 and DN1200): Similar pattern to corrugated PE pipe and fittings; corrugated, soiltight couplings; and coupled joints.
48. NPS 42 and NPS 48 (DN1050 and DN1200): Similar pattern to corrugated PE pipe and fittings; corrugated, silttight couplings; and coupled joints.
49. NPS 42 to NPS 144 (DN1050 to DN3600): Reinforced-concrete sewer pipe and fittings, gaskets, and gasketed joints.
50. NPS 42 to NPS 132 (DN1050 to DN3300): Reinforced-concrete arch pipe, sealing bands, and banded joints.
51. NPS 39 to NPS 144 (DN975 to DN3600): Reinforced-concrete, Type HE, horizontal, elliptical pipe; sealing bands; and banded joints.
52. NPS 39 to NPS 144 (DN975 to DN3600): Reinforced-concrete, Type VE, vertical, elliptical pipe; sealing bands; and banded joints.

D. Force-Main Piping: Use the following:

1. NPS 3 (DN80): Ductile-iron sewer pipe; standard- or compact-pattern, ductile-iron fittings; gaskets; and gasketed joints.
2. NPS 4 to NPS 8 (DN100 to DN200): Ductile-iron sewer pipe; standard- or compact-pattern, ductile-iron fittings; gaskets; and gasketed joints.
3. NPS 4 to NPS 8 (DN100 to DN200): PVC pressure pipe, PVC pressure fittings, gaskets, and gasketed joints.
4. NPS 10 and NPS 12 (DN250 and DN300): Ductile-iron pipe; standard- or compact-pattern, ductile-iron fittings; gaskets; and gasketed joints.

5. NPS 10 and NPS 12 (DN250 and DN300): PVC pressure pipe; compact-pattern, ductile-iron fittings; gaskets; and gasketed joints.

3.04 SPECIAL PIPE COUPLING AND FITTING APPLICATIONS

- A. Special Pipe Couplings: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.
 1. Use the following pipe couplings for nonpressure applications:
 - a. Sleeve type to join piping, of same size, or with small difference in OD.
 - b. Increaser/reducer-pattern, sleeve type to join piping of different sizes.
 - c. Bushing type to join piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.
 2. Use pressure-type pipe couplings for force-main joints. Include PE film, pipe encasement.
- B. Special Pipe Fittings: Use where indicated. Include PE film, pipe encasement.

3.05 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.
- C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.
- D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
 1. Install piping pitched down in direction of flow, at minimum slope of 1 percent, unless otherwise indicated.
 2. Install piping with 36-inch (1000-mm) minimum cover.
- F. Install force-main piping between and connect to building's storm-drainage force main and termination point indicated.
 1. Install piping with restrained joints at horizontal and vertical changes in direction. Use cast-in-place concrete supports and anchors or corrosion-resistant rods and clamps.
 2. Install piping with 36-inch (1000-mm) minimum cover.
- G. Extend storm drainage piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.
- H. Install ductile-iron, force-main piping according to AWWA C600.
- I. Install PVC force-main piping according to AWWA M23.
- J. Install force-main piping between and connect to building's force main and termination point indicated.
- K. Install force-main piping with 36-inch (1000-mm) minimum cover.
- L. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed by tunneling, jacking, or a combination of both.

3.06 PIPE JOINT CONSTRUCTION AND INSTALLATION

- A. General: Join and install pipe and fittings according to installations indicated.
- B. Refer to Division 2 Section "Utility Materials" for basic piping joint construction and installation.
- C. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: With rubber gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook." Use gaskets that match class of pipe and fittings.
 - 1. Install PE film, pipe encasement over hub-and-spigot, cast-iron soil pipe and fittings according to ASTM A 674 or AWWA C105.
- D. Hubless Cast-Iron Soil Pipe and Fittings: With CISPI-type couplings according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook."
 - 1. Install PE film, pipe encasement over hubless cast-iron soil pipe and fittings according to ASTM A 674 or AWWA C105.
- E. Hubless Cast-Iron Soil Pipe and Fittings: With heavy-duty-type couplings according to CISPI 310, CISPI's "Cast Iron Soil Pipe and Fittings Handbook," and coupling manufacturer's written instructions.
 - 1. Install PE film, pipe encasement over hubless cast-iron soil pipe and fittings according to ASTM A 674 or AWWA C105.
- F. Ductile-Iron Sewer Pipe with Ductile-Iron Fittings: According to AWWA C600.
 - 1. Install PE film, pipe encasement over ductile-iron sewer pipe and ductile-iron fittings according to ASTM A 674 or AWWA C105.
- G. Stainless-Steel Drainage Piping: According to ASME A112.3.1 and manufacturer's written instructions.
- H. Install with top surfaces of components, except piping, flush with finished surface.
- I. Corrugated-Steel Pipe: Join and install according to ASTM A 798. Use standard joints made with coupling bands, unless otherwise indicated.
- J. Corrugated-Steel Pipe: Join and install according to ASTM A 798. Use soiltight joints made with coupling bands and gaskets, unless otherwise indicated.
- K. Corrugated-Aluminum Pipe: Join and install according to ASTM B 788. Use standard joints made with coupling bands, unless otherwise indicated.
- L. Corrugated-Aluminum Pipe: Join and install according to ASTM B 788. Use soiltight joints made with coupling bands and gaskets, unless otherwise indicated.
- M. ABS Pipe and Fittings: As follows:
 - 1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
 - 2. Install according to ASTM D 2321.
- N. PE Pipe and Fittings: As follows:
 - 1. Join pipe, tubing, and fittings with couplings for soiltight joints according to manufacturer's written instructions.
 - 2. Install according to ASTM D 2321 and manufacturer's written instructions.
 - 3. Install corrugated piping according to the Corrugated Polyethylene Pipe Association's "Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings."
 - 4. Installation Practices for Corrugated Polyethylene Pipe and Fittings."
- O. PVC Pressure Pipe and Fittings: Join and install according to AWWA M23.
- P. PVC Sewer Pipe and Fittings: As follows:
 - 1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.

2. Install according to ASTM D 2321.

Q. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:

1. Round Pipe and Fittings: ASTM C 443 (ASTM C 443M), rubber gaskets.
2. Elliptical Pipe: ASTM C 877 (ASTM C 877M), Type I, sealing bands.
3. Arch Pipe: ASTM C 877 (ASTM C 877M), Type I, sealing bands.

R. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.

S. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

3.07 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Form continuous concrete channels and benches between inlets and outlet.

C. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches (76 mm) above finished surface elsewhere, unless otherwise indicated.

D. Install precast concrete manhole sections with gaskets according to ASTM C 891.

E. Construct cast-in-place manholes as indicated.

F. Install fiberglass manholes according to manufacturer's written instructions.

3.08 CATCH-BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.09 STORM DRAINAGE INLET AND OUTLET INSTALLATION

A. Construct inlet head walls, aprons, and sides of reinforced concrete, as indicated.

B. Construct riprap of broken stone, as indicated.

C. Install outlets that spill onto grade, anchored with concrete, where indicated.

D. Install outlets that spill onto grade, with flared end sections that match pipe, where indicated.

E. Construct energy dissipators at outlets, as indicated.

3.10 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

3.11 DRY-WELL INSTALLATION

A. Excavate hole to diameter of at least 6 inches (150 mm) greater than outside of dry well. Do not extend excavation into ground-water table.

B. Install precast, concrete-ring dry wells according to the following:

1. Assemble rings to depth indicated.
2. Extend rings to height where top of cover will be approximately 8 inches (200 mm) below finished grade.
3. Backfill bottom of inside of rings with filtering material to level at least 12 inches (300 mm) above bottom.
4. Extend effluent inlet pipe 12 inches (300 mm) into rings and terminate into side of tee fitting.

5. Backfill around outside of rings with filtering material to top level of rings.
6. Install cover over top of rings.

C. Install manufactured, PE dry wells according to manufacturer's written instructions and the following:

1. Assemble and install panels and cover.
2. Backfill bottom of inside of unit with filtering material to level at least 12 inches (300 mm) above bottom.
3. Extend effluent inlet pipe 12 inches (300 mm) into unit and terminate into side of tee fitting.
4. Install filter fabric around outside of unit.
5. Install filtering material around outside of unit.

D. Install constructed-in-place dry wells according to the following:

1. Install brick lining material dry and laid flat, with staggered joints for seepage. Build to diameter and depth indicated.
2. Install block lining material dry, with staggered joints and 20 percent minimum of blocks on side for seepage. Install precast concrete rings with notches or weep holes for seepage. Build to diameter and depth indicated.
3. Extend lining material to height where top of manhole will be approximately 8 inches (200 mm) below finished grade.
4. Backfill bottom of inside of lining with filtering material to level at least 12 inches (300 mm) above bottom.
5. Extend effluent inlet pipe 12 inches (300 mm) into lining and terminate into side of tee fitting.
6. Backfill around outside of lining with filtering material to top level of lining.
7. Install manhole over top of dry well. Support cover on undisturbed soil. Do not support cover on lining.

3.12 DRAINAGE SYSTEM INSTALLATION

- A. Assemble and install components according to manufacturer's written instructions.
- B. Assemble and install stainless-steel drainage systems according to ASME A112.3.1 and manufacturer's written instructions.
- C. Install with top surfaces of components, except piping, flush with finished surface.
- D. Assemble channel sections to form slope down toward drain outlets. Use sealants, adhesives, fasteners, and other materials recommended by system manufacturer.
- E. Embed channel sections and drainage specialties in 4-inch (100-mm) minimum concrete around bottom and sides.
- F. Fasten grates to channel sections if indicated.
- G. Assemble trench sections with flanged joints.
- H. Embed trench sections and drainage specialties in 4-inch (100-mm) minimum concrete around bottom and sides.
- I. Make piping connections and install stainless-steel piping with gasketed joints between system components.

3.13 BACKWATER VALVE INSTALLATION

- A. Install horizontal units in piping where indicated.
- B. Install combination units in piping and in structures where indicated.
- C. Install terminal units on end of piping and in structures where indicated. Secure units to structure walls.

3.14 CLEANOUT INSTALLATION

- A. Install cleanouts and riser extension from sewer pipe to cleanout at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.

- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches (450 by 450 by 300 mm) deep. Set with tops 1 inch (25 mm) above surrounding earth grade.
- C. Set cleanout frames and covers in concrete pavement with tops flush with pavement surface.

3.15 DRAIN INSTALLATION

- A. Install type of drains in locations indicated.
- B. Embed drains in 4-inch (100-mm) minimum depth of concrete around bottom and sides.
- C. Fasten grates to drains if indicated.
- D. Set drain frames and covers with tops flush with pavement surface.

3.16 STORMWATER DISPOSAL SYSTEM INSTALLATION

- A. Excavate trenches of width and depth, and install system and backfill according to chamber manufacturer's written instructions. Include storage and leaching chambers, filtering material, and filter mat.

3.17 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch (150-mm) overlap, with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
- C. Make branch connections from side into existing piping, NPS 4 to NPS 20 (DN100 to DN500). Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches (150 mm) of concrete with 28-day compressive strength of 3000 psi (20.7 MPa).
- D. Make branch connections from side into existing piping, NPS 21 (DN525) or larger, or to underground structures by cutting opening into existing unit large enough to allow 3 inches (76 mm) of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches (150 mm) of concrete for minimum length of 12 inches (300 mm) to provide additional support of collar from connection to undisturbed ground.
 - 1. Use concrete that will attain minimum 28-day compressive strength of 3000 psi (20.7 MPa), unless otherwise indicated.
 - 2. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
- E. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.18 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
 - 1. Close open ends of piping with at least 8-inch- (200-mm-) thick, brick masonry bulkheads.
 - 2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Structures: Excavate around structure as required and use one procedure below:
 - 1. Remove structure and close open ends of remaining piping.
 - 2. Remove top of structure down to at least 36 inches (1000 mm) below final grade. Fill to within 12 inches (300 mm) of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.

3. Backfill to grade according to Division 2 Section "Earthwork."

3.19 FIELD QUALITY CONTROL

- A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
 1. In large, accessible piping, brushes and brooms may be used for cleaning.
 2. Place plug in end of incomplete piping at end of day and when work stops.
 3. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.
- B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches (600 mm) of backfill is in place, and again at completion of Project.
 1. Submit separate reports for each system inspection.
 2. Defects requiring correction include the following:
 - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
 - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
 - c. Crushed, broken, cracked, or otherwise damaged piping.
 - d. Infiltration: Water leakage into piping.
 - e. Exfiltration: Water leakage from or around piping.
 3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
 4. Reinspect and repeat procedure until results are satisfactory.
- C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
 1. Do not enclose, cover, or put into service before inspection and approval.
 2. Test completed piping systems according to authorities having jurisdiction.
 3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
 4. Submit separate reports for each test.
 5. Where authorities having jurisdiction do not have published procedures, perform tests as follows:
 - a. Force Main: Perform hydrostatic test after thrust blocks, supports, and anchors have hardened. Test at pressure not less than one and one-half times maximum system operating pressure, but not less than 150 psig (1035 kPa).
 - 1) Ductile-Iron Piping: Test according to AWWA C600, Section "Hydraulic Testing."
 - 2) PVC Piping: Test according to AWWA M23, "Testing and Maintenance" Chapter.
 6. Leaks and loss in test pressure constitute defects that must be repaired.
 7. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

SECTION 02634

PVC PIPE (AWWA C900)

PART ONE - GENERAL

1.01 SCOPE

- A. The Contractor shall furnish and install all polyvinyl chloride (PVC) pipe as specified herein, shown on the Drawings or as directed by the Engineer.
- B. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. Section 02100 Clearing and Grubbing
 - Section 02225 Granular Backfill
 - Section 02235 Trench Excavation
 - Section 02620 Pipe Joints
 - Section 02625 Ductile Iron Pipe & Fittings

1.02 QUALITY ASSURANCE

- A. The PVC pipe 12" or smaller shall meet AWWA C900.
- B. The PVC pipe larger than 12" shall meet AWWA C905.

1.03 SUBMITTALS

- A. Prior to the use or replacement of ductile iron pipe, the Contractor shall submit manufacturers material specification and recommended handling and installation procedures.

PART TWO - PRODUCTS

2.01 MATERIALS

- a. All PVC pipe used, as covered under this Item, shall conform to AWWA C900, with end being designated for one of the type joints as specified herein, or under Section 02625.
- B. The outside diameter of the pipe shall be identical to that of ductile iron pipe for similar diameters, requiring no special adaptors to allow the use of cast or ductile iron fittings where necessary.
- C. The minimum class for PVC pipe under Section 02634 shall be DR 18.
- D. Materials of construction, including joints and gaskets, shall be suitable for exposure to raw sewage, and shall also be UV stabilized with either 2% carbon black or titanium dioxide.

2.02 JOINTS

- A. See Section 02620 of these Detailed Specifications.
- B. Mechanical Joints and Push-on Joints including their respective appurtenances shall conform to ANSI 21.11 (AWWA C111).

PART THREE - EXECUTION

3.01 INSTALLATION

- A. Process and Pressure Pipe

1. Pipe and appurtenance shall be installed true to line, grade, and location; with joints centered, spigots home; pipe properly supported and restrained against movement; and all valve stems.
2. All elbows, tees, plugs, etc. shall be properly anchored, blocked, or otherwise restrained to prevent movement of the pipe in the joints due to internal or external pressure.
3. The open ends of all pipes and special castings shall be plugged or otherwise closed with a watertight plug to the approval of the Engineer before leaving the work for the night, and at other times of interruption of the work. All pipe ends which are to be permanently closed shall be plugged or capped and restrained against internal pressure.
4. Where new or existing pipe requires cutting in the field, it shall be done in a manner to leave a smooth end at right angles to the pipe centerline. The finished cut must be approved by the Engineer.
5. Just prior to joining the pipe, the surfaces of the joint rings shall be wiped clean and the joint rings and rubber gaskets shall be liberally lubricated with an approved type of vegetable oil soap. The spigot end, with the gasket placed in the groove, shall be entered into the bell of the pipe already laid, making sure that both pipes are properly aligned. Before the joint is fully "home" the position of the gasket in the joint shall be determined by means of a suitable feeler gauge supplied by the pipe manufacturer. If the gasket is found not to be in proper position, the pipes shall be separated and the damaged gasket replaced. The pipe is then forced "home" firmly and fully. In its final position, the joint between the pipes shall not be deflected more than 1/2 in. at any point.

B. Field Quality Control

1. The PVC AWWA C900 pipe, specials, and fittings shall be installed in accordance with AWWA C600.
2. Field inspection and testing shall be performed for the PVC AWWA C900 pipeline as follows:
 - a. Preliminary inspection/test
 - (1) The PVC AWWA C900 pipe and the pipe coating and lining, specials, and fittings have not been damaged during shipping, storage and installation.
 - (2) The pipe trench has been prepared as per project specifications and as shown on drawings.
 - (3) All field assembly has been done in accordance with AWWA C600.
 - (4) Anchors and thrust blocks have been provided where indicated on the drawings.
 - (5) Backfilling has been done as specified and as shown on drawings.
 - (6) Specials, fittings, and appurtenances have been properly connected.
 - b. Pre-final inspection/test

Pre-final inspection/testing consists of conducting the hydrostatic field test as described in Section 4.1 of AWWA C600. The test pressure shall be 150 psi. The test pressure shall be maintained for a minimum of two hours. A leakage test shall be conducted concurrently with the hydrostatic pressure test in accordance with AWWA C600, Section 4.1.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. A detectable tracer tape shall be installed in the same trench with every non-metallic potable water line or service, natural gas line or service, wastewater collection/transport sewers.
2. The Contractor shall supply all labor, materials, tools, and equipment required to furnish and install in good workmanlike manner the magnetic locating tape as specified herein.

B. Related Work:

1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
2. All applicable Divisions of the Technical Specifications.

1.02 SUBMITTALS

- A. The Contractor shall submit one (1) sample section five (5) feet in length for each color tape to be installed, the manufacturer's descriptive literature, and manufacturer's installation instructions.

PART TWO - PRODUCTS

2.01 MATERIAL

All detector tape shall be at least three (3) inches wide, shall be detectable with conventional pipe location equipment, and shall be color coded on both sides in accordance with the following schedule:

| <u>Type of Service</u> | <u>Color</u> | <u>Legend (if required)</u> |
|------------------------|--------------|-----------------------------|
| Natural Gas | Orange | Gas Line Below |
| Potable Water | Blue | Buried Water Line Below |
| Non-Potable Water | Red | Not Required |
| Wastewater Sewers | Green | Buried Sewer Line Below |

2.02 MANUFACTURER

Detector tape shall be Alarm Tape, Terra Tape, or equal.

PART THREE - EXECUTION

3.01 INSTALLATION

- A. The detector tape shall be continuous and installed in the trench approximately eighteen (18) inches above the top of the pipe.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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UNDERGROUND PIPING INSTALLATION

PART ONE - GENERAL

1.01 DESCRIPTION

A. Work included:

1. Provide underground piping installation, complete, in place, as shown on the Drawings, specified herein, and needed for a complete and proper installation.
2. Unless otherwise specified, this Section shall apply to any underground piping installation.
3. Underground piping shall include buried piping.

B. Summary of PART TWO - PRODUCTS

1. Subsection 2.01: Concrete For Cradles, Encasements or Thrust Blocking
2. Subsection 2.02: Pipe Embedment
3. Subsection 2.03: Imported Fill
4. Subsection 2.04: Job Excavated Material
5. Subsection 2.05: Other Materials

C. Summary of PART THREE - EXECUTION

1. Subsection 3.01: Surface Conditions
2. Subsection 3.02: Coordination
3. Subsection 3.03: General Excavation
4. Subsection 3.04: Trench Excavation
5. Subsection 3.05: Structure Excavation
6. Subsection 3.06: Rock Excavation
7. Subsection 3.07: Foundation Stabilization
8. Subsection 3.08: Pipeline Installation
9. Subsection 3.09: Installing Manholes and Catch Basins
10. Subsection 3.10: Testing

D. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Section 02220: Excavation, Backfilling and Compaction

3. Section 02625: Ductile Iron Pipe and Fittings
4. Section 02733: Reinforced Concrete Pipe
5. Section 03120: Cast-In-Place Concrete
6. Section 11900: Processing Piping System
7. Section 11910: Exposed Piping Installation
9. Section 11920: Valves and Appurtenances

1.02 QUALITY ASSURANCE

- A. Qualifications of Manufacturers: Products used in the work of this Section shall be produced by manufacturers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these Specifications:
 1. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
 2. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the Work.
 3. Test data required elsewhere in these Sections.
- C. Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Engineer three (3) copies of an operation and maintenance manual compiled in accordance with the provisions of Section 01730 of these Specifications.

1.04 PRODUCT HANDLING

- A. General: Comply with pertinent provisions of Section 01350.

1.05 VERIFICATION OF CONTRACT DOCUMENTS

- A. The Contract Drawings indicate the required pipe sizes and the general arrangement for all piping and equipment. Locations shall be verified in the field by the Contractor. In the event it should become necessary in some cases to change the location of any of the work due to building construction, the Contractor shall consult with the Engineer before making any changes. Any such changes approved by the Engineer shall be made without added cost to the Owner. Under no circumstances shall the pipe sizes indicated on the Contract Drawings be changed without first having the written approval of the Engineer.
- B. The attention of the Contractor is directed to the fact that this Project may also include work of other trades. The final location for the underground piping installation must be coordinated with facilities required for other installations to prevent interference.
- C. The Contractor is especially cautioned to install no work that connects to equipment until such time as

complete shop drawings of such equipment have been approved by the Engineer. Any such work so installed by the Contractor prior to approval of shop drawings will be at the Contractor's risk.

PART TWO - PRODUCTS

2.01 CONCRETE FOR CRADLES, ENCASEMENTS OF THRUST BLOCKING

- A. Comply with pertinent provisions of Section 03120.
- B. Concrete shall meet ACI Specifications for 3000 psi concrete at twenty-eight (28) days minimum.

2.02 PIPE EMBEDMENT

- A. Unless otherwise specified, material for pipe embedment shall consist of crushed stone or gravel and shall be well graded with 100% passing a one (1) inch sieve and no more than 10% passing a No. 200 sieve. All bedding material shall be approved by the Engineer.

2.03 IMPORTED FILL

- A. Imported backfill material for gravel road restoration or as otherwise directed, shall be bank run gravel and shall not contain any large lumps over two (2) inches in greatest dimension or any cinders, brush, rubbish, roots, debris, large stones or boulders, junk or organic matter. Local bank run gravel approved by the Engineer and meeting these requirements will be acceptable.

2.04 JOB EXCAVATED MATERIAL

- A. All job-excavated materials which are to be used for trench backfill, above pipe embedment, and which are to be compacted by any method except settlement by water, shall be clean and shall be of such composition that such materials can be compacted to 95% relative standard as measured by the Standards Proctor Density Test (ASTM D698).

2.05 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 COORDINATION

- A. Carefully coordinate with all other trades to ensure proper and adequate interface of the work of the other trades with the work of this Section.

3.03 GENERAL EXCAVATION

- A. Excavation shall include the clearing of the site of the work, the loosening, loading, removing, transporting and disposal of all materials, wet or dry, necessary to be removed to construct all process piping systems included in this Contract to the lines, grades, and locations shown on the Contract Drawings. The Contractor must assume the risk of meeting and the Contract price shall include the cost of removal to quicksand, hardpan, boulders, clay rubbish, unforeseen obstacles, underground conduits, gas pipe, drain tile, trees, roots, timber or masonry structures, railroad tracks pavements, and sidewalks, and the delay or damage occasioned by the same, whether these obstacles are shown on the Contract Drawings or not.

- B. No claim for any amount of money beyond the Contract price of the work will be entertained or allowed on account of the character of the ground in which the trenches or other excavation is made.
- C. The locations of sewers, conduits, and structures, as shown on the Contract Drawings, have been selected to provide the service intended. The Owner reserves the right to make minor variations in the location of these items during the construction, and no extra payment will be allowed the Contractor for such shifts in alignment.
- D. The location of existing piping and underground utilities, such as gas mains, water mains, electric duct lines, telephone conduits, etc., as shown on the Contract Drawings have been determined from the records of the parent utility companies and drawings of the existing facilities. However, the Owner does not assume responsibility for the possibility that during construction, utilities, other than those shown, may be encountered or that actual location of those shown may be different from the locations designed on the Contract Drawings.
- E. At the locations wherein detailed positions of these facilities become necessary to the new construction, the Contractor shall, at his own expense, furnish all labor and tools to either verify and substantiate the record drawing locations, or definitely establish the position of the facilities.
- F. Unless otherwise specified, all concrete and asphalt surfaced pavements shall be sawed before removal.
- G. Necessary arrangements shall be made by the Contractor with all persons, firms, corporations owning or using any poles, pipes, tracks, or conduits, etc., affected by the construction on this Project, to maintain and protect such facilities during construction with the cost of any such protection paid by the Contractor and included in the Contract price. In the event that any existing gas pipes, water pipes, conduits, sewers, tile drains or poles are blocked or interfered with by the excavation required on this project, the Contractor shall maintain them in continuous operation, and restore them to the same condition as they were prior to the start of construction of this Project, all at no additional compensation.
- H. The Contractor shall do all ditching, pumping, well pointing, and bailing, build all drains, and do all other work necessary to keep the excavation clear of ground water, sewage or storm water during the progress of the work, and until the finished work is safe from injury. Where the excavation is wet and suitable construction conditions cannot be obtained by other methods, the Contractor shall install and operate, at no additional compensation, a pumping system connected with well points so as to drain the same effectively. No masonry or pipe shall be laid in water, and water shall not be allowed to rise over masonry until concrete or mortar has set at least forty-eight (48) hours. All water pumped or drained from the work shall be disposed of in a manner satisfactory to the Engineer without damage to adjacent property or to other work under construction. Necessary precautions shall be taken to protect all construction against flooding.
- I. Whenever the excavation is carried beyond the lines and grades shown on the Contract Drawings, or given by the Engineer, the Contractor shall, at his own expense, refill all such excavated space with such material and in such a manner as may be directed. Beneath and around concrete structures, space excavated without authority shall be thoroughly compacted when refilling, or if deemed necessary by the Engineer, shall be refilled with concrete at the Contractor's expense.
- J. If the materials encountered on any excavation are not suitable for structural foundations, or, if necessary to go an additional depth or width from that designated on the Contract Drawings to provide proper bearing for pipe or masonry, or to construct pile or plank foundations, the Contractor shall make such additional excavations outside the regular limits of the work as may be directed by the Engineer.
- K. Excavated material shall be deposited so as to interfere as little as possible with the excavation of the whole work or its several parts, and in such manner that for each purpose the most suitable material may be placed in its final position but not in a manner to interfere with the satisfactory carrying out of the work. Such material as cannot be placed in its final position in fills and embankments shall be removed to a temporary spoil bank, from which it shall later be taken and placed in embankment or fills.
- L. Unsuitable and surplus excavated material not incorporated in the improvement shall be disposed of by the Contractor at his own expense unless otherwise designated in the Project Specification, or on the Contract Drawings.
- M. If private land is used by the Contractor as a spoil site, the Contractor shall obtain written permission from the

Owner or Agent of the land agreeing to its use for this purpose, and provide the project Owner with a certified copy of such agreement.

- N. These Specifications shall in no way supersede and requirements of the Department of Labor and Industry of the Ohio Division of Labor, as set forth in "Regulations for Trenches and Excavations," except wherever these Specifications are more stringent than those of the Department of Labor and Industry.

3.04 TRENCH EXCAVATION

- A. The ground shall be excavated in open trenches, of sufficient width and depth to provide ample room within the limits of the excavation, or lines of sheeting and bracing, for the proper construction of the sewer, drain or pressure pipeline, and its appurtenances as shown on the Contract Drawings and for removing any material which the Engineer may deem unsuitable for foundation.
- B. The excavation of the trench shall not advance more than 200 feet ahead of the completed masonry and pipe work, except where, in the opinion of the Engineer, it is necessary to drain wet ground.
- C. When trench excavation is carried ahead of contemplated masonry and pipe work, the elevation of the bottom of the trench shall be continually checked to the satisfaction of the Owner. Excavation made below that necessary for the proper installation of the sewers, masonry, and appurtenances shall be refilled only with sand or fine gravel, or properly graded crushed rock, thoroughly compacted, all at the Contractor's expense.
- D. The trenches must be of sufficient width (within limitations hereinafter established) to admit ample room within the limits of the excavation for the placing of sheeting and bracing, should sheeting and bracing be necessary to secure the protection of the work.
- E. In clay excavation the bottom of the trench shall be excavated to a minimum depth of four (4) inches below the bottom of the pipe barrel and this space refilled with pipe embedment material satisfactory to the Engineer. Refill shall be slightly rounded to provide as much bearing area as possible for the lower quarter of the pipe. Clay shall be interpreted to mean all soils other rock, sand or gravel.
- F. When pipe of the bell and spigot type is to be installed in the trench, bell holes of sufficient depth shall be dug across the bottom of the trench to accommodate the bell and to permit adequate jointing.
- G. The width of trench measured at the top of pipe shall be not less than the outside pipe diameter plus four (4) inches on each side, to allow room for proper compaction, and not more than the outside pipe diameter plus eight (8) inches on each side.
- H. Wherever shoring or sheeting are used, the trench shall be an additional width sufficient to allow a minimum of four (4) inches between the outside of the pipe and the inside face of the timber.

3.05 STRUCTURE EXCAVATION

- A. Excavation for manholes, catch basins, inlet and special structures shall be made to the depth and dimensions necessary for the proper installations of all structure shown on the Contract Drawings. Care shall be taken that the foundation area of the structure is not excavated below grade except when rock is encountered. Where masonry is built directly against the sides or bottom of the excavations, the final trimming shall be done just before the masonry is placed.

3.06 ROCK EXCAVATION

- A. Wherever the work "Rock" appears in this Section, it shall be interpreted to mean any material geologically in place and of a hardness when first exposed of three (3), or greater, in the scale of mineral hardness, which corresponds to the hardness of the transparent variety of calcite. Any material encountered not of a uniform hardness of three (3) in the scale of mineral hardness which cannot be removed from its original position with a modern three-quarter cubic yard backhoe power excavator in good condition without continuous drilling and blasting will be considered rock provided that the Contractor proves by demonstration and photographic evidence that slate shale, sandstone or other hard material encountered cannot be removed with heavy equipment without continuous drilling and blasting. Other materials shall not be classed as rock, although it

may be more economical to remove same by blasting. Boulders will not be classified as rock unless larger than 1/2 cubic yard.

- B. Should rock be encountered in the excavation, it may be removed by blasting or otherwise only after obtaining the written approval of the Engineer. Where blasts are made, the excavation shall be carefully covered with suitable brush, timber or matting, to prevent danger to life and property. The Contractor shall secure all permits required by law for blasting operations and any additional hazard insurance required; the cost of such permits and insurance to be borne by the Contractor. The Contractor shall strip the rock of overburden, such stripping to be done in sections. No blasting shall be done by the Contractor until he has notified the Engineer and until the necessary cross sections of the top of the rock have been taken.
- C. Materials classified as "Rock" in these Specifications, if encountered, shall be excavated to not less than three (3) inches below the grade of the bottom of structures and six (6) inches below the bottom of pipes, or conduits to be installed, unless specifically shown on the Contract Drawings to be removed to a greater depth. After such rock is removed, the excavation shall be backfilled with pipe embedment material satisfactory to the Engineer, and consolidated to place the top surface at the grade established on the Contract Drawings of the bottom of the structure, pipe, or conduit. Top surface for pipes shall be slightly rounded to provide as much bearing area as possible for the lower quarter of the pipe.

3.07 FOUNDATION STABILIZATION

A. General

- 1. Whenever the ground is sufficiently firm and unyielding, the masonry shall be laid directly on the bottom of the excavation and pipes or conduits shall be laid as specified under 3.04E.
 - 2. When so designated on the Contract Drawings, or ordered by the Engineer, excavated areas shall be strengthened for foundation purposes by furnishing and placing crushed rock or gravel refill, concrete cradle or encasement, timber cradles, timber piling or a combination of these materials.
 - 3. After the excavation is opened and to grade, it will be examined by the Engineer who will determine whether or not it is a satisfactory foundation for masonry or pipes, or if it is necessary to stabilize the base, install concrete or timber cradle, concrete encasement or drive piling. Any masonry or pipe installed in an excavation that has not been examined by the Engineer, is so installed at the Contractor's own risk. Where deemed necessary by the Engineer, a soil load test shall be made to determine the safe bearing capacity of the ground.
 - 4. When refill or cradle is to be placed on any material which will run or move when wet, sheeting must be employed during construction to keep adequate side supports on each side of sewer trench so that weight of cradle and/or sewer will not tend to cause bottom material to run to each side of the excavation. In extremely fluid materials, at the direction of the Owner, wood sheeting shall be used and left in place. In this case the refill or cradle shall extend the entire width between sheeting.
- B. Crushed rock or gravel refill shall be placed to the depth shown on the Contract Drawings or as ordered by the Engineer but in no case shall the depth be less than six (6) inches. If refill is greater than six (6) inches in depth, the balance of the material must have sufficient amounts of graded stone or coarse sand to fill all voids between rock fragments. The top of the refill under pipes shall be slightly rounded to provide as much bearing area as possible for the lower quarter of the pipe.
 - C. Concrete cradle or encasement shall be furnished and placed including reinforcing steel, if required, to the details shown on the Contract Drawings or as ordered by the Engineer. The thickness below the bottom of the pipe shall be four (4) inches and may be more if so directed by the Engineer. The width of the cradle shall be such as to fill the trench width completely. The concrete cradle shall be extended upward to encase the lower quadrant of the pipe. If directed by the Engineer, the cradle shall extend upward to the springline of the pipe.
 - D. Timber cradles shall be fabricated and placed to the details shown on the Contract Drawings, or ordered by the Engineer. Lumber for planking, timbering, or bracing shall be No. 2 common yard lumber, for timber in sizes less than six (6) inches nominal, and common structural grade for timbers over six (6) inches nominal. Minimum planking thickness shall be two (2) inches nominal. All cradle lumber and planking shall be sawn or

hewn with square corners, and shall be free from wormholes, loose knots, wind shakes, decayed or unsound portions, or other defects which might impair its strength or tightness. All lumber and timber shall be subject to inspection by the Engineer before it is incorporated in the finished work.

3.08 PIPELINE INSTALLATION

A. General

1. Proper and suitable tools and appliances for the safe and convenient handling and laying of pipes and fittings shall be used. Great care shall be taken on coated items to prevent the coating from being damaged particularly on the inside of pipes and fittings. All pieces shall be carefully examined for defects, and no piece shall be laid which is known to be defective. If any defective piece is discovered after having been laid, it shall be removed and replaced with a sound piece by the Contractor at his own expense. The interior pipe and fittings shall be thoroughly cleaned before laying and shall be kept clean until the completed work is ready for acceptance by the Owner.
2. All pipes and appurtenances when laid shall conform accurately to the lines and grades or depth of cover below established grade, as designated in the Contract Documents. If no cover or grade is so designated, the minimum cover to the established grade shall be four and one-half (4½) feet. All pipe shall be laid in a straight line. If shown on the Contract Drawings or if approved by the Engineer, pipe joint deflection shall be in accordance with the pipe manufacturers' recommendations. Pipe shall be cut as required to locate fittings, valves and appurtenances at positions indicated on the Contract Drawings.
3. Pipe and fittings shall be laid on good foundation, and where required, secure against settlement in a manner approved by the Engineer. At joints, enough depth and width shall be provided around the pipe to permit the joints to be made in a proper manner. Pipes shall have a solid bearing throughout their entire length. When laid in tunnel, the pipe shall be blocked in such a manner as to take the weight off of bells or couplings. At the end of each day's work or when work is suspended temporarily, the pipe-end shall be tightly plugged.

B. Relation to Water Mains

1. Horizontal separation - Whenever possible, sewers should be laid at least ten (10) feet, horizontally, from any existing or proposed water mains. Should local conditions prevent a lateral separation of ten (10) feet, a sewer may be laid closer than ten (10) feet to a water main if:
 - a. It is laid in a separate trench; or if
 - b. It is laid in the same trench, with the water main located at one side on a bench of undisturbed earth; and if
 - c. In either case the elevation of the crown of the sewer is at least eighteen (18) inches below the invert of the water main.
2. Vertical separation - Whenever sewers must cross under water mains, the sewer shall be laid at such an elevation that the top of the sewer is at least eighteen (18) inches below the bottom of the water main. When the elevation of the sewer cannot be varied to meet the above requirements, the water main shall be relocated to provide this separation, for a distance of ten (10) feet extending on each side of the sewer. If possible, one full length of water main should be centered over the sewer so that both joints will be as far from the sewer as possible. The water main should be constructed of slip-on or mechanical-joint cast iron pipe, asbestos - cement pressure pipe or pre-stressed concrete cylinder pipe and the sewer constructed of mechanical-joints cast iron pipe for any portion within ten (10) feet of the water main. Both services shall be pressure tested to assure water-tightness prior to backfilling. Where less than eighteen (18) inch vertical separation exists between the water and sewer line, the sewer line may be concrete encased ten (10) feet on either side of the water main.
3. If possible, sewers crossing water mains shall be constructed so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to prevent damage to the water main.

C. PVC Pipe Installation

1. PVC Pressure Pipe Installation: Installation of PVC pressure pipe shall be in accordance with ASTM D2467 "Socket-Type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80"; ASTM D2564, "Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings"; and, ASTM D2774, "Underground Installation of Thermoplastic Pressure Piping."
2. PVC Gravity Sewer Pipe Installation: Installation of PVC gravity sewer pipe shall be in accordance with Uni-Bell Plastic Pipe Association Standard UNI-B-5.

D. Vitrified Clay Pipe Installation

1. ASTM Specification C-12, "Recommended Practice for Installing Vitrified Clay Pipe Lines" shall be considered to be a part of this Specification and shall be followed wherever applicable or wherever an omission may occur in this Project Manual.

E. Ductile Iron Pipe Installation

1. Installation of Ductile Iron Pipe shall be in accordance with Section 1, 2 and 3 of AWWA C600-82 unless otherwise specified herein.
2. All buried ductile iron pipe joints exterior to foundation walls and structures shall be mechanical joints.

F. Steel Pipe Installation

1. Steel pipe shall be transported and handled in a manner to prevent damage to the lining or coating of the pipe. Prior to the lowering of the pipe, each length of pipe will be inspected by the Engineer and approved lengths properly identified. Damaged pipe shall be repaired or removed from the site as directed by the Engineer.
2. Ditch bottom must be excavated and smoothed up to provide an even bearing for the pipe. Any large clods of dirt, stones or sticks shall be removed from the ditch bottom.
3. Threaded joints shall be made in accordance with the manufacturer's recommendations.
4. Flanged joints shall be made in accordance with AWWA C207.

G. Reinforced Concrete Pipe Installation

1. Installation shall conform to ASTM C12.
2. When pipes enter or pass through concrete walls, manholes, sewers or other structures, holes shall be provided and the pipes properly cemented in place so as to form a watertight joint.

H. Thrust Blocks

1. All buried pressure pipelines shall be backed up and anchored with poured concrete at all bends $22\frac{1}{2}^\circ$ or greater and at all changes of direction so that there will be no movement of the pipeline in the joints due to internal or external pressures. The concrete shall completely fill the space between the bends or fittings and the wall of the trench from six (6) inches below the fitting to twelve (12) inches above the fitting or pipe and so placed that there will be no interference with the making or remaking of joints regardless of the type of joint used.

I. Valves

1. Valves shall be installed at locations designated on the Drawings. On all buried valves a cast iron valve box shall be set truly vertical and so supported until sufficient backfill has been placed to insure the vertical alignment of the box.

J. Compacted Granular Bedding

1. Bedding shall be used throughout the project, except where the Engineer may order the use of concrete cradle or encasement, or may direct that bedding is not required.
2. Bedding material shall be as specified and shall be placed on a flat trench bottom.
3. Bedding shall have a minimum compacted thickness, below the bottom of the pipe of four (4) inches and shall be extended upward to the elevation of the longitudinal centerline of the installed pipe.
4. The granular embedment material shall be deposited by means of hand tools, and compacted by cutting, slicing, rodding, tamping, vibrating, or by any combination of these methods to secure a compaction of less than 95% density at optimum moisture content.

K. Pipe Embedment

1. At an elevation which will approximately include the bottom quadrant of the pipe, a continuous trough shall be excavated in the bedding to receive the bottom quadrant of the pipe barrel. In addition, bell holes shall be excavated so that after placement, only the barrel of the pipe receives bearing pressure from the trench bottom.
2. In order to insure adequate lateral and vertical stability of the installed pipe during pipe jointing and embedment operations, a sufficient amount of the specified pipe embedment material to hold the pipe in rigid alignment shall be uniformly deposited and thoroughly compacted on each side, and back in any manner, after the joints have been made, shall not be permitted.
3. The remainder of the bedding material shall be deposited at the sides of the pipe, in uniform layers not exceeding three (3) inches uncompacted thickness. Each layer shall be thoroughly compacted until the special bedding extends halfway up the pipe barrel at the sides.
4. Backfill to a minimum depth of twelve (12) inches over the top of the pipe shall be deposited and compacted, by hand, in layers not to exceed four (4) inches in uncompacted depth. Such deposition and compaction shall be done simultaneously and uniformly on both sides of the pipe. This material may be native soil, if of granular nature, and if it contains no large lumps over two (2) inches in greatest dimension or any cinders, brush, rubbish, roots, debris, large stones (over 2 inches), junk or organic matter. If, in the opinion of the Engineer, the native soil is unsuitable, imported backfill material, as specified, shall be used.
5. Installation requirements for rigid pipe shall conform to the requirements of Class B Bedding as defined in ASCE - Manuals and Reports on Engineering Practice - No. 60. Installation of flexible pipe shall conform to the requirements given in ASTM D2321 for Class I, II, or III material.
6. At the close of each day's work, or whenever the work ceases for any reason, the end of the pipe shall be protected with a close fitting stopper.

L. Pipe Jointing

1. Unless otherwise specified, all process piping shall be joined in accordance with the special assembly instructions of the pipe manufacturer.
2. Where pipes connect with outside faces of manhole walls or the outside faces of the wall or other structures, at the ends of concrete cradles or encasements, there shall be a pipe joint located so that slight flexibility or motion can take place in the plane of the wall or encasement face.

M. Backfilling of Pipe

1. No backfill shall be placed around or over any sewers until they have been inspected and the elevations, alignment, and pipe joints have been checked, inspected and approved by the Engineer.

2. The backfill to at least one (1) foot above the tops of all pipes shall be special material, specially placed by hand, as hereinbefore specified.
3. The remainder of the trench shall be backfilled with excavated material, which shall not include any rocks larger than four (4) inches, any brush, roots, or debris, or any frozen lumps. The material shall be placed in layers not to exceed six (6) inches uncompacted, and shall be compacted to a density equal to that of adjacent original material, but not less than 95% of optimum density.
4. Where directed by the Engineer, imported backfill material as hereinbefore specified, shall be substituted in whole or in part for the excavated material. It shall be compacted as directed by the Engineer.
5. Jetting, puddling or flooding of the backfill will not be permitted, unless the material and location are such that this method of compaction is specifically ordered by the Engineer. If the backfill material is too dry to achieve the desired density, the Engineer may direct the Contractor to add the required amount of water.
6. Excavation for manholes, catch basins, inlets and structures shall be backfilled in the same manner as the adjoining sewers to which they are connected or a part thereof.
7. All surplus excavated material which is not used in backfilling shall be loaded and disposed of by the Contractor at his own expense.
8. Any settlement of the backfill below the original ground surface shall be remedied by the Contractor for a period of one (1) year after final completion and acceptance upon receipt of written notice from the Owner.

3.09 INSTALLING MANHOLES AND CATCH BASINS

A. General:

1. Precast manhole bases shall be carefully set, to insure that the floor is level, and to insure that all pipe inlets and outlets shall be at the correct elevation. All openings shall be formed at the time the base is cast, and shall be the correct size and location as shown on the Drawings. Manhole joints shall be of the tongue and groove type with "O" ring seals. All joint surfaces shall be thoroughly clean and wet prior to setting the sections. Joints shall be set in mortar as specified.
2. Channels may be poured concrete, or may be constructed by laying the sewer lines continuously through the manhole, and breaking out the top exposed section after the floor concrete has hardened, and neatly trimming the edges.
3. Changes of direction of flow within the manholes shall be made with a smooth curve with as long a radius as possible.
4. The floor shall be concrete. It shall be carefully poured so as not to disturb the elevation or alignment of the channels. Before pouring the floor concrete, the floor and wall surfaces of the precast base shall be coated with a thin coat of mortar. The finished floor shall reach the edges of split pipe, or the halfway mark of whole pipe. The floor shall be finished smooth and shall slope toward the channel not less than one (1) inch per foot.
5. The space around the pipes through the pre-formed openings shall be carefully and neatly closed with grout.
6. Poured concrete bases shall be constructed as shown on the Drawings, with floors and channels as hereinabove specified for precast bases.

B. Excavation:

1. For precast reinforced concrete manhole bases, the maximum diameter of the excavation at the bottom shall be the diameter of the base plus sixteen (16) inches.

2. Except where special construction in unstable soil is authorized, all manhole bases shall be set on a 3" dry mix concrete layer which shall be founded on, and shall be in direct contact with, undisturbed original subsoil; all unauthorized excavation below the specified structure sub-grade shall be replaced, at the expense of the Contractor, with fill concrete. The fill concrete shall be properly cured for at least three (3) days, and then the precast base shall be bonded to the poured concrete with a thin coat of mortar.
3. All excavations shall be kept dry to the extent that no pipe or manhole is installed in water. No water shall be permitted to come in contact with any concrete within twelve (12) hours after placing. All excavations for manholes which extend down to or below the static ground water elevation shall be dewatered by lowering and maintaining the ground water at an elevation not less than twelve (12) inches below the bottom of such excavations at all times when work thereon is in progress, during sub-grade preparation and the placing of materials, and continuously thereafter until concrete, grout, and mortar have hardened.
4. Where the sub-grade soil is found to be unstable by the Engineer, the unstable soil shall be removed to a depth of width as directed by the Engineer, and shall be replaced by imported backfill material, as specified by the Engineer.
5. Sub-grade soil for all concrete structures, regardless of type or location, shall be firm, dense and thoroughly compacted and consolidated; shall be free from mud and muck; and shall be sufficiently stable to remain firm and intact under the feet of the workmen engaged in sub-grade surfacing, laying reinforcing steel, construction forms, and depositing concrete thereon.
6. The provisions of Section 02151 and 02220 relative to shoring, utility protection, and control of ground water shall be applicable to all excavation under this Section.

C. Backfilling:

1. Backfill and compact in accordance with pertinent provisions of Section 02220 and the following:
 - a. All forms, shores, trash and debris shall be removed from around the structure. Approved backfill material, either from excavation or imported, shall be free from rock, lumber, debris, or frozen material.
 - b. Backfill material shall be placed symmetrically on all sides in six (6) inch maximum layers. Each layer shall be moistened when necessary, and shall be compacted with mechanical or hand tampers to density equal to that of adjacent original material.

- D. Installing grates, covers and frames: Frame casts shall be set in full mortar beds on top of masonry as detailed. Elevation shall conform to that shown on the Drawings or to that directed by the Engineer.

3.10 TESTING

A. General

1. It is the intent of these Specifications to secure pipelines with a minimum amount of leakage. All pressure pipe shall be pressure tested as described herein. All gravity pipelines shall be tested for infiltration or exfiltration as specified herein.

B. Gravity Sewer Line Testing

1. Where insufficient groundwater occurs for infiltration testing gravity pipelines shall be either hydrostatically pressure tested for exfiltration as described or by a low pressure air test conforming to ASTM C-828-80 entitled "Low Pressure Air Test of Vitrified Clay Pipe Lines." The testing methods shall take into consideration the groundwater elevations occurring during the test.
2. Where ground water is encountered during construction, an infiltration test may be made. Such a test shall be made after complete backfilling of trench.

3. The Contractor, at no added compensation over the contract price for the sewers, shall furnish, install and maintain a "V" notch sharp-crested calibrated weir to be installed at each location as directed, in accordance with these specifications. The weirs shall be within the allowable limits.
4. Where the groundwater level is not at least two (2) feet above the crown of the pipe, the Contractor may be directed to supply materials and labor, at no added compensation over contract price for the sewers, to perform an exfiltration test between each pair of adjacent manholes, in the affected areas.
5. The hydrostatic test for exfiltration shall be performed, before backfilling, as follows: The trench shall be dry. The sewer pipe shall be stoppered by bulkheads at each manhole (or manhole location). Water shall then be admitted to the sewer pipe by means of a six (6) inch pipe which passes through the bulkhead at the lower end of the section of sewer. Air will be permitted to escape from the sewer by way of a vent pipe through the bulkhead at the upper end. The level of the water in the six (6) inch entrance pipe will be kept four (4) feet above the crown of the sewer at the upper end.
6. The test period shall be twenty-four (24) hours. If the quality of infiltration or exfiltration is in excess of the maximum allowable, remedial construction shall be performed by and at all expenses of the Contractor. The section of sewer shall then be retested after repairs are completed to determine compliance with the specifications.
7. The maximum allowable quantity infiltration or exfiltration shall be 200 gallons per day per inch diameter of pipe being tested for VCP and 50 gpd/inch-mile for PVC.

C. Pressure Pipeline Testing

1. Piping which will convey aqueous solutions shall be tested either hydrostatically or with air. Piping which will convey gases or liquids other than water or aqueous solutions shall be tested with air.
2. Hydrostatic Pressure Testing
 - a. When a stretch of pipe and appurtenances have been completed and before it is covered, the Contractor shall furnish proper appliances and facilities for testing and draining same without injury to the work or surrounding area. Contractor shall test by filling the pipe with clean water furnished by the Contractor at his own expense.
 - b. The pipe shall be tested under a minimum hydrostatic pressure of 150 pounds per square inch (psi) for Class 200 or higher head pipe, 100 psi for Class 150 pipe and specials and 75 psi for Class 100 pipe and specials.
 - c. In no case shall there be any visible leakage nor shall the leakage in any stretch of pipe exceed 70 gallons per twenty-four (24) hour day per inch diameter per mile, as measured over a period of two (2) hours in a manner approved by the Engineer. This leakage is based on installation of pipe in eighteen (18) foot lengths. If pipe lengths other than eighteen (18) feet are installed, the allowable leakage will be increased or decreased in the ratio of eighteen (18) feet to the length of pipe actually installed.
3. Air Pressure Testing
 - a. All pipe to be air tested shall be subject to an air pressure at least 50% in excess of the maximum pressure to which the piping will ordinarily be subjected, but in no case lower than 100 psi for steel or ductile iron pipe. Air pressure shall be held for a period of four (4) hours with no drop in pressure.
4. Any defects, cracks, or leakage that may develop, or that may be discovered either in the joints or in the body of the casting or pipe walls, shall be promptly made good by the Contractor, at his own expense, either by replacement of defective items or by repairs as approved by the Engineer. Backfilling around joints shall not be made until the leakage tests have been made and if any leaks eliminated to meet the requirements stated above.

D. Test for Displacement

1. Storm sewers and under-drainage systems will be checked by the Engineer to determine whether any displacement of the pipe has occurred.
2. Checking will be done upon completion of the backfill.
3. The building sewers shall be carefully inspected for grade, alignment and joints before backfilling. This inspection, however, will not excuse the Contractor from responsibility for the quality of his work.
4. The test for displacement of sewer lines will be made by flashing a light between manholes or pipe ends. If the illuminated interior of the pipe shows any misalignment, displaced pipe, or any other defects, the defects designated by the Engineer shall be remedied by the Contractor at his expense. Manholes will be visually inspected for displacement.

E. Television of Sewers

1. Where direct replacement of an existing sewer prevents testing as previously described the sewer shall be televised in accordance with the following:
 - a. After completing the installation, the sanitary sewers shall be cleaned and visually inspected by means of closed-circuit television. The inspection will be done one manhole section at a time and the flow in the section being inspected will be suitably controlled.
 - b. The television camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor, and other components of the video system shall be capable of producing a color picture having a picture quality to the satisfaction of the Engineer and if unsatisfactory, equipment shall be removed and no payment will be made for an unsatisfactory inspection.
 - c. The camera shall be moved through the line either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition. In no case will the television camera be pulled at a speed greater than thirty (30) feet per minute. Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation, the television camera will not pass through the entire manhole section, the Contractor shall set up his equipment so that the inspection can be performed from the opposite manhole. If again, the camera fails to pass through the entire manhole section, the inspection shall be considered complete and no additional inspection work will be required.
 - d. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication shall be used to set up between the two manholes of the section being inspected to insure good communication between members of the crew.
 - e. Measurement for location of defects and lateral connections shall be above ground by means of a meter device. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. Accuracy of the distance meter shall be checked by use of a walking meter, roll-a-tape, or other suitable device, and the accuracy shall be satisfactory to the Engineer.
 - f. Documentation of the television results shall be as follows:
 1. Television Inspection Logs: Printed location records shall be kept by the Contractor and will clearly show the location in relation to an adjacent manhole of each infiltration point observed during inspection. In addition, other points of significance such as locations of building sewers, unusual conditions, roots, storm sewer connection, broken pipe, presence of scale and corrosion, and other discernible features will be recorded and a copy of such records will be supplied to the Owner.

2. Photographs: Instant developing, 35 mm, or other standard-size photographs of the television picture of problems shall be taken by the Contractor upon request of the Owner's Representative, as long as such photographing does not interfere with the Contractor's operations.
3. Videotape Recording (VHS): The purpose of tape recording shall be to supply a visual and audio record of problem areas of the lines that may be replayed. Videotape recording playback shall be at the same speed that it was recorded.

F. Special Testing for Deflection of PVC and HDPE Sewer Pipe

1. PVC Sewer Pipe

- a. Before final acceptance of sewer lines constructed of these materials, all sections of sewer pipe six (6) inches and larger specified diameter shall be measured for vertical ring deflection by the Contractor and witnessed by the Engineer. Maximum deflection under full load shall not exceed 5% of the average inside diameter for nominal pipe diameters less than eighteen (18) inches and 7.5% of the average inside diameter for nominal pipe diameters of eighteen (18) inches and greater. The average inside diameter shall be based on the shop drawing submittals for each pipe diameter. The deflection test shall be completed not earlier than thirty (30) days after the initial installation.

2. HPDE Sewer Pipe

- a. Before final acceptance of sewer lines constructed of these materials, all sections of sewer pipe six (6) inches and larger specified diameter shall be tested in accordance with the requirements of AASHTO DESIG. M294-86 unless noted otherwise herein by the Contractor and witnessed by the Engineer. Maximum deflection under full load shall not exceed 5% for pipe diameters less than eighteen (18) inches and shall not exceed 7.5% for pipe diameters eighteen (18) inches and greater of the average inside diameter as determined by the laboratory for the specified piping.
3. Should any pipe exceed the allowable deflection, the Contractor shall replace those pipes and retest the section as directed by the Engineer.
4. Equipment used in testing shall be "go-no-go" pull through gauges of a type approved by the Engineer. Each gauge must be checked and approved by the laboratory before using.
5. Testing equipment and personnel to perform the required tests shall be provided by the Contractor. Tests must be witnessed by the Engineer.
6. Use of mechanical pulling devices will not be permitted.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

SANITARY AND/OR STORM SEWER CONSTRUCTION

PART ONE - GENERAL

1.01 SCOPE

- A. This work shall consist of the construction of a sanitary and/or storm sewer in accordance with these specifications and in reasonably close conformity to the lines and grades indicated on the plans or as established by the Engineer.
- B. This work shall include excavating for pipe, fittings, thrust blocks and other appurtenances, clearing and grubbing and the removal of all materials necessary for placing the pipe, except removals listed separately; furnishing and placing granular or concrete bedding and granular backfill as required, constructing and subsequently removing all necessary cofferdams, cribs, and sheeting, pumping and dewatering, making all pipe joints as required, installing all necessary pipe, joining to existing and proposed appurtenances as required, performing leakage tests as specified and restoration of disturbed facilities and surfaces.
- C. Arrangements for and the performance of all tests shall be the Contractor's responsibility. Additional information is in Section 2235, Trench Excavation.
- D. Related work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Pipe, fittings, specials, manholes, joint materials, thrust blocks, and other appurtenances shall be the size and kind specified in the proposal and shown on the plans.
- B. Concrete sanitary sewer main shall be coal tar coated upon its interior surface with two (2) applications of Bitumaster Super Service Block as manufactured by Tar Products Division of the Kop-Coat, Inc., Pittsburgh, PA, or approved equal.

PART THREE – EXECUTION

3.01 EXCAVATION

- A. Sewer trenches must be excavated with vertical sides from the bottom of the trench to one (1) foot above the top of the sewer, from which point sides may slope to ground surface, except that in streets or roadway, trenches must be excavated with vertical sides to the top of the trench. Width of trench in the vertical section shall be excavated only as wide as necessary to provide free working space on each side of the sewer according to the size of the sewer and the character of the ground; but in every case there shall be sufficient space between the sewer and the sides of the trench to make it possible to thoroughly ram the backfilling around the sewer and to secure tight joints, but in no case less than nine (9) inches on either side of pipe. In no case, however, shall the width of the trench at the top of the sewer exceed the dimensions as shown on the Contract Drawings. In no case will it be permitted to excavate sewer trenches with sides sloping to the bottom.

3.02 LAYING PIPE

- A. The Contractor shall furnish all of the proper tools and equipment required for the safe, proper handling and laying of all pipe, fittings, and specials that are to be installed in this work. All storage, handling, laying, and backfill methods shall be performed so as to avoid damaging either the interior or the exterior surfaces of all pipe fittings, specials, joint materials, or other appurtenances, and any such damage shall be remedied at the

Contractor's expense, as approved or directed by the Engineer.

- B. Before any pipe is lowered into the trench, it shall be inspected for damage, and any unsatisfactory lengths shall be rejected. Cast metal pipe and fittings shall be inspected for cracks by ringing with a light hammer while suspended. The interior and exterior of each pipe length used shall be cleaned as necessary to remove all dirt or other foreign material before it is inspected. The interior of the pipe shall be kept clean until the work is accepted.
- C. No pipe shall be laid in water, mud or when trench conditions or weather is unsuitable for such work, except by permission of the Engineer.
- D. If mud, surface water, leaves and/or other debris have been permitted to enter the strung-out pipe, the inside shall be cleaned as directed by the Engineer and before the pipe is lowered into the trench.
- E. Pipe shall not be pushed off the bank nor shall it be permitted to fall into the trench. Each type of pipe, fitting, special or other appurtenances shall be handled in strict accordance with recommendations of its respective manufacturer.
- F. No rocks, stones, metal, concrete, bricks, pavement pieces, wood, soil lumps or other hard materials too big to pass through a six (6") inch screen shall be permitted within six (6") inches of the pipe after it is laid in the trench. Any pipe endangered by such debris shall be subject to removal and disposal at the Contractor's expense as and when directed by the Engineer.
- G. When pipe laying is not in progress, the open ends of installed pipe shall be closed by appropriate means to prevent the entrance of dirt and water.
- H. Pipe lengths shall not be deflected at the joint to any greater degree than recommended by the manufacturer of the particular joint being used. Where deflections in excess of such recommendations are necessary, the appropriate specifications for the particular type of pipe being installed shall govern the mode of accomplishing such excessive deflections. All pipe deflections shall be performed only with the Engineer's approval.

3.03 JOINTING PROCEDURES

- A. The particular method of making up pipe joints shall be governed by the type of pipe material and type of joint in accordance with the Drawings and/or specifications.

3.04 ANCHORAGE

- A. All force mains, and sewers where shown on the Drawings shall be provided with a reaction backing or shall be restrained by attaching suitable metal rods, clamps, anchored fittings or harnessed joints, as shown on the plans or as specified so as to prevent movement.
- B. Reaction backing shall be of concrete, with steel reinforcement as required, unless otherwise shown on the Drawings. Backing shall be placed between solid ground and the fitting or other part of the pipeline to be anchored; the area of bearing on the pipe and on the ground in each instance shall be that as indicated on the plans. The backing shall be so placed, unless otherwise directed, that the pipe and fitting joints will be accessible for repair.
- C. Steel tie rods or clamps of adequate strength to prevent movement may be used instead of concrete backing. Steel rods or clamps shall be painted with three (3) coats of an approved bituminous paint or coal tar enamel.

3.05 BACKFILLING

- A. Backfilling shall be accomplished in a two-step procedure as follows: 1) Partial backfill before leakage tests and 2) Completion of backfill after tests. Departure from this procedure due to traffic or other conditions shall be approved by the Engineer.
- B. All backfill in trenches under street pavements shall be thoroughly compacted as specified, using approved

mechanical tampers or jetting equipment before replacing any pavements, either permanent or temporary. Backfill may be sprinkled, if necessary, at the time of backfilling to maintain the optimum moisture content at the time of compaction.

3.06 TESTING OF BACKFILL COMPACTION

- A. Testing of the quality of the backfill compaction shall include either of the herein specified methods depending upon which backfill method was used by the Contractor. The following specified field tests shall be completed by an independent laboratory and testing firm approved by the Engineer.
 - 1. If the backfill was compacted using mechanical tamping equipment, the following compaction testing method will be used. A nuclear densometer shall be on site for the compaction testing of the eight (8) inch loose lift layers as they are compacted. The time of testing and location shall be as selected by the Engineer.
 - 2. Or, a "dutch cone" soil compaction testing procedure with a minimum of one (1) test hole per three-hundred (300) feet of trench backfilled. The location of the test hole shall be selected by the Engineer.
 - 3. Pavement replacement shall not occur until one of the above tests have been completed and the results have been certified by the testing firm and received and reviewed by the Engineer.

3.07 LINE AND GRADE

- A. The Contractor will be required to set up and use batter boards located at every established grade and line point. A line shall be set on these batter boards at an elevation such that it is parallel to the invert grade line and on the proper centerline of the pipe. Not less than three (3) batter boards shall be set before any pipe is placed. A grade stick provided with a bracket on the bottom shall be used to locate the pipe at the proper elevation and a plumb bob shall be used to locate it on line.
- B. In lieu of the above method the Contractor may, if he has suitable equipment and a capable operator, use a laser beam for establishing line and grade. The method used shall be as recommended by the manufacturer of the laser equipment and must be satisfactory to the Engineer. The laser beam shall be of no greater power than 2.5 milliwatts (0.0025 watts). A continual visual check shall be provided by the laser equipment. The Engineer will provide reference points for line and grade in sufficient numbers to make possible the efficient use of the laser beam equipment.
- C. No sewer pipe shall be laid until a sufficient length of trench has been properly prepared to permit laying at least twelve (12) feet of pipe at one time. No pipes shall be laid except in the presence of the Engineer and no pipes shall be covered or backfilled until they have been examined and directions given to cover the same.

3.08 SERVICE CONNECTIONS

- A. In general, and as called for on the Drawings, as required or as ordered, provision shall be made in the sewers for service connections by inserting a tilted-up "Tee" branch for each service connection with a branch of size called for by the Contract Drawings but never less than six (6) inches, in the sewer at the location shown, where required or ordered. The Contractor shall construct a riser, where so required, as per detail, in such a manner that the top of the riser shall be not less than seven (7) feet below grade or at such elevation as to properly receive the required service connection with full regard to elevation of service sewer and slope from building or structure to the sewer which shall be not less than one percent (1%). Risers are to be encased in brick or concrete as shown on the Contract Drawings.
- B. Reconnecting of existing service shall each consist of the furnishing and installing of the Tee-branch and all curbed and straight pipe as required, the removal of such existing service laterals as is necessary, and the furnishing and placing of all materials to securely plug the discontinued service to the old sewer and make proper connection to the new sewer. All excavation required to complete the reconnections shall be included.
- C. The Owner may increase the number of connections or delete some connections as the sewer is being built, or increase the size of connections when it deems such advisable. Concrete for encasement of risers and of

supporting pipe shall be placed in a manner to preserve alignment and avoid disturbance of joints.

3.09 PROTECTION OF SEWER

- A. After the sewer or drain is completed and trench backfilled, the Contractor shall maintain barricades and keep traffic off freshly backfilled trenches until the backfill has consolidated, but in no event shall traffic be permitted on backfill in less than seventy-two (72) hours after the trench has been properly backfilled and compacted.

3.10 SANITARY AND STORM SEWER TESTING

- A. Prior to final payment for and acceptance of the sanitary sewer installation, visual inspection of all sanitary sewers shall be as specified.
- B. After the completion of any sanitary sewer or any portion thereof, a leakage test shall be made by the Contractor under the supervision of the Engineer. Testing is to be conducted over the entire length of the sewer pipe installation.
- C. All pipes which do not meet the testing requirements must be repaired or replaced and then retested, all at the Contractor's expense, until it meets the requirements.

3.11 INFILTRATION AND EXFILTRATION TESTS FOR SEWER PIPE

A. Preparation

- 1. Before sections of sewers may be tested for infiltration or exfiltration, all house leads from it must be constructed to limits called for and plugged or capped and all trenches backfilled and compacted.
- 2. Sewers to be tested shall be clean and free from construction debris. Sand, dirt, concrete, or other materials shall be completely removed in a manner that will not damage the sewer pipe.
- 3. Pipe joints shall be watertight. The Contractor shall repair manholes and pipe joints as required to stop all visible leaks. Seepage permitted through walls or patched joints shall be at the discretion of the Engineer, but in no instance will the specified allowable infiltration be exceeded.
- 4. Where sewers are above the ground water table, the Contractor may flood the trench or air test the sewer to find and repair leaks prior to exfiltration tests.
- 5. The materials and methods for repairing leaks shall be submitted to the Engineer for approval before beginning work.

B. Inspection

- 1. After a sewer has been cleaned and all repairs made as specified, the sewer shall be inspected and approved by the Engineer before conducting infiltration or exfiltration tests.
- 2. Sewers thirty-six (36) inch diameter and larger shall be inspected from the inside. Inspection of sewers smaller than thirty-six (36) inch diameter from the inside shall be at the discretion of the Engineer.
- 3. Smaller sewers shall be inspected using closed circuit television.
- 4. Where called for on the Drawings or specified, smaller sewers may be inspected by lamping between manholes in lieu of closed circuit television.
- 5. The Contractor shall furnish all lights, carts, television, and other equipment and labor required to assist the Engineer in the inspection.

C. Test sections

1. The maximum length of a sewer test section shall be 900 linear feet. Every manhole shall be included in one (minimum) test section.
2. The Contractor shall furnish and install bulkheads, sewer plugs, weirs, water level tubes, lighting, and other equipment required to conduct the tests in locations and as directed by the Engineer.
3. Infiltration
 - a. Where the ground water level is above the top of the pipe, the sewer shall be tested for infiltration.
 - b. The Contractor shall plug or bulkhead the sewer to isolate the test section and install a weir in the pipe at the outlet manhole. The weir shall be direct reading, of an approved design, calibrated to read gallons per day.
 - c. Where the ground water level is below the top of the sewer pipe, and if the trench can be flooded and the level maintained above the pipe for the test period, the Contractor may test the pipe for infiltration.
4. Exfiltration
 - a. Where the ground water level is below the top of the pipe, the sewer shall be tested for exfiltration.
 - b. The Contractor shall bulkhead or plug each end of the designated test section and fill with water to the elevation directed by the Project Engineer. The test shall be performed with a minimum positive head of 2 feet. Exfiltration will be computed from the loss of water as measured in the manholes.
5. Allowable leakage
 - a. The test in each section shall be continued for at least twenty-four (24) hours and, if its measured leakage during that period exceeds 100 gallons per inch of diameter per mile of pipe, the Contractor shall locate the points of leakage and make necessary repairs, continuing the work until leakage is reduced to the permissible maximum as specified.
 - b. The amount of infiltration allowed for storm sewers shall be limited to reasonable seepage, except that, if specified, the total in any section shall not exceed the amounts allowed for sanitary sewers as herein specified.
6. Air tests: In lieu of testing exfiltration by water means, pipe twenty-four (24) inches in diameter or smaller may be tested by means of low pressure air, but only after a request has been submitted to the Engineer for review and the Contractor receives written approval from the Engineer to air test.

3.12 AIR TESTING (ASTM F-1417)

- A. Air testing will be conducted as the project is being installed. At no time will more than 900 feet of pipe be installed before air testing is performed.
- B. After backfilling a manhole-to-manhole reach of sanitary sewer line, the contractor shall, at his expense, conduct the Line Acceptance Test. The test shall be performed according to the stated procedures and under the supervision of the Owner and/or the Engineer.
- C. Equipment used shall meet the following minimum requirements and be approved by the Engineer:
 1. Pneumatic plugs shall have a sealing length equal to or greater than the diameter of the pipe to be inspected.
 2. Pneumatic plugs shall resist internal test pressures without requiring external bracing or blocking.
 3. All air used shall pass through a single control panel.

4. Three (3) individual hoses shall be used for the following connections:
 - a. From control panel to pneumatic plugs for inflation.
 - b. From control panel to sealed line for introducing the low-pressure air.
 - c. From sealed line to control panel for continually monitoring the air pressure rise in the sealed line.
- D. Testing procedures will be as follows: All pneumatic plugs shall be seal tested before being used in the actual test installation. One length of pipe shall be laid on the ground and sealed at both ends with the pneumatic plugs to be checked. The sealed pipe shall be pressurized to 5 psig. The plugs must hold against this pressure without having to be braced.
- E. After a manhole-to-manhole reach of pipe has been backfilled and cleaned, and the pneumatic plugs are checked by the above procedure, the plugs shall be placed in the line at each manhole. Low-pressure air shall be slowly introduced into this sealed line until the internal air pressure reaches approximately 4 psig.
- F. At least two minutes shall be allowed for the air pressure to stabilize. When the pressure has stabilized and is at or above 3.5 psig, the air hose from the control panel to the air supply shall be disconnected. The portion of the line being tested shall be termed "acceptable" if the time required in minutes for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time shown for the given diameters in the following table:

TABLE 1 Minimum Specified Time Required for a 1.0 psig Pressure Drop for Size and Length of Pipe Indicated for Q= 0.0015

NOTE 1—See Practice UNI-B-6-90.

NOTE 2—Consult with pipe and appurtenance manufacturer for maximum test pressure for pipe size greater than 30 in. in diameter.

| Pipe Diameter, in. | Minimum Time, min:s | Length for Minimum Time, ft | Time for Longer Length, s | Specification Time for Length (L) Shown, min:s | | | | | | | |
|--------------------|---------------------|-----------------------------|---------------------------|--|--------|--------|--------|--------|--------|--------|--------|
| | | | | 100 ft | 150 ft | 200 ft | 250 ft | 300 ft | 350 ft | 400 ft | 450 ft |
| 4 | 3:46 | 597 | 0.380 L | 3:46 | 3:46 | 3:46 | 3:46 | 3:46 | 3:46 | 3:46 | 3:46 |
| 6 | 5:40 | 398 | 0.854 L | 5:40 | 5:40 | 5:40 | 5:40 | 5:40 | 5:40 | 5:42 | 6:24 |
| 8 | 7:34 | 298 | 1.520 L | 7:34 | 7:34 | 7:34 | 7:34 | 7:36 | 8:52 | 10:08 | 11:24 |
| 10 | 9:26 | 239 | 2.374 L | 9:26 | 9:26 | 9:26 | 9:53 | 11:52 | 13:51 | 15:49 | 17:48 |
| 12 | 11:20 | 199 | 3.418 L | 11:20 | 11:20 | 11:24 | 14:15 | 17:05 | 19:56 | 22:47 | 25:38 |
| 15 | 14:10 | 159 | 5.342 L | 14:10 | 14:10 | 17:48 | 22:15 | 26:42 | 31:09 | 35:36 | 40:04 |
| 18 | 17:00 | 133 | 7.692 L | 17:00 | 19:13 | 25:38 | 32:03 | 38:27 | 44:52 | 51:16 | 57:41 |
| 21 | 19:50 | 114 | 10.470 L | 19:50 | 26:10 | 34:54 | 43:37 | 52:21 | 61:00 | 69:48 | 78:31 |
| 24 | 22:40 | 99 | 13.674 L | 22:47 | 34:11 | 45:34 | 56:58 | 68:22 | 79:46 | 91:10 | 102:33 |
| 27 | 25:30 | 88 | 17.306 L | 28:51 | 43:16 | 57:41 | 72:07 | 86:32 | 100:57 | 115:22 | 129:48 |
| 30 | 28:20 | 80 | 21.366 L | 35:37 | 53:25 | 71:13 | 89:02 | 106:50 | 124:38 | 142:26 | 160:15 |
| 33 | 31:10 | 72 | 25.852 L | 43:05 | 64:38 | 86:10 | 107:43 | 129:16 | 150:43 | 172:21 | 193:53 |
| 36 | 34:00 | 66 | 30.768 L | 51:17 | 76:55 | 102:34 | 128:12 | 153:50 | 179:29 | 205:07 | 230:46 |

- G. In areas where ground water is known to exist, the Contractor shall install a 1/2-inch diameter capped pipe nipple, approximately ten (10) inches long, through the manhole wall on top of one of the sanitary sewer lines entering the manhole. This shall be done at the time the sanitary sewer line is installed. Immediately prior to the performance of the Line Acceptability Test, the ground water shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the nipple. The plastic tube shall be vertical and a measurement of the height, in feet of water over the invert of the pipe shall be taken after the water has stopped rising in this plastic tube. Air test pressure is to be increased by 0.433 psi for each foot the ground water is above the invert of the sewer line being tested. The allowable drop of one (1) pound and the timing of the test remain the same.
- H. If a Line Acceptability Test is being conducted on more than one (1) manhole reach of pipe, the entire section

being tested shall meet the Line Acceptability requirements as if only one (1) of the manholes reach in the section were being tested.

3.13 MAINTENANCE OF EXISTING DITCHES

- A. The Contractor shall use the utmost care in maintaining ditches and other waterways, and, if either bottoms or banks of such ditches are disturbed, they shall be promptly restored and maintained for the life of the guaranty period. Similar care shall be used in preventing damage to existing paving by caving of trench walls and undermining such paving. If paving is damaged, the Contractor shall repair same at his own expense.

3.14 CLEARING SITE AND RESTORING DAMAGED SURFACES

- A. Upon completion of the backfill work, the Contractor shall immediately remove and dispose of all surplus materials including dirt and rubbish.
- B. Unless otherwise called for on the plans, the Contractor shall replace all pavement, sidewalks, sod, or other surfaces disturbed to a condition equal to that existing before the work was started, furnishing all materials, labor, equipment, etc., at no additional cost to the Owner.
- C. All restoration of lawns shall be performed in accordance with these specifications as a part of performing the work as specified herein.
- D. All restoration of driveways, sidewalks, roadways and shoulders (berms) shall be in accordance with these specifications as a part of performing the work as specified herein.
- E. Upon completion of the foregoing work, all tools and other property belonging to the contractor shall be removed, and the site shall be left in good condition.

PART FOUR – SPECIAL PROVISIONS

4.01 N/A

END OF SECTION

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REINFORCED CONCRETE PIPE

PART ONE - GENERAL

1.01 SCOPE

- A. The Contractor shall, under this item, furnish all the materials for and shall properly place at the location shown on the drawings or as directed, all reinforced concrete pipe and all reinforced concrete pipe specials of the sizes specified, shown or required for the proper completion of the work included under this contract.

1.02 QUALITY OF PIPE

- A. All reinforced concrete pipe shall be of the best quality concrete pipe, free from imperfections of any kind and shall have a smooth, dense finish. All pipe shall be true in shape and dimension and conform to ODOT Item 706.02.
- B. All circular reinforced concrete pipe shall comply with and meet A.S.T.M. Designation C76.
- C. All reinforced concrete elliptical pipe shall comply with and meet A.S.T.M. Designation C507 and shall be either horizontal elliptical (HE) or vertical elliptical (VE) as called for on the Drawings.
- D. No old pipes or specials that have been previously used will be allowed in the herein specified work.
- E. The required strength or class of pipe shall be as called for on the plans.
- F. The interior of all reinforced concrete pipe shall be coal tar epoxy lined with "Kop-Coat" bitumastic super service black or approved equal. Dry film thickness to be a minimum of sixteen (16) mils.

PART TWO - PRODUCTS

2.01 DIMENSIONS OF PIPE

- A. The sizes of the pipe and specials shall refer to nominal inside diameters. Straight pipe shall be furnished in minimum lengths of six (6) feet.

2.02 LAYING

- A. All trenches, when pipe laying is in progress, shall be kept dry and all pipes and specials shall be laid accurately to the required lines and grades and shall be uniformly supported along their entire lengths. The bottom of the excavation shall be properly trimmed, with holes at each joint to receive the bell and to permit the proper cementing of joints.
- B. The pipe shall immediately be shoved home, with care to ensure a tight seal and proper alignment. Great care shall be exercised after laying to prevent deflection or separation of the joint just made; all joints shall be made in the trench; and one (1) joint shall be made at a time.
- C. Pipe shall be fully entered and shall abut against adjacent pipe and in such a manner that there will be no unevenness along the inverts.
- D. When pipes enter or pass through concrete walls, manholes, sewers or other structures, holes shall be provided and the pipes properly cemented in place so as to form a watertight joint.
- E. Installation shall conform to A.S.T.M. C12.

2.03 PIPE JOINTS

- A. Each pipe length shall have bell and spigot, tongue and groove or modified tongue and groove ends formed

on machined rings to insure accurate joint surfaces and shall meet the requirements of A.S.T.M. C443 or C361. Diameters of joint surfaces shall not vary from theoretical diameters by more than one sixteenth (1/16) inch.

- B. Premium type joints shall be used on all sanitary or intercepting sewers, and on combined, relief or other sewers, if called for. Premium joints shall be made with rubber gaskets, Hexseal, Tylox, O-Ring or an approved equal. The type of joint shall be approved by the Engineer prior to the placing of the order for pipe by the Contractor.
- C. Premium type joint gaskets shall be made of special composition rubber which will assure a permanent, watertight seal, and have smooth surfaces free from all imperfections. Gasket rubber shall meet the physical test requirements of "Rubber Gasket Material, 35 Durometer Hardness", Federal Specifications ZZ-R-710A. The rubber shall contain all least 60% first grade natural crude; have a tensile strength of 1700 psi and elongation at rupture such that two (2) inch gauge mark will stretch to eight (8) inches.
- D. Premium type joint pipe using the "O"-ring type joint shall be similarly formed but with a specially reinforced bell end. The reinforcing shall be adequate to meet all tensile stresses in the concrete caused by compressing the rubber "O"-ring.
- E. Standard type joints shall be used on all storm sewers, unless otherwise called for on the plans.
- F. Standard type joints shall be made with bituminous products thoroughly mixed with asphalt, and other mineral matter, to a homogenous consistency which shall have a flash point of 345°F minimum, and shall not crack at a temperature of -10°F.

PART THREE - EXECUTION

3.01 PREPARATION OF PIPE JOINTS

- A. All pipe joints shall be scrupulously cleaned of all dirt and foreign material prior to laying the pipe.
- B. Premium type joints shall be swabbed with lubricant approved for use by the gasket manufacturer and in accordance with his recommendations and instructions.
- C. Standard type joint shall be swabbed with joint compound approved by the Engineer and in accordance with the manufacturer's recommendations and instructions.

3.02 SPECIAL PIPE

- A. All special shaped pipe, such as angle pipes, radius pipe or curves shall be made using beveled pipe, in accordance with the data shown on the Drawings.
- B. Pre-cast holes, into which a stub is concreted in place after the pipe has been laid, shall be provided at such locations, and of such size as shown on the Drawings or required by the Engineer, to receive house service lateral connections and/or connections for intercepting sewers.
- C. Entering stubs of all sizes shall be set so that there will be no projection in the interior of the sewer and the edges of the opening shall be made smooth. Entering stubs shall be fully supported during and after being concreted in place.
- D. The joint of all entering stubs larger than eight (8) inches in diameter shall be encased in Class "C" concrete per ODOT Item 499.
- E. All stubs shall be plugged unless connected to intercepting sewers and/or house service laterals.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PRECAST CONCRETE CATCH BASINS/CURB INLETS

PART ONE - GENERAL

1.01 SCOPE

- A. Under this Section, the Contractor shall furnish and construct precast concrete catch basins, including drops and manhole stacks of types and at locations shown on the Drawings and/or scheduled.
- B. This Section includes additional excavation to widen and deepen sewer trenches for catch basin construction, furnishing and installing concrete of classes called for, brick, Portland cement mortar, reinforcing steel, precast concrete pipe, integral base sections, bottom riser sections, transition sections, riser sections, eccentric cones, flat slab tops and adjusting rings, flexible manhole connections, pipe for drop connections, plugging lifting holes, pointing joints, forming channels through manhole bottoms, making watertight connections to new and existing sewers, and other work incidental to catch basin construction.
- C. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. Section 02100 Clearing and Grubbing
Section 02235 Trench Excavations
Section 02500 Pavement Construction Repair and Replacement
Section 02620 Pipe Joints
Section 02635 PVC Pipe (ASTM D2241)
Section 02733 Reinforced Concrete Pipe

1.02 DEFINITIONS

- A. The various types of catch basins are as shown on the Drawings or in the Standard Details.

1.03 SUBMITTALS FOR ENGINEER'S APPROVAL

- A. Manufacturer's Shop Drawings and Certificates:
 - 1. Precast Concrete Catch Basins
 - 2. Flexible Joints
- B. Supplier's Certificates: Brick.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Precast Concrete Catch Basins Sections:
 - 1. Precast concrete catch basin sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to ASTM Specification C478. Reinforcing in transition sections shall be equal to that specified for wall sections of the larger diameter.
 - 2. Joints shall be O-ring type conforming to ASTM Specification C443.
 - 3. The standard length of riser sections shall be forty-eight (48) inches in length of thirty-two (32) inch or sixteen (16) inch to meet required dimensions and as specified.

4. Openings for connecting pipes in riser sections bottom riser sections, and integral base sections, and for access in flat slabs shall be preformed or cored by the manufacturer. Cutout openings shall be made immediately after the pipe is removed from the casting form. All cored openings for sewer pipe connections shall have flexible joints.
 5. Precast integral base sections shall be of monolithic construction. The bottom of the section shall be six (6) inch thick minimum and contain 0.32 sq. in. minimum of steel reinforcing each way in top of the slab. Walls shall meet ASTM Specification C478.
 6. Specified catch basin steps shall be factory installed to provide a continuous ladder of sixteen (16) inch O/C rung spacing. Steps shall be placed in the forms and cast in pipe wall or placed immediately after the pipe is removed from casting and carefully mortared in place with non-shrink mortar to insure a watertight joint. If the outer surface of the pipe wall is pierced, the patch shall be completely covered with a bituminous sealer.
 7. Where pressure tight catch basin frames and covers are called for, threaded inserts shall be cast in eccentric cones or flat slab tops and holes formed or cored in adjusting rings to match bolt size and spacing specified for catch basin casting.
- B. Catch Basin Steps:
1. Catch basin steps shall be of polypropylene plastic reinforced with a 3/8-inch No. 60 grade reinforcing rod as detailed on the Drawings or in the Standard Details. Steps of similar cross section and dimensions may be submitted for approval.
 2. Cast iron or aluminum catch basin steps will not be permitted.
- C. Catch Basin Frames and Covers:
1. Catch basin frames and covers shall be as shown on the Drawings or in the Standard Details or as indicated in the Special Provisions.
 2. Where pressure tight catch basin covers are called for, lid seals shall be a continuous round rubber gasket supplied by the manufacturer.
- D. Mortar:
1. Mortar used for the structures herein specified shall conform to Specifications for Mortar for unit Masonry, ASTM Designation C 270 Type S, containing no masonry cement. The mortar shall be composed of one (1) part Portland cement to two (2) parts sand by volume.
 2. Materials for non-shrinking mortar shall be Sauereisen F-100 Grout as manufactured by Sauereisen Cement Co., Pittsburgh, Pennsylvania; Five-Star Grout as manufactured by U.S. Grout Corp., Old Greenwich, Connecticut; or equal.
- E. All cast-in-place concrete used for forming channels in catch basin bottoms shall be Class B as specified in Section 03120.
- F. Reinforcing steel used in cast-in-place concrete shall meet the requirements of Section 03200, "Concrete Reinforcement".
- G. Joints for precast pipe openings shall be "Reseal" type as manufactured by Price Brothers Company, "Lock-Joint Flexible Manhole Sleeves" as manufactured by National Pollution Control Systems, Inc., or equal.
- H. Pipe for catch basin drops shall conform to type and specifications of the connecting main line pipe for the required size.
- I. Brick used for catch basin and manhole construction shall conform to Specifications for Sewer and Manhole Brick (made from clay or shale), ASTM Designation C 32, and shall be Grade "MS" unless otherwise specified.

PART THREE - EXECUTION

3.01 LOCATION AND CONSTRUCTION

- A. Location and type of catch basin installed shall be as shown on the Drawings or directed.
- B. Construction shall be in conformance with details shown on the Drawings and as specified.

3.02 EXCAVATION

- A. Excavation for catch basin construction shall be prepared as directed in applicable paragraphs of Section 02222 and 02731.

3.03 INSTALLATION OF INTEGRAL BASE SECTIONS

- A. Class B concrete shall be poured so as to provide a minimum of four (4) inch pad under the entire area of the catch basin base. Place the catch basin on the pad before the concrete is completely set so that final leveling adjustment can be made.
- B. Six (6) inch granular backfill bedding can be used in lieu of Class B concrete at the direction of the Engineer.

3.04 INSTALLATION OF BOTTOM RISER SECTIONS

- A. Unless otherwise called for on the Drawings or directed, bottom riser sections shall be placed with cast-in-place concrete bases.
- B. The base shall be of Class A concrete nine (9) inch thick minimum placed on undisturbed earth.
- C. The cut-out riser section shall be blocked in place above the pipe and the concrete base poured in place. Concrete shall be extended above the lower rim of the riser wall as required to provide a watertight seal around the entire circumferences of the riser section. The sewer pipe shall be bedded in concrete monolithic with the base to the first joint each way from the catch basins.
- D. On straight runs the Contractor may carry the sewer pipe through the catch basin and break out the top half after the fill concrete has set. In all cases the sewer pipe shall extend through the manhole wall to the inside face.

3.05 CHANNELING CATCH BASIN BOTTOMS

- A. The bottoms of all catch basins shall be channeled to conduct flow in the planned direction. Channels shall be the true shape of the lower half of the sewer pipe and shall match inverts of connecting pipe at the catch basin wall.
- B. In integral base sections (only) channels may be constructed using brick and Portland cement mortar. Mortar shall be 3/4-inch thick minimum between bricks and between bricks and concrete and one (1) inch thick minimum on all exposed surfaces.

3.06 PRECAST CONCRETE RISER SECTIONS

- A. The shortest length of riser section to be incorporated into the catch basin shall be installed immediately below the flat slab top.
- B. Pipe section joints shall be pointed and lifting holes filled with non-shrinking mortar.

3.07 INSTALLATION OF CATCH BASIN FRAMES

- A. Catch basin frames and covers shall be installed to grades shown on the Drawings or as directed.

- B. Adjustment of catch basin castings shall be made using specified brick or precasting adjusting rings and Portland cement mortar joints. The entire outer surface of adjusting rings and manhole castings shall be plastered with one (1) inch minimum Portland cement mortar unless otherwise detailed on the Drawings or directed.
- C. The maximum depth of adjustment below any manhole casting shall be sixteen (16) inches.

PART FOUR – SPECIAL PROVISIONS

- 4.01 Catch basin frames and covers shall be Owner's standard

END OF SECTION

PRE-CAST CONCRETE MANHOLES

PART ONE - GENERAL

1.01 SCOPE

- A. Under this Section, the Contractor shall furnish and construct pre-cast concrete manholes, including drops and manhole stacks of types and at locations shown on the Drawings.
- B. This Section includes additional excavation for manhole furnishing and installing concrete of classes called for, brick, Portland cement mortar, reinforcing steel, pre-cast concrete pipe, integral base sections, bottom riser sections, transition sections, riser sections, eccentric cones, flat slab tops and adjusting rings, flexible manhole connections, pipe for drop connections, plugging lifting holes, pointing joints, forming channels through manhole bottoms, making watertight connections to new and existing sewers, and other work incidental to manhole construction.
- C. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. All applicable Divisions of the Technical Specifications.

1.02 DEFINITIONS

- A. The various types of manholes are as shown on the Drawings or in the Standard Details.

1.03 SUBMITTALS FOR ENGINEER'S APPROVAL

- A. Manufacturer's Shop Drawings and Certificates:
 - 1. Pre-cast Concrete Manhole Sections and Specials
 - 2. Flexible Joints
 - 3. Manhole Frame and Covers
- B. Supplier's Certificates:
 - 1. Reinforced Concrete Pipe Manhole Sections.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Pre-cast Concrete Pipe Manhole Sections:
 - 1. Pre-cast concrete pipe manhole sections, transition sections, eccentric cones, flat slab tops, and adjusting rings shall conform to ASTM Specification C478. Reinforcing in transition sections shall be equal to that specified for wall sections of the larger diameter.
 - 2. Joints shall be O-ring type conforming to ASTM Specification C443.
 - 3. The standard length of riser sections shall be forty-eight (48) inches in length of thirty-two (32) inch or sixteen (16) inch to meet required dimensions and as specified.
 - 4. Openings for connecting pipes in riser sections bottom riser sections, and integral base sections, and for access in flat slabs shall be preformed or cored by the manufacturer. Cutout openings shall be made immediately after the pipe is removed from the casting form. All cored openings for sewer pipe connections shall have flexible joints.

5. Pre-cast integral base sections shall be of monolithic construction. The bottom of the section shall be six (6) inch thick minimum and contain a minimum steel reinforcing of No. 5 Rebar at 12 in c-c each way in top of the slab. Walls shall meet ASTM Specification C478.
 6. Specified manhole steps shall be factory installed to provide a continuous ladder of sixteen (16) inch C/C rung spacing. Steps shall be placed in the forms and cast in pipe wall or placed immediately after the pipe is removed from casting and carefully mortared in place with non-shrink mortar to insure a watertight joint. If the outer surface of the pipe wall is pierced, the patch shall be completely covered with a bituminous sealer.
 7. Where pressure tight manhole frames and covers are called for, threaded inserts shall be cast in eccentric cones or flat slab tops and holes formed or cored in adjusting rings to match bolt size and spacing specified for manhole casting.
- B. Manhole Steps:
1. Manhole steps shall be specified in Section 02739 and installed as shown on the Drawings.
- C. Manhole Frames and Covers:
1. Manhole frames and covers shall be as shown on the Drawings or in the Standard Details or as indicated in the Special Provisions.
 2. Where pressure tight manhole covers are called for, lid seals shall be a continuous round rubber gasket supplied by the manufacturer.
- D. Mortar:
1. Mortar used for the structures herein specified shall conform to Specifications for Mortar for unit Masonry, ASTM Designation C 270 Type S, containing no masonry cement. The mortar shall be composed of one (1) part Portland cement to two (2) parts sand by volume.
 2. Materials for non-shrinking mortar shall be Sauereisen F-100 Grout as manufactured by Sauereisen Cement Co., Pittsburgh, Pennsylvania; Five-Star Grout as manufactured by U.S. Grout Corp., Old Greenwich, Connecticut; or equal.
- E. All cast-in-place concrete used for forming channels in manhole bottoms shall be Class B as specified in Section 03120.
- F. Reinforcing steel used in cast-in-place concrete shall meet the requirements of Section 03200.
- G. Joints for pre-cast pipe openings shall be "Reseal" type as manufactured by Price Brothers Company, "Lock-Joint Flexible Manhole Sleeves" as manufactured by National Pollution Control Systems, Inc., or equal.
- H. Brick used for catch basin and manhole construction shall conform to Specifications for Sewer and Manhole Brick (made from clay or shale), ASTM Designation C 32, and shall be Grade "MS" unless otherwise specified.

PART THREE - EXECUTION

3.01 LOCATION AND CONSTRUCTION

- A. Location and type of manhole installed shall be as shown on the Drawings or directed.
- B. Construction shall be in conformance with details shown on the Drawings and as specified.

3.02 EXCAVATION

- A. Excavation for manhole construction shall be prepared as directed in applicable paragraphs of Section 02222.

3.03 INSTALLATION OF INTEGRAL BASE SECTIONS

- A. Class B concrete shall be poured so as to provide a minimum of four (4) inch thick pad under the entire area of the manhole base. Place the manhole on the pad before the concrete is completely set so that final leveling adjustment can be made.

- B. Six (6) inch granular backfill bedding can be used in lieu of Class B concrete at the direction of the Engineer.

3.04 CHANNELING MANHOLE BOTTOMS

- A. The bottoms of all manholes shall be channeled to conduct flow in the planned direction.

3.05 PRE-CAST CONCRETE RISER SECTIONS

- A. The shortest length of riser section to be incorporated into the manhole shall be installed immediately below the flat slab top.
- B. Pipe section joints shall be pointed and lifting holes filled with non-shrinking mortar.

3.06 INSTALLATION OF MANHOLE FRAMES

- A. Manhole frames and covers shall be installed to grades shown on the Drawings or as directed.
- B. Adjustment of manhole castings shall be made using specified brick or pre-casting adjusting rings and Portland cement mortar joints. The entire outer surface of adjusting rings and manhole castings shall be plastered with one (1) inch minimum Portland cement mortar unless otherwise detailed on the Drawings or directed.
- C. Each pressure tight manhole casting shall be anchored in place using four (4) 5/8-inch stainless steel bolts with nuts as detailed on the Drawings or as directed.
- D. The maximum depth of adjustment below any manhole casting shall be eighteen (18) inches

3.07 STANDARD TEST METHOD FOR CONCRETE SEWER MANHOLES BY THE NEGATIVE AIR PRESSURE (VACUUM) TEST PRIOR TO BACKFILL 1 (ASTM C 1244-02)

A. Scope

1. This test method covers procedures for testing precast concrete manhole sections when using the vacuum test Method to demonstrate the integrity of the installed materials and the construction procedures. This test method is used for testing concrete manhole sections utilizing mortar, mastic, or gasketed joints.
2. This test method is intended to be used as a preliminary test to enable the installer to demonstrate the condition of the concrete manholes prior to backfill.
3. This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

4. This test method is the companion to metric Test Method C 1244M; therefore, no SI equivalents are shown in this test method.

NOTE 1—Vacuum test criteria presented in this test method are similar to those in general use. The test and criteria have been widely and successfully used in testing manholes.

NOTE 2—It should be understood that no correlation has been found between vacuum (air) and hydrostatic tests.

B. Referenced Documents

1. **ASTM** Standards:

- a. C 822 Terminology Relating to Concrete Pipe and Related Products.
- b. C 924 Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
- c. C 969 Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.

C. Summary of Practice

1. All lift holes and any pipes entering the manhole are to be plugged. A vacuum will be drawn and the vacuum drop over a specified time period is used to determine the acceptability of the manhole.

D. Significance and Use

1. This is not a routine test. The values recorded are applicable only to the manhole being tested and at the time of testing.

E. Preparation of the Manhole

1. All lift holes shall be plugged.
2. All pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.

F. Procedure

- 1 The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.
- 2 A vacuum of 10 in. Hg shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 in. Hg.
- 3 The manhole shall pass if the time for the vacuum reading to drop from 10 in. Hg to 9 in. Hg meets or exceeds the values indicated in Table 1.
- 4 If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.
- 5 Use or failure of this vacuum test shall not preclude acceptance by appropriate water infiltration or exfiltration testing, (see Practice C 969), or other means.

TABLE 1 Minimum Test Times for Various Manhole Diameters in Seconds

| Depth (ft) _____ | | | | | | | | | |
|------------------|------------------|----|----|----|----|----|----|-----|-----|
| | 30 | 33 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| | Time, in seconds | | | | | | | | |
| 8 | 11 | 12 | 14 | 17 | 20 | 23 | 26 | 29 | 33 |
| 10 | 14 | 15 | 18 | 21 | 25 | 29 | 33 | 36 | 41 |
| 12 | 17 | 18 | 21 | 25 | 30 | 35 | 39 | 43 | 49 |
| 14 | 20 | 21 | 25 | 30 | 35 | 41 | 46 | 51 | 57 |
| 16 | 22 | 24 | 39 | 34 | 40 | 46 | 52 | 58 | 67 |
| 18 | 25 | 27 | 32 | 38 | 45 | 52 | 59 | 65 | 73 |
| 20 | 28 | 30 | 35 | 42 | 50 | 53 | 65 | 72 | 81 |
| 22 | 31 | 33 | 39 | 46 | 55 | 64 | 72 | 79 | 89 |
| 24 | 33 | 36 | 42 | 51 | 59 | 64 | 78 | 87 | 97 |
| 26 | 36 | 39 | 46 | 55 | 64 | 75 | 85 | 94 | 105 |
| 28 | 39 | 42 | 49 | 59 | 69 | 81 | 91 | 101 | 113 |
| 30 | 42 | 45 | 53 | 63 | 74 | 87 | 98 | 108 | 121 |

PART FOUR – SPECIAL PROVISIONS

- 4.01 Manhole frames and covers shall be per City Standards.

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work Included: The Contractor shall furnish and install all manhole steps used to provide access in cast-in-place and precast concrete structures as shown on the Drawings and as specified herein.
- B. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. All applicable Divisions of the Technical Specifications.

1.02 SUBMITTALS

- A. Shop drawings in sufficient detail to show fabrication, installation, anchorage and interface of the work required by this Section.
- B. Manufacturer's recommended installation procedures which when approved by the Engineer, will become the basis for accepting or rejecting actual installation unless otherwise stated herein.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. Manhole steps shall be of polypropylene plastic reinforced with a 3/8-inch No. 60 grade reinforcing rod as detailed in the Drawings. Steps of similar cross section and dimensions may be submitted for approval.
- B. Manhole steps shall be fabricated to provide a minimum of twelve (12) inch of step width and a minimum of six (6) inch of clearance behind the ladder rung.
- C. Cast iron or aluminum manhole steps will not be permitted.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations and shop drawings as approved by the Engineer.
- B. Manhole steps shall be placed in the formwork and cast in the concrete to provide an individual rung ladder with sixteen (16) inch center-to-center rung spacing.

- C. All steps shall be square and plumb to the other steps installed, as well as being free of any warp, twist, sag, or buckle.
- D. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

SECTION 02744

PVC SEWER PIPE (ASTM D3034)

PART ONE - GENERAL

1.01 SCOPE

- A. The Contractor shall, under Section 02744 shall furnish all the materials for and shall properly install at the location shown on the contract drawings or as directed by the Engineer all polyvinyl chloride pipe (PVC) and fittings necessary for the proper completion of the work included under this contract.
- B. All sewer pipe shall conform to American Society of Testing Materials Specifications, as set forth for the various classifications of pipe shown on the plans and/or in the proposal of these specifications. No old pipe or specials that have previously been used will be allowed in the herein specified work.
- C. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.

1.02 SUBMITTALS

- A. The Contractor shall furnish catalog data and specifications for approval describing in detail all pipe and specials proposed to be furnished under this Contract and a letter certifying that all such materials will be made to meet the applicable ASTM Specifications for the various classifications of pipe shown on the plans and/or in the proposal of these specifications.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. All PVC pipe used, as covered under Section 02744, shall conform to ASTM D3034, with end being designated for the type of joint as specified herein. PVC compounds shall conform to ASTM D 1784.
- B. The minimum class for PVC pipe under Section 02744 shall be SDR 35.
- C. Materials of construction, including joints and fittings, shall be suitable for exposure to raw sewage, and shall also be UV stabilized with either 2% carbon black or titanium dioxide.

2.02 JOINTS AND FITTINGS

- A. Bell and spigot type joints, including their respective appurtenances shall conform to ASTM D3212. Gaskets shall be in accordance with ASTM F477.
- B. All spigots shall have a "home" mark in order to facilitate joint closure.

2.03 DIMENSIONS

- A. The minimum class for PVC pipe under this item shall be SDR 35, unless otherwise noted on the plans.
- B. Pipe intended to be straight shall have a maximum deviation from straightness of 1/16 inch per lineal foot when measured in accordance with ASTM D 2122.

2.04 INSPECTION

- A. All pipe and fittings will be inspected by the Engineer or his authorized representative immediately prior to installation. A manufacturers certificate that the PVC material and pipe were manufactured and tested in accordance with AWWA 900 shall be furnished to the Engineer prior to installation of the pipe.

PART THREE - EXECUTION

3.01 STORAGE

- A. All plastic fixtures and pipe, if stored outside, shall be covered with an opaque material to protect it from the sun's rays.

3.02 INSTALLATION

- A. Cutting of all pipe shall be done with sharp tools. The ends of each pipe shall be reamed until all burrs or fins are removed. Full tapered threads shall be used throughout and threaded joints shall turn up perfectly tight without the use of filling substances. A standard pipe joint paste shall be used on the male threads only, and none shall be allowed to accumulate on the inside of the pipes. All connections between pipe shall be made with an approved dielectric insulating material.
- B. Pipe joints shall conform to respective industry standards.
- C. Exterior pipelines shall be installed and graded in accordance with state and/or local plumbing codes.
- D. Pipe shall be firmly bedded throughout the full length with the exception of where bell holes are required. Where unstable soil conditions occur under buildings, support shall be made from the underside of the structural slab by an approved type hanging device embedded in the concrete.
- E. Where PVC piping is laid in a trench, the bottom of the trench shall be well graded and compacted to insure even bearing for the full length of the pipe and the pipe shall be snaked at approximately fifty (50) feet intervals to provide for expansion or contraction. Prior to testing the pipe, the pipe shall be center loaded with backfill between joints to prevent the pipe from arching or whipping under pressure. During backfill the line shall be pressurized to 25 psi. to minimize impact damage.

3.03 TESTING

- A. Special testings for deflection of PVC sewer pipe
 - 1. Before final acceptance of sewer lines constructed of these materials, all sections of sewer pipe six (6) inch and larger specified diameter shall be measured for vertical ring deflection by the Contractor and witnessed by the Engineer. Maximum deflection under full load shall not exceed 5% of the average inside diameter as determined by the laboratory for the specified piping.
 - 2. Should any pipe exceed the allowable deflection, the Contractor shall replace those pipes and retest the section as directed by the Engineer.
 - 3. Equipment used in testing shall be "go-no go" pull through gauges of a type approved by the Engineer. Each gauge must be checked and approved by the laboratory before using.
 - 4. Testing equipment and personnel to perform the required tests shall be provided by the Contractor. Tests must be witnessed by the Engineer.
 - 5. Use of mechanical pulling devices will not be permitted.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work Included: The Contractor, shall furnish all the materials for and shall properly place at the locations shown on the Drawings or as directed, all service connections including all tee (or wye) branches, bends, riser pipes, user services, plugs, blocking, ties and appurtenances thereto as shown or required for the proper completion of the work included under this contract.
- B. Related Work:
 - 1. Including but not limited to the General Conditions, Supplementary Conditions or General Requirements.
 - 2. All applicable Divisions of the Technical Specifications.

1.02 QUALITY ASSURANCE

- A. As applicable to its respective material, each service connection component shall comply with the requirements of other sections of these Detailed Specifications.
- B. Similarly, each component is subject to testing as per its respective material specification.

1.03 SUBMITTALS

- A. Prior to the use or placement of any service connection components, the Contractor shall submit manufacturers' material specifications and recommended handling and installation procedures.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. The house service pipe, riser pipe, and connection to the main sewer shall be of the same material, strength, and joint, unless otherwise shown or approved by the Engineer.
- B. Specifications for sewer pipe and joints are applicable for all house service.
- C. No old pipes or specials that have been previously used will be allowed in the herein specified work.

2.02 DIMENSIONS OF PIPE

- A. The sizes of pipe and specials shall refer to nominal inside diameters.

PART THREE - EXECUTION

3.01 LAYING

- A. All trenches, when pipe laying is in progress, shall be kept dry and all pipes and specials shall be laid accurately to the required lines and grades and shall be uniformly supported along their entire lengths.

The bottom of the excavation shall be properly trimmed, with bell holes at each joint to receive the bell so as to avoid supporting the pipe by its bell.
- B. Pipe shall be fully entered and shall abut against adjacent pipe and in such a manner that there will be no unevenness along the inverts.

- C. When pipes enter or pass through concrete walls, manholes, sewers or other structures, holes shall be provided and; 1) The pipes properly cemented in place so as to form a watertight joint or 2) Resilient boots shall be used.

- D. Installation shall conform to ASTM C 12.

3.02 SERVICE WYES

Service wye branches shall be of the proper size.

- A. Location: In general, branches shall be placed in the main sewer opposite each lot or property to which a service connection may be extended as shown on the Drawings and as directed by the Engineer.
- B. Existing Sewers: Where a service wye branch is to be installed in an existing sewer, the Contractor will be permitted to tap the sewer pipe and install the wye branch as directed by the Engineer.

3.03 RISER PIPE

Where the cover on the tee (or wye) branch is in excess of twelve (12) feet below average ground surface, a 45 degree bend and sufficient riser pipe shall be added to terminate (to the nearest even length of riser pipe) at a depth of ten (10) feet below the ground surface, provided the property being served will not require additional depth.

3.04 SERVICE CONNECTIONS

Service connections to be extended from main sewers over ten (10) feet deep, where the property being served does not require the full depth, may be brought up to grade in the manner described for riser pipe with payment for all pipe as house service only. Connections from main sewers with less than ten (10) feet depth will be extended on a straight uniform grade from the main to the point of terminus. Depths of service connections at the point of termination will be supplied by the Engineer, but in general will be held to a minimum of eight (8) feet when the depth of the main sewer permits.

- A. Installation: Specifications for sewer pipe installation are applicable for all service connections. Unless otherwise shown on the plans or directed by the Engineer, all house services shall be installed in a trench with a maximum width at the top of the pipe barrel of twenty-four (24) inches.
- B. Encasement Pipe: At the locations shown on the plans, or as required by the Engineer, service connections shall be installed in an encasement pipe as shown on the plans. A sufficiently large boring pit shall be excavated to allow for proper alignment of the drilling equipment and to allow the service connection pipe to be pushed through the encasement pipe. The horizontal alignment of the encasement pipe shall not vary more than two (2) feet at the upstream end of the service connection from a line drawn at right angles to the sanitary sewer at the tee (or wye) branch or riser.

3.05 CLOSURES

The outlet of each wye branch, riser or house service shall be securely sealed with a watertight and vacuum tight closure that can be later removed without damage to the outlet.

- A. ABS or PVC: All closures at the ends of ABS or PVC wye branches, risers or house services shall be made by installing a length of ABS or PVC pipe to the wye branch, riser or house service and solvent cementing an ABS or PVC cap to the spigot end. A sufficient length of pipe should be installed to permit removal of the closure and extending the line in the future. Mechanical plugs shall not be permitted.

3.06 MARKER POLES

A marker pole shall be placed at the end of each tee (or wye) branch, riser, or house service, as the case may be, extending to a point six (6) inches below finished grade. The wye pole shall be braced in such a manner as to hold it firmly in position during backfilling. If the wye pole is pulled out, bent, or broken, the Contractor shall, at no

cost to the Owner, replace or straighten the pole. The wye pole shall be adjacent to the end of the pipe but not in it.

- A. Material: Marker poles shall be of hardwood, not less than 2 inches by 2 inches (2"x2" in.) cross section. The material used for wye poles shall be in condition and shall be straight, sound and free from large or loose knots.

3.07 SPECIAL PROVISIONS

- A. The Contractor, when constructing a direct replacement of an active wastewater line, shall reconnect each service connection complete as specified herein when encountered and as approved by the Engineer during the construction of the wastewater line.
- B. Prior to connecting/reinstalling a service connection, the Engineer shall inspect each existing wye or tap-in connection. Upon completion of the inspection, the Engineer will instruct the Contractor to reconnect or not to reconnect the wye or tap-in connection. The Engineer shall, if determined necessary, dye test the existing wye or tap-in connection.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Planting and seeding required for this Work is indicated on the Drawings or is required by other specification sections of this Project Manual and, in general, include plants and other ground cover throughout the Work. Unless otherwise specified, all areas distributed by construction activities shall be planted and seeded in accordance with this Section.
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.02 QUALITY ASSURANCE

- A. Qualifications of workmen: Provide at least one person who shall be present at all times during execution of this portion of the Work, who shall be thoroughly familiar with the type of materials being installed and the proper materials and methods for their installation, and who shall direct all work performed under this Section.
- B. Standards:
 - 1. All plants and planting material shall meet or exceed the specifications of Federal, State, and County laws requiring inspection for plant disease and insect control.
 - 2. Quality and size shall conform with the current edition of "Horticultural Standards" for number one grade nursery stock as adopted by the American Association of Nurserymen.
 - 3. All plants shall be true to name. One of each bundle or lot shall be tagged with the name and size of the plants in accordance with the standards of practice of the American Association of Nurserymen. In all cases, botanical names shall take precedence over common names.
 - 4. Unless otherwise specified, planting and seeding shall be in conformance with the latest edition of the "Agronomy Guide" as published by the Pennsylvania State University, College of Agriculture Extension Service.

1.03 SUBMITTALS

- A. General: Comply with the provisions of Section 01300.
- B. Materials lists: Within forty-five (45) days after award of the Contract, submit a complete list of all materials proposed to be furnished and installed under this Section, demonstrating complete conformance with the requirements specified except as provided under Section 01300.
- C. Certificates: Deliver all certificates to the Engineer.

1.04 PRODUCT HANDLING

- A. Delivery and storage:
 - 1. Deliver all items to the job site in their original containers with all labels intact and legible at time of Engineer's inspection.
 - 2. Immediately remove from the site all plants which are not true to name, and all materials which do not comply with the specified requirements.

3. Use all means necessary to protect plants materials before, during, and after installation and to protect the work and materials of all other trades.

- B. Replacements: In the event of damage; immediately make all repairs and replacements necessary to the approval of the Engineer at no additional cost to the Owner.

PART TWO - PRODUCTS

2.01 FERTILIZER

- A. Provide commercial balanced 0-20-20 and 10-10-10 fertilizer, delivered to the site in bags labeled with the manufacturer's guaranteed analysis. If stored at the site, protect fertilizer from the element at all times.

2.02 MULCH

- A. Acceptable materials:
 1. Oat or wheat straw, reasonably free from weed, foreign matter detrimental to plant life, and in dry condition. Hay or chopped cornstalks is also acceptable if above conditions are met.
 2. Wood or wood cellulose fiber free of growth or germination inhibiting ingredients.
 3. Erosion control fabric consists of a knitted construction of yarn interwoven with strips of biodegradable paper. Erosion control fabric shall be Hold/Gro Erosion Control Fabric as manufactured by Gulf States Paper Company or approved equal.

2.03 NYLON EROSION CONTROL MATTING

- A. Provide nylon erosion control matting consisting of heavy nylon monofilament fused at their intersection. Nylon erosion control matting shall be Enkamat Type 7020.

2.04 TREE STAKES

- A. Unless otherwise indicated on the Drawings, provide wood stakes, rough-sawn, two (2) inches by two (2) inches by eight (8) feet long.

2.05 GRASS SEED

- A. General: All grass seed shall be free from noxious weeds, grade A recent crop, recleaned, and treated with appropriate fungicide at time of mixing. Deliver to the site in sealed containers with dealer's guaranteed analysis.
- B. Proportions by weight shall be in accordance with Table 1 of this Section or as directed by the Engineer.

2.06 PLANT MATERIALS

- A. Provide all plant materials where indicated on the Plant Schedule in the Drawings.

2.07 TOPSOIL

- A. Where and if shown on the Drawings or otherwise required, provide topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, roots, heavy or stiff clay, stones larger than two (2) inch in greatest dimension, noxious weeds, sticks, brush, litter, and other deleterious matter.
- B. Obtain topsoil from sources within the project limits, or provide imported topsoil obtained from sources outside the project limits, or from both sources.

2.08 OTHER MATERIALS

- A. All materials, not specifically described but required for a complete and proper installation, shall be as selected by the Contractor subject to the approval of the Engineer.

PART THREE - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely conditions have been corrected.

3.02 PREPARATION

- A. Protect existing underground improvements from damage. Remove foreign materials, plants, roots, stones, and debris from site. Do not bury foreign material.
- B. Cultivate to a depth of three (3) inches all areas which are to receive topsoil.
- C. All unpaved areas within the plant perimeter fence shall be prepared for seeding.

3.03 SPREADING TOPSOIL

- A. Spread topsoil to a depth of six (6) inches over all areas to be seeded unless otherwise directed by the Engineer. Place topsoil during dry weather and on dry unfrozen sub-grade. Where existing in-place topsoil is satisfactory to the Engineer, further topsoil will not be required.
- B. Cultivate topsoil to a depth of six (6) inches with mechanical tiller, cultipacker or other similar equipment. Cultivate inaccessible areas by hand. Rake until surface is smooth.
- C. Remove from site foreign materials collected during cultivation.
- D. Grade to eliminate rough spots and low areas where ponding may occur. Maintain a smooth, uniform grade and provide positive drainage away from tanks, buildings and other structures.

3.04 PLANTING TREES AND SHRUBS

- A. General:
 - 1. Plant nursery stock immediately upon delivery to the site and approval by the Engineer except that, if this is not feasible, heel-in all bare roots and balled material with damp soil to protect from sun and wind.
 - 2. Regularly water all nursery stock in containers, and place them in a cool area protected from sun and drying winds.
- B. Excavation: At all holes more than twelve (12) inches deep, probe by hand to determine if mechanical auger will hit any in-place utilities. Provide planting holes of the following dimensions:
 - 1. For shrubs in one-gallon containers, a hole twelve (12) inches in diameter and twelve (12) inches deep.
 - 2. For shrubs and trees in five-gallon containers, a hole twenty (20) inches in diameter and eighteen (18) inches deep.
 - 3. For trees in fifteen-gallon containers, a hole thirty (30) inches in diameter and thirty (30) inches deep.
- C. Planting:
 - 1. Fill holes with backfill mixture consisting of three (3) parts soil taken from the hole and one (1) part specified soil amendment, by volume.

2. Fill to proper height to receive plant, and thoroughly tamp before setting the plant.
3. Set plant in upright position in the center of the hole, and compact the backfill mixture around the ball or roots.
4. Thoroughly water each plant when the hole is 2/3 full.
5. After watering, tamp the soil in place until the surface of the backfill is level with the surrounding area and the crown of the plant is at the finished grade of the surrounding area.
6. Build up a temporary watering basin around the base of each tree and shrub, except no basin in turf areas or in raised planter areas.

3.05 PLANTING GROUND COVER

- A. Preparation: Rake existing soil smooth and free from all soil lumps, rocks, sticks, and other deleterious materials.
- B. Planting:
 1. Space the ground cover plants evenly as indicated on the Drawings, staggering spaces around trees and shrubs and in the open areas.
 2. Plant only in soil that is moist but friable, never wet or soggy.
 3. In the case of planting in the open on hot days, shorten the time between planting and watering.

3.06 SEEDING TURF GRASS

- A. Preparation: Grade all seed beds, thoroughly removing all ridges and depressions, and making all areas into smooth, continuous, firm planes that ensure proper drainage. Remove all soil lumps, rocks, sticks, and other deleterious material.
- B. Fertilizing:
 1. Apply ground limestone at the rate of 150 lbs. per 1000 square feet or according to soil test.
 2. Apply fertilizer according to soil test or work in deeply 15 lbs. per 1000 square feet of 0-20-20 and at the time of seeding work into the surface 15 lbs. per 100 square feet of 10-10-10.
 3. Do not apply grass and fertilizer at same time and in the same machine. Lightly water fertilized areas to aid the breakdown of fertilizer and to provide moist soil for seed.
- C. Seeding:
 1. Sow with a seed mixture approved for that purpose by the Engineer. Promptly after seeding, wet the seedbed thoroughly, keeping all areas moist throughout the germination period.
 2. Do not sow immediately following rain, when the ground is too dry or windy periods. Apply water with a fine spray immediately after each area has been sown.
- D. Protect all seeded areas by erecting temporary fences, barricade, signs, and other protection needed to prevent trampling.
- E. Unless otherwise shown on the Drawings, all seeded areas with a slope less than 1V:3H shall be mulched with straw at the rate of 75-100 lbs. (2-3 bales per 1000 sq. ft.) Lightly cover 75 to 90 percent of surface with mulch. Areas with slopes exceeding 1V:3H shall be mulched with the manufactured erosion control fabric as described in 3.08 of this Section.

3.07 STAKING

- A. Stake all trees, using one stake per tree with two tree ties per stake, and driving all stakes into the ground at least two feet.

3.08 SEED PROTECTION ON STEEP SLOPES

- A. Cover seeded sloped where grade is 3:1 or greater with erosion control fabric or approved equal. Erosion fabric shall be installed immediately after seeding operations have been completed in work areas. Mulch shall not be used under the fabric.
- B. Installation instructions shall be supplied by the manufacturer and erosion control fabric shall be applied in accordance with the manufacturer's recommendation as directed by the Engineer.
- C. Erosion control fabric shall be unrolled and draped loosely without stretching so that continuous ground contact is maintained. In ditches, fabric shall be unrolled and applied parallel to the flow direction. On slopes, fabric shall be applied parallel to the slope direction unless Engineer approves an alternate application method.
- D. In ditches and on slopes, each upslope and each downslope end of each piece of fabric shall be placed in four (4) inch trench, stapled on twelve (12) inch centers, backfilled and tamped. Where on roll ends and second roll starts, the upslope piece shall be brought over the end of the downslope roll so that there is a twelve (12) inch overlap, placed in a four (4) inch trench stapled on twelve (12) inch centers backfilled and tamped.
- E. On slope where two (2) or more widths of fabric are applied, the two edges shall be overlapped according to manufacturer's installation instructions and stapled at eighteen to twenty-four (18-24) inch intervals along the exposed edge of the lap joint. The body of the fabric shall be stapled in a grid pattern with stapled three foot (3) on center (minimum each way).
- F. Where heavy concentrations of water or extremely erodible soil conditions existing, erosion checks shall be installed at intervals up to fifty (50) feet as directed by the Engineer. Erosion checks shall be a four (4) inch deep trench perpendicular to the flow line across the width of the fabric. The fabric shall be stapled at nine (9) inch intervals along the bottom of the trench across the entire width of the fabric backfilled and tamped.

3.09 MAINTENANCE

- A. General: Maintain all planting, starting with the planting operation and continuing for thirty (30) calendar days after all planting is complete and approved by the Engineer.
- B. Work included:
 - 1. Include all watering, weeding, cultivating, spraying, and pruning necessary to keep the plant materials in a healthy growing condition, and to keep planted areas neat and attractive during the maintenance period.
 - 2. Provide all equipment and means for proper application of water to those planted areas not equipped with an irrigation system.
 - 3. Protect all planted areas against damage, including erosion and trespassing, by providing and maintaining proper safeguards.
- C. Replacements:
 - 1. At the end of the maintenance period, all plant material shall be in a healthy growing condition.
 - 2. During the maintenance period, should the appearance of any plant indicate weakness and probability of dying, immediately replace that plant with a new and healthy plant of the same type and size, without additional cost to the Owner.

3. Replacements required because of vandalism or other causes beyond control of the Contractor are not part of the Contract.

| TABLE 1 PERMANENT SEEDING FOR CRITICAL AREA ON PREPARED SEED BED | | | | | |
|--|-------------------|---|-------------------------|----------|---|
| | | | Seeding Rates in Pounds | | |
| Species or Mixture for Permanent Cover | Percent By Weight | Pounds Per Acre | Per 1,000 sq. ft. | Per Acre | Recommended Seeding Dates |
| FORMULA I: | | | | | |
| a. Kentucky 31 Tall Fescue Redtop | 88% 12% | 35 5 | 1-2 | 40 | April 1 to June 15 July 15 to September 15 |
| b. Kentucky 31 Tall Fescue Birdsfoot trefoil | 75% 25% | 30 10 | 1-2 | 40 | March 1 to June 15 |
| c. Kentucky 31 Tall Fescue or } Creeping Red Fescue or } Rye Grass } and Crown Vetch | 75% 25% | 30 or 30 or 30 and 10 | | | |
| d. Kentucky 31 Tall Fescue Birdsfoot trefoil Crown Vetch | 50% 30% 20% | 20 12 8 | 1-2 | 40 | March 1 to June 15 |
| e. Timothy Birdsfoot trefoil | 40% 60% | 5 8 | ½-1 | 13 | April 1 to June 15 |
| FORMULA II: | | | | | |
| Rye Grass Crownvetch | 55% 45% | 25 20 | 1-2 1-2 | 45 | March 1 to May 30 |

Notes for Table 1

1. Inoculate legume seeds - use four times the normal rate when hydroseeding.
2. One to 1-1/2 bu. of small grain may be seeded with any of the mixtures in this section that do not contain a legume. Mow small grains just before they head out, if slopes permit.
3. When seedings are mulched, seeding dates may be extended from March 1 to October 15 for regular seedings. Dormant seedings with mulches can be made from November 15 to March 1.
4. Seeding mixtures with Crownvetch will not be approved for wet soils.
5. Formula I mixtures will be used on all areas with a slope less than one (1) vertical to three (3) horizontal and Formula II will be used on all slopes equal to or greater than one (1) vertical to three (3) horizontal.

PART FOUR – SPECIAL PROVISIONS

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DIVISION 3
CONCRETE

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SECTION 03105

CONCRETE WALKS AND STAIRS

PART ONE - GENERAL

1.01 SCOPE

- A. Under this Item the Contractor shall furnish and construct sidewalks and stairs as shown or scheduled on the Drawings, specified or directed.
- B. This Item includes preparation of the base and/or sub-grade construction of walks, adjustment of manhole castings and valve boxes to conform to new elevations and other work and materials incidental to the construction of walks and stairs.

1.02 OWNER'S STANDARDS AND SPECIFICATIONS

- A. Where applicable, street pavement and berms shall be restored in accordance with the Owner's present standards and specifications.
- B. Items preceded by ODOT shall refer to the latest edition of the State of Ohio, Department of Transportation, Construction and Material Specifications.

PART TWO - MATERIALS

2.01 CONCRETE

- A. All concrete used shall be Class C as specified in Item 608.

2.02 WALKS AND STAIRS

- A. Materials for walks and stairs shall meet the applicable requirements of ODOT Item 608.

PART THREE- EXECUTION

3.01 INSTALLATION

- A. All soil sub-grade under walks and stairs shall be compacted in accordance with Item 203.
- B. All service boxes, manholes and inlet tops shall be set to the required grades.
- C. All construction for walks and stairs shall be in accordance with ODOT Item 608 for the type called for on the Drawings.
- D. Minimum thickness of concrete walks shall be 4 inches.
- E. Stairs shall be as detailed on the drawings.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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PART ONE - GENERAL

1.01 DESCRIPTION

- A. Under this Section, the Contractor shall provide, transport, and place all concrete required to construct conduits, pavements, curbing, foundations, slabs, walls, floors, columns, beams, tanks, roads, highways, drives and other concrete structures; and for special uses as required by the Project Specifications or as shown on the Drawings.
- B. Related Work:
 - 1. Related work includes, but is not limited to, the General Conditions, Supplementary Conditions, Section 01300 Submittals, Section 03200 Concrete Reinforcement, Section 03100 Concrete Formwork, Section 01410 Testing Laboratory Services, and all other applicable Sections of the Project Technical Specifications.

1.02 QUALITY ASSURANCES

- A. Where applicable State and local codes exist and conflict with this Section, the State and local code requirements shall control.
 - 1. Ohio Department of Transportation requirements shall apply to all road and highway work.
- B. American Society for Testing and Materials, (ASTM) and American Concrete Institute (ACI) standards as specified herein shall apply.
- C. Laboratory Services and Control
 - 1. The laboratory providing the services specified in Section 01410 shall make sample tests as required to assure that the concrete provided is of the specified quality and composition.
 - 2. Laboratory technicians shall have free access to the job and concrete production facilities at all times and receive the full cooperation of the Contractor for the preparation, storage, and transportation of concrete sample test cylinders and/or test beams.
 - 3. The laboratory shall provide the forms for testing cylinders and beams.
 - 4. The Contractor shall provide to the Owner, design mixes that include the weight in pounds of fine aggregate, coarse aggregate, cement, and water per cubic yard of concrete; the number of 94 pound sacks of cement per cubic yard of concrete; the pounds of water per sack of cement; gross weight and yield per cubic yard of concrete; weight in ounces or pounds of admixture per sack of cement; slump; air content; and compressive strength of test cylinders at seven (7) days and twenty-eight (28) days. Weight of fine and coarse aggregate shall be determined in saturated, surface dry condition. Material samples shall be provided, as required, to the Owner for verification of the design mix.
 - a. The laboratory shall, as directed by the Engineer, test and produce reports of mix designs for all concrete incorporated in the work.
 - b. Only the laboratory shall adjust concrete mixes, as required, to obtain a product in conformance with the specified limiting requirements.
 - 5. It shall be the responsibility of the Contractor to obtain mix designs for each specified class of concrete used. The Engineer shall approve the mix designs before the Contractor starts concrete production.
 - a. The mix design for pumped concrete shall conform to concrete industry standard ANSI/ACI 304.2R.
 - 6. The laboratory shall make scheduled quality control tests consisting of the following:
 - a. Test specimens (compressive strength)
 - b. Slump

c. Air Entrainment

7. When concrete is procured from a central batching plant or transit mixers are used, the Owner may provide a representative at such plant to check the proportioning of aggregates and water, and mixing time.

D. Schedule of Tests

1. Quality control tests for concrete each mix shall be performed as determined necessary by the Engineer.
2. Three (3) test cylinders shall be made for each 20 cu. yds. or part thereof of concrete poured each day.
3. Two (2) test beams shall be made for each 250 sq. yds. of concrete pavement placed.
4. When cylinders and/or beam samples are made, the slump and air tests shall be made using concrete from the same batch.
5. Samples of concrete tested for determining air content and slump and for test cylinders and beams shall be taken at the point of discharge into the structure unless otherwise directed by the Engineer.

E. Standard Testing Specifications

1. Test specimens shall be made in accordance with "Standard Method of Making and Curing Concrete Test Specimens in the Field," ASTM Designation C31.
2. Tests for compression shall be performed in accordance with "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens," ASTM Designation C 39.
3. Tests of beam specimens shall be made in accordance with "Standard Test Method for Flexural Strength of Concrete" (Using Simple Beam with Center-Point Loading), ASTM Designation C 293.
4. Slump tests shall be made using "Standard Test Method for Slump of Portland Cement Concrete," ASTM Designation C 143.
5. Air content shall be determined for concrete mixes composed of sand, gravel, and stone aggregates by use of "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method," ASTM Designation C 231. Where slag aggregate is used, the air content shall be determined by the Volumetric Method, ASTM Designation C 173.
6. Should the twenty-eight (28) day strength fall below that specified for the particular class of concrete, the Contractor shall take such action as necessary to assure that the strength is not less than that specified.
7. Acceptance of concrete shall conform to ACI 301, Chapter 17.

F. Concrete Plant

1. Plant equipment and facilities shall be in accordance with applicable requirements of ASTM Designation C 94 and as specified herein.
2. Equipment shall comply with the following requirements:
 - a. The accuracy of the weighing equipment shall conform to the requirements of the United States Bureau of Standards.
 - b. Equipment shall be capable of compensating for the varying weight of moisture contained in the aggregates, or for changing the proportionate batch weights.
 - c. The equipment shall be capable of accurately controlling the weight of the cement and aggregate.
 - d. The equipment shall be so arranged as to permit the convenient removal of overweight material.
 - e. Standard testing weights and other necessary equipment for testing the accuracy of the weighing equipment shall be available at the plant at all times.

3. Plant Inspection

- a. A qualified representative of the testing laboratory shall, as directed by the Engineer, inspect the plant and determine if the necessary facilities and equipment are available and adequate for the scheduled production of concrete as specified.
- b. If the plant does not meet requirements, the Contractor shall be informed of the deficiencies so that they may be corrected.
- c. When, in the opinion of the laboratory representative, the plant meets the requirements for specified production, he shall so notify the Engineer in writing. The notification shall include a list of all major facilities necessary for use in production of specified concrete for use in the Project.

4. Production of concrete shall not be started until the Engineer has approved the plant for use.

G. Mixing and Transporting Concrete

1. Concrete may be mixed in portable mixers located at the job site, in central plant mixers, or in transport mixers. Mixers of all types shall conform to the requirements specified herein.
2. Transit and central plant mixed concrete shall be mixed in approved batch mixers of the rotary drum type having sufficient capacity to assure continuous delivery at the required rate, except that relatively small quantities may be hand mixed with special permission. The mixing drum shall be kept free of set concrete at all times. A water storage tank equipped with a gauge glass and an accurate measuring device shall be provided to determine the exact amount of water added to each batch. The measuring device shall be readily adjustable, and so designed that it can be locked after setting and that the amount of added water cannot be altered after such setting. Mixing shall continue at least one (1) minute at the manufacturer's rated drum speed after water, all aggregate, and cement have been added; and until every particle of aggregate is coated with mortar and the whole mass is uniform in color and homogeneous in texture. The Contractor shall supply a discharge locking device, so designed that concrete cannot be discharged in less than the required mixing time. The mixer also shall be equipped with an alarm that sounds at the end of the mixing time, and with an approved batch meter that will accurately record each batch delivered.
3. Transit mixed concrete shall be mixed completely in truck mixers equipped with the specified water-measuring control and locking device. Each batch of concrete shall be mixed for not less than 70 nor more than 100 revolutions of the drum or blades at the rate of rotation designated by the manufacturer of the equipment as mixing speed. Mixing shall be at the speed designated by the manufacturer of the equipment at their rated capacity. Trucks shall be equipped with counters that register the number of revolutions of the drum or blades.
4. The Contractor shall furnish two (2) delivery tickets with each load containing the following information:
 - a. Date
 - b. Producer and Plant
 - c. Job, name, and location
 - d. Truck number and time dispatched
 - e. Concrete designation and cement type
 - f. Admixture descriptions and contents
 - g. The time discharge was started and completed
 - h. Amount of concrete in load
 - i. Amount of any materials added at the site and authorized signature.

1.03 SUBMITTALS

A. Contractor

1. Plant certification
2. Cement certificate for each shipment
3. Admixture certificate
4. Concrete mix design

- a. Design mix approval
- b. Test results
- c. Sieve analysis of coarse and fine aggregates
- d. Admixtures
- d. Pozzolan admixture, Type F

PART TWO - PRODUCTS

2.01 MATERIALS

A. Cement shall conform to the requirements of ASTM C 150 or ASTM C 595. Types as provided in Table 1.

B. Admixtures

1. Air entrainment admixtures conforming to ASTM Designation C 260 shall be introduced into the mix in quantities to entrain air as follows:

| | |
|----------------|------------------------------------|
| Class A, B & D | 5% optimum - allowable variance 1% |
| Class C | 6% optimum - allowable variance 2% |

2. Pozzolan admixture shall conform to the requirements of ASTM Designation C 618, Class F.
3. Calcium chloride or admixtures containing more than 0.1% chloride ions are prohibited.
4. High range water reducing admixture (super-plasticizer) may be used as an option by the Contractor, but at no additional cost to the Owner.
 - a. The admixture shall conform to ASTM C494, Type F.

- 1) Approved products are Eucon - 37 by Euclid Chemical Company, Sikament by Sika Chemical Corporation or equal.

C. Fine Aggregate

1. Fine aggregate shall consist of natural sand composed of clean, hard, strong durable, uncoated grains, It shall be free from injurious amounts of shale, clay lumps, soft or flaky particles and other unsound or deleterious substances. It shall conform to Specifications for Concrete Aggregates, ASTM Designation C 33.

D. Coarse Aggregate

1. Coarse aggregate shall consist of gravel, slag, or broken stone composed of strong, hard, clean, durable, uncoated pebbles or rock fragments free from injurious amounts of shale, coal, clay lumps, soft fragments, dirt, glass, and organic or other deleterious substances. It shall conform to Specifications for Concrete Aggregates, ASTM Designation C 33, Size 467, 57 or 67, Class 4S. Slag shall weigh at least 75 lbs/cf.
2. For thin sections, the maximum stone size used shall be reduced when directed. For heavy sections the maximum stone size shall be increased when directed. In both cases, the gradation of other stone sizes shall be modified as directed. Crushed stone and gravel shall be washed if necessary to remove dust, dirt, or loam and if unsatisfactory shall be excluded from the work.

E. Non-shrinking Grout

1. Materials for non-shrink grout shall conform to CRD-C-621 "Corps of Engineers Specifications for Non-Shrink Grout". Approved products are Sauereisen F-100 Grout as manufactured by Sauereisen Cements Co., Pittsburgh, Pennsylvania; Five-Star Grout as manufactured by U.S. Grout Corp., Old Greenwich, Connecticut; Masterflow 713 as manufactured by Master Builders, Cleveland, Ohio and "Euco N-S" by Euclid Chemical Co.

F. Forms for Concrete

1. Forms shall be in accordance with Section 03100 Concrete Formwork and the following:

2. Forms for exposed surfaces shall be of approved material to produce a smooth surface with minimal joint marks.
3. When wood forms are used, they shall be constructed of sound top construction grade western fir or hemlock, or equivalent acceptable lumber, dressed on forming sides and neatly fitted. Joints shall be of quality to produce a smooth surface compatible with the type of finish required.
4. Plywood used for formwork shall be manufactured using waterproof glue made for this type of installation.

G. Concrete Reinforcement

1. Concrete reinforcement shall be in accordance with Section 03200 Concrete Reinforcement.

PART THREE - EXECUTION

3.01 PROPORTIONING

- A. Normal weight concrete shall be designated Class A, B, C or D and be proportioned and mixed to develop not less than the minimum compressive strength shown in Table I. (ACI 301 - Proportioning on the basis of previous field experience or trial mixtures).

| TABLE 1 CONCRETE REQUIREMENTS | | | | | | |
|--|----------------|--|--------------------------------------|--------------------------------------|------------------|------|
| Concrete Class | Cement Type | Min. 28-Day Compressive Strength PSI | Maximum Water- Cement Ratio | Minimum Cement Content Sack/CY | Slump Minimum | Max. |
| A | I | 4000 | 0.45 | 6 - 1/2 | 1 | 4 |
| B | I | 2000 | 0.74 | 4 - 1/2 | 2 | 6 |
| C | I | 4000 | 0.50 | 6 - 1/2 | 1 | 4 |
| D | II or IP | 4000 | 0.45 | 6 - 1/2 | 1 | 4 |
| Note: See paragraph 3.11 herein for the uses of the various classes of cast-in-place concrete. | | | | | | |

B. Water-Cement Ratio

1. Except by special permission of the Engineer, maximum amounts of water (U.S. gallons), including the surface water carried by the fine and coarse aggregates per sack (94 lbs. net) of cement shall be that listed in Table 1. Standard methods shall be used for determination of surface moisture in the aggregates.
2. Concrete of the maximum strength, density, and durability possible with the specified water-cement ratio is required. No increase of these ratios will be permitted.
 - a. Refer to ANSI/ACI 304.2R for placing concrete by pumping methods.
3. Water may be added with the approval of the Engineer, but in no case shall the maximum slump limit be exceeded.

C. Each cubic yard of concrete shall contain the minimum number of sacks (94 lbs. net per sack) of cement listed in Table 1.

1. The minimum amounts of cement listed shall be used regardless of tests and design methods used.

D. Proportions

1. The proportions of aggregate to cement for concrete of the specified water-cement ratio shall be such as to produce concrete that can be puddled readily into the corners and angles of forms and around reinforcement without excessive spading and without segregation of materials or collections of free water on the surface. In no case shall concrete be placed which shows slumps outside the limits listed in Table 1.
2. Consistency of the concrete shall be closely regulated and the proportions of fine and coarse aggregate shall be such as to produce no harshness in placing nor honeycombing in the structures. If required, the mixture shall be modified by changing the relative volume of fine and of coarse aggregate. The Contractor shall cooperate in every way to the end that concrete of the desired quality shall be obtained.

3.02 FORMS FOR CONCRETE

A. Concrete forms shall be in accordance with Section 03100 Concrete Formwork and the following:

B. Erection

1. All walls shall be plumb with level tops; all floors shall be either level or sloped toward a floor drain where provided.
2. Forms for repeated use shall be supplied in numbers to provide for the required rate of progress. Defective forms shall not be used.
3. Forms for all exposed surfaces of ceilings, beams and columns, and of walls of tanks, conduits and buildings shall be constructed of 3/4 inch or 7/8 inch plywood or lined by a method that assures smooth surfaces.

C. Forms shall not be removed until the concrete has attained sufficient strength to assure structural stability under all dead and construction loads, and so that removal can be accomplished without marring concrete surfaces. The determination of when forms may be removed shall take into account temperature and humidity. Formwork that does not support the weight of concrete shall remain in place for at least 24 hours after concrete placement. Formwork supporting the weight of concrete shall remain in place until the concrete has obtained 80% of the specified 28-day strength.

3.03 PLACING CONCRETE

A. Scheduling

1. The Contractor shall notify the Engineer at least twenty-four (24) hours in advance of placing concrete.
2. Concrete shall be placed between the hours of 8:00 A.M. and 6:00 P.M. unless permission is obtained to extend that time. No slab shall be placed after 12:00 Noon on any last working day of the week.
3. Each concrete pour shall be completed in a continuous operation with no interruption in excess of forty-five (45) minutes.
4. No concrete shall be placed after its initial set has occurred, and no re-tempered concrete shall be used under any circumstances.
5. When columns, brackets, or walls are to support beams or slabs, the concrete in the vertical or supporting member shall be deposited up to 1/2 inch above the bottom of the supported member and a period of at least twelve (12) hours shall elapse for settlement before placing concrete in the horizontal member.
6. No concrete shall be placed during rain, sleet, or snow unless adequate protection is provided and approval is obtained. Rainwater shall not be allowed to increase the mixing water nor damage the surface finish.

B. Before placing the concrete, all forms shall be thoroughly cleaned and the space to be occupied by the concrete shall be free from all laitance, silt, dirt, shavings, sawdust, and other debris.

C. Conveying Concrete to Forms

1. The method or device used for conveying the concrete from the mixer to its place in the work shall be such as

to assure against the separation of the materials.

2. Where placing operations involve dropping the concrete more than four (4) feet, it shall be deposited through sheet metal or other approved pipes. These pipes shall be made in sections not to exceed four (4) feet in length.

D. Placing Concrete in Forms

1. Concrete placing shall conform to ACI 304.
2. Concrete shall be deposited at or near its final position and carried up evenly within forms, in layers not exceeding eighteen (18) inches in depth. It shall be thoroughly consolidated around and into contact with forms, reinforcement, pipes, or other shapes built into the work, by spading and vibrating. Voids or pockets of coarse aggregate shall be prevented and the completed work shall be a solid, watertight unit with smooth form surfaces. A sufficient number of workers shall be available at all times to perform the work properly. Control of methods and practices of placing shall be subject to the approval of the Engineer.
3. Where pipe or other shapes are built into the work, the concrete shall be placed from one side only and shall flow under the pipe or shape to the other side until all air is displaced.

3.04 PLACING CONCRETE DURING COLD WEATHER

- A. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
- B. When concrete is placed at or below an atmospheric temperature of 40°F, or whenever, in the opinion of the Engineer, the temperature may fall below 40°F within the curing period, the water, aggregate, or both shall be heated and suitable enclosures and heating devices shall be provided.

C. Heating of Materials

1. Heating of mixing water shall be controlled to maintain uniform temperature from batch to batch. In no case shall the water be heated to a temperature greater than 140°F.
2. Aggregate shall be uniformly heated to eliminate all frozen lumps, ice, and snow. However, the aggregate shall not be heated to a temperature of more than 100°F.

D. Placing

1. Concrete shall be placed at a temperature of not less than 50°F. and not more than 75°F. and the air surrounding the forms and deposited concrete shall be maintained within this temperature range for a period of not less than seven (7) days. The enclosures and heating devices shall not be removed at the end of this period until the temperature of the concrete has been permitted to drop, at a rate not to exceed 20°F. per twenty-four (24) hours, to within 20°F. of the atmospheric temperature. Thermometers shall be furnished by the Contractor so that the temperature within the enclosure may be determined.
2. Concrete shall not be placed in contact with materials having a temperature of less than 40°F. If necessary, the forms, reinforcing steel, and foundation materials shall be enclosed and heated before the concrete is placed.
3. The completion of suitable enclosures and the application of heat to bring the air surrounding the forms and deposited concrete to the specified temperature shall follow the placing of concrete as soon as possible.
4. Heaters shall be vented at all times. No products of combustion shall be permitted to come in contact with concrete surfaces before twenty-four (24) hours after finishing.

E. Form Insulation

1. In lieu of heated enclosures, the Contractor may protect concrete in slabs more than twelve (12) inches thick and in walls of structures by the use of insulation, if approved by the Engineer.
2. When form insulation is used, the concrete shall be placed at a temperature of not less than 50°F and not more than 75°F as directed by the Engineer, and maintained by the insulation at a surface temperature of the

concrete of not less than 50°F and not more than 100°F. Sufficient thermometers shall be furnished and installed by the Contractor in such a manner that the surface temperature of the concrete may be readily determined. Whenever the surface temperature as indicated by the thermometer reading exceeds the specified maximum temperature, the forms or insulation shall be loosened or otherwise vented until the surface temperature is within the specified limits. If the thermometer readings indicate that the minimum required temperature is not being maintained, the structure shall be promptly enclosed and heat furnished as required.

3. The insulation material shall be wind and water-resistant. Special precautions shall be taken at edges and corners to insure that such points are adequately protected. The tops of pours shall be protected by a tarpaulin, or other approved waterproof cover over the insulation.
4. At the close of the protection period, the temperature of the concrete within the form shall be gradually decreased, by loosening the forms of insulation to permit a rate of cooling not to exceed 20°F per twenty-four (24), to within 20°F of the atmospheric temperature.

3.05 PLACING CONCRETE DURING HOT WEATHER

- A. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
- B. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.
- C. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
- D. Wet forms thoroughly before placing concrete.
- E. Do not use retarding admixtures without the written acceptance of the Engineer.

3.06 JOINTS AND BONDING

- A. Construction joints and expansion joints shall be placed as shown on the Drawings. Approval of the Engineer must be secured for the placing of any construction joints not shown on the Drawings.
- B. Keyways shall be provided in all construction joints. Unless shown otherwise on the Drawings, the width of all keyways shall be 1/3 of the wall or slab thickness by two (2) inches deep.
- C. Horizontal Construction Joints (in walls).
 1. Lower Joint Surface Construction
 - a. Proposed joint surfaces shall be finished straight by use of temporary straight edges tacked to the inside of the form with the lower edges on the line of the joint.
 - b. Keyway shall be formed before the concrete attains its initial set.
 2. Completing Joint
 - a. Within twelve (12) hours after the keyway has been formed, the lower surface of the joint shall be thoroughly cleaned by the use of wire brushes and all laitance and loose material removed so as to expose clean, solid concrete. Care must be taken not to loosen any of the coarse aggregate in the concrete. If for any reason this laitance is not removed within twelve (12) hours after the concrete is placed, it shall be removed using such tools and methods as may be necessary to secure the results specified above.
 - b. After the lower surface has been prepared and immediately before placing concrete above the joint, the lower surface shall be thoroughly wetted and flushed and a bed of mortar composed of one (1) part Portland Cement and two (2) parts sand spread over the entire surface (two (2) inches minimum depth in wall pours). The mortar shall be thoroughly worked into all openings and crevices.

3.07 SURFACE FINISH

- A. Concrete surfaces shall be finished even and reasonably free from imperfections and roughness. Angles shall be true and edges straight.
- B. Patching
 - 1. Upon removal of forms, cavities produced by form ties, honeycomb spots, broken corners or edges, and other defects shall be cleaned, saturated with water, and completely filled, pointed and trued with a mortar mix of cement and fine aggregate of the same proportions used in the concrete being finished. Form tie holes shall be completely filled by use of a pressure gun or by a hand ramming method.
 - 2. On all exposed surfaces, all fins and irregular projections shall be removed with a stone or power grinder, in such a way as to avoid contrasting surface textures. Holes and other areas requiring corrective work shall be coated with neat cement and patched. Except where the surface is to be painted or otherwise covered, sufficient white cement shall be substituted for the regular cement in the patching mortar to produce finished patches of the same color as the surrounding concrete.
- C. General Related to Finishing:
 - 1. After removal of forms, give the concrete surfaces one or more of the finishes specified below where so indicated on the Drawings.
 - 2. Revise the finishes as needed to secure the approval of the Engineer.
 - 3. Concrete surfaces which will be exposed to view in the completed construction shall have a smooth even surface. Repairs shall be made to surface as soon as forms are stripped.
- D. As-Cast Finish:
 - 1. Rough form finish:
 - a. Leave surfaces with the texture imparted by forms, except patch tie holes and defects.
 - b. Remove fins exceeding 1/4" in height.
 - 2. Smooth form finish:
 - a. Coordinate as necessary to secure form construction using smooth, hard, uniform surfaces, with the number of seams kept to a practical minimum and in a uniform and orderly pattern.
 - b. Patch tie holes and defects.
 - c. Remove fins completely.
 - d. Unsightly ridges or lips on exposed concrete shall be removed by tooling and rubbing. All surfaces requiring rubbing shall be thoroughly washed with water after the rubbing is completed. Voids or stone pockets shall be cleaned out and patched. Wires and rods shall be cut off depressed not less than one inch below finished surface. Loose stones and all holes shall be cleaned out and the defects repaired with concrete to a smooth even surface. Holes left by removal of form ties shall be thoroughly and completely filled with patching concrete, as specified under Repairs and Patching. Plastering or cement wash will not be permitted unless otherwise specified in this section.
- E. Finishing Slabs:
 - 1. Definition of Finishing Tolerances:
 - a. "Class A": True plane within 1/8" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.
 - b. "Class B": True plane within 1/4" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.

- c. "Class C": True plane within 1/4" in two feet as determined by a two foot straightedge placed anywhere on the slab in any direction.
- 2. Scratched Finish: After the concrete has been placed, consolidated, struck-off, and leveled to a Class C tolerance, roughen the surface with stiff brushes or rakes before the final set.
- 3. Float Finish:
 - a. After the concrete has been placed, consolidated, struck-off, and leveled, do not work the concrete further until ready for floating.
 - b. Begin floating when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation.
 - c. During or after the first floating, check the surface plane with a ten-foot straightedge applied at not less than two different angles.
 - d. Cut down high spots and fill low spots, and produce a surface with a Class B tolerance throughout.
 - e. Re-float the slab immediately to a uniform sandy texture.
- 4. Trowel Finish:
 - a. Provide a floated finish as described above, followed by power trowelling and then a hand trowelling.
 - 1. Produce an initial surface which is relatively free from defects, but which still may show some trowel marks.
 - 2. Provide hand trowelling when a ringing sound is produced as the trowel is moved over the surface.
 - 3. Thoroughly consolidate the surface by hand trowelling.
 - 4. Small areas may be entirely hand trowelled.
 - b. Provide a finished surface essentially free from trowel marks, uniform in texture and appearance, and in a plane of Class A tolerance.
 - 1. For concrete on metal deck, Class B plane tolerance is acceptable.
 - 2. On surfaces intended to support floor coverings, use grinding or other means as necessary and remove all defects of such magnitude as would show through the floor coverings.
- 5. Broom Finish:
 - a. Provide a floated finish as described above.
 - b. While the surface is still plastic, provide a textured finish by drawing a fiber bristle broom uniformly over the surface.
 - c. Unless otherwise directed by the Engineer, provide the texturing in one direction only.
 - d. Provide "light", "medium", or "course" texturing as directed by the Engineer or otherwise called for on the Drawings.
- 6. Scratch Finish:
 - a. If a surface is to receive bond-applied cementitious coating, provide a scratch finish.
- 7. Finish Schedule, unless otherwise indicated:
 - a. Building Interiors

| | |
|-------------------------|---------------|
| Floors, bases, & curbs: | Trowel finish |
| Other slabs: | Float finish |

- | | |
|--------------------------|----------------------|
| Exposed formed surfaces: | Smooth-rubbed finish |
| Other formed surfaces: | As-cast finish |
- b. Building Exteriors

| | |
|--------------------------|---|
| Slabs, drives, & walks: | Broom finish |
| Exposed formed surfaces: | Smooth-rubbed finish to 6 in. below grade |
| Other formed surfaces: | As-cast finish |
 - c. Pedestrian ramps & exterior steps

Trowel finish (with slip-resistant aggregate applied) landings, platforms, garage floors
 - d. Tanks and Other Liquid Retaining Structures:

| | |
|---------------------------|---|
| Slabs: | Float finish |
| Interior formed surfaces: | Smooth-rubbed down to 6 in. below water line when exposed to view |
| | As-cast finish below water line |
| Exterior formed surfaces: | Smooth-rubbed finish down to 6 in. below finished grade |
| | As-cast finish below finished grade |
| Other formed surfaces: | As-cast finish |
- F. Concrete floor hardener shall be furnished and applied to all interior exposed concrete floors, unless indicated otherwise on the Drawings. Floor hardener shall be Lapidolith as manufactured by Sonneborn, Inc., Hornolith as manufactured by A.C. Horn, Inc., or equal. Products shall be applied in conformance with the manufacturer's instructions and as specified herewith. The hardener shall be applied diluted with water in the following proportions:
1. First application - 1 part hardener to 2 parts water
 2. Second application - 1 part hardener to 1 part water
 3. Third application - 2 parts hardener to 1 part water

3.08 CURING OF CONCRETE

- A. Curing of concrete shall be in conformance with ACI "Manual of Concrete Practice" Part I ACI 308 and as specified herein.
- B. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures, and mechanical injury, and shall be maintained with minimal moisture loss and at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The Contractor shall provide thermometers as required by the Engineer.
- C. Horizontal units such as floor slabs and sidewalks shall be cured in two stages:
 1. Initial curing shall begin immediately after concrete finishing is complete and shall be continued for twenty-four (24) hours and shall be in conformance with one of the following methods:
 - a. The concrete shall be covered with two thicknesses of an acceptable woven fabric such as burlap thoroughly saturated with water and shall be maintained in a saturated condition for the specified period. Lap the burlap strips by half widths when placing to give greater moisture retention and aid in preventing displacement of burlap during high wind or heavy rain.
 - b. Ponding of water over the entire surface for the specified period.
 - c. Continuous application of water by means of suitable sprinkling devices for the specified period.
 2. Final curing shall last for a minimum of six (6) days and shall employ one of the following methods:
 - a. Continuation of the water curing process employed in the initial curing period.
 - b. An impervious paper or plastic covering, meeting ASTM Specification C 171, placed and maintained in contact with the concrete.

D. Vertical elements such as walls and columns shall be cured in two stages:

1. Initial curing shall begin immediately after the finishing of the concrete or within three (3) hours after placing operations cease. Curing shall consist of covering exposed surfaces with two (2) thicknesses of an approved woven fabric such as burlap, thoroughly saturated with water and maintained in a saturated state by means of a soaker hose placed on top of the burlap. If form work is to be left in place for more than forty-eight (48) hours, the forms should be loosened to assure that water runs down the inside of the forms, to keep the concrete surfaces wet.
2. Upon removal of the wet coverings and formwork used for the initial curing, one of the following methods for final curing may be used:
 - a. Application of a continuous mist spray of water directly on the concrete.
 - b. Application of an impervious paper or plastic covering, meeting ASTM Specifications C 171, directly upon the surface of the concrete.

E. When the mean daily temperature of the surrounding air is less than 40°F., the concrete shall be protected to maintain the temperature of the concrete between 50°F. and 70°F. for the curing period.

F. Curing water shall be approximately the same temperature as the concrete to alleviate temperature-change stresses that could be detrimental to the concrete.

3.09 PROTECTION

A. Free Water

1. Concrete for structures shall not be placed in water, nor shall water be allowed to come into contact with freshly poured concrete until it has attained a sufficient set, except where special permission may have been given to place concrete under water by the Engineer.
2. Water used for cleaning the placing equipment shall be discharged outside the forms.

B. All forms and reinforcing steel, located above the concrete being placed, and all placing equipment shall be kept clean and free of hardened concrete.

C. Aluminum Inserts:

1. All aluminum materials inserted in or in contact with concrete shall have the contact surface coated with bitumastic.

3.10 MUD MATS

A. Where called for on the plans or as directed by the Engineer, the Contractor shall construct concrete mud mats immediately after cleaning the excavation bottom, to preserve the bearing surface condition. Concrete for mud mats shall be not less than three (3) inches thick. Bottom of excavation shall be free of water, mud and loose material prior to mud mat placement.

3.11 CAST-IN-PLACE CONCRETE

A. All reinforced concrete shall be Class A, except as otherwise specified or shown on the Drawings.

B. Concrete used for mud mats, fill and channeling in manholes and chambers shall be Class B unless otherwise noted on the Drawings.

C. Concrete conforming to ODOT Current Edition shall be used for all concrete pavement, curbing, driveways, and sidewalks, unless noted otherwise on the Drawings.

D. Class B concrete may be used for encasing pipelines, fill, and pipe bedding.

E. Where Class B concrete fill is called for an installed in or on structures, the following steps shall be taken:

1. Scrub concrete slabs and/or walls with a stiff wire brush and streams of clean water.

2. Apply a bonding agency with a product name of Euco-Weld as manufactured by Euclid Chemical Company or equal.
 3. The Class B concrete shall then be placed and screeded to bring the surface to final grade.
- F. Class D concrete shall be used for sewerage treatment plants and sewerage pump stations, or as noted on the Drawings.

PART FOUR - SPECIAL PROVISIONS

END OF SECTION

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PART ONE - GENERAL

1.01 SCOPE

- A. This Item includes furnishing and placing concrete reinforcing steel of the quality, type and size designated including steel dowels.

1.02 STANDARDS

- A. Concrete reinforcement shall conform to requirements of ACI 301, latest edition, "Specifications for Structural Concrete for Buildings", except as modified herein.

1.03 SUBMITTALS FOR ENGINEER'S APPROVAL

- A. The manufacturer shall submit certified results of at least one representative tensile and bending test for each size bar and fabric reinforcement furnished for contracts requiring 10,000 lbs. of reinforcing steel or more, unless otherwise required.

1.04 DELIVERY AND IDENTIFICATION

- A. Reinforcing steel, as delivered to the job site, shall be bound in bundles of either bent or straight bars identified by a numbered weatherproof tag. The tag numbers shall identify the bars corresponding to those shown on the bar lists and placement drawings.
- B. The Engineer shall be given a copy of the weigh bill and invoice for each shipment delivered.

1.05 PROTECTION

- A. All reinforcing steel, metal chairs and supports shall be stored on timber supports above the ground and out of flood areas. It shall be protected from dirt, oil, grease, and rust.

PART TWO - PRODUCTS

2.01 QUALITY AND GRADE

- A. Structures:
 - 1. Bar reinforcement shall be Grade 60 deformed bars meeting the requirements of ASTM A 615 or ASTM A 616.
 - 2. Steel fabric shall conform to "Specification for Fabricated Steel Bar or Rod Mats for Concrete Reinforcement", ASTM A 184, and shall be furnished in flat sheets.
 - 3. Sizes shall be as indicated on the drawings.
- B. Pavements, Curbing and Walks
 - 1. Dowel bars for load transfer joints shall be straight, smooth, round bars conforming to the dimensions shown on the Drawings and shall be shop coated with a suitable rust inhibitor. For expansion joints, the dowel bars shall be fitted with expansion caps.
 - 2. Longitudinal Bulkhead Joint Devices:
 - a. Hooked bolts for mechanically coupled lane tie assemblies shall have a 5/8-inch minimum shank diameter. Each assembly shall have a 24,000 lbs. minimum ultimate tensile strength.
 - b. Self-drilling anchors shall be the flush-end type of the snap-off chuck end type conforming to Federal Specifications No. FF-S-325 Group III, Type 1(a) or (c).

- c. Longitudinal lane ties shall be 5/8-inch minimum diameter deformed reinforcing bars of length to embed fifteen (15) inch minimum into each lane of pavement.
- 3. Reinforcing steel shall be deformed bars conforming to ASTM A 615, A 616, or 617, Grade 60.
- 4. Fabric reinforcement shall conform to ASTM A 184.

2.02 DETAILED DRAWINGS

- A. All detailing, fabrication accessories, and erection of reinforcing steel unless otherwise noted shall conform to the "Manual of Standard Practice for Detailing Reinforced Concrete" (ACI 315).
- B. Laps and splices unless otherwise noted shall conform to "Building Code Requirements for Reinforced Concrete" (ACI 318).

PART THREE - EXECUTION

3.01 PLACEMENT

- A. Reinforcement of the size and shape shown on the approved shop drawings, or as may be directed by the Engineer, shall be placed where indicated on the Drawings or as necessary to carry out the intent of the Drawings and Specifications.
- B. The steel shall not be bent nor straightened in any injurious manner, such as by heating in the field. Bars with kinks or bends not shown on the Drawings shall be rejected.
- C. Reinforcement shall be securely tied at intersections as often as necessary to maintain the bars in their proper position during placement of concrete.
- D. The ends of spliced reinforcing bars shall overlap not less than forty (40) bar diameters unless otherwise shown on the Drawings. The splices in adjacent bars shall be staggered.
- E. No reinforcing bars shall be driven nor forced into concrete after it has obtained its initial set.
- F. Welding of main reinforcing is prohibited.
- G. Before placing concrete in freezing weather, reinforcing bars shall be heated and kept warm to prevent concrete from freezing to the steel.
- H. Reinforcing bars may be moved within allowable tolerance to avoid interference with other reinforcing steel, conduits, other embedded items, or openings.
- I. The clear space between the outside face of reinforcing bars and the surface of concrete shall conform to the following dimensions, except as otherwise shown on the Drawings:
 - 1. Concrete not in contact with earth or water or located over water
 - a. Columns, Beams, and Girders 1-1/2 in.
 - b. Slabs and Walls 3/4 in.
 - c. Wearing Surfaces 1 in.
 - 2. Concrete in contact with or over water
 - a. All Members 2 in.
 - 3. Concrete in contact with earth
 - a. Formed Walls and Columns 2 in.
 - b. Slabs on Ground 3 in.

3.02 SUPPORTS

- A. All supports for reinforcement shall be of adequate strength, of the proper depth and number to securely hold the reinforcement in position while placing the concrete.
- B. Metal supports shall have a shape that is easily enveloped by the concrete.
- C. Metal supports in contact with formwork shall have plastic tips.
- D. Where slabs are placed on forms, only metal supports will be permitted.
- E. Where slabs are to be poured on firm ground or concrete mud mats, reinforcement may be supported by pre-cast concrete blocks or metal supports.
- F. Pre-cast concrete spacer blocks of the required thickness shall be wired to wall and column steel to assure required concrete protection. However, pre-cast concrete spacer blocks will not be permitted where walls or columns will remain exposed after forms are removed.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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CONCRETE FINISHING AND CURING

PART ONE - GENERAL

1.01 DESCRIPTION

- A. Work included: Provide finishes on cast-in-place concrete as called for on the Drawings, specified herein, and needed for a complete and proper installation.
- B. Summary of PART TWO - PRODUCTS
 - 1. Subsection 2.01: Materials
 - 2. Subsection 2.02: Sealer
 - 3. Subsection 2.03: Waterproofing
 - 4. Subsection 2.04: Other Materials
- C. Summary of PART THREE - EXECUTION
 - 1. Subsection 3.01: Surface Conditions
 - 2. Subsection 3.02: Coordination
 - 3. Subsection 3.03: Installation
 - 4. Subsection 3.04: Finishing of Formed Surfaces
 - 5. Subsection 3.05: Finishing Slabs
 - 6. Subsection 3.06: Curing and Protection
 - 7. Subsection 3.07: Sealing
 - 8. Subsection 3.08: Waterproofing
- D. Related Work
 - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.
 - 2. Section 03120: Cast-in-Place Concrete

1.02 QUALITY ASSURANCE

- A. Qualifications of Suppliers: Products used in the work of this Section shall be produced by suppliers regularly engaged in the manufacture of similar items and with a history of satisfactory production acceptable to the Engineer.
- B. Qualifications of Installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper installation of the work in this Section.
- C. Except as may be modified herein or otherwise directed by the Engineer, comply with ACI 301, "Specifications for Structural Concrete for Buildings".

1.03 SUBMITTALS AND SUBSTITUTIONS

- A. Comply with pertinent provisions of Section 01300.
- B. The following product data shall be submitted in accordance with the approved Construction Schedule required in Section 01300 of these Specifications:
 - 1. Manufacturer's recommended installation procedures which, when approved by the Engineer, will become the basis for accepting or rejecting actual installation procedures used on the Work.
 - 2. Test data required elsewhere in this Specification.

1.04 PRODUCT HANDLING

- A. General: Comply with pertinent provisions of Section 01350.

PART TWO - PRODUCTS

2.01 MATERIALS

- A. General:

1. Carefully study the Drawings and these Specifications, and determine the location, extent, and type of required concrete finishes and curing.
2. As required for the Work, provide the following materials, or equals approved in advance by the Engineer.

- B. Concrete Materials:

1. Comply with pertinent provisions of Section 03120, except as may be modified herein.

- C. Curing and Protection Paper or Film:

1. Use waterproof paper or polyethylene film.
2. Approved products:
 - a. "Sisalkraft, Orange Label".
 - b. Equal products, comply with ASTM C171.
3. Where concrete will be exposed and will be subjected to abrasion, such as floor slabs, use non-staining paper such as "Sisalkraft, Seekure 896", or equal paper faced with polyethylene film.

- D. Membrane Type Curing Compound:

1. Use products conforming to ASTM C-309/type 1D/Class A and Fed. Spec. TT-C-800A Type 2/Class. Approved products include the following:
 - a. Maximent floor seal, Set Projects, Inc.
 - b. Masterseal, Master Builders.
 - c. Sealtight CS-309 Acrylic Curing and Sealing Compound, W.R. Meadows, Inc.
 - d. Kure-N-Seal, Sonneborn, Building Products Division.
 - e. "Traz" Sealer, as manufactured by Chem-Masters Corporation, Chagrin Falls, Ohio.
2. Where application of specified finish materials will be inhibited by use of curing agents, cure the surface by water only; do not use chemical cure.

- E. Floor and Deck Sealer with Hardener:

1. Approved products where no floor covering is to be installed:
 - a. Sealtight Cure-Hard Curing and Harding Compound, as manufactured by W.R. Meadows, Elgin, Illinois.
 - b. "Polyseal 4 in 1" Curing and Hardening Compound, as manufactured by Chem-Masters Corporation, Chagrin Falls, Ohio.
2. In areas where floor covering is to be installed, the chemical must be compatible with the adhesives to be used. Liquid curing and sealing agents, as specified above, may be used if shown to be compatible.

- F. Slip-Resistant Abrasive Aggregate:

1. Provide aluminum oxide, 14/36 grading.
2. Acceptable manufacturers:
 - a. Carborundum Company
 - b. Norton Company
 - c. L.M. Schofield Company

2.02 SEALER

- A. The sealer shall be Hydrozo Clear 16 as manufactured by Hydrozo Coatings Company, Lincoln, Nebraska or an approved equal. The sealer shall be an aluminum modified siloxane material containing approximately 6% solids and be applied by an approved applicator as per manufacturer's directions. It shall pass ASTM C67-80 with a repellency rating of 96%. It shall show, in twenty-eight (28) day submersion tests, a repellency rating of 99.55%. When tested for chloride ion resistance, it shall show little or no absorption. When tested per ASTM C672, Scaling Resistance Test, it shall have a rating of "No Scaling" after 40 cycles as compared to untreated concrete that had a rating of "Severe Scaling" after 10 cycles on non-air-entrained concrete. It shall have a Moisture Vapor Transmission Rate, per ASTM C 1653-72, of 52 grams per square foot per twenty-four (24) hours at 25°C.

2.03 WATERPROOFING

- A. The waterproofing Xypex shall be as manufactured by Xypex Chemical Corporation, Richmond, British Columbia, Canada or an approved equal. The waterproofing shall be of the cementitious crystalline type that controls and permanently fixes non-soluble crystalline growth throughout the capillary voids of the concrete. The waterproofing material shall exhibit no leakage when two (2) inches, 2000 psi design samples are tested in conformance with U.S. Army Corps of Engineers' Permeability Specifications CRD C-48-73.
- B. Clear sealers or cement-based compounds which utilize sodium silicate as a "gel" are not acceptable.

2.04 OTHER MATERIALS

- A. Provide other materials, specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

PART THREE - EXECUTION

3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 COORDINATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations and shop drawings as approved by the Engineer.
- B. Upon completion of the installation, carefully inspect each component and verify that all items have been installed in their proper location, adequately anchored, and adjusted to achieve optimum operation.

3.04 FINISHING OF FORMED SURFACES

- A. General:
 1. After removal of forms, give the concrete surfaces one or more of the finishes specified below where so

indicated on the Drawings.

2. Revise the finishes as needed to secure the approval of the Engineer.
3. Concrete surfaces which will be exposed to view in the completed construction shall have a smooth even surface. Repairs shall be made to surface as soon as forms are stripped.

B. As-Cast Finish:

1. Rough form finish:
 - a. Leave surfaces with the texture imparted by forms, except patch tie holes and defects.
 - b. Remove fins exceeding 1/4" in height.
2. Smooth form finish:
 - a. Coordinate as necessary to secure form construction using smooth, hard, uniform surfaces, with number of seams kept to a practical minimum and in a uniform and orderly pattern.
 - b. Patch tie holes and defects.
 - c. Remove fins completely.
 - d. Unsightly ridges or lips on exposed concrete shall be removed by tooling and rubbing. All surfaces requiring rubbing shall be thoroughly washed with water after the rubbing is completed. Voids or stone pockets shall be cleaned out and patched. Wires and rods shall be cut off depressed not less than one inch below finished surface. Loose stones and all holes shall be cleaned out and the defects repaired with concrete to a smooth even surface. Holes left by removal of form ties shall be thoroughly and completely filled with patching concrete, as specified under Repairs and Patching. Plastering or cement wash will not be permitted unless otherwise specified in this section.

C. Unspecified Finish: If the finish of formed surfaces is not specifically called out elsewhere in the Contract Documents, provide the following finishes as applicable.

1. Rough form finish:
 - a. For all concrete surfaces not exposed to public view.
2. Smooth form finish:
 - a. For all concrete surfaces exposed to public view.

3.05 FINISHING SLABS

A. Definition of Finishing Tolerances:

1. "Class A": True plane within 1/8" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.
2. "Class B": True plane within 1/4" in ten feet as determined by a ten foot straightedge placed anywhere on the slab in any direction.
3. "Class C": True plane within 1/4" in two feet as determined by a two foot straightedge placed anywhere on the slab in any direction.

B. Scratched Finish: After the concrete has been placed, consolidated, struck-off, and leveled to a Class C tolerance, roughen the surface with stiff brushes or rakes before the final set.

C. Floated Finish:

1. After the concrete has been placed, consolidated, struck-off, and leveled, do not work the concrete further

until ready for floating.

2. Begin floating when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation.
3. During or after the first floating, check the planeness of the surface with a ten-foot straightedge applied at not less than two different angles.
4. Cut down high spots and fill low spots, and produce a surface with a Class B tolerance throughout.
5. Re-float the slab immediately to a uniform sandy texture.

D. Trowelled Finish:

1. Provide a floated finish as described above, followed by a power trowelling and then a hand trowelling.
 - a. Produce an initial surface which is relatively free from defects, but which still may show some trowel marks.
 - b. Provide hand trowelling when a ringing sound is produced as the trowel is moved over the surface.
 - c. Thoroughly consolidate the surface by hand trowelling.
 - d. Small areas may be entirely hand trowelled.
2. Provide a finished surface essentially free from trowel marks, uniform in texture and appearance, and in a plane of Class A tolerance.
 - a. For concrete on metal deck, Class B plane tolerance is acceptable.
 - b. On surfaces intended to support floor coverings, use grinding or other means as necessary and remove all defects of such magnitude as would show through the floor coverings.
 - c. The inside of the chlorine contact tank shall be very carefully trowelled, with a hard smooth finish acceptable to the Engineer.

E. Broom Finish:

1. Provide a floated finish as described above.
2. While the surface is still plastic, provide a textured finish by drawing a fiber bristle broom uniformly over the surface.
3. Unless otherwise directed by the Engineer, provide the texturing in one direction only.
4. Provide "light", "medium", or "course" texturing as directed by the Engineer or otherwise called for on the Drawings.

F. Unspecified Finish: If the finish of slab surfaces is not specifically called for elsewhere in the Contract Documents, provide the following finishes as applicable:

1. Scratch finish:
 - a. For surfaces scheduled to receive bond-applied cementitious applications.
2. Floated finish:
 - a. Only in areas directed.
3. Trowelled finish:
 - a. For floors intended as walking surfaces.
 - b. For floor scheduled to receive floor coverings or waterproof membrane.

- c. For parking areas.
- 4. Non-slip finish (trowelled finished with slip-resistant aggregate applied):
 - a. For exterior platforms, steps, and landings.
 - b. For interior and exterior pedestrian ramps and walks.
 - c. For garage floors.

3.06 CURING AND PROTECTION

- A. Beginning immediately after placement, protect concrete from premature drying, excessively hot and cold temperatures, and mechanical injury.
- B. Preservation of Moisture:
 - 1. All concrete shall be cured in a manner which will prevent loss of moisture from the concrete surface and keep the concrete in a continuously moist condition for at least seven days.
 - 2. Unless otherwise directed by the Engineer, apply one of the following procedures to concrete not in contact with forms, immediately after completion of placement and finishing.
 - a. Ponding or continuous sprinkling.
 - b. Application of absorptive mats or fabric kept continuously wet.
 - c. Application of sand kept continuously wet.
 - d. Continuous application of steam (not exceeding 150°F) or mist spray.
 - e. Application of waterproof sheet materials specified in Part 2 of this Section.
 - f. Application of other moisture retaining covering as approved by the Engineer.
 - g. Application of the curing agent specified in Part 2 of this Section or elsewhere in the Contract Documents.
 - 3. Where forms are exposed to the sun, minimize moisture loss by keeping the forms wet until they can be removed safely.
 - 4. Cure concrete by preserving moisture as specified above for at least seven (7) days.
 - 5. If forms are removed sooner than seven (7) days after placement of concrete, curing shall be continued until at least seven (7) days have elapsed by application of the curing and sealing or curing and hardening compound of type specified in this Section, or as otherwise allowed by the Engineer. No compound shall be used which will adversely affect the application of any coatings, adhesives, waterproofing or damp-proofing or any other finishes indicated for the concrete surface on the Drawings or elsewhere in the Specifications. Any dyes in curing compounds used on exposed concrete must be fugitive-type.
 - 6. Where hardeners are required on a floor, the floors shall be cured and hardened simultaneously as specified in this Section or an Engineer approved equal and compatible with any topping or finish which will be applied to the slab.
 - 7. The Contractor shall make arrangements with the curing and hardening material manufacturer to make available at no cost to the Owner the services of a field representative to clarify to the Contractor the proper application of the products under prevailing job conditions.
- C. Temperature, Wind and Humidity:
 - 1. Cold Weather:
 - a. When the mean daily temperature outdoors is less than 40°F, maintain the temperature of the concrete

between 50°F and 70°F for the required curing period.

- b. When necessary, provide proper and adequate heating system capable of maintaining the required heat without injury due to concentration of heat.
 - c. Do not use combustion heaters during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.
- 2. Hot Weather: When necessary, provide windbreaks, fog spraying, shading, sprinkling, ponding, or wet covering with a light colored material, applying as quickly as concrete hardening and finishing operations will allow.
 - 3. Rate of Temperature Change: Keep the temperature of the air immediately adjacent to the concrete during and immediately following the curing period as uniform as possible and not exceeding a change of 5°F in any one-hour period, or 50°F in any 24-hour period.
- D. Protection from Mechanical Injury:
- 1. During the curing period, protect the concrete from damaging mechanical disturbances such as heavy shock, load stresses, and excessive vibration.
 - 2. Protect finished concrete surfaces from damage from construction equipment, procedures, rain and running water.
 - 3. Do not load self-supporting structures in such a way as to overstress the concrete.

3.07 SEALING

- A. Unless otherwise specified, all exterior and submerged (extend sealer to two (2) feet above liquid level) cast-in-place concrete which is not painted (Section 09900) or waterproofing (Section 03345, paragraph 3.08) shall be sealed with two (2) coats of the specified sealer, Type "B" Waterproofing in section 03535.
- B. All work shall be done in strict accordance with the manufacturer's printed instructions. The sealer shall be applied with approved equipment and shall be removed from any surfaces not specified to be coated.
- C. All interior concrete floor subject to vehicle traffic shall receive sealer at the rate of 1.5 PSF.

3.08 WATERPROOFING

- A. All below grade exterior concrete walls shall receive two (2) coats of Type "A" Waterproofing as per section 03535. Coverage shall extend to two (2) feet above liquid level.
- B. The construction joints shall receive one (1) coat of Xypex Concentrate on all joint surfaces between pours.
- C. All work shall be done in strict accordance with the manufacturer's printed instructions. The waterproofing shall be applied with approved equipment and shall be removed from any surfaces not specified to be coated.

PART FOUR – SPECIAL PROVISIONS

END OF SECTION

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