

Project Manual for  
**US 68/KY 80 Water Line Relocation  
Glasgow, Kentucky**

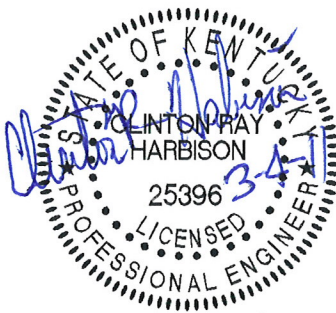
Owner:

**Glasgow Water Company  
126E Public Square  
Glasgow, Kentucky 42141  
Tel. No. (270) 651-3727**

**CCI Project No. 00676-0037**

**Issued for Bid:**

**Set No. \_\_\_\_\_**



**Cannon & Cannon, Inc.**

Consulting Engineers • Field Surveyors

730 Fairview Avenue, Suite A5  
Bowling Green, KY 42101

**SECTION 00010**  
**TABLE OF CONTENTS**

The following Table of Contents outlines the list of the US 68/ KY 80 Water Line Relocation, Glasgow, Kentucky Contract Documents. The CONTRACTOR is advised that this Project Manual, the Contract Drawings, and any and all addenda and/or change orders related thereto are hereby defined in whole as the "Contract Documents" and no separation of same will be considered.

This Project Manual follows the 1995 MASTERFORMAT Document Identifying System. Nonapplicable division and section references have been omitted.

Conflicts between any parts of the Contract Documents shall be brought to the OWNER's attention prior to the receiving of bids.

The CONTRACTOR is responsible for verifying that all documents have been received.

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END OF SECTION

**SECTION 00200**  
**INSTRUCTIONS TO BIDDERS**

**ARTICLE 1 – DEFINED TERMS**

- 1.01 Terms used in these Instructions to Bidders shall have meanings assigned to them in the General Conditions and Supplementary Conditions. Additional terms have the meanings shown below:
- A. *Bidder* – means the individual or entity who submits a Bid directly to OWNER.
  - B. *Bidding Documents* – included all documents dealing with the bidding process, including the Advertisement for Bids, Instructions to Bidders, the Bid Form, and the proposed Contract Documents including any and all Addenda issued prior to the opening of Bids.
  - C. *Successful Bidder* – means the lowest responsible Bidder submitting a responsive Bid to whom OWNER (on the basis of OWNER’s evaluation as hereinafter provided) makes an award.

**ARTICLE 2 – COPIES OF BIDDING DOCUMENTS**

- 2.01 Complete sets of Bidding Documents may be obtained from the OWNER.
- 2.02 Complete sets of Bidding Documents must be used in preparing Bids and neither OWNER nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 OWNER and ENGINEER in making copies of Bidding Documents available on the above terms do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

**ARTICLE 3 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE**

- 3.01 Underground Facilities
- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to OWNER and ENGINEER by owners of such Underground Facilities or others, and OWNER and ENGINEER do no assume responsibility for the accuracy or completeness thereof.
- 3.02 Upon request OWNER will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such activities

- 3.03 It is the responsibility of each Bidder before submitting a Bid to:
- A. Obtain and study the Contract Documents thoroughly;
  - B. Visit the Site to become familiar with the local conditions that may affect cost, progress, performance or furnishing of the Work;
  - C. Become familiar with all federal, state and local Laws and Regulations that may affect cost, progress, or performance of the Work;
  - D. Agree at the time of submitting its Bid that no further examinations are necessary for the determination of its Bid for performance of the Work at the price bid and within the times and in accordance with the terms of the Bidding Documents;
  - E. Study and correlate Bidder's observations of the Site, the Bidding Documents, and any additional examinations; and,
  - F. Promptly give written notice to ENGINEER of all conflicts, errors, or discrepancies discovered in the Bidding Documents.
- 3.04 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and using such means, methods, techniques, sequences, and procedures of construction that may be indicated or expressly required by the Bidding Documents, that Bidder has submitted written notice to ENGINEER of all conflicts, errors, and discrepancies discovered in the Bidding Documents, and that Bidding Documents are sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing the Work.

#### **ARTICLE 4 – SITE AND OTHER AREAS**

- 4.01 The Site is identified in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by CONTRACTOR. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by OWNER unless otherwise provided in the Bidding Documents.

#### **ARTICLE 5 – INTERPRETATIONS AND ADDENDA**

- 5.01 All questions about the meaning or intent of the Bidding Documents are to be submitted in writing to the ENGINEER. Interpretations or clarifications considered necessary by ENGINEER in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by ENGINEER as having received the Bidding Documents. Questions received less than one (1) day prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

5.02 Addenda may be issued to clarify or modify the Bidding Documents as deemed advisable by OWNER or ENGINEER.

## **ARTICLE 6 – BID SECURITY**

6.01 Not applicable.

## **ARTICLE 7 – CONTRACT TIMES**

7.01 The times for Final Completion and readiness for final payment are to be set forth by Bidder in the Bid and will be entered into the Agreement. The times will be taken into consideration by OWNER during the evaluation of Bids, and it will be necessary for the apparent Successful Bidder to satisfy OWNER that they will be able to achieve Substantial Completion and be ready for final payment with the times designated in the Bid.

## **ARTICLE 8 – LIQUIDATED DAMAGES**

8.01 Provisions for liquidated damages are set forth in the Agreement.

## **ARTICLE 9 – SUBSTITUTE AND “OR-EQUAL” ITEMS**

9.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or “or-equal” items. Whenever it is specified in the Bidding Documents that a substitute or “or-equal” item of material or equipment may be furnished or used by CONTRACTOR if acceptable to ENGINEER, application for such acceptance will not be considered by ENGINEER until after the Effective Date of the Agreement. The procedure for submission of any such application by CONTRACTOR and consideration by ENGINEER is set forth in the General Conditions and may be supplemented in the Specifications.

## **ARTICLE 10 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

10.01 If the Bidding Documents require the identity of certain Subcontractors, Suppliers, or other entities to be submitted to OWNER in advance of the Effective Date of the Agreement, the Bidder shall submit the requested data. The apparent Successful Bidder shall, if requested by OWNER, submit experience statements with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or entity. If OWNER or ENGINEER, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, or entity, OWNER may request apparent Successful Bidder to submit a substitute before the Notice of Award is given, without an increase in the Bid.

10.02 If apparent Successful Bidder declines to make any such substitution, OWNER may award the Contract to the next lowest Bidder that proposed to use acceptable Subcontractors, Suppliers, or entities. Any Subcontractor, Supplier, or entity so listed and to which OWNER or ENGINEER makes no written objection prior to the giving of the Notice of Award will be deemed acceptable

to OWNER and ENGINEER subject to revocation of such acceptance after the Effective Date of the Agreement.

- 10.03 CONTRACTOR shall not be required to employ any Subcontractor, Supplier, or entity against whom CONTRACTOR has reasonable objection.

## **ARTICLE 11 – PREPARATION OF BID**

- 11.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from ENGINEER.
- 11.02 All blanks on the Bid Form shall be completed either in ink or by typewriter.
- 11.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.
- 11.04 A Bid by a partnership must be executed in the partnership name and signed by a partner whose title must appear under the signature, accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
- 11.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm just be shown below the signature.
- 11.06 A Bid by an individual shall show the Bidder's name and official address.
- 11.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture must be shown below the signature.
- 11.08 All names must be typed or printed below the signatures.
- 11.09 The Bid shall contain an acknowledgement of receipt of all Addenda and the numbers of each shall be filled in on the Bid Form.
- 11.10 The address and telephone number for communications regarding the Bid shall be shown.

## **ARTICLE 12 – BASIS OF BID; EVALUATION OF BIDS**

- 12.01 Unit Price
- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed on the Bid Form.
- B. The total of all Unit Bid prices will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for each item.

- C. Discrepancies between the total price for each unit of Work and the unit prices will be resolved in favor of the unit prices.
  - D. If Alternates are included, each Alternate Bid Price shall be stated as provided on the Bid Form. The price for each alternate will be the amount added to or deducted from the base Bid if OWNER selects an alternate. In the evaluation of Bids, alternates will be applied in the same order as listed in the Bid Form.
  - E. The value of OWNER furnished materials shall not be included in the Unit Price Bid.
- 12.02 The total Bid Price shall include such amounts as the Bidder deems proper for overhead and profit.
- 12.03 Discrepancies between the indicated sum of any column of figures and the correct sum will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

### **ARTICLE 13 – SUBMITTAL OF BID**

- 13.01 Each Bidder shall fully complete and execute the Bid Form and submit the Bid Form, with the Bid security and other required documents, at the time and place indicated in the Advertisement for Bids. All blank spaces for bid prices must be filled in by typewriter or in ink.
- 13.02 Bid shall be enclosed in an opaque sealed envelope plainly marked with the Project title, the OWNER's name and address, the name and address of the Bidder.
- 13.03 If Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation "BID ENCLOSED".

### **ARTICLE 14 – MODIFICATION AND WITHDRAWAL OF BID**

- 14.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted at any time prior to the opening of Bids.
- 14.02 If within 24 hours after Bids are opened any Bidder files a duly signed, written notice with OWNER and promptly thereafter demonstrates to the reasonable satisfaction of OWNER that there was a material and substantial error in the preparation of its Bid, that Bidder may withdraw its Bid. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

### **ARTICLE 15 – OPENING OF BIDS**

- 15.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and unless obviously non-responsive read aloud publicly. An abstract of the amounts of the base Bids and major alternates will be made available to Bidders after the opening of Bids.

- 15.02 Bids without evidence of proper qualifications as described in Article 3 or not submitted as described in Article 15 shall be listed as NON-RESPONSIVE and shall be returned to the Bidder unopened.

#### **ARTICLE 16 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

- 16.01 All Bids will remain subject to acceptance for sixty (60) calendar days after the actual date of the Bid opening, but the OWNER may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

#### **ARTICLE 17 – AWARD OF CONTRACT**

- 17.01 OWNER reserves the right to reject any or all Bids, including all nonconforming, non-responsive, unbalanced or conditional bids. OWNER also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder. OWNER further reserves the right to reject the Bid of any Bidder if OWNER believes that it would not be in the best interest of the Project to make an award to that Bidder.
- 17.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the work may be cause for disqualification of that Bidder and the rejection of all bids in which that Bidder has an interest.
- 17.03 In evaluating Bids, OWNER will consider whether or not the Bids comply with the prescribed requirements, such alternates, unit prices and other data as may be requested, the qualifications of the Bidders and may consider qualifications and experience of Subcontractors, Suppliers, and other entities proposed for portions of the Work. OWNER may also consider the operating costs, maintenance requirements, performance data, and guarantees of major items of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.
- 17.04 OWNER may conduct such investigations as OWNER deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, and other entities to perform the Work in accordance with the Contract Documents.
- 17.05 If the Contract is to be awarded, OWNER will award the Contract to the Bidder whose Bid is in the best interests of the Project.

#### **ARTICLE 19 – SIGNING OF AGREEMENT**

- 19.01 When OWNER gives a Notice of Award, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the attached Agreement. Within fifteen days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents, along with the required Bonds and insurance, to OWNER. Within ten days thereafter, OWNER shall deliver

one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

## **ARTICLE 20 – SALES AND USE TAXES**

20.01 All applicable sales and use taxes are to be included in the Bid.

## **ARTICLE 21 – RETAINAGE**

21.01 Provisions concerning retainage or CONTRACTOR's rights to deposit securities in lieu of retainage are set forth in the Agreement.

END OF SECTION

**SECTION 00400  
BID FORM**

**Project Identification:** Glasgow Water Company  
US 68/KY 80 Water Line Relocation  
Glasgow, Kentucky

**This Bid is Submitted to:** Mr. Billy R. Carver, Jr.  
Glasgow Water Company  
126 East Public Square  
Glasgow, Kentucky 42141  
Telephone No. (270) 651-3727

**Bid Opening Date:** Friday, March 11, 2011 2:00 PM CST  
at Glasgow Water Company  
(address shown above)

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

**2.1** The Bidder accepts all of the terms and conditions of the Invitation to Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for 30 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request to OWNER.

**3.1** In submitting this Bid, the Bidder represents the following as set forth in the Agreement:

A. Bidder has examined and carefully studied the Contract Documents, other related data referenced in the Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No. _____	Addendum Date _____
Addendum No. _____	Addendum Date _____
Addendum No. _____	Addendum Date _____
Addendum No. _____	Addendum Date _____

B. Bidder has visited the site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress and the performance of the Work;

C. Bidder is familiar with and is satisfied as to all Federal, State and local laws and regulations that may affect cost, progress and the performance of work;

D. Bidder has obtained and carefully studied all reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating

to existing surface or subsurface features at or contiguous to the Site including underground utilities.

- E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, exploration tests, studies and data concerning the conditions (surface and subsurface) at or contiguous to the Site which may affect cost, progress or performance of Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction to be used by the Bidder, including applying specific means, methods, techniques, sequences and procedures of construction expressly required by the Contract Documents to be used by the Bidder, and safety precautions and programs incident thereto;
- F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for the performance of the Work at the price(s) and within the times and in accordance with the other terms and conditions of the Contract Documents;
- G. Bidder is aware of the general nature of the work to be performed by the OWNER and others at the Site that relates to the Work as indicated in the Contract Documents;
- H. Bidder has correlated the information known to the Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents;
- I. Bidder has given the ENGINEER written notice of all conflicts, errors, ambiguities or discrepancies that the Bidder has discovered in the Contract Documents, and the written resolution thereof by the ENGINEER is acceptable to the Bidder;
- J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- K. Bidder acknowledges if the total cost of construction exceeds \$250,000.00, that Kentucky Prevailing Wage Rates shall apply.

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

**5.1** The Bidder acknowledges and accepts the OWNER's right to waive any and all Bid requirements and formalities.

**6.1** Bidder will complete the Work in accordance with the Contract Documents for the following compensation:

<u>Item No. and Description</u>	<b>BASE BID</b>			
	<u>Unit</u>	<u>Quantity</u>	<u>Unit Price</u>	<u>Total</u>
1.0 12" Ductile Iron Pipe	LF	1,225	\$ _____	\$ _____
2.0 6" PVC – CI 200 Pipe	LF	25	\$ _____	\$ _____
3.0 24" Steel Casing by Bore for 12" DIP	LF	100	\$ _____	\$ _____
4.0 12" Gate Valve	EA	3	\$ _____	\$ _____
5.0 6" x 6" Tapping Sleeve and Valve	EA	1	\$ _____	\$ _____
6.0 Fire Hydrant Assembly	EA	1	\$ _____	\$ _____
7.0 Water Meter Assembly	EA	4	\$ _____	\$ _____
<b>TOTAL BASE BID =</b>		<b>\$</b>	_____	

(Use Words \_\_\_\_\_)

Unit Prices have been computed in accordance with the General Conditions. Bidder acknowledges that the estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities provided, determined as provided in the Contract Documents.

Bidder also acknowledges that quantities awarded may be significantly less than shown on the Bid Form and bid items may be deleted in order to meet the available funds for the project.

**7.1** Bidder agrees that the Work will be Completed within 45 days of the Notice to Proceed and completed and ready for final payment.

**7.2** Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the time specified above, which shall be stated in the Agreement.

**8.1** The following documents are attached to and made a condition of this Bid:

- A. A tabulation of Subcontractors, Suppliers, and other individuals and entities required to be identified in this Bid; and,

**9.1** The terms used in this Bid with initial capital letters have the meaning indicated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

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

If Bidder is:

**An Individual**

\_\_\_\_\_ (SEAL)  
(Individual's Signature)

\_\_\_\_\_  
(Individual's Name - Print/Type)

doing business as: \_\_\_\_\_

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone No.: \_\_\_\_\_ Fax No: \_\_\_\_\_

**A Partnership**

\_\_\_\_\_ (SEAL)  
(Firm Name)

\_\_\_\_\_  
(Signature of General Partner)

\_\_\_\_\_  
(Print/Type)

Business address: \_\_\_\_\_

\_\_\_\_\_

Phone No: \_\_\_\_\_ Fax No: \_\_\_\_\_

**A Corporation**

\_\_\_\_\_  
(Corporation Name)

By: \_\_\_\_\_ Title: \_\_\_\_\_  
(Signature of person authorized to sign)

\_\_\_\_\_  
(Print/Type name of person authorized to sign)

(Corporate Seal)

Attest: \_\_\_\_\_  
(Secretary)

\_\_\_\_\_  
(State of incorporation)

Business address: \_\_\_\_\_  
\_\_\_\_\_

Phone No: \_\_\_\_\_ Fax No: \_\_\_\_\_

Date of Qualification to do business is \_\_\_\_\_.

**A Joint Venture**

\_\_\_\_\_  
(Joint Venture) (SEAL)

By: \_\_\_\_\_ By: \_\_\_\_\_  
(Signature of Joint Venturer) (Signature of Joint Venturer)

\_\_\_\_\_  
(Type/Print) (Type/Print)

\_\_\_\_\_  
(Address) (Address)

(Each joint venturer must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above).

END OF SECTION 00400

**SECTION 00520**  
**AGREEMENT BETWEEN OWNER AND CONTRACTOR**

THIS AGREEMENT is by and between Glasgow Water Company (Owner) and \_\_\_\_\_ (Contractor).

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

**ARTICLE 1 – WORK**

1.01 CONTRACTOR shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Labor and materials to install approximately 1325 linear feet of 12” water line and appurtenances.

**ARTICLE 2 – THE PROJECT**

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

US 68 KY 80 Water Line Relocation

**ARTICLE 3 – ENGINEER**

3.01 The project has been designed by Cannon & Cannon (ENGINEER), who is to act as OWNER’s representative, assume all duties and responsibilities, and have the rights and authority assigned to ENGINEER in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

**ARTICLE 4 – CONTRACT TIMES**

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

4.02 *Days to Achieve Completion and Final Payment* – All Work will be completed within 45 days after the date when the Contract Times commence to run and completed and ready for final payment.

4.03 *Liquidated Damages* – CONTRACTOR and OWNER recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by OWNER if the Work is not completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty), CONTRACTOR shall pay OWNER \$500 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

**ARTICLE 5 – CONTRACT PRICE**

5.01 OWNER shall pay CONTRACTOR for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, below:

- A. 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 that item as indicated in Section 00400. It is understood by the CONTRACTOR that estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by OWNER.

ESTIMATED TOTAL OF ALL UNIT PRICE WORK

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

**ARTICLE 6 – PAYMENT PROCEDURES**

6.01 *Final Payment* – Upon final completion and acceptance of the Work, OWNER shall pay the Contract Price for actual quantities and classification of items installed as determined by the OWNER within 14 days of approved pay request from CONTRACTOR.

**ARTICLE 7 – INTEREST**

7.01 All moneys not paid when due shall bear interest at the rate of 12 percent per annum.

**ARTICLE 8 – CONTRACTOR’S REPRESENTATION**

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

- A. CONTRACTOR has examined and carefully studies the Contract Documents and the other related data identified in the Bidding Documents;
- B. CONTRACTOR has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- B. CONTRACTOR is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;
- C. CONTRACTOR does not consider any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents;
- D. CONTRACTOR is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Contract Documents;
- E. CONTRACTOR has correlated the information known to CONTRACTOR, information and observations obtained from visits to the Site, reports and drawings identified in the Contract

Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents;

- F. CONTRACTOR has given ENGINEER written notice of all conflicts, errors, ambiguities, or discrepancies that CONTRACTOR has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to CONTRACTOR; and,
- G. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

## **ARTICLE 9 – CONTRACT DOCUMENTS**

9.01 *Contents* – The Contract Documents consist of the following:

- A. This Agreement (pages 1 to 6, inclusive).
- B. Specifications as listed in the table of contents of the Project Manual.
- C. Project Drawings
- D. Addenda (numbers \_ to \_, inclusive)
- E. CONTRACTOR’s Bid, marked as Section 00400.
- F. The following which may be delivered or issued on or after the Effective date of the Agreement and are not attached hereto:
  - 1. Notice to Proceed
  - 2. Work Change Directives
  - 3. Change Order(s)

9.02 There are no Contract Documents other than those listed above in this Article 9.

## **ARTICLE 10 – MISCELLANEOUS**

10.01 *Assignment of Contract* – No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent 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.

10.02 *Successors and Assigns* – OWNER and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability* – Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon OWNER and CONTRACTOR, who agree the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

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

This Agreement will be effective on \_\_\_\_\_ (which is the Effective Date of the Agreement).

OWNER: Glasgow Water Company

CONTRACTOR:

By: \_\_\_\_\_  
(Signature)

By: \_\_\_\_\_  
(Signature)

Name: \_\_\_\_\_  
(Typed or printed)

Name: \_\_\_\_\_  
(Typed or printed)

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

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

[CORPORATE SEAL]

[CORPORATE SEAL]

Attest: \_\_\_\_\_

Attest: \_\_\_\_\_

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

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

Address for giving notices:

Address for giving notices:

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

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

License No: \_\_\_\_\_

Agent for service of process:

\_\_\_\_\_

(If OWNER is a corporation, attach evidence of authority to sign. If OWNER is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement).

(If CONTRACTOR is a corporation or a partnership, attach evidence of authority to sign.)

END OF SECTION 00520

**SECTION 02125  
EROSION, SEDIMENTATION CONTROL, AND FINAL CLEANUP**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This section describes the implementation of temporary and permanent erosion and sedimentation control.

**1.02 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. No Separate Payment. This item shall be considered and designated a necessary part of the construction and the unit prices bid for items for which this item is required shall be full compensation for this item and for all labor, materials, and equipment required to carry out the item in accordance with the drawings and specifications.

**1.03 SCOPE**

- A. The work specified in this section consists of providing, maintaining and removing temporary erosion and sedimentation controls.
- B. Temporary erosion controls, include, but are not limited to, grassing, mulching, watering and re-seeding on-site surfaces and spoil and borrow area surfaces, and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the Federal Clean Water Act of 1987, as amended.
- C. Temporary sedimentation controls include, but are not limited to, silt dams, traps, barriers, filter stone and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the Federal Clean Water Act of 1987, as amended.
- D. Basic Principles
  - 1. Conduct the earthwork and excavation activities in such a manner to fit the topography, soil type and condition.
  - 2. Minimize the disturbed area and the duration of exposure to erosion elements.
  - 3. Stabilize disturbed areas immediately.
  - 4. Safely convey run-off from the site to an outlet such that erosion will not be increased off site.
  - 5. Retain sediment on site that was generated on site.
  - 6. Minimize encroachment upon watercourses.
- E. Temporary Erosion and Sedimentation Control: In general, temporary erosion and sedimentation control procedures shall be directed toward the following:
  - 1. Preventing soil erosion at the source
  - 2. Preventing silt and sediment from entering any waterway if soil erosion cannot be prevented
  - 3. Preventing silt and sediment from migrating downstream in the event it cannot be prevented from entering the waterway

- F. Permanent Erosion Control: Permanent erosion control measures shall be implemented to prevent sedimentation of the waterways and to prevent erosion of the project site.

#### **1.04 QUALITY ASSURANCE**

- A. General: Perform all work under this section in accordance with all pertinent rules and regulations including, but not necessarily limited to, those stated above and in these specifications.
- B. Conflicts: Where provisions of pertinent rules and regulations conflict with these specifications, the more stringent provisions shall govern.

### **PART 2 PRODUCTS**

#### **2.01 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- A. Silt Fence
  - 1. Silt fence shall be polymer type netting with a built-in cord running throughout the top edge of the fabric. Posts shall be steel or pressure treated fir, southern pine, or hemlock and shall be spaced not more than six feet on center. Silt fence shall be provided with netting to provide reinforcing when necessary. Silt fence shall have an equivalent opening size (EOS) of 40 to 100. Silt fence fabric shall have a maximum permeability of 40 gallons per minute per square foot.
  - 2. Silt fence fabric shall be Mirafi 100X, Amoco 1380, or Exxon GTF-100 Series.
- B. Hay bales shall be clean, seed-free cereal hay type.
- C. Netting shall be 1/2-inch, galvanized steel, chicken wire mesh.

#### **2.02 STONE RIP RAP**

- A. Use sound, tough, durable stones resistant to the action of air and water. Slabby or shaley pieces will not be acceptable. Specific gravity shall be 2.0 or greater. Riprap shall have less than 66% wear when tested in accordance with AASHTO T-96. Riprap shall be in accordance with the Kentucky Transportation Cabinet Standard Specifications.

#### **2.03 FILTER FABRIC**

- A. The filter fabric for use under riprap shall be a monofilament, polypropylene woven fabric meeting the specifications as established by Task Force 25 for the Federal Highway Administration. The filter fabric shall have an equivalent opening size (EOS) of 70.
- B. Filter fabric under riprap shall be Mirafi, Amoco, or Exxon.

### **PART 3 EXECUTION**

#### **3.01 GENERAL**

- A. Standards: Provide all materials and promptly take all actions necessary to achieve effective erosion and sedimentation control in accordance with the Federal Clean Water Act of 1987, as amended, local enforcing agency guidelines and these specifications.

- B. Implementation: The CONTRACTOR shall have the responsibility to actively take all steps necessary to control soil erosion and sedimentation.

### **3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- A. Temporary erosion and sedimentation control procedures should be initially directed toward preventing silt and sediment from entering the waterways. The preferred method is to provide an undisturbed natural buffer, extending a minimal five feet from the water, to filter the run-off. Should this buffer prove infeasible due to construction activities being too close to the water, or if the amount of sediment overwhelms the buffer, the CONTRACTOR shall place silt fences to filter the run-off and, if necessary, place permanent riprap to stabilize the bank.
- B. Silt dams, silt fences, traps, barriers, check dams, appurtenances and other temporary measures and devices shall be installed as indicated on the approved plans and working drawings, shall be maintained until no longer needed, and shall then be removed. Deteriorated hay bales and dislodged filter stone shall be replaced with new materials.
- C. Where permanent grassing is not appropriate, and where the CONTRACTOR's temporary erosion and sedimentation control practices are inadequate, the ENGINEER may direct the Contractor to provide temporary vegetative cover with fast growing seeds.
- D. All erosion and sedimentation control devices, including check dams, shall be inspected by the Contractor at least weekly and after each rainfall occurrence and cleaned out and repaired by the Contractor as necessary.
- E. Temporary erosion and sedimentation control devices shall be installed and maintained from the initial land disturbance activity until the satisfactory completion and establishment of permanent erosion control measures. At that time, temporary devices shall be removed.

### **3.03 PERMANENT EROSION CONTROL**

- A. Permanent erosion control shall include the following:
  - 1. Restoring the work site to its original contours, unless shown otherwise on the drawings or directed by the Engineer
  - 2. Permanent vegetative cover shall be performed in accordance with "Grassing" of this section
- B. Permanent erosion control measures shall be implemented as soon as practical after the completion of pipe installation or land disturbance for each segment of the project. In no event shall implementation be postponed when no further activities related to pipe installation would impact that portion or segment of the project. Partial payment requests may be withheld for those portions of the project not complying with this requirement.

### **3.04 GRASSING**

- A. General
  - 1. All references to grassing, unless noted otherwise, shall relate to establishing permanent vegetative cover as specified herein for seeding, fertilizing, mulching, etc.
  - 2. When final grade has been established, all bare soil, unless otherwise required by the contract documents, shall be seeded, fertilized and mulched in an effort to restore to a protected condition. Critical areas shall be sodded as approved or directed by the Engineer.

3. Specified permanent grassing shall be performed at the first appropriate season listed below following establishment of final grading in each section of the site.

Times of Sowing and Seed Mixtures Required	
February 1 – August 30	Group A Only
September 1 – November 30	Group B Only
December 1 – January 31	Do Not Sow Any Seeds

**B. Materials**

1. Topsoil: Natural, fertile, agricultural soil typical of the locality, capable of sustaining vigorous plant growth, from a well drained site free of flooding, not in frozen or muddy condition, not less than six percent organic matter, and pH value of 5.9 to 7.0. Free from subsoil, slag, clay, stones, lumps, live plants, roots, sticks, crabgrass, couch grass, noxious weeds, and foreign matter.
2. Peatmoss: Horticultural grade Class A decomposed plant material, elastic and homogeneous. Free of decomposed colloidal residue, wood, sulphur, and iron. Peatmoss shall have a pH value of 5.9 to 7.0, 60 percent organic matter by weight, moisture content not exceeding 15 percent and water absorption capacity of not less than 300 percent by weight on oven dry basis.
3. Sand: Hard, granular, natural, beach sand, washed, free of impurities, chemical, or organic matter.
4. Fertilizer: 6-12-12 grade Commercial type with six- percent nitrogen, 12 percent P<sub>2</sub>O<sub>5</sub>, and 12 percent K<sub>2</sub>O.
5. Lime: Standard agricultural type containing at least 85 percent total carbonates applied at a rate of 4,000 pounds per acre (92 pounds per 1,000 square feet), or as required by the test results and recommendations as specified above. Before seeding, apply lime and fertilizer and incorporate them into the soil at least 3-inches deep by disking and harrowing, at the rates recommended above or required by the above test results.
6. Seed: Seed shall be uniform mixtures of the following kinds and properties:

Variety	Group A		Group B	
	% by Weight	Pounds/Acre	% by Weight	Pounds/Acre
Kentucky Bluegrass	25	50	25	50
Hulled Bermuda	-	-	20	40
Kentucky 31 Fescue	75	150	35	70
English Rye	-	-	20	40
Total	100	200	100	200

- C. Replant grass removed or damaged in residential areas using the same variety of grass and at the first appropriate season. Where sod is removed or damaged, replant such areas using sod of the same species of grass at the first appropriate season. Outside of residential or landscaped areas, grass the entire area disturbed by the work on completion of work in any area. In all areas, promptly establish successful stands of grass.

**3.05 RIPRAP**

- A. Unless shown otherwise on the drawings, riprap shall be placed where ordered by the ENGINEER. Carefully compact backfill and place rip rap to prevent subsequent settlement and

erosion.

- B. Preparation of foundations: The ground surface upon which the rip rap is to be placed shall be brought in reasonably close conformity to the correct lines and grades before placement is commenced. Where filling of depressions is required, the new material shall be compacted with hand or mechanical tampers.
- C. Placement of filter fabric: The surface to receive fabric shall be prepared to a relatively smooth condition free from obstructions, depressions, and debris. The fabric shall be placed with the long dimension running up the slope and shall be placed to provide a minimum number of overlaps. The strips shall be placed to provide a minimum width of one foot of overlap for each joint. The filter fabric shall be anchored in place with securing pins of the type recommended by the fabric manufacturer. Pins shall be placed on or within 3-inches of the centerline of the overlap. The fabric shall be placed so that the upstream strip overlaps the downstream strip. The fabric shall be placed loosely so as to give and therefore avoid stretching and tearing during placement of the stones. The stones shall be dropped no more than three feet during construction. The fabric shall be protected at all times during construction from clogging due to clay, silts, chemicals, or other contaminants. Any contaminated fabric or any fabric damaged during its installation or during placement of riprap shall be removed and replaced with uncontaminated and undamaged fabric at no expense to the OWNER.
- D. Placement of riprap: The riprap shall be placed on a 6-inch layer of soil, crushed stone, or sand overlaying the filter fabric. This 6-inch layer shall be placed to maximize the contact between the soil beneath the filter fabric and the filter fabric. Riprap shall be placed with its top elevation conforming to the natural slope of the stream bank and stream bottom. Stone riprap shall be dumped into place to form a uniform surface and to the thickness specified on the drawings. The thickness tolerance for the course shall be - 6-inches and +12-inches. If the drawings or bid do not specify a thickness, the course shall be placed to a thickness of not less than 18-inches.
- E. Repair of existing riprap ditches: The drawings show locations where existing riprap ditches will be disturbed in order to construct the new water main. The CONTRACTOR shall limit the amount of ditch disturbed to that which is necessary to construct the water main. Immediately after placement of the water main, the rip rap ditch shall be repaired. The CONTRACTOR, at its option may reuse the existing rip rap providing it is free of all mud or any other deleterious matter and has not been made unusable by the action of the CONTRACTOR. The ENGINEER will determine as to the suitability of the material for reuse. Any shortage of materials to replace the ditch shall be replaced with new material by the CONTRACTOR. If the CONTRACTOR chooses not to use the existing stone, the unused material shall be removed from the site. All new riprap used to repair/replace the existing ditches shall meet the requirements as specified in Article 2.2 riprap of this Section of the Specifications. Placement of the riprap will be in accordance with the requirements of Article 3.5, Paragraph D of this section of the specifications.

END OF SECTION

**SECTION 02510  
WATER DISTRIBUTION SYSTEM**

**PART 1. GENERAL**

**1.1 SECTION INCLUDES**

- A. Provide water pipe.
- B. Provide valves and boxes.
- C. Provide flush type fire hydrants.
- D. Provide required fittings.
- E. Provide Lines, Grades, Stakes, and Templates.

**1.2 RELATED SECTIONS**

- A. DIVISION 2 – SITEWORK.
- B. Section 02520 - DISINFECTION OF WATER DISTRIBUTION SYSTEM.

**1.3 UNIT PRICE – MEASUREMENT AND PAYMENT**

- A. Pipe:
  - 1. Basis of Measurement: by the linear foot.
  - 2. Basis of Payment: includes hand trimming, excavation, pipe, bedding, backfill, testing, and all labor, material, equipment and other accessories required for a complete installation. CONTRACTOR shall provide all pipe, fittings, tie-ins, temporary flushing and testing connections, and all other materials required for a complete installation.
- B. Valves:
  - 1. Basis of Measurement: by the unit.
  - 2. Basis of Payment: include valve, (butterfly or gate), excavation, backfilling, blocking, boxes, and accessories as shown on the drawings.
- C. Tapping Sleeve & Valve:
  - 1. Basis of Measurement: by the unit.
  - 2. Basis of Payment: include valve, tapping sleeve, tap, testing, excavation, backfilling, blocking, boxes, and accessories including all labor, material, equipment and other items required for a complete installation.

D. Fire Hydrant Assembly

1. Basis of Measurement: per unit.
2. Basis of Payment: at the contract unit price including fire hydrant, hydrant lead, valve, valve box, main line tee, depth as required, and all labor, equipment, materials, and accessories required to complete the item.

E. Water Meter Assembly

1. Basis of Measurement: per unit.
2. Basis of Payment: at the contract unit price for each complete meter assembly including saddle, corporation stop, service line, meter, meter box, meter yoke, all fittings, connection of customer-side service line to meter, and all labor, materials, equipment and accessories required to complete the item.

F. Steel Casing by Bore or Open Cut

1. Basis of Measurement: per linear foot.
2. Basis of Payment: at the contract unit price including fittings, seals, casing, carrier pipe, spacers, and all labor, equipment, materials and accessories for complete installation.

G. Non-Pressure connections: are not pay items. These include all connections made to existing plugged openings and all connections made by inserting new fittings in existing mains, while the main is out of service and substantially not under pressure, regardless of water conditions in the trench at the connection point. Include these in the various unit prices for other pay items. However, all new piping materials used in these connections will be paid for separately, as specified herein before.

H. Granular Pipe Bedding Material and Granular Backfill Material

1. All granular material used in bedding and as backfill material shall be included in the cost of construction the water line and appurtenances. There will be no separate payment for granular material except for road gravel as described elsewhere in this specification.

I. Rock Excavation

1. All excavation shall be “unclassified” and therefore no separate payment will be provided for rock excavation. The cost of all excavation should be included in the cost of constructing the water line and appurtenances.

J. Extra Depth Excavation – no extra payment.

K. Fittings

1. All fittings, bends, and temporary blowoffs shall be included in the cost of construction the

water line and appurtenances. There will be no separate payment for fittings.

L. Concrete for Cradles, Kickers, Anchors, Encasement, Pavement, and Other Structures

1. All concrete material used in this project for cradles, kickers, deadmen, anchors, encasement, pavement, and any other items or structures shall be included in the cost of construction the water line and appurtenances. There will be no separate payment for concrete material.

M. Other Miscellaneous Items: gaskets, bolts, nuts, mechanical joint glands, and other joint materials, PVC fittings; road gravel and asphalt; excavation and backfill; testing and disinfecting; and removing and replacing sod, fences, etc.: No separate payment. Include these in the various unit prices.

#### **1.4 REFERENCES**

- A. AWWA C104: cement mortar lining for ductile iron pipe and fittings for water.
- B. AWWA C110: ductile iron and gray iron fittings.
- C. AWWA C151: ductile iron pipe, centrifugally cast in metal molds or sand-lined molds, for water and other liquids.
- D. AWWA C500: gate valves, for water and sewage systems.
- E. AWWA C504: rubber seated butterfly valves.
- F. AWWA C600: installation of ductile iron water mains and their appurtenances.
- G. ASTM D2241: poly (vinyl chloride PVC) pressure rated pipe (SDR Series).
- H. ASTM C94: ready mix concrete.
- I. AWWA C900: polyvinyl chloride (PVC) pressure pipe 4 in. through 12 in. for water.

#### **1.5 QUALITY ASSURANCE**

- A. Requirements of Regulatory Agencies: All work shall comply with rules and regulations of local and state agencies having jurisdiction.

#### **1.6 JOB CONDITIONS**

- A. Existing Conditions: Carefully maintain benchmarks, fences, roads, traffic, monuments, and survey control references.

#### **1.7 SUBMITTALS**

- A. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.
- B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

## **1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, protect and handle products to site under provisions of these specifications.
- B. Equipment and Materials Which Will Be Installed Outdoors: At all times prior to its installation, store this equipment and these materials on pallets, skids, runners, platforms, or other suitable supports which will hold all parts of this equipment and these materials at least six inches above ground; provide watertight coverings for those stored items which may be damaged by rain or snow; all as approved.
- C. Payment for Stored Materials and Equipment: No payment will be made for on-site or off-site stored materials and equipment which are not stored as specified above.
- D. Submit in triplicate, certificates from the manufacturers certifying that all pipe and fittings furnished for this contract comply with these specifications.

## **PART 2. PRODUCTS**

### **2.1 MANUFACTURERS**

- A. The manufacturer specified is intended to indicate the standard of quality of materials in this section; other manufacturers will be acceptable. Submit manufacturer to ENGINEER for approval.

### **2.2 TYPES OF PIPE TO BE USED**

- A. Types of pipes for various locations and usages shall be:
  - 1. Ductile iron and PVC where indicated.

### **2.3 DUCTILE IRON PIPE, PVC PIPE, FITTINGS, AND JOINTS**

- A. Ductile Iron pipe shall conform to AWWA specifications C 150 and C 151 is provided by the OWNER. CONTRACTOR is responsible for picking up the pipe at the OWNER's facility and transporting to the site.
- B. Ductile iron mechanical joint fittings shall be required for all sizes of PVC pipe and all sizes of ductile iron pipe. Ductile iron mechanical joint fittings shall conform to AWWA specification C153, compact style, and shall have a rated working pressure of 350 psi up to 24 inch diameter and 250 psi above 24 inch. Cast iron or ductile iron fittings shall be furnished with a bituminous coating outside one mil thick and shall be cement mortar lined inside according to AWWA specification C 104.

All fittings shall be installed with Megalug restraining system. Only high strength low alloy steel T-bolts shall be used with all mechanical joints including fittings, valves, etc. All fittings and T-bolts shall be manufactured in the United States and shall be a brand acceptable to the ENGINEER.

Fittings shown on the plans are intended to convey the general configuration and restraint type only. The CONTRACTOR shall be required to furnish fittings at each abrupt change (vertical or horizontal) in the pipeline alignment, as determined by the ENGINEER. The CONTRACTOR shall also be required to furnish any special gaskets, adaptors, etc. necessary for construction. All vertical bends shall include restraining devices approved by the ENGINEER.

- C. Furnish duplicate certificates from the manufacturer certifying that all ductile iron pipe and iron fittings furnished for this project comply with the above specifications.
- D. Plastic pipe shall meet the requirements as set forth by the Plastic Pipe Institute Specifications and meet the requirements set forth by ASTM D1784 for Type 1, Grade 1. All plastic pipe shall bear the National Sanitation Foundation Testing Laboratory seal for potable water. The pipe shall also meet the requirements of ASTM D-2122, ASTM D-2241, ASTM D-3139, and all other specifications referred to therein. Integral bell designs based solely on Section 5.3.1 of ASTM D-3139 are not acceptable (see thickening requirements below). Provisions shall be made for contraction and expansion at each joint with either twin gasketed couplings or integral bell joints. Integral bell pipe shall be manufactured so that the minimum wall thickness of the bell, at any point, between the gasket groove and the pipe barrel shall conform to the SDR requirements for the pipe. The minimum wall thickness in the gasket groove and bell-entry sections shall equal or exceed the minimum wall thickness of the pipe barrel. Twin gasketed couplings shall be rated for working pressure equal to that of pipe and shall be as manufactured by Harco, Certainteed, Can-tex, J-M, Vulcan, or equal. To be approved, the pipe manufacturer shall have produced pipe in accordance with the above specifications as routine standard procedure for a minimum of three years at all plants operated by the pipe manufacturer. In general and unless indicated otherwise on the plans, PVC pipe shall be Class 200 (SDR21)

## **2.4 CUT-OFF VALVES AND VALVE BOXES**

- A. General: For each location where a certain type of cut-off valve is specified, indicated, or required for the application involved, provide the appropriate type accordingly. OTHERWISE, cut-off valves shall be either gate type or butterfly type.
- B. Resilient Seat Gate Valves: These shall be iron body, modified wedge disc type, conforming to AWWA Specification C509, as manufactured by Mueller, or pre-approved equal. Each valve shall have "O" ring type stem seal, standard two-inch AWWA operating nut, and shall be opened by COUNTER-CLOCKWISE stem rotation. Except where otherwise specified, indicated, or required for the application involved, all gate valve ends shall be AWWA Specification C111 mechanical joint type, with plain rubber gaskets.
- C. Butterfly Valves: These shall be Mueller, or as approved resilient seated type, for at least 250 psi water working pressure, conforming to AWWA Specification C504. Each valve shall have AWWA Specification C111 mechanical joint ends with plain rubber gaskets, watertight operator with standard two inch AWWA operating nut, and shall be opened with COUNTER-CLOCKWISE stem rotation.
- D. Valve Boxes: These shall be standard cast iron two-piece 5-1/4 inch inside shaft diameter screw

adjustable type, each consisting of a cover marked WATER, an upper telescoping section, and a lower section. Where necessary to provide extra depth, provide cast iron extension pieces as required.

## **2.5 FIRE HYDRANTS**

- A. Fire hydrants shall be Mueller, Model A-423, or as approved compression type conforming to AWWA Specification C502 and Glasgow Water Company's Standards.
- B. Fire hydrants shall be of the lubricated dry top break-away traffic type, each complete with: Five inch minimum valve opening; 6 inch AWWA Specification C111 mechanical joint inlet connection with plain rubber gasket; depth of bury as shown on the plans; two fire hose nozzles; one pumper connection nozzle; nozzle caps and chains; drain valve; asphalt varnish shop coats inside and below ground outside; and red paint shop coat above ground outside. The following items shall match those of existing hydrants, and the CONTRACTOR shall examine the existing hydrants designated by the OWNER, obtain necessary data, and furnish new hydrants accordingly:
  - 1. Sizes of all nozzles.
  - 2. Threads on all nozzles.
  - 3. Size and shape of operating and cap nuts.
  - 4. Direction of rotation of valve opening.

## **2.6 TAPPING SLEEVES AND VALVES**

- A. All tapping sleeves shall be cast iron.
- B. Tapping sleeves for cast iron or ductile iron pipe shall be mechanical joint and shall be Mueller H615 or M & H Style 1174. Tapping sleeves for A.C. pipe shall be mechanical joint and shall be Mueller H-619 or approved equal. Tapping sleeves for 4-inch through 8-inch PVC pipe shall be Mueller H-612 or Clow #F-6342. Tapping sleeves for 10-inch and 12-inch PVC pipe shall be Smith-Blair No. 622 fabricated steel sleeves, epoxy coated with stainless steel bolts and nuts.
- C. Tapping valves shall meet the same general specifications as described herein for gate valves.

## **2.7 BLOWOFFS**

- A. Blowoff valves and appurtenances shall be constructed where shown on the general plans and as detailed on the standard detail sheet. Gate valves as specified hereinbefore and the meter boxes described below shall be used in the blowoff assembly. Bends used in blowoff assemblies may be PVC with gasketed joints, as approved by the ENGINEER. Blowoffs shall include box and lid for access and flushing.

## **2.8 AIR RELEASE VALVE ASSEMBLY**

- A. Automatic air release valves shall be designed to allow a quantity of air to automatically escape through the valve out of the valve orifice when air accumulates at high points in the water line while the water line is under pressure. After the entrained air is released through the air release

orifice, the valve orifice shall be closed by a needle mounted on a compound lever mechanism energized by a float preventing water from escaping.

Valves shall be tested for service to pressures of at least 250 psi and shall be furnished with cast iron body and cover, stainless steel float, Buna-N valve seat and stainless steel internal linkage. Inlet size shall be as shown on the Drawings and orifice size shall be as approved by the ENGINEER. Valves shall be furnished with an exterior paint coating of Phenolic Primer Red Oxide and shall be field painted on the outside with two coats of compatible alkyd enamel with color selected by the OWNER. Valve shall be installed in manholes as shown on the drawings. Air release valves shall be APCO (Valve & Primer Corporation) 200A, ARI, or approved equal.

Manual air release valves shall be constructed with stainless steel piping, stainless steel ball valve, and saddle as shown on the drawings.

## **2.9 GRANULAR BEDDING**

- A. Granular pipe bedding material shall be either of the following types:
  - 1. Crushed rock, crushed stone, or washed gravel, 95 percent by weight passing through a 3/4 inch screen, and 95 percent by weight retained on a No. 4 sieve. Kentucky Transportation Cabinet No. 57 stone is acceptable.
  - 2. Sand: clean and sharp.

## **2.10 GRANULAR BACKFILL**

- A. Granular backfill material shall be one of the materials specified above for granular pipe bedding material.
- B. Usage: Use granular backfill material ONLY where indicated, specified hereinafter, or authorized.

## **2.11 CONCRETE**

- A. Concrete shall be 3,000 psi ready mixed type conforming to ASTM Specification C94 composed of Portland cement, sand, and washed coarse aggregate all conforming to ASTM Specifications; mixed with clean water free of oil, acid, alkali, and organic matter; and furnished by an approved ready mix plant's standard for the specified strength, as established and tested by an approved laboratory, in accordance with applicable ASTM Standard Specifications.

# **PART 3. EXECUTION**

## **3.1 TRENCHING, EXCAVATING, SHORING, BRACING, AND DEWATERING**

- A. Special Requirements:
  - 1. See RAILROAD CROSSINGS and HIGHWAY CROSSINGS, hereinafter, for special excavation requirements in those areas.
  - 2. See ROCK EXCAVATION AND BLASTING, hereinafter for special excavation

requirements where rock is encountered.

3. Driveway and special crossings: install pipe crossing concrete driveways, sidewalks, asphalt driveways, and other special conditions by tunneling or boring, or as authorized. Install pipes crossing dirt or gravel drives by open cut, unless otherwise authorized.
4. Unstable or unsuitable trench bottoms: where authorized because unstable trench bottom conditions, lay pipe on granular bedding, as specified in Article 2.8 GRANULAR BEDDING. Where the trench bottom at required subgrade contains ashes, cinders, any type of refuse, vegetable or other organic material, large pieces or fragments of inorganic material or other unsuitable materials which in the ENGINEER's opinion should be removed, remove such material; before laying pipe, bring the trench bottom up to proper subgrade by backfilling with approved material placed in three inch maximum thickness loose layers, and thoroughly compact each layer as required to provide an approved firm and stable trench bottom.

B. General Excavation Requirements: Except as otherwise indicated, specified hereinafter, or authorized, make all excavations by open cut as specified in this paragraph. Excavate trenches to the indicated lines and locations to provide uniform and continuous bearing and support of each pipe barrel on firm undisturbed earth at every point between bell holes, with an ample bell hole at each joint to facilitate proper jointing and to prevent bells from bearing on the trench bottom. Trench depths shall be as required to provide the specified MINIMUM cover over the tops of pipes; as required to permit pipes to pass under culverts, railroads, highways, existing pipe lines, and other obstructions; and as required to accommodate valves and boxes. Trench widths shall be as required for the proper laying and jointing of pipes, and the proper placing and compacting of backfill, but in no case shall a trench be more than 24 inches wider than the inside diameter of the pipe to be laid therein. Machine or hand-cut trenches, except that in all cases prepare the final subgrade accurately with hand tools, and in special cases where required, cut the trenches entirely by hand. Where excavation is carried below proper subgrade, before laying pipe bring the trench bottom up to proper subgrade by backfilling with approved material placed in three inch maximum thickness loose layers, and thoroughly compact each layer as required to provide uniform and continuous bearing and support for the pipe barrel at every point between bell holes. The CONTRACTOR shall repair any damaged water or sewer services immediately. The CONTRACTOR shall have on hand all necessary materials to repair said services. The OWNER will not provide or loan any material to the CONTRACTOR.

C. Minimum cover over tops of pipes shall be as follows:

1. All pipes, except as otherwise specified below: 30-inch MINIMUM cover.
2. Hydrant leads, where they cross side ditches ONLY: 18 inch MINIMUM cover.
3. Hydrant leads, all other locations: 30 inches MINIMUM cover.
4. Customers' service lines: 18-inch MINIMUM cover.
5. Special Conditions: MINIMUM cover as indicated on the drawings.

D. IN ALL CASES, THE SPECIFIED MINIMUM COVER OVER PIPES SHALL BE BASED UPON FINAL FINISHED SURFACES, INCLUDING PAVING, IF ANY. Where grading is

involved, do not cut trenches under roads, streets, or other areas until the final finish grading has been done, unless otherwise authorized.

- E. Shore and brace trenches and excavations as required, to protect personnel, adjacent structures, and adjacent property. Where required by the conditions encountered, brace trenches and excavations with suitable close sheeting or sheet piling. Do all necessary cribbing up required for the proper operation of trenching machines.
- F. Provide and maintain in proper working order all necessary dewatering equipment required to remove water from the excavations. Where quicksand or other water bearing strata are encountered, install and connect the necessary number of well points with pumping equipment of sufficient capacity to prevent rise of water in the excavation until the work has been installed properly and will be unaffected by submersion.
- G. Do not install any work until excavations are free of water, mud, and loose earth. Do not install any work on frozen ground.

### **3.2 ROCK EXCAVATION**

- A. Wherever used as the name of an excavated material, the term "rock" shall mean any one or more of the following materials which in the ENGINEER's opinion require for their removal wedging, sledging, or barring, or breaking up with power operated hand tools: boulders, pieces of concrete, and pieces of masonry, each weighing more than 250 pounds; and solid ledge rock, concrete, and masonry, each with more than 1/2 cubic yard of volume. No measurement or allowance will be made for: soft or disintegrated rock or gravel which can be removed with a hand pick or power operated excavator or shovel; loose, shaken, or broken stone in rock fillings or elsewhere; rock exterior to the limits of measurement allowed which may fall into the excavation; and removal of existing pavement. The cost of rock excavation shall be included in all appropriate pay items described in section 1.3. Rock excavation is NOT a separate pay item.
- B. Where rock is encountered in pipe trenches, remove all rock from sides of trench to provide at least ten (10) inch horizontal clearance from the pipe bells on each side, and remove all rock from required subgrade down to at least six (6) inches below the bottom of the pipe bells. Bring trench bottom up to required subgrade by backfilling with one of the following materials placed and compacted as required to provide uniform and continuous bearing of pipe barrels at every point between bell holes; sand; selected earth as specified in Article 3.10 of BACKFILLING hereinafter; or granular bedding material in Article 2.9 GRANULAR BEDDING, as specified herein before.
- C. All blasting operations shall be conducted in strict accordance with federal, state, and local requirements. The CONTRACTOR shall also comply with applicable municipal ordinances, Federal Safety Regulations and Section 9 of the Manual of Accident Prevention in Construction, published by the Associated General Contractor's of America, Inc. Necessary permits shall be secured and paid for by the CONTRACTOR. All explosives shall be stored in conformity with said ordinances, laws and safety regulations. No blasting shall be done within twenty feet of any water mains, or gas mains. Any damage done by blasting is the responsibility of the CONTRACTOR and shall be promptly and satisfactorily repaired by him. The CONTRACTOR shall limit peak particle velocities occurring as a result of blasting to protect structures from damage due to ground motions from blast events.

All shots shall be covered with rope, heavy timber or steel blasting mats to prevent flying material.

Unless otherwise specified or directed, delay caps shall be used to reduce earth vibrations and noise. In sparsely populated areas, the ENGINEER may permit the CONTRACTOR to use regular type caps.

The CONTRACTOR shall keep a blasting log and, for each blast, shall record the date, time of blast, number of holes, type of explosive, number of delays, amount of charge per delay, stemming and number and type of caps. An inventory of all explosives handled and stored shall also be kept.

All blasting shall be supervised and performed by qualified personnel and shall be monitored to ensure compliance with the particle velocity requirements. The CONTRACTOR shall submit a monitoring plan to the ENGINEER prior to beginning blasting activities.

A pre-blast survey shall be performed by the CONTRACTOR. The pre-blast survey shall be accurate and up to date at the time of the blast event.

Appropriate notification and warning shall be given to all persons in the immediate vicinity of blasting activities.

The survey shall be a compilation of the condition, type, and general appearance of all nearby structures. It shall also include a listing of any vibration-sensitive equipment or conditions which exist at adjacent facilities. The owners and occupants of these facilities shall be notified of the intent to blast and the blasting schedule. The survey shall be conducted by a competent engineering firm or other qualified firm and sufficiently documented by photographs, measurements, and diagrams. The survey shall include all structures within 500 feet of the water main centerline or the nearest structure measured perpendicular to the centerline. Pre-blast survey results shall be submitted to the OWNER for review before construction takes place.

Blasting operations shall be covered by comprehensive general liability insurance or separate public liability insurance to cover blasting as set forth in the General Conditions. The CONTRACTOR shall bear all associated costs of insurance and shall be liable for all damage to persons or property.

All blasting shall be supervised and performed by qualified personnel.

### **3.3 HANDLING AND LAYING DUCTILE IRON PIPE AND FITTINGS**

- A. Provide and use suitable equipment for the safe and convenient handling of pipe, fittings, valves, and other water piping materials. Unload all water piping materials carefully, and lower them carefully into the trenches, piece by piece, in such a manner that will prevent damage to the materials and their protective coatings and linings. Do not under any circumstances drop or dump water piping materials, either from transportation vehicles, or into trenches.
- B. Before laying, inspect each length of pipe and each fitting for defects. Promptly remove all defective pipe and defective fittings from the pipe laying area.
- C. Before laying pipe and fittings: Remove all lumps, blisters, and excess coal tar coating from each spigot and the inside of each bell; wire brush and wipe all dirt and other foreign matter from the outside of each spigot and the inside of each bell; swab out the inside of each length of pipe and each fitting; and remove all dirt and other foreign matter from all gaskets, glands, bolts, and nuts. Use every precaution to prevent dirt and other foreign matter from entering pipe and fittings while they are being laid. Spigot ends, insides of bells, gasket grooves, gaskets, glands, bolts, and nuts

shall be kept free from dirt and other foreign matter after they have been cleaned and before the joints have been made up.

- D. Mechanical Joints: After placing pipe and fittings into the trench, slide gland over spigot, apply proper lubricant to gasket and spigot, slip gasket over spigot, center spigot end in bell, force pipe home, and bring it into correct line and grade. Press gasket evenly in place into bell, slide gland into position for bolting, insert all bolts, screw on and hand tighten all nuts, then tighten all nuts with an approved wrench. Tighten diagonally opposite nuts alternately to obtain uniform pressure on all parts of the gland, with torques of 40 to 60 foot pounds for 5/8 inch bolts, and 60 to 90 foot pounds for 3/4 inch bolts. Realign pipe as required and secure it in place with approved backfill material tamped around pipe, except at bells.
  - 1. On retainer type glands, after pipe has been aligned properly, tighten all set screws as specified hereinafter under ANCHORAGE.
- E. Push-On Joints: Make up push-on joints in accordance with the manufacturer's recommendations, generally as follows: after placing pipe and fittings into the trench, insert gasket in gasket groove, apply proper lubricant to gasket and spigot, center spigot end in bell, and force pipe home with proper jacks, bars, chains, cables, or other suitable equipment. Realign pipe as required, and secure it in place with approved backfill material tamped around pipe, except at bells. Taper each field cut spigot end back about 1/8 inch at a 30 degree angle, using a coarse file or portable grinder, to prevent gasket damage.
- F. Do not "buckle-in" any pipe without approval.
- G. At all times when pipe laying is not in progress, keep all open ends closed tightly with suitable caps or plugs to prevent foreign material from entering any part of the pipework.

### **3.4 ALIGNMENT OF PIPE**

- A. Ductile Iron Pipe: In straight trenches, lay pipe in reasonably straight lines, using appropriate fittings at all sharp breaks in grade. In curved trenches, lay pipe to follow the trench centerline as closely as practicable, using appropriate fittings at all sharp breaks in grade, and using appropriate fittings or deflecting joints and using shorter than standard lengths of pipe as necessary to make the required curves. Do not deflect any joint in excess of pipe manufacturer's recommendations.
- B. PVC Pipe: In straight trenches, lay pipe in reasonably straight lines, using appropriate fittings at all sharp breaks in grade. In curved trenches, lay pipe to follow the trench centerline as closely as practicable, using appropriate fittings at all sharp breaks in grade, and using appropriate fittings or bending the pipe in gradual uniform curves as necessary to make the required curves. Do not bend any pipe with a radius of curvature less than that recommended by the pipe manufacturer.

### **3.5 ANCHORAGE**

- A. Provide anchorage for each fire hydrant, and for each bend, tee, plug, deadend, and other fitting subject to blowing off of the line under pressure.
- B. Unless otherwise indicated, anchorage shall consist of 3,000 psi concrete blocking poured between firm undisturbed earth and the unbalanced sides of the items to be anchored, with sufficient earth bearing area to prevent displacement of joints under pressure. Pour concrete blocking before

applying pressure test on piping and arrange it so that the pipe and fitting joints will be accessible for repair. BLOCKING BEARING AREA SHALL BE BASED UPON THE SPECIFIED TESTING PRESSURE. Blocking shall be used for restrained joint fittings.

- C. Anchoring Type Tees for Fire Hydrant Connections: These shall be as specified hereinbefore under: DUCTILE IRON PIPE, FITTINGS, AND JOINTS; and/or PVC PIPE, FITTINGS, AND JOINTS. Anchor fire hydrant cut-off valves directly to the locked-on gland rings of the tee outlets or 45° bend where possible.

### **3.6 TRACER WIRE INSTALLATION**

- A. Tracer wire shall be installed along the top of all PVC water lines as shown on the drawings. Wire shall be continuous along the main run of the pipe. Connections for tees and fire hydrants shall use 3M connectors and be jell-coated for protection.

### **3.7 VALVE AND BOX INSTALLATION**

- A. Install valves with their operating stems plumb, at approximate locations indicated, but at exact locations as approved and as specified below. Leave all valves in normal operating positions, free from leakage.
  - 1. Fire hydrant cut-off valves: install these directly on the spigot outlets of the anchoring type tees in the mains.
  - 2. All other valves: insofar as practicable, install these 3'-0" from centers of tees and crosses at intersections, and at locations in runs where easy to find in the future. For valves located in unpaved areas, set each valve box in a concrete slab 18" square and 6" thick, flush with finished grade.
- B. Set and support each valve box so that no stress or shock can be transmitted to the valve, with the box centered and plumb over the valve wrench nut, and the box top exposed and flush with finished grade. Readjust boxes as required so that all boxes conform to these requirements at the time of acceptance of the system. For valves that are in excess of 5 feet in depth from ground level to top of valve nut, an extension shall be installed to allow valve nut access to be 3 feet in depth.
- C. Valves and Stub-out Pipes for Future Connections to Water Mains:
  - 1. Anchor these valves to the mains as specified hereinafter under ANCHORAGE.
  - 2. Where NO piping is indicated from valve outlet: plug each valve outlet with a standard cast iron plug. Do not anchor or block plug.
  - 3. Where stub-out is indicated from valve outlet: close the open end of each stub-out pipe with a suitably easily removable plug which will prevent dirt from entering the stub-out pipe, but will allow water to escape from the stub-out pipe and prevent water pressure therein if the valve should leak or be opened before the future piping is properly connected to the stub-out pipe. Do not anchor or block stub-out piping on outlet sides of these valves.

### **3.8 HYDRANT INSTALLATION**

- A. Install hydrants at approximate locations indicated, but at exact locations as approved. Unless otherwise indicated or approved, locate hydrants at the intersections of private property lines, and between curbs and sidewalks. All hydrant leads shall be six-inch pipe.
- B. Set each hydrant on a four-inch thick 15 inch square minimum size precast concrete slab in true plumb position, with lowest nozzle at least 12 inches above finished grade. Securely block or anchor hydrant to prevent it from blowing off of lead, and place at least 1/4 cubic yard of broken stone or coarse gravel around the base to at least 12 inches above and 12 inches below the drain hole for proper drainage.
- C. Hydrant Extensions: Provide hydrant extension units at the unit price bid, only where authorized for satisfactory hydrant settings under abnormal or adverse job conditions beyond the CONTRACTOR's control. No additional payment will be made for any hydrant extension units. Install hydrants as shown on the plans. All hydrant settings, regardless of length, shall conform to all of the above specified setting requirements.
- D. After setting, and after testing and final cleanup of the work, finish paint each hydrant above ground line with one coat of highest quality outside paint, color as selected by the ENGINEER.

### **3.9 SERVICE CONNECTIONS**

- A. General: Install service connections at locations authorized only, using copper tubing from water main to the meter for all service connections. Meter locations shall be as designated in the field.
- B. Copper Service Pipe: This shall be Type K seamless annealed copper tubing, conforming to ASTM B88.
- C. Service Units: Each 3/4 inch service unit shall consist of:
  - 1. Tapping or fitting required to connect corporation stop to main.
  - 2. One 3/4 inch male thread inlet x compression outlet corporation stop.
  - 3. One length of 3/4 inch copper service pipe, IN ONE CONTINUOUS PIECE WITHOUT INTERMEDIATE JOINTS, from water main to meter location.
  - 4. One 3/4 inch compression inlet X IPS female thread outlet "O" ring seal type curb stop.
  - 5. Two 3/4 inch IPS male thread meter couplings, and two gaskets.
- D. Service Fittings: These shall be Mueller, Hays, Ford, or as approved of the types specified above, all bronze.
- E. Service Unit Installation:
  - 1. Joints: all service tubing joints shall be compression type, with rubber ring gaskets.

2. Connections to mains: set the corporation stops in the mains at a 45 degree angle from vertical, except that the connections may be set horizontally in the side of the mains where necessary to install service pipe under deep side ditches.
3. Service tubing: do not bend service tubing in excess of the tubing manufacturer's recommended maximum limits. PROVIDE AT LEAST A 24-INCH STRAIGHT RUN OF TUBING AT THE INLET OF EACH METER.
4. If meters are included in this contract: connect each service to meter inlet; deliver all meter outlet couplings and their gaskets to the OWNER, and obtain his signed receipt therefore.
5. Meter locations shall be as designated in the field.
6. Meters shall be Badger, Model 25 with ORION Integral Transmitter

### **3.10 BACKFILLING**

#### **A. General:**

1. Do not backfill pipe trenches until the pipework has been inspected and approved. Immediately after approval, backfill the trenches as specified below.
2. Testing for leaks on the surface of the pipe prior to backfilling will not be required, but other test procedures, as specified hereinafter under TESTING and DISINFECTION, shall be followed after backfilling trenches.

#### **B. Pipe Under Non-Paved Areas: Backfill the trenches as shown on the drawings. Place gravel backfill up to six (6) inches in normal soil and twelve (12) inches in rock excavation ABOVE tops of pipes, leave in BEFORE placing remaining backfill, thoroughly hand tamp the backfill equally and uniformly into bell holes and between trench walls and pipework on each side of the pipework, and over the tops of the pipework, all to prevent pipe displacement. Then place the remaining backfill to fill the trenches completely, and compact the backfill by running the wheels of heavy rubber-tired construction equipment longitudinally over the trench, until the backfill is compacted to at least the density of the undisturbed soil and is flush with the surrounding ground surfaces.**

Finally, windrow the excess excavated materials over the trench. At the end of each day's work, do not leave more than 100 feet of trench without compacted backfill, unless otherwise approved. PUDDLING OR WATER JETTING WILL NOT BE PERMITTED.

#### **C. Pipe Under Paved Areas, Including Areas With Existing Paving and Areas Proposed To Be Paved: Backfill the trenches as shown on the plans.**

1. For each section of pipe laid, do not allow more than 100 feet of trench to remain without compacted backfill at the end of the day on which the section of pipe was laid, unless otherwise approved.
2. All compaction shall be subject to field density tests by the testing laboratory; see TESTING LABORATORY SERVICES.

3. At CONTRACTOR's expense, remove, replace, and recompact all backfill which fails to comply with the above specified compaction density requirements.
- D. Vehicular Traffic: For all pipes crossing streets, roads, gravel driveways, and dirt driveways which are in regular use, backfill the trenches and make the crossings usable by vehicular traffic immediately after laying pipe and obtaining approval thereof, and maintain these crossings usable by vehicular traffic until project acceptance. Do not under any circumstances leave a street or road crossing or a private driveway unusable overnight without written permission from the Owner or Warren County Road Department or the appropriate landowner.
- E. Backfill Materials, Except as Otherwise Specified:
- From six inches above tops of pipes up to finished grade or paving subgrade as the case may be: backfill with any materials removed from the excavation and suitable for backfill, except do not use as backfill material any pieces of the following materials which are larger than six inches in their greatest dimensions: rock; stone; concrete; asphalt paving; or masonry. Dispose of all excavated materials which are not replaced as backfill, as approved.
- F. Final Backfilling Requirements: Refill and smooth off as required all backfill which settles, so that all backfill finally conforms to the original ground surfaces, not only at the time of project acceptance, but also for the duration of the guarantee period. This includes removing and repairing all pavement which may have been damaged by settlement.
- G. Special Backfill Requirements:
1. Pipes in tunneled or bored holes, without casings: backfill with gravel only, placed as approved and as required to prevent caving and settling.
  2. See HIGHWAY CROSSINGS and RAILROAD CROSSINGS, hereinafter for special backfill requirements.
  3. Granular backfill materials: where authorized in the field to accommodate special conditions which may be encountered, where indicated on drawings, and/or where specified herein, backfill materials from six inches above tops of pipes up to finished grade or paving subgrade as the case may be, shall be as specified in Article 2.10 GRANULAR BACKFILL.

### **3.11 CONNECTIONS TO EXISTING WATER SYSTEM**

- A. "Non-Pressure" Connections: Unless otherwise indicated or authorized, make connections to existing water mains by removing plug from existing plugged fitting, or inserting a tee and proper sleeve in existing main, as applicable, at each point of connection between new and existing mains. This will require shutting off water in the existing main involved.
1. BEFORE SHUTTING OFF WATER TO MAKE EACH NON-PRESSURE CONNECTION, OBTAIN APPROVAL OF OWNER'S WATER AND FIRE DEPARTMENTS, AND ADVISE ALL AFFECTED WATER CUSTOMERS ACCORDINGLY. AFTER SHUTTING OFF WATER, DO ALL NECESSARY WORK, AND RESTORE WATER SERVICE AS QUICKLY AS POSSIBLE.

- B. "Pressure" Connections: Where indicated or authorized, make the connection to existing water main by installing therein a split mechanical joint tapping sleeve and tapping valve, and cutting proper opening in existing main with a suitable tapping machine, all without shutting off water in existing main involved. Tapping valves and their boxes shall conform in all respects to applicable requirements of CUT-OFF VALVES AND VALVE BOXES hereinbefore, and tapping valves shall be one gate type, each with one flanged end to mate with tapping sleeve flange, and one mechanical joint hub end.

### **3.12 HIGHWAY AND/OR RAILROAD CROSSINGS (WATER MAINS)**

- A. All water line crossings of County, State and United States Highways, and/or railroads shall be in smooth wall steel casing pipe. Casing pipe shall be 0.50" minimum wall thickness for 36" and 48" diameter, 0.375" minimum wall thickness for 20" through 30" diameter, and 0.25" minimum wall thickness for 18" and smaller diameters. Joints in casing pipe shall be welded continuously all around. Crossings shall have a minimum depth cover of three feet, as measured from the top of the casing pipe to the low point of the crossing cross section. Carrier pipe used inside steel casing shall generally be the material shown on the plans for the pipeline outside the casing. Inside the casing at intervals that are in accordance with the spacer manufacturer's recommendations. DIP carrier pipe shall be provided with a restrained joint system as specified previously. All carrier pipes shall be supported on casing spacers (Advance, Calpico, or approved equal).
- B. The spacer manufacturer shall be supplied the following information when ordering the spacers; carrier pipe O.D., carrier pipe bell O.D., casing pipe I.D., type of pipe being used and SDR information. All carrier pipe shall be centered with maximum clearance of 1" between spacer runner and casing. For PVC carrier, the spacer shall be a polyethylene spacer. The CONTRACTOR shall also supply end seals for all steel casings. End seals may be pull-on or wrap around types with stainless steel bands.

### **3.13 INSPECTION OF THE LINES**

Before the CONTRACTOR backfills any of the lines, they first shall be inspected by the ENGINEER's Representative and the ENGINEER's Representative shall give the CONTRACTOR permission to proceed with the backfilling. If any joints, pipes, fittings, or materials or workmanship are found to be defective, they shall be removed and replaced by the CONTRACTOR without any additional compensation.

### **3.14 TESTING**

- A. After backfilling, subject all pipework to pressure and leakage tests. Piping may be tested in sections between valves as the work progresses. Admit water slowly into the section to be tested, and expel all air through all hydrants, and through corporation stops or other openings at all high points in the piping, as required. After all air has been expelled apply a hydrostatic pressure of 250 psi or the pressure rating of the pipe, whichever is greater, measured at the lowest point in the piping section involved. Maintain the test pressure at least two hours, during which time the leakage shall not exceed that permitted by AWWA Specification C600 for mechanical joint and push-on joint pipe. Repair all apparent leaks. If the measured leakage exceeds the maximum specified allowable leakage locate and repair the leaks, and repeat the tests on sections of pipe involved until all tests have been approved. Furnish approved testing equipment, consisting of a suitable pump to apply and maintain test pressure, accurate pressure gauges, suitable equipment to measure volume of water pumped, and other necessary equipment, and conduct all tests in the

ENGINEER's presence, as approved. Determine leakage by measuring the volume of water pumped to maintain the required test pressure for the duration of the leakage test. Obtain a copy of AWWA Specification C600, and keep it on the job in good condition for the CONTRACTOR's and ENGINEER's use in computing the permissible leakage in each section to be tested.

### **3.15 DISINFECTION**

- A. Disinfect the water lines in accordance with Section 02520 "Disinfection of Water Distribution System".
- B. After all tests have been approved, and before placing the pipe lines in service, disinfect all new pipework with chlorine for at least 24 hours duration. Introduce sufficient chlorine into pipe line to provide at least 50 ppm chlorine residual throughout the entire piping system, using either liquid chlorine or chlorine bearing compounds similar to "HTH", and determining the required quantity of chlorinating agent in accordance with the manufacturer's directions for the calculated volume of water to be treated. Inject chlorine solution into the pipe lines through corporation stops installed at proper locations in pipe line, or through other openings. After at least 24 hours retention time, thoroughly flush all chlorinated water out of the pipe lines through hydrants and other openings, take samples of the fresh water at approved locations in the pipe line, and have the samples analyzed for bacterial purity by an approved laboratory. Continue this process until the samples indicate that the water is free of contamination and safe for domestic use, all to the satisfaction of the ENGINEER and the Department or Board of Public Health of the State in which the work is located. Furnish all necessary approved sterilizing equipment and chlorinating agents. The CONTRACTOR shall pay for all laboratory bacterial analysis services, and include the cost thereof in the contract price.
- C. Water for testing, disinfecting, and flushing will be furnished by the OWNER from existing water facilities, without cost to the CONTRACTOR, but the CONTRACTOR shall furnish all piping and equipment to convey the water to the new pipe lines.
- D. Corporation stops shall match those of the customer service connections; provide these as required for testing and sterilizing, and after that use, leave them in place with their outlets plugged. Customer service corporation stops may also be used for testing and sterilizing.

### **3.16 CUTTING AND REPLACING PAVEMENT AND OTHER SPECIAL SURFACES**

- A. Unless otherwise shown on the drawings, restore to at least the conditions which existed before excavation, all surfaces which have been disturbed by the pipeline installation, as specified below. As each surface is being cut, the ENGINEER will examine the existing surface in the CONTRACTOR's presence, and the type of surface to be replaced in each case shall be determined by mutual agreement between the ENGINEER and the CONTRACTOR.
- B. As specified under TRENCHING, EXCAVATION, SHORING, BRACING, AND DEWATERING, the maximum pipe trench width shall be 24 inches greater than the inside diameter of the pipe laid therein. The maximum width of all pavement and other surface repairs allowable for payment by the OWNER will be the inside diameter of the pipe plus 36 inches, or six inches beyond each side of the maximum allowable trench width. At CONTRACTOR's expense, make all repairs outside of this limit. If the repairs do not reach this limit, the OWNER will pay ONLY for the actual extent of the repairs.

- C. Prior to making any excavation, outline the limits of the proposed excavation, and saw-cut the pavement along the outline to a depth of at least one-inch to provide a smooth pavement cut line. Carefully remove the pavement between the saw-cuts and avoid damage to the paved surface outside the saw-cuts. Replace with new surfaces all existing surfaces which are cut, removed, or otherwise damaged by the work under this Contract, as specified below. All new surfaces shall conform accurately to the elevations and contours of the existing adjacent undisturbed surfaces.
- D. Milling: The CONTRACTOR shall mill areas as shown on the plans. Milling shall be performed along all curbs as noted in the General Notes of the drawings. All milled debris shall be removed and disposed of immediately. Milled areas shall be broom cleaned to remove all excess debris and millage.
- E. Unless otherwise shown on the drawings, repair damaged pavement and special surfaces as follows:
1. Existing gravel surfaces: replace these with a six-inch thick compacted layer of new road gravel.
  2. Concrete Surfaces: replace these with 3000 psi concrete, 6" thick for streets, and 4" thick for aprons, driveways, and sidewalks. If existing concrete surfaces are thicker than previously defined, the CONTRACTOR shall match existing thickness.
  3. Existing Asphalt ("black top", single bituminous surfaces and double bituminous surfaces): The 4" asphalt base course shall be considered as a temporary traffic surface and shall be maintained in good condition until installation of surface coat. Maintenance shall include, filling pot holes, work necessary to confine stone to trench area by sweeping with mechanical sweeper with collection hopper and water-fed brooms, and watering temporary surface daily, if necessary, for dust control. Final surface shall be installed as shown on the plans. Before laying asphaltic concrete surface course, apply a prime coat to the underlying base course, as specified in paragraph (4).
  4. Asphalt Base Pavement: Where authorized by the ENGINEER in the field, the CONTRACTOR shall immediately provide temporary pavement over the crushed limestone base as shown on the drawings. The pavement over the pipe line trench shall be a 4" thick approved, plant mixed, bituminous pavement rolled to conform to existing surrounding street surfaces. The temporary pavement shall be allowed to settle under traffic for a time period determined by the ENGINEER, after which the temporary pavement shall be removed and replaced by permanent pavement as specified in Article 3.15 hereinbefore. The length of pipeline trenches along or across paved streets, which are to be temporarily paved as above, shall not exceed one block or 600 feet at any one time on any single street or road.
    - a. Failure by the CONTRACTOR to proceed with the performance of this phase of the work immediately after above authorization, may be considered cause for deducting the section of pipe line from the periodic estimate.
  5. Prime coat: this shall be one of the following types of liquid asphalt as authorized for the conditions involved: RC-70; RC-250; MC-70; or MC-250. Heat the priming material and apply it with a suitable asphalt distributor, at a uniform rate of 0.25 to 0.50 gallons per square yard of base, all as approved.
- F. Where pipe is installed on the shoulders parallel to asphalt, double bituminous surface treatment,

concrete, or other surfaces, maintain ditches until they are firm and present no traffic hazard. Where authorized, place six inch thick compacted layers of new road gravel.

- G. Do not cut streets, roads, and other paved surfaces except where necessary for the water main installation. At CONTRACTOR's expense, repair all damage outside of the specified limits, as approved. Maintain all crossings until project completion.
- H. Concrete Curbs and Gutters: Replaced with new cast-in-place concrete all existing curbs and gutters which have been removed to accommodate the piping installation. New curbs and gutters shall match the existing undisturbed curbs and gutters in cross section and finish.
  - 1. Concrete shall be 3000 psi type. Before placing concrete, compact subgrade as specified in paragraph 3.9 hereinbefore. This is not a separate pay item.
- I. Road Gravel Material: Road gravel shall be of the same type and gradation as that used for street and road work by the local street or County road department in the area in which the water system is located.
- J. City Approvals: All repairs to City streets shall be subject to the approval of Glasgow or Barren County Road Department. FINAL PAYMENT WILL NOT BE MADE UNTIL THE CONTRACTOR HAS OBTAINED ALL NECESSARY CITY APPROVALS AND SUBMITTED ACCEPTABLE WRITTEN EVIDENCE THEREOF.

### **3.17 CLEANING UP OF DISTRIBUTION SYSTEM**

- A. Clean up the distribution system as the work progresses. Negligence in proper cleaning up which causes undue inconvenience to the public or private citizens, or presents an unsightly or dangerous condition, or causes embarrassment to civic officials will be sufficient reason for rejection of construction estimates until the unsatisfactory conditions have been remedied.
- B. After all work is complete, make a final cleanup of all areas where work has been done, and leave them in broom clean condition.

### **3.18 FINAL VALVE AND HYDRANT CHECK**

- A. After completion of all water line work and before the work will be accepted, make a final check of each valve and hydrant installed in this project, and of each existing valve that has been operated in connection with the work under this project.
- B. Make this final check in the ENGINEER's presence, and demonstrate that each valve is in fully open position, and that each hydrant operates properly.

### **3.19 SEPARATION OF WATER MAINS AND EXISTING SEWERS**

- A. Parallel Installation:
  - 1. Normal conditions: water mains shall be laid at least 10 feet horizontally from existing sanitary sewers, storm sewers, and sewer manholes, wherever possible; the distance shall be measured edge-to-edge.

2. Unusual conditions: where local conditions prevent a 10 foot horizontal separation, a water main may be laid closer to existing storm or sanitary sewers, provided that the bottom of the water main is at least 18 inches above the top of the existing sewer.

B. Crossings:

1. Normal conditions: water mains crossing existing house sewers, storm sewers, or sanitary sewers shall be laid to provide a separation of at least 18 inches between the bottom of the water main and the top of the existing sewer, wherever possible.
2. Unusual conditions: where local conditions prevent a vertical separation as described above, water mains passing under existing sewers shall be protected by providing:
  - a. A vertical separation of at least 18 inches between the bottom of the existing sewer and the top of the water main.
  - b. Adequate structural support for the existing sewers, to prevent excessive deflection of joints and settling on and breaking the water mains.
  - c. A full laying length of water pipe centered at the point of crossing, so that the joints will be equidistant and as far as possible from the existing sewer.

- C. Manholes: No water pipe shall pass through or come into contact with any part of any existing manhole.

END OF SECTION

**SECTION 02520**  
**DISINFECTION OF WATER DISTRIBUTION SYSTEMS**

**PART 1. GENERAL**

**1.1 SECTION INCLUDES**

- A. Disinfection of potable water distribution and transmission system.
- B. Testing and reporting results.

**1.2 RELATED SECTIONS**

- A. Section 02510 - WATER DISTRIBUTION SYSTEM.

**1.3 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Disinfection:
  - 1. Basis of Measurement: no separate measurement.
  - 2. Basis of Payment: no separate payment, included in the other items of work.

**1.4 REFERENCES**

- A. ANSI/AWWA B300 - Standard for Hypochlorites.
- B. ANSI/AWWA B301 - Standard for Liquid Chlorine.
- C. ANSI/AWWA B303 - Standard for Sodium Chlorite.
- D. ANSI/AWWA C651 - Standards for Disinfecting Water Mains.

**1.5 SUBMITTALS**

- A. Test Reports: Indicate results comparative to specified requirements.
- B. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.

**1.6 PROJECT RECORD DOCUMENTS**

- A. Disinfection report; record:
  - 1. Type and form of disinfectant used.
  - 2. Date and time of disinfectant injection start and time of completion.
  - 3. Test locations.

4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
5. Date and time of flushing start and completion.
6. Disinfectant residual after flushing in ppm for each outlet tested.

B. Bacteriological report; record:

1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet used.
6. Coliform bacteria test results for each outlet tested.
7. Certification that water conforms, or fails to conform, to bacterial standards of the state.
8. Bacteriologist's signature and authority.

## **1.7 QUALITY ASSURANCE**

- A. Perform Work in accordance with ANSI/AWWA C651.

## **1.8 QUALIFICATIONS**

- A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this section with minimum three years experience.
- B. Testing Firm: Company specializing in examining potable water systems, approved by the State of Kentucky.

## **1.9 REGULATORY REQUIREMENTS**

- A. Conform to applicable code or regulation for performing the work of this section.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of water system.

## **PART 2. PRODUCTS**

## **2.1 DISINFECTION CHEMICALS**

- A. Chemicals: ANSI/AWWA B300, Hypochlorite, ANSI/AWWA B301, Liquid Chlorine, and ANSI/AWWA B303, Sodium Chlorite.

## **PART 3. EXECUTION**

### **3.1 EXAMINATION**

- A. Verify that piping system has been cleaned, inspected and pressure tested.
- B. Perform scheduling and disinfection activity with startup, testing, adjusting and balancing, demonstrating procedures, including coordination with related systems.

### **3.2 EXECUTION**

- A. Provide and attach required equipment to perform the work of this Section.
- B. Inject treatment disinfectant into piping system.
- C. Maintain disinfectant in system for 24 hours.
- D. Flush, circulate and clean until required cleanliness is achieved; use municipal domestic water.

### **3.3 QUALITY CONTROL**

- A. Provide analysis and testing of treated water.
- B. Test samples in accordance with ANSI/AWWA C651.

END OF SECTION