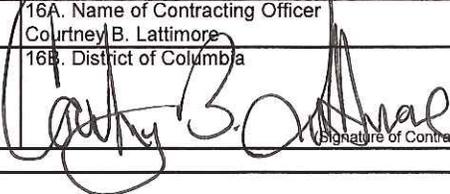


AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT		1. Contract Number DCKA-2013-B-0144	Page of Pages 1 | 142	
2. Amendment/Modification Number One (1)	3. Effective Date MAY 15 2014	4. Requisition/Purchase Request No.	5. Solicitation Caption Minnesota Avenue, N.E. Revitalization Phase-1	
6. Issued By: Office of Contracting and Procurement Roadways and Highway 55 M Street SE 7th Floor Washington, D.C. 20003		7. Administered By (If other than line 6)		
8. Name and Address of Contractor (No. Street, city, country, state and ZIP Code)		(X)	9A. Amendment of Solicitation No. DCKA-2013-B-0144	
			9B. Dated (See Item 11) 5/14/2014	
			10A. Modification of Contract/Order No.	
			10B. Dated (See Item 13)	
Code	Facility			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
X The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input type="checkbox"/> is extended. <input checked="" type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or fax which includes a reference to the solicitation and amendment number. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or fax, provided each letter or telegram makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12. Accounting and Appropriation Data (If Required)				
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14				
A. This change order is issued pursuant to: (Specify Authority) The changes set forth in Item 14 are made in the contract/order no. in item 10A.				
B. The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation date, etc.) set forth in item 14, pursuant to the authority of 27 DCMR, Chapter 36, Section 3601.2.				
C. This supplemental agreement is entered into pursuant to authority of:				
D. Other (Specify type of modification and authority)				
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input checked="" type="checkbox"/> is required to sign this document and return <u>1</u> copies to the issuing office.				
14. Description of amendment/modification (Organized by UCF Section headings, including solicitation/contract subject matter where feasible.) The solicitation is amended as follows:				
APPENDICES				
Delete: Appendix C in its entirety and Replace with New Appendix C. (Attach with the addendum).				
WAGE RATES				
Delete: General Wage Decision No. DC140001, Modification No. 4 dated April 25, 2014 and Replace with General Wage Decision No. DC140001, Modification No. 5, dated May 05, 2014. (Attach with the addendum).				
PRE-BID CONFERENCE				
A pre-bid conference is scheduled for Monday, May 19, 2014 @ 10:00 am. The meeting will be held at 55 M Street, SE 6th Floor, Conference Room No. 639, Washington, DC. Please provide all questions at that time and they will be answered via addendum.				
DEADLINE FOR SUBMISSION OF QUESTIONS				
All questions are due by 4:45 PM., May 23, 2014. Submit all questions in writing to: DDOT-Minnesota@dc.gov				
Except as provided herein, all terms and conditions of the document referenced in Item (9A or 10A) remain unchanged and in full force and effect				
15A. Name and Title of Signer (Type or print)		16A. Name of Contracting Officer Courtney B. Lattimore		
15B. Name of Contractor	15C. Date Signed	16B. District of Columbia	16C. Date Signed	
(Signature of person authorized to sign)			5/15/14	
		(Signature of Contracting Officer)		

GOVERNMENT OF THE DISTRICT OF COLUMBIA

**DEPARTMENT OF
TRANSPORTATION**

INFRASTRUCTURE PROJECT MANAGEMENT
ADMINISTRATION



**APPENDIX C
DC WATER SPECIFICATIONS & DETAILS**

**MINNESOTA AVENUE, N.E. REVITALIZATION PHASE 1
FROM A STREET, SE. TO SOUTH BENNING ROAD, NE**

Bids will be Publically Opened By The Office of Contracting and Procurement,
Bid Room, located at 55 M Street, SE, 4th Floor Washington, DC 20003

Bids Will Be Opened On June 03, 2014 At 2:00 P.M.

**DC WATER AND SEWER AUTHORITY
DEPARTMENT OF ENGINEERING AND TECHNICAL SERVICES**

STANDARD SPECIFICATION INDEX

**MINNESOTA AVENUE REVITALIZATION PHASE 1
FROM A STREET, SE TO SOUTH BENNING ROAD, NE**

SECTION	TITLE	NO. PAGES	LATEST REVISION
017842	As-Built Drawings	7	050114
211110	Fire Hydrants	4	050114
211117	Removing & Relocating Hydrants & Control Valves	3	050114
211118	Changing Elevations of Fire Hydrants & Hydrant Laterals	3	050114
312310	Trench Excavation and Backfill	16	050114
312338	Water Service Test Holes	2	050114
330134	Building Sewer Connections and Cleanouts	8	050114
330502	Water Utility Distribution Piping - DIP	19	050114
330620	Valve Casings	3	050114
330622	Butterfly Valve Manholes	4	050114
331120	Concrete Thrust Block	2	050114
331122	Concrete In-Line Thrust Block	2	050114
331213	Water Service Connections	17	050114
331233	Water Meters	4	050114
331400	Gate Valves	6	050114

331405	Butterfly Valves	5	050114
331900	Sanitary Utility Sewage Piping	9	050114
331910	Sewer Manholes	7	050114
334800	Concrete Valve/Venturi Vaults	4	050114

SECTION 01 78 42

AS-BUILT DRAWINGS

PART 1 GENERAL

1.1 SUMMARY:

- A. This Section covers the requirements for drawings containing information of infrastructure in the constructed or "as-built" state.
- B. As-built Drawings are an official record of the project at the time of construction completion. The original "as-designed" contract drawings are modified to show all additions, deletions and substantial deviations made during construction.
- C. As-built Drawings shall be prepared and certified by an authorized officer of the construction firm.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications Sections, apply to this section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.
- C. DC WATER CADD Manual.

1.3 RELATED SECTIONS: Specified elsewhere but not limited to:

- A. Section 01 33 00: Submittals
- B. Section 01 74 23: Field Engineering
- C. Section 01 77 00: Contract Closeout

1.4 MAINTENANCE OF DOCUMENTS AND SAMPLES:

- A. Contractor shall maintain at the site, for the DC Water, one (1) record copy of prints of drawings including delineated "As-built" modifications
- B. Store Contract Documents and samples in Contractor's field office apart from documents used for construction.
 - 1. Provide files and racks for storage of documents.
 - 2. Provide secure storage space for storage of samples.
- C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- D. Within one (1) day's notice, during the course of the work, current as-builts shall be made available for inspection by DC Water.

1.5 RECORDING "AS-BUILT" MODIFICATIONS:

- A. Label each document "AS-BUILT" in neat, large printed letters.

- B. Record information concurrently with construction progress.
1. Do not conceal any work until required information is recorded.
 2. Accurately record information in an understandable drawing technique.
 3. Mark Record Prints to show the actual installation where installation varies from that shown originally.
- C. Drawings: Legibly marked to record all deviations to current Contract Documents showing actual construction.
1. Accurately record information in an acceptable drawing technique as stated in DC Water CADD Manual.
 2. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 3. Depths of various elements of foundation in relation to finish first floor datum.
 4. Dimensional changes to Drawings.
 5. The location and dimensions of any major changes within a building structure.
 6. The location and dimensions of property corners and lines.
 7. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.
 8. The topography, invert elevations and grades of drainage installed or affected by the project.
 9. Actual location of anchors, construction and control joints, etc. in concrete.
 10. Unusual or uncharted obstructions that are encountered in the contract work area during construction.
 11. Horizontal and vertical location, kinds and sizes of all existing and new underground utilities and appurtenances, referenced to permanent surface improvements.
 12. Measurements shall be shown for all underground utilities change of direction points and all surface or underground components such as valves, bends, manholes, drop inlets, clean outs, wyes, corporation stops, curb stops, inlets, thrust blocks, hydrants, PRV, pipe slope and distances, pressure relief valves, air release valves, fittings, etc.
 13. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
 14. Data required for casing pipes: Location, type and size
 15. Data station on each Water tap and sewer wye branch.
 16. Data required for valves: date set, cover, size, manufacturer, number of turns to open, direction of opening and joint types.
 17. Data required for hydrants: date set, manufacturer, depth of bury, distances between main and valve, distance between valve and hydrant and face of curb.
 18. Data on manholes, inlets, etc.: rim and invert in and out elevations, diameter of manhole and inlet dimensions.

19. Data on gravity pipeline: slope (determined from end of pipe to end of pipe), size of pipe, type of joints, manufacturer. The manhole at the lowest elevation will be station 0+00.
20. Location of underground utilities and appurtenances shall be shown by dimensioning along the utility run from a reference point and by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction.
21. Mark important additional information that was either shown schematically or omitted from original Drawings.
22. Show the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
23. Changes made by addenda. Addenda number shall be noted.
24. Field changes of dimension and detail. Field Order Number shall be noted.
25. Changes made by field order or by change order. Change Order Number shall be noted.
26. Correct dimensions and details transferred from shop drawings.
27. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
28. Record information on the Work that is shown only schematically.
29. Datum: All plans shall be accurately located in Maryland state plane coordinates. And with datum reference:
 - a. NAD 83 Horizontal
 - b. NAVD 88 Vertical
30. Details not on original Contract Drawings.
 - a. Record the name of manufacturer, supplier, installer, and other information necessary to provide a record of selections made.
 - b. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 - c. Layout and schematic drawings of electrical circuits and piping.
31. As-Built Survey Construction Tolerances:
 - a. Contractor shall provide measurements and elevations of the following construction elements to within the stated tolerance. Note: All tolerances are plus or minus.

1)	Manhole Rim	0.10	ft
2)	Manhole Invert	0.05	ft
3)	Inlet Rim	0.10	ft
4)	Inlet Invert	0.05	ft

5)	Gravity Sewer Slope	0.02	%
6)	Gravity Pipe Location	1.00	ft
7)	Manhole Location	0.50	ft
8)	Inlet Location	1.00	ft
9)	Fire Hydrant	1.00	ft
10)	Valve	1.00	ft
11)	Valve Depth	0.10	ft
12)	Fittings Location	0.50	ft
13)	Fittings Depth	0.10	ft
14)	Offsets	0.50	ft
15)	Wye Location	1.00	ft
16)	Wye Depth	0.50	ft
17)	Corporation Stop Location	1.00	ft
18)	Corporation Stop Depth	0.50	ft
19)	Meter	1.00	ft
20)	Blow Off Assembly	1.00	ft
21)	PRV	1.00	ft
22)	Air Release Pit	1.00	ft
23)	Pressure Pipe Location	1.00	ft
24)	Pressure Pipe Depth	0.50	ft
25)	Structures – Elevations	0.10	ft
26)	Structures – Dimensions	0.10	ft

1.6 ELECTRICAL AS BUILT DRAWINGS

- A. “As Built” wiring and interconnection drawings shall be provided for all field installed and applied wiring as part of the Contract for all electrically powered devices.
- B. These drawings shall be supplied in addition to the wiring and interconnection diagrams specified and required in the individual sections of the technical sections.
- C. The drawings shall illustrate electrical control devices, instruments and systems, and all instrumentation and/or control system.
- D. Information on the drawings shall contain sufficient data and be presented in a format, which permits tracing of wires and trouble shooting on all electrically powered and controlled equipment, independent o any other document or drawing.
- E. Information shall be provided for any pneumatically or hydraulically controlled systems, and shall include interconnection drawings serving functions similar to that of electrical equipment and devices.

- F. Information presented, such as connections, terminations, conduit or wire-way members, junction box numbers, terminal block identification, terminal numbers, wire numbers, reference to manuals, etc. shall be verified in the field prior to submission of the drawings.
- G. In addition, references shall be made to the internal wiring of on-field wired devices such as the termination at prefabricated panels, control devices, control stations for electrical and electronic equipment.
- H. These references shall include the terminal block number and/or the device identification, the drawing number of the referenced item and the service or Operation & Maintenance Manual identification in which the drawing is contained. If the connection of a conductor is shown on more than one drawing, the reference shall include all drawing numbers.

1.7 RECORD PRODUCT DATA:

- A. Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
- B. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
- C. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

1.8 CERTIFICATION:

- A. Certify as a part of each application for payment that project as-built are current at time application is submitted.
- B. Certification Statement: The following certification shall be placed on the cover sheet of the project drawing set and signed by a District of Columbia registered Professional Civil Engineer or Professional Land Surveyor:

"I certify that these as-builts are accurate and that all information provided is field-verified as-built information and within the tolerances specified and substantial conformity with the Project Manual.

Date: _____ Name: _____
 (Seal) Signed: _____"

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 RECORDING AND MAINTENANCE:

- A. Recording:
 - 1. Maintain one (1) copy of each submittal during the construction period for Project As-built (Redlined) purposes.
 - 2. Post changes and modifications to Project As-built (Redlined Drawings) as they occur; do not wait until the end of the Project.

B. Maintenance:

1. Store As-built apart from the Contract Documents used for construction.
2. Do not use As-built for construction purposes.
3. Maintain As-built in good order and in a clean, dry, legible condition, protected from deterioration and loss.
4. Provide access to Project As-built for DC Water's reference during normal working hours.

3.2 FINAL "AS-BUILTS":

- A. Contractor shall transfer the changes on the redlined drawings to the original electronic CADD files.
- B. DC Water will provide a CD in AutoCAD DWG format for the Contractor's use.
- C. Contractor shall use standard professional engineering drafting practices in correcting the original electronic CADD drawings to show the as-built information.
- D. All changes shall be made in model space at 1:1 scale.
- E. In general, the letter styles, line thickness, and scale shall be the same as the original drawings unless stated otherwise.
- F. When changes are required on small-scale drawings and in restricted areas; large-scale inserts shall be drawn with leaders to the location where pertinent.
- G. Add and denote in legend, any additional equipment or material facilities, service lines, utilities lines, etc. incorporated under As-built if not already shown in legend.
- H. Use written explanations on As-built to describe changes. Do not rely totally on graphic means to convey the revision.
- I. Whenever a revision is made, make changes to affect related section views, details, legends, profiles, plans and elevation views, schedules, notes and call-out designations to avoid conflicting data on all other sheets.
- J. Legibility of lettering and digit values shall be precise and clear when making changes and clarify ambiguities concerning the nature and application of change involved.
- K. CADD Standards: File Naming Convention, layer, etc. shall be in accordance with DC Water CADD Manual Standards unless otherwise noted.
- L. All As-built "Triangle" changes shall be on a separate single layer as stated in DC Water CADD Manual.
- M. Revision Block:
 1. Those sheets, which have no changes, shall only be labeled "AS-BUILTS" as described above.
 2. Those sheets which have changes shown on them shall have the label "AS-BUILTS" as described above and shall have "REVISED AS-BUILTS" entered in the first available space in the Revision Block. This will be revision one and a number 1 shall be entered in the triangle as described. In the event the sheet has already been revised and a number and revision appear in the revision line; the next sequential number will be used.

- N. Place an equilateral triangle (3/8" per side) near the area revised for all changes with the revision number inserted in the center of the triangle. One triangle may be placed near the table or detail title where several items in a table or detail are changed or completely redrawn.

3.3 SUBMITTAL: "AS-BUILTS" DOCUMENTS:

- A. At "Beneficial Occupancy" or with the Substantial Completion Inspection request, the Contractor shall submit marked-up Record Prints to the DC Water. Certify to their accuracy and completion. All modifications clearly marked for identification
- B. Within ten (10) days of the Substantial Completion Inspection; Contract shall submit the electronic As-built CDs to DC Water plus 3 sets of full-size paper copies.
- C. Contractor shall provide two (2) sets of security protected format digital media (CD or DVD disk); one full set in .pdf format and one full set in .dwg CAD format.
- D. As-built documents shall be submitted and approved by DC Water prior to acceptance of the improvement and prior to monthly and final payment to the Contractor,

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for As Built Drawings shall not be measured separately for payment.

4.2 PAYMENT

- A. The cost thereof shall be distributed among the appropriate items specified in the technical sections of these specifications.

~ END OF SECTION 01 78 42 ~

SECTION 21 11 10

FIRE HYDRANTS

PART 1 GENERAL

1.1 SCOPE:

- A. Work includes of furnishing and setting new fire hydrants, (boot with ductile iron retainer gland, standpipe and hydrant complete) plus constructing dry wells complete, at locations where as directed by DC Water. Work includes temporary restoration of landscape features, trench excavation and backfill for hydrant connecting pipe, restraint; water valve and water valve casing (along the main) are not part of work.

1.2 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- A. Section 00 70 00: General Conditions.
- B. Section 01 00 00: General Requirements.
- C. Section 01 33 00: Submittals
- D. Section 31 23 10: Trench Excavation and Backfill
- E. Section 33 05 02: Water Utility Distribution Piping – DIP
- F. Section 33 06 20: Valve Casings
- G. Section 33 14 00: Gate Valves
- H. Section 33 14 05: Butterfly Valves

1.3 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections General and Supplementary Conditions of the Contract, and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.4 QUALITY ASSURANCE:

- A. Reference Codes and Specifications:
 - 1. AWWA C502: "AWWA Standard for Dry-Barrel Fire Hydrants".
 - 2. ASTM D1682: "Test Methods for Breaking Load and Elongation of Textile Fabric".

1.5 SUBMITTALS:

- A. Shop drawings shall be submitted for hydrants and joint details.
- B. Affidavits, certifications, catalog and maintenance data shall be submitted per this section.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Hydrants:

1. Fire hydrants shall be compression type, hand operated, for fire protection service under operating pressure of 200 psig manufactured per AWWA C502.
2. All fire hydrants furnished shall be tested to 300 psig operating pressure.
3. The manufacturer shall be regularly engaged in the design, manufacture and maintenance of fire hydrants. The manufacturer must furnish satisfactory evidence of adequate facilities for furnishing repair parts for hydrants furnished.
4. Hydrant Models – Mueller Super Centurion 250 - Model No. A-423, (made by Mueller Company, Decatur, Illinois), Kennedy Guardian - Model No. K-81-D (made by Kennedy Valve, Elmira, New York). No other hydrant models or 'or-equals' shall be used.
5. AWWA C502 is modified or supplemented as follows:
 - a. When required, the manufacturer shall furnish catalog and maintenance data.
 - b. Certified drawings showing the principal dimensions, construction details, and materials shall be submitted for approval per "Shop and Working Drawings".
 - c. Affidavit of compliance required.
 - d. Size - 5-1/4 inch minimum, nominal I.D. main valve opening.
 - e. Bury Length - 4-1/2 feet or as directed by the DC Water
 - f. Barrel Sections - Hydrants shall be "traffic" type fire hydrants complete with breakable safety flange and 8 bolts and nuts, located near the ground line and designed to break on vehicle impact. Design shall allow top section to rotate a full 360°.
 - g. Hydrant Top - Hydrants shall be permanently lubricated and require one man maintenance, no special tools.
 - h. Outlet Nozzles - Two 2-1/2 inch nominal I.D. hose nozzles; one 4-1/2 inch nominal I.D. pumper connection.
 - 1) Threads for 2-1/2-inch nozzles per National Fire Standard Hose Coupling Screw Threads; threads for 4-1/2 inch pumper connection will be per National Standard Threaded Connections.
 - i. Operating Stem and Mechanism - Operating and outlet nozzle cap nuts shall be pentagonal in shape.
 - 1) The pentagon shall measure 1-51/64 inch from point to flat at the base of the nut and 1-47/64 inch at the top. The height of the nut shall not be less than 1-inch.
 - 2) Direction of operating nut rotation to open:
 - a) Left (counterclockwise).

- j. 0-Ring Seals - 0-ring seals shall be used in lieu of stuffing box.
 - k. Gaskets - Material shall be rubber composition; asbestos prohibited.
 - l. Hydrant Inlet - Boot side inlet shall be 6-inch diameter with retainer gland mechanical joint per Section 33 05 02.
 - m. Cap chains - hose cap chains and steamer cap chains are required with all hydrants; chain links (zinc plated steel) shall be fabricated not less than 1/8-inch in diameter and with S hook device (zinc plated steel) attached.
 - n. Painting - Above grade line, outside of hydrant shall be painted with two coats of zinc chromate primer and two finish coats of No. 209 medium green enamel manufactured by Purity Paint Products Corp., Brooklyn, New York; or approved equal.
 - o. Operating nut – The operating nut shall be drilled and tapped with a 27/64 drill hole 1 1/8" deep with a 1/2"-13 thread tap to the bottom of the drill hole. The operating nut shall be custodian ready for Hydra-Shield Custodian Lock Assembly as manufactured by Hydra-Shield or approved equal.
- B. Gravel for Dry Well:
- 1. Washed gravel
- C. Filter Fabric:
- 1. Woven filter fabric shall be composed of polypropylene monofilament yarns woven into sheets of approximately sixteen-(16) mil thickness. The tensile strength of the fabric shall be per ASTM D1682. The weave of the fabric shall be dense and tight so the openings are barely visible.
 - 2. Test results shall indicate the filter fabric can effectively retain particles coarser per opening of U.S. 140-sieve mesh for all conditions.
 - 3. Tests shall also demonstrate that the filter permeability is between 3.3 and 3.8 x 10² centimeters per second.
 - 4. Filter fabric shall be manufactured by Mirafi Company, P.O. Box 240967, Charlotte N.C. or approved equal.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

- A. Fire hydrant and dry well material, excavation, installation and backfill shall be included in this Section. Fire hydrant connection pipe excavation and backfill shall be included as part of trench excavation.
- B. All related work on hydrant water line including tests and chlorination shall be pertinent to provisions of Section 31 23 10. Hydrants shall be set plumb with 4-1/2 inch nozzle normal to the curb line.
 - 1. When a hydrant delivered with the nozzle facing in the improper direction, the hydrant shall be rotated to the correct orientation prior to placing the hydrant into service.
- C. Joint and joint restraint between boot and the connection pipe to the main shall be per Section 33 15 03 02.

- D. Dry wells shall be excavated to dimensions indicated on Standard Detail W-50.01. Filter fabric shall be placed in the excavated dry wells' interior bottom, interior side walls and placed on the top of the excavation and secured around the hydrant's fittings before completing backfill.
- E. Restoration:
 - 1. Any items disturbed during construction, including shrubs and lawns, shall be restored by the Contractor upon completion of work. Grassed areas shall be resodded as part of work.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for Fire Hydrants shall be measured per each for payment.

4.2 PAYMENT:

- A. Payment for Fire Hydrants shall be made at the Contract unit price per each in the SOP's, complete in place, which price and payment shall include but not limited to traffic maintenance and protection, minor complications and/or delays, excavation, backfill and compaction beyond trench excavation pay limits, concrete base and piers, risers, frames, covers, temporary and permanent surface restoration and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~ END OF SECTION 21 11 10 ~

SECTION 21 11 17

REMOVING AND RELOCATING FIRE HYDRANTS AND CONTROL VALVES

PART 1 GENERAL

1.1 SCOPE:

- A. Work consists of furnishing and setting control valves (in front of hydrants) and fire hydrants, (boot with ductile iron retainer gland, standpipe and hydrant complete) plus constructing dry wells complete, at locations where as directed by DC Water. Work includes temporary restoration of landscape features, trench excavation and backfill for hydrant connecting pipe, restraint; water valve and water valve casing (along the main) are not part of work.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- A. Section 00 70 00: General Conditions.
- B. Section 01 00 00: General Requirements.
- C. Section 31 23 10: Trench Excavation and Backfill.
- D. Section 32 92 23: Sodding
- E. Section 33 05 02: Water Utility Distribution Piping - DIP
- F. Section 33 06 20: Valve Casings.
- G. Section 33 14 00: Gate Valves.
- H. Section 33 14 05: Butterfly Valves.

PART 2 PRODUCTS

2.1 MATERIALS:

- A. Paint:
 - 1. Above grade line, outside of hydrant shall be painted with two coats of zinc chromate primer and two finish coats of No. 209 medium green enamel manufactured by Purity Paint Products Corp., Brooklyn, New York; or approved equal.
- B. Gravel for Dry Well:
 - 1. Washed gravel

- C. Filter Fabric:
 - 1. Woven filter fabric shall be composed of polypropylene monofilament yarns woven into sheets of approximately sixteen-(16) mil thickness. The tensile strength of the fabric shall be per ASTM D1682. The weave of the fabric shall be dense and tight so the openings are barely visible.
 - 2. Test results shall indicate the filter fabric can effectively retain particles coarser per opening of U.S. 140-sieve mesh for all conditions.
 - 3. Tests shall also demonstrate that the filter permeability is between 3.3 and 3.8 x 10² centimeters per second.
 - 4. Filter fabric shall be manufactured by Mirafi Company, P.O. Box 240967, Charlotte N.C. or approved equal.
- D. Valve Box Extensions (if required): Approved cast iron.
- E. Valve Stem Extension: Match and fit existing

PART 3 EXECUTION

3.1 PREPARATORY WORK:

- A. Shut off water main and excavate to uncover lateral.
- B. Remove hydrant and valve, cutting pipe or breaking joints as required.

3.2 REMOVING HYDRANT AND CONTROL VALVE:

- A. Plug or cap abandoned water line and provide concrete thrust block.
- B. Turn hydrants and valves over to Facility.
- C. Back fill excavation and restore area.
- D. Damage to hydrant or valve resulting from performance of the Work shall be repaired at no cost to the State.

3.3 RELOCATING HYDRANT AND CONTROL VALVE:

- A. Locate hydrant 2 feet from the curb or gutter unless otherwise directed. Position the steamer connection to face the road.
- B. Set hydrant plumb with steamer and nozzle centerline elevation 19 inches above finished grade, or match grade line indicated on barrel of hydrant with finished grade. Provide thrust blocks as shown and fill in around the drip or waste outlet at the bottom of each hydrant with not less than 4 cubic feet of crushed stone. At least one half of the stone shall be below the drip or outlet. Compact additional fill around hydrant to maintain hydrant stability and to insure against shock injury to connections.
- C. Clean and paint all parts of the hydrants showing above the ground with two coats of paint.
- D. Alter valve extensions as required and install valves and boxes where shown with water tight joints.
- E. Cap or plug existing line to be abandoned and provide concrete thrust block.

3.4 RESTORATION:

- A. Any items disturbed during construction, including shrubs and lawns, shall be restored by the Contractor upon completion of work. Grassed areas shall be resodded as part of work.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for Removing and Relocating Fire Hydrants and Control Valves shall be measured per each for payment.

4.2 PAYMENT:

- A. Payment for Removing and Relocating Fire Hydrants and Control Valves shall be made at the Contract unit price per each in the SOP's, complete in place, which price and payment shall include but not limited to traffic maintenance and protection, minor complications and/or delays, excavation, backfill and compaction beyond trench excavation pay limits, concrete base and piers, risers, frames, covers, temporary and permanent surface restoration and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract. The installation of a fire hydrant connection pipe, control valve and a water valve casing will be paid under other pay items in the SOP's.

~ END OF SECTION 21 11 17 ~

SECTION 21 11 18

CHANGING ELEVATIONS OF FIRE HYDRANTS AND HYDRANT LATERALS

PART 1 GENERAL

1.1 SCOPE:

- A. Work consists of furnishing and setting hydrant laterals and fire hydrants, (boot with ductile iron retainer gland, standpipe and hydrant complete) plus constructing dry wells complete, at locations where as directed by DC Water. Work includes temporary restoration of landscape features, trench excavation and backfill for hydrant connecting pipe, restraint; water valve and water valve casing (along the main) are not part of work.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- A. Section 00 70 00: General Conditions.
- B. Section 01 00 00: General Requirements.
- C. Section 31 23 10: Trench Excavation and Backfill.
- D. Section 32 92 23: Sodding
- E. Section 33 05 02: Water Utility Distribution Piping - DIP
- F. Section 33 06 20: Valve Casings.
- G. Section 33 14 00: Gate Valves.
- H. Section 33 14 05: Butterfly Valves.

PART 2 PRODUCTS

2.1 MATERIALS:

- A. Paint:
 - 1. Above grade line, outside of hydrant shall be painted with two coats of zinc chromate primer and two finish coats of No. 209 medium green enamel manufactured by Purity Paint Products Corp., Brooklyn, New York; or approved equal.
- B. Gravel for Dry Well:
 - 1. Washed gravel
- C. Filter Fabric:

1. Woven filter fabric shall be composed of polypropylene monofilament yarns woven into sheets of approximately sixteen-(16) mil thickness. The tensile strength of the fabric shall be per ASTM D1682. The weave of the fabric shall be dense and tight so the openings are barely visible.
2. Test results shall indicate the filter fabric can effectively retain particles coarser per opening of U.S. 140-sieve mesh for all conditions.
3. Tests shall also demonstrate that the filter permeability is between 3.3 and 3.8 x 10² centimeters per second.
4. Filter fabric shall be manufactured by Mirafi Company, P.O. Box 240967, Charlotte N.C. or approved equal.

PART 3 EXECUTION

3.1 ADJUSTMENTS:

- A. Fire hydrant and dry well material, excavation, installation and backfill shall be included in this Section. Fire hydrant connection pipe excavation and backfill shall be included as part of trench excavation per Section 21 11 10.
- B. All related work on hydrant water line including tests and chlorination shall be per pertinent to provisions of Section 21 11 10. Hydrants shall be set plumb with 4-inch nozzle normal to the curb line.
- C. Raise or lower existing hydrants, and shut-off valves (including boxes) as required, shown or directed.
- D. Position of steamer connections to face the road; Set hydrants plumb with steamer and nozzle centerline elevations 19 inches above finished grade, or match gradeline indicated on barrel of hydrants with finished grade. Provide thrust blocks as shown and fill in around the drip or waste outlet at the bottom of each hydrant with not less than 4 cubic feet of crushed stone. At least one half of the stone shall be below the drip or outlet. Compact additional fill around hydrant to maintain hydrant stability and to insure against shock injury to connections.
- E. Adjust hydrant laterals, if required, to provide a minimum cover of 4'-6" feet to finished grade.
- F. Provide new stand pipe extension pieces as approved and alter or provide new stems. Provide concrete thrust blocks, gaskets and straps as required.
- G. Clean and paint all parts of the hydrants showing above the ground with two coats of paint.
- H. Adjust valve boxes as required.
- I. Restoration:
 1. Any items disturbed during construction, including shrubs and lawns, shall be restored by the Contractor upon completion of work. Grassed areas shall be resodded as part of work.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for Changing Elevations of Fire Hydrants and Hydrant Laterals shall be measured per each for payment.

4.2 PAYMENT:

- A. Payment for Changing Elevations of Fire Hydrants and Hydrant Laterals shall be made at the Contract unit price per each in the SOP's, complete in place, which price and payment shall include but not limited to traffic maintenance and protection, minor complications and/or delays, excavation, backfill and compaction beyond trench excavation pay limits, concrete base and piers, risers, frames, covers, temporary and permanent surface restoration and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract. The installation of a fire hydrant connection pipe, a gate valve and a water valve casing shall be paid under other pay items in the SOP's.

~ END OF SECTION 21 11 18 ~

SECTION 31 23 10

TRENCH EXCAVATION AND BACKFILL

PART 1 GENERAL

1.1 SCOPE:

- A. Work includes excavation, shoring, supporting utilities and backfilling of open trenches for the construction of pipe sewer and water main systems, including disposal of unsuitable and excess materials.
- B. When water service and/or building sewer connections are part of Contract, payment for excavation and backfill for water service and/or building sewer connections will be made under Section 33 12 13 and/or 33 01 34, respectively.

1.2 RELATED DOCUMENTS:

- A. Drawing, Technical Specification Sections, General and Supplementary Conditions of the Contract, and other Division 00 and Divisions 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- A. Section 01 45 29: Testing Laboratory Services
- B. Section 01 78 42: As-Built Drawings
- C. Section 01 77 00: Project Closeout Procedures
- D. Section 31 23 23: Controlled Low-Strength Backfill Mater (Flowable Fill)
- E. Section 31 41 00: Sheeting, Shoring and Bracing

1.4 REFERENCES:

- A. Reference Codes and Specifications:
 - 1. American Association of State Highway and Transportation
 - a. AASHTO T2: "Sampling Aggregates".
 - b. AASHTO T27: "Sieve Analysis of Fine and Coarse Aggregates".
 - c. AASHTO T87: "Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test".
 - d. AASHTO T88: "Particle Size Analysis of Soils".
 - e. AASHTO T89: "Determining the Liquid Limit of Sorts".
 - f. AASHTO T90: "Determining the Plastic Limit and Plasticity Index of Soils".

- g. AASHTO T96: "Resistance to Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine".
 - h. AASHTO T180: "Moisture-Density Relations of Soils Using a 4.54-kg (10 Lb) Rammer and a 457-mm (18 in) Drop".
 - i. AASHTO T191: "Density of Soil In-Place by the Sand-Cone Method".
 - j. AASHTO T193: "The California Bearing Ratio".
 - k. AASHTO T238: "Density of Soil and Soil-Aggregate in Place by Nuclear Methods".
 - l. AASHTO T239: "Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods".
- 2. American National Standards Institute:
 - a. ANSI A10.16: "Safety Requirements for Construction of Tunnels, Shafts, and Caissons".
 - 3. American Society for Testing and Materials:
 - a. ASTM C33: "Concrete Aggregates".
 - b. ASTM D2940: "Specification for Graded Aggregate Material for Bases or Sub-bases for Highways or Airports".
 - c. ASTM D4318: "Liquid Limit, Plastic Limit, and Plastic Limit, and Plasticity Index of Soils".

1.5 SAFETY PRECAUTIONS:

- A. Observe safety precautions in all phases of the work. Including but not limited to trench shoring, bracing, lighting, and barricades as dictated by reason and by the District of Columbia.

1.6 OBSTRUCTIONS:

- A. The Contractor's attention is directed to the possible existence of pipe and other underground improvements which may or may not be shown on the Drawings. Preserve and protect any such improvements whether shown on the Drawings or not. Expose such improvements in advance of the pipeline construction to allow for changes in the alignment as necessary. Where it is necessary to remove and replace or to relocate such improvements in order to prosecute the work, they shall be removed, maintained, and permanently replaced by the Contractor at his expense.

1.7 TESTING FOR COMPACTION:

- A. Determine the density of soil in place by the sand cone method, ASTM D 1556, or by nuclear methods, ASTM D 2922 and D 3017.
- B. Determine laboratory moisture-density relations of soils by ASTM D 1557.
- C. Determine the relative density of cohesion less soils by ASTM D 4253 and D 4254.
- D. Sample of backfill materials by ASTM D 75.

1.8 SUBMITTALS:

- A. Sampling and Tests:
- B. Soil samples shall be submitted for trench backfill, soils base, borrow trench fill, and sub-grade gravel.

PART 2 PRODUCTS

2.1 GENERAL:

- A. All backfill shall meet requirements of this subsection.
- B. Payment for pipe bedding gravel for pipe sewers will be made under Section 33 19 00.
- C. Stone or graded aggregate gravel supplied from a quarry producing aggregates of asbestos bearing content or having asbestos present at the quarry is prohibited.
- D. Should such aggregates be utilized, both the Contractor and stone supplier will be directed to remove all asbestos bearing aggregates and replace them with non-asbestos bearing aggregates. The Contractor and supplier shall further be liable for any and all consequential damages, which may result as a violation of this requirement.

2.2 MATERIALS:

- A. Trench Backfill:
 - 1. Material used in trench backfill shall be a well-graded soil-aggregate mixture with ten- percent maximum, by weight, passing the No. 200 sieve. The soil shall have a liquid limit not greater than 40 and a maximum plasticity index of 10, both per ASTM D4318.
 - 2. Within one foot of the pipe, no gravel or stone shall be larger than 1-1/2 inches in any dimension.
 - 3. For remainder of trench, no gravel or stone shall be larger than 4 inches in any dimension, and not larger than one inch within one foot of finish grade.
 - 4. Backfill shall be free from snow, ice, frozen materials, trash, brick, clay lumps, broken or recycled concrete, tree roots, sod, ashes, cinders, glass, plaster, organic matter and any other foreign matter.
 - 5. Backfill shall have a minimum dry weight density of 100 pounds per cubic foot.
 - 6. Backfill shall have uniform moisture content suitable for compaction to the specified density. The Contractor shall moisten or dry soils materials to obtain suitable, uniform moisture content.
 - 7. If the materials are of such nature that heaving, pumping, rutting, or shearing occurs in the compacted backfill under the action of construction equipment, even though soil meets density requirements, affected material shall be replaced to limits as directed.
- B. Trench Subgrade Gravel:
 - 1. Gravel to backfill trench undercut areas shall be per ASTM C33, Grading Size No. 57.
- C. Soils Base:

1. Soils base course material shall consist of either Bank Run Gravel Base or Crushed Stone Base and have a minimum CBR of 25 in accordance with AASHTO T193.
2. Bank Run Gravel Base:
 - a. Coarse aggregate retained on the No. 10 (2.00 mm) sieve shall consist of hard, durable particles or fragments of stone, gravel or slag; materials that break up when subjected to freeze-thaw or wetting-drying action are prohibited.
 - b. Coarse aggregate shall have a maximum percentage of wear of 50 per the Los Angeles test.
 - c. Fine aggregate passing the No. 10 (2.00 mm) sieve shall consist of natural and crushed sand and finer mineral particles. The fraction passing the No. 200 (0.075 mm.) sieve shall not exceed one-third (1/3) of the fraction passing the No. 40 (0.425 mm) sieve. The fraction passing the No. 40 sieve shall have a maximum liquid limit of 25 and a maximum plasticity index of 6. The composite material shall conform to the following gradation requirements:

<u>Sieve Designation</u>	<u>Percent Passing By Weight</u>
2-in.	100
1-in.	70-100
3/4-in.	60-95
No. 4	40-75
No. 10	25-65
No. 40	10-45
No. 200	2-10

3. Crushed Stone Base:
 - a. Crushed aggregate shall consist of crushed stone having hard, strong, durable particles per requirements of ASTM D2940.
 - b. Additional fine aggregate shall consist of material of the same type and quality as specified above for coarse aggregate.
 - c. Use of soil fines or natural sands is prohibited.
4. The coarse aggregate and additional fine aggregate shall be so proportioned as to produce a final mixture meeting the following gradation requirements:

<u>Sieve Designation</u>	<u>Percent Passing By Weight</u>	<u>Job Mix Tolerance Weight Percent Passing</u>
2-in.	100	-2
1-1/2 in.	95-100	±5
3/4-in.	70-92	±8
3/8 in.	50-70	±8
No. 4	35-55	±8
No. 30	12-25	±5
No. 200	0-8	±3

PART 3 EXECUTION

3.1 SAMPLING/TESTS:

A. General:

1. The soil samples shall be representative of the soil encountered during excavation. They shall be free from snow, ice, frozen materials, organic matter and foreign matter.
- B. The Contractor shall also submit a sample of trench borrow fill material from any supplier which the Contractor purposes to supply backfill material during the Contract.
- C. The Contractor shall at no cost to DC Water, have a testing laboratory which is approved by the DC Water, prepare each sample per AASHTO T-87, perform sieve analysis per AASHTO T-27 and T-88, determine percentage of wear per ASSHTO T-96, determine the liquid limit per AASHTO T-89, determine the plasticity index per AASHTO T-90, provide a modified Proctor test per AASHTO T-180/D and field density test at the ends of each trench and a minimum of 10 tests for every 1000 linear feet or fraction thereof.
- D. The Contractor shall have the testing laboratory provide DC Water with copies of the testing laboratory's reports within seven (7) days of when the samples were taken. The Contractor shall not install permanent fill using material which has not been approved by DC Water.

3.2 TRENCH EXCAVATION:

A. General:

1. Trench excavation shall include removal of all materials and objects of whatever nature encountered in excavation, excluding rock and existing steel sheeting left in place.
2. Sewer and water main trench operations shall be coordinated with other utility work and scheduled to meet maintenance of traffic provisions. Utility service connections and appurtenances to individual premises may not be shown in the Contract documents and the Contractor shall determine the exact location of, and maintain these services.
3. When trenching through lawn, park or other tillable areas, sod and topsoil shall be removed with care as directed and salvaged if suitable for reuse in restoring disturbed surfaces.
4. Blasting will not be allowed unless approved in writing by the DC Water and permit is obtained by the Contractor.
5. All excavation within trench limits shall be classified as trench excavation unless otherwise stated in the Contract.
6. Surface materials of whatever nature shall be removed, including pavement, base, curb and gutter, sidewalk, and topsoil within trench limits. The Contractor shall properly separate and store materials, the DC Water shall deem what materials will be suitable for use in backfilling or restoring original conditions.
7. All work shall be done in accordance with DDOT Urban Forestry Department. Operations shall be conducted so as to avoid injury to tree trunks, branches and

roots. Excavations within limits of tree limb spread shall proceed with extreme care either by use of hand tools or with equipment that will not cause tree damage.

- a. Exposed roots two inches and larger in diameter shall be wrapped in burlap or other approved material and kept moist at all times.
 - b. Roots two inches and larger in diameter outside the actual space occupied by the sewer or structure shall not be cut; excavation shall be tunneled under these roots.
 - c. When approved, tree branches that interfere with construction may be trimmed in advance of excavation.
 - d. Root cutting and branch trimming shall be performed per accepted horticultural practice.
8. When approaching existing underground construction which may be in proximity to work under this Contract, the trench shall be opened a sufficient distance ahead of the work, test pits made, or other approved exploratory methods employed to allow for authorized changes in line and grade.
- a. Changes in line and grade plus excavation and pipe removal caused by failure to take such precautions shall be made at no additional cost to the DC Water.
9. The Contractor shall adequately support underground pipes or conduits exposed as a result of excavations; adequate support shall be provided along their entire exposed length by using timber or steel in such manner that backfilling may be performed without dislodging such pipes or conduits. No additional payment will be made for supporting materials left-in place, nor for installing and maintaining supports.
10. When work requires excavation to an elevation below, and to a width wider than trench width required for, a proposed pipe utility, proper backfill and its compaction shall be first completed to a point at least one foot above outside top of proposed utility; utility trench in the backfill may then be excavated. Pipe utilities shall not be placed in such backfill as the fill is brought to utility subgrade.
11. With prior approval, portions of trench may be excavated as tunnel at the Contract price for Trench Excavation measured from surface as if open cut; tunnel bracing and all repair shall be included as part of work.
- a. Tunnel excavation shall meet requirements of ANSI A10.16.
 - b. Tunnel excavation includes backfilling the void between pipe structure and tunnel roof with concrete of approved mix design.
 - c. Whenever there is any sign of settlement or loose material in tunnel roof or walls, appropriate remedial measures shall be taken, or the excavation shall be made as in open trench as directed.
 - d. Tunneling is prohibited when outside of tunnel roof is within such proximity of the bottom of concrete base or asphaltic concrete base to create danger of collapse, settlement or other damage.
12. Trench bottom shall be excavated approximately flat and square with trench walls.

- a. When material at trench grade elevation is suitable, trench bottom shall be protected and maintained free from standing water.
 - b. If not maintained, extra excavation and disposal, furnishing and placing undercut gravel to trench grade elevation shall be at no additional cost to the DC Water.
13. If material found at trench grade is unsuitable for a foundation for pipe bedding, it shall be removed by the Contractor to the depth and width directed by DC Water.
 14. Except in downtown and other congested areas, trench excavation shall be completed at least 25 feet in advance of pipe laying; at end of a work day or at the discontinuance of work, the pipe laying may be completed to within five feet of the end of the open trench.
 15. All trench excavation material suitable for backfill shall be stockpiled, protected, and maintained either on-site or off-site as available space will permit.
 - a. Excavated materials shall be neither deposited nor stockpiled so as to endanger in any manner the project, new or existing structures or utilities, nor interfere with project construction sequence and work by others.
 16. The Contractor shall remove and dispose of all excess and unsuitable materials, and shall furnish his own disposal areas.
 - a. The Contractor must use sealed trucks or containers when hauling wet materials.
 - b. The Contractor must obtain written permission from owner or operator of disposal areas before disposing of waste material or surplus debris.
 17. Provide ingress and egress to buildings and property at all times.
- B. Cuts Through Paving and Sidewalk:**
1. Cuts through asphalt wearing surfaces and flexible pavements (full depth asphalt paving) shall be made using pneumatic tools, with asphalt blade, along the trench limit line to make even, neat edges (see DDOT Standard Drawings Manual referenced in Section 01 42 00 "Reference Standards") for addition information.
 2. Cuts through concrete roadway surfaces and concrete base (after removal of asphalt overlays) and cuts through concrete sidewalks, shall be made by concrete saw of sufficient size to saw cut the full depth of the concrete to make even, neat edges; types of paving materials to be cut are indicated in the Contract documents but not guaranteed.
 3. Use of impact type breakers for concrete and asphaltic concrete removal over trenches shall be restricted to the "Hoe Ram" type or approved equivalent; this type equipment shall not be used near saw cut edges of existing paving limits to remain; this equipment may be restricted or prohibited when in the public interest.
 4. Any pavement, sidewalk, curb and gutter, or other highway structure outside the pay limits prescribed for trenches which may be marred, altered, damaged, or destroyed by the Contractor (due, but not limited, to his methods of construction, mobility of equipment, and handling and storage of materials) will be replaced by the District with Department of Public Works' standard type of new pavement, sidewalk, curb, gutter, or other highway structure.

5. The entire cost of any such replacement will be the Contractor's responsibility and at no additional expense to the DC Water.

C. Trench Shoring:

1. The Contractor shall furnish, place, maintain, and remove such bracing, trench shields, sheeting or other supporting material to properly support trench side walls and side walls of cuts, and to prevent movement which might in any way injure persons, the project, or other structures near the project, or reduce trench dimensions below those needed for proper construction.
 - a. When excavation depth exceeds five feet, adequate shoring is required. For deep trench cuts, adequate trench shields, braced or unbraced sheeting may be necessary.
 - b. Working drawings for the proposed method for trench support, maintenance, and shoring removal shall be prepared under the direction, and bear the seal, of a Registered Professional Engineer with a valid license.
 - 1) Working drawing submittals will be for information only, and shall be submitted in advance of work.
 - 2) DC Water shall be notified in advance of any change in method of trench support and maintenance.
 - c. If the Contractor elects to use sheeting, the sheeting shall be removed in conjunction with trench backfilling.
 - 3) If approved in writing, sheeting may be cut off and left in place below a line one foot above the top of the installed pipe.
 - d. Voids that may develop outside the bracing, shield, sheeting and shoring shall be promptly filled with appropriate material such as gravel, sand or other approved material.
 - e. If at any point sufficient or proper supports have not been provided, the DC Water may order additional supports installed at no additional cost to DC Water.

D. Trench Width Design:

1. Trench width may be less than, but shall not exceed, trench pay width for the trench section from trench sub-grade to a point one-foot above top of pipe.
2. At the Contractor's option, actual trench width more than one foot above the top of the pipe may exceed trench pay width if conditions will permit and are approved.
 - a. No additional payment will be allowed for additional excavation, backfill and temporary paving or for support or additional support of underground pipes or conduits which may be required as a result of the Contractor exceeding trench pay width.
 - b. Should the Contractor elect this option, DC Water shall be notified prior to work so that he may estimate the additional cost of permanent paving. Monies due the Contractor shall be retained to cover temporary and permanent paving repair beyond trench pay widths.

3. Water or sewer trench width shall be as shown on pertinent to Standard Drawings bound in the specifications or as shown on the Contract drawings.
 - a. If the value of W_s or W_u is exceeded below a horizontal plane 1'-0" above top of pipe, the Contractor shall submit to the DC Water pipe design reevaluation computations certified by a professional engineer to assure that the allowable load on the pipe will not be exceeded.
 - b. Computations shall reflect any additional work required such as concrete bedding, concrete encasement of pipe, higher class of pipe or any other proposed work to solve the problem.
 - c. The Contractor shall perform all necessary work at no extra cost to the DC Water.

E. Abandoned Utilities:

1. Work includes removal of utilities to be abandoned within limits of trench excavation or infringing on trench limits.
2. Abandoned Utilities shall be backfilled with Controlled Low Strength Material (Flowable Fill), and as directed by DC Water at no additional cost to DC Water.
3. Open ends of abandoned utilities or those scheduled for abandonment shall be bulk headed by 9-inch thick brick masonry or concrete of approved mix design, or cast-iron plugs or caps in small diameter abandoned in-place water mains.
4. All abandoned in-place pipeline with a 36-inch or larger diameter shall be filled with fly ash, sand or other suitable material prior to bulk heading.
5. Water mains and water appurtenances shall be abandoned in place as directed by DC Water.
 - a. Frames and covers of manholes and valve casings to be abandoned shall be salvaged and returned to the DC Water's property yard.
 - b. Abandoned manholes and water valve casings shall be backfilled to grade with No.57 stone. Puncture base of abandoned manholes to allow drainage. Any water remaining in the manhole and/or valve casing shall be removed prior to backfilling.
 - c. Abandoned fire hydrants shall be removed including standpipe and boot and delivered to the Department of Water Services Property Yard.
 - d. Hydrant drain lateral shall be plugged, if necessary plug drain laterals inside the water manhole.
 - e. Water mains to be salvaged shall be severed as directed with a smooth cut at a joint or at an intermediate point if approved.
6. Whenever manholes or water valve casings to be abandoned are isolated from trench excavation limits, they shall be abandoned in place as indicated above and payment shall be included as part of the lump sum price of the project or the bid items that it is associated.
7. Breakage will not be permitted. Mains 24-inch diameter and larger must normally be cut. Any loss of value resulting from damage to usable and surplus water main materials resulting from Contractor operations will be charged to the Contractor.

F. Dewatering:

1. Trench dewatering and drainage, including pumping and well points, when needed, shall be included as part of trench excavation.
2. Upon entering the premises, the Contractor shall assume responsibility for site surface and subsurface drainage and shall maintain such drainage in an acceptable manner during the life of the Contract.
3. The Contractor shall provide, maintain and operate pumps and related equipment, including stand by equipment, of sufficient capacity to keep all excavation and trenches free of all water at all times and under any and all contingencies that may arise until all foundations, structures, and pipe installations have been completed and backfilled, and are safe from damage, flotation, settlement, or displacement.
4. The Contractor shall supply all supervision, labor, material and equipment necessary to build and maintain all drains, ditching, sluiceways, pumping, bailing, wicking, sumps, wells, well points, cut off trenches, curtains, sheeting, and other appurtenances and structures required to obtain and maintain a dry excavation and as may be necessary to construct the project.
5. The Contractor shall perform all work necessary to keep excavations and areas to be filled free of all groundwater, surface water, all supply water, and all wastewater.

G. Temporary Plating Over Trenches:

1. To maintain traffic and safety, steel plates shall be used to temporarily bridge trench excavations at no cost to the DC Water.
 - a. Plates shall be of size and positioned to provide adequate bearing at plate edges, shall be securely anchored, and shall be fitted in place in a manner to minimize noise when crossed by traffic.
 - b. Plates shall be of sufficient thickness to safely carry heavy traffic without detrimental deflection; however, unless otherwise specified, the minimum thickness of plates shall be one inch.
 - c. Plate edges exposed to traffic shall be feathered with asphalt mix as part of trench excavation work.
 - d. Work includes surveillance and adjustment of plating over trenches which shall be provided by the Contractor during non-work hours, weekends, and holidays.
 - e. Plating and asphalt around plates shall be removed when directed.
2. Notify the Director of Transportation or his designee prior to the use of plates in public space.
3. Contractor is responsible for all Street Steel Plate fees.
4. When work is not actively being performed in or around an open excavation, the Contractor shall temporarily cover all open excavations. Where vehicular or pedestrian traffic is possible use steel plating. Cover the remaining open excavations with 3/4-inch plywood.
5. When trench is within a DDOT right-of-way, backfill material and compaction shall meet DDOT requirements.

3.3 TRENCH BACKFILL:

A. General:

1. When pipes, connections and bedding are complete and approved, trenches shall be backfilled using excavated materials meeting backfill requirements and as shown on pertinent to Standard Detail(s).
2. All soil materials removed from trench excavations that fall within the Unified Soil Classification System type ML, CL, OL, MH, CH, OH, PT, as well as material containing organic matter, ashes, cinders, refuse, frozen or other unsuitable materials are prohibited for use as backfill and shall be removed from the site.
3. When the required quantity of trench backfill exceeds quantity of approved on-site material, borrow trench fill shall be used. Borrow soils base shall be used in that portion of the trench projecting through soils base layer.

B. Density Requirements:

1. Standard Density requirements for soils, graded stone and recycled materials are defined as the Maximum Dry (Laboratory) Density obtained by AASHTO T180, Method D. The in-place or required density shall be determined per AASHTO T191, or nuclear methods AASHTO T238 and T239, and is expressed as a percentage of the Standard Density.
2. If the in-place density sample contains material larger than three-fourths (3/4) inch, the field density shall be adjusted for the material retained on the three-fourths (3/4)-inch sieve before direct comparison with the Standard Density.
3. The minimum in-place density for trench fill in road-bed areas shall be as specified in Table 31 23 10-1.

TABLE 31 23 10-1 DENSITY REQUIREMENTS

<u>Description</u>	<u>Min. Density Required; % of Max. Dry Density</u>
Trench Backfill and Backfill for Pipe Sewers and Undercut Areas	93 percent for each layer up to six inches below roadway subgrade. 95 percent for top six inch layer below road-way subgrade.
Trench Backfill for D.I. Pipe Water Mains - Laying Condition Type 2A (See Standard Detail W-10.01)	70 percent between trench bottom and 12 inches over top of pipe. 93 percent for each layer above the 12-inch layer over top of pipe, up to six inches below roadway subgrade. 95 percent for top six inch layer below roadway subgrade.
Trench Backfill for D.I. Pipe Water Mains - Laying	Uncompacted for four inch trench bottom layer.

Condition Type 3A (See
Standard Detail
W-10.02)

70 percent between four
inch uncompacted layer and 12
inches above top of pipe.

93 percent for each layer above the
12-inch layer over top of pipe, up to
six inches below roadway subgrade.

95 percent for top six inch layer
below roadway subgrade.

Soils Base Course
(New and Existing)

95 percent for Portland
cement concrete roadway and
sidewalk areas.

100 percent for bituminous concrete
roadway areas.

C. Construction Requirements:

1. Trench fill material shall be dumped outside the trench near the project of excavation and not end-dumped directly into the trench.
 - a. Fill shall be placed in uniform horizontal layers of not more than 12 inches loose depth and for full trench width. Any fill placed on frozen trench soils shall be removed at no additional cost to DC Water.
2. Backfilling shall proceed without displacement of the grade and alignment of the pipeline and its appurtenances.
 - a. Displacement of the pipeline and settlement of backfill shall be considered evidence of improper workmanship or inclusion of unsuitable backfill materials, or both, and will require re-grading and realigning the pipeline and removing and re-compacting settled material at no additional cost to DC Water.
 - b. Puddling and jetting are prohibited.
3. Each lift shall be compacted to density requirements herein before next lift is placed.
 - a. In trenches outside of roadbed areas, all layers shall be compacted to at least 93 percent of standard density.
 - b. The use of "Hydra-Hammer" for compacting backfill in trenches is not permitted.
 - c. Compaction by hand will be required where necessary.
4. All trench shoring and supports shall be so removed that trench cave-in and settlement are minimized and no voids remain.
 - a. Voids caused and left by sheeting and shoring removal shall be backfilled with pervious fill or other approved material and compacted at no additional cost to DC Water.
 - b. All material displaced by slides, settlement, and trench cave-in shall be removed and replaced with specified soils at no additional cost to DC Water.

5. DC Water may require trench backfilling over completed pipelines if traffic conditions warrant such action.
 - a. Extra compensation will not be allowed for such trench backfilling.
6. DC Water reserves the right to limit the amount of pipe laid in advance of backfilling, but in no case shall these amounts exceed 100 feet for sewer work and 50 feet for water main work.

3.4 TRENCH UNDERCUT EXCAVATION AND BACKFILL (CONTINGENT ITEM):

- A. When material at trench grade is unsuitable, trench bottom shall be undercut to depth, length and width as directed by DC Water. Undercut volume shall be backfilled to trench grade with subgrade gravel compacted with a vibratory compactor, protected and maintained. Work includes any required additional shoring and disposal of excavated material.

3.5 BORROW TRENCH BACKFILL (CONTINGENT ITEM):

- A. When trench excavation soils fail to meet requirements and when the quantity of approved trench excavation soils is insufficient approved borrow trench backfill shall be used.
- B. Furnishing approved borrow soils to replace approved trench excavation soils that are suitable, DC Water will not be responsible for any additional costs to the Contractor. Delivery tickets for each load of borrow material shipped to the project site shall have an inspection certification affixed at the source by the inspector. Any material delivered which has not been inspected prior to delivery may be rejected. The Contractor shall give prior notification of at least 12 hours as to source and quantity to be shipped, but acceptance of the material from any location shall not be construed as approval of the entire location, but only insofar as the material continues to meet specifications.
- C. Material may be rejected on visual examination pending tests of representative samples.
- D. Work includes Borrow Soils Base to the same depth as, and to replace, soils base removed during trench excavation.
- E. Materials consisting of crushed concrete, crushed brick or similar man-made substances shall not be used.

3.6 MATERIAL REPLACEMENT:

- A. Remove and replace any trenching and backfilling material which does not meet the specification requirements, at the Contractor's expense.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND VOLUMES:

- A. Volumes will be computed if required from the following dimensions:
 1. Width:
 - a. Width for payment at all sewer trench cross sections will be based on trench pay widths tabulated on Standard Details S-15.01, S-12.01 and S-12.02 as required.

- b. Width for payment at all water main trench cross sections will be based on trench pay widths on Standard Details S-10.01, S-10.02, or S-10.03, as required.
 - c. Actual trench width more than one foot above top of pipe may exceed trench pay width if approved and at no additional cost to DC Water.
2. Depth:
- a. Depth at any cross section will be based on mean depth from surface where trench excavation started to trench subgrade elevation.
3. Length:
- a. Length will be based on the horizontal projection of the completed sewer or water main without deduction for manholes, valves, and fittings. Other types of sewer or water main structures will be deducted from length measure.

4.2 MEASUREMENT AND PAYMENT FOR TRENCH EXCAVATION AND BACKFILL (<= 8 FEET DEPTH):

- A. Work for trench excavation and backfill less than or equal to 8 feet in depth will not be measured separately for payment.
- B. Payment for trench excavation and backfill shall be considered incidental and included as part of the items that it is associated with in the SOP's, which price and payment shall include but is not limited to , excavated material backfill and compaction, disposal of unsuitable excavated material as well as placement and compaction of borrow trench fill, dewatering, shoring, sheeting and bracing, trench plating as needed, minor complication and/or delays, traffic maintenance & protection, maintain and supporting utilities and structures, excavation for various sizes of utility pipelines, sanitary sewers and stormwater manhole structures, utility service connections and cleanouts, in-line thrust block restraints, concrete thrust blocks, abandonment of various sizes of pipes and structures, removal and disposal of existing sewer main sections and structures, temporary and permanent paving and surfacing restoration, samples/testing and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.
- C. Payment will not be made for shoring, sheeting and bracing left in place at the Contractor's option.
- D. Payment for Abandon Isolated Structures or Utility Pipelines, isolated from trench excavation limits, shall be considered incidental and included as part of the items that it is associated with in the SOP's, which price and payment shall include but is not limited to excavation as needed, disposal of unsuitable excavated material, shoring, sheeting and bracing, trench plating as needed, minor complication and/or delays, traffic maintenance & protection, salvaging manhole frame and cover, backfill and compaction to approved grade, temporary and permanent paving and surfacing restoration and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.
- E. Payment for excavation for sewer utility service connections will be included in Section 33 01 34.

4.3 MEASUREMENT AND PAYMENT FOR TRENCH EXCAVATION AND BACKFILL (≥ 8 FEET DEPTH) (CONTINGENT ITEM):

- A. Work for trench excavation and backfill greater than or equal to 8 feet in depth shall be measured per cubic for payment.
- B. Payment for Trench Excavation and Backfill will be made at the Contract unit price per cubic yard in the SOP's, which price and payment shall include but is not limited to , excavated material backfill and compaction, disposal of unsuitable excavated material as well as placement and compaction of borrow trench fill, dewatering, shoring, sheeting and bracing, trench plating as needed, minor complication and/or delays, traffic maintenance & protection, maintain and supporting utilities and structures, excavation for various sizes of utility pipelines, sanitary sewers and stormwater manhole structures, utility service connections and cleanouts, in-line thrust block restraints, concrete thrust blocks, abandonment of various sizes of pipes and structures, removal and disposal of existing sewer main sections and structures, temporary and permanent paving and surfacing restoration, samples/testing and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

4.4 MEASUREMENT AND PAYMENT FOR TRENCH UNDERCUT EXCAVATION AND BACKFILL (CONTINGENT ITEM):

- A. Unit of measure for Trench Undercut Excavation and Backfill will be per cubic yard, with volumes computed from volume of trench subgrade gravel to fill undercut.
- B. Payment for Trench Undercut Excavation and Backfill will be made at the Contract unit price per cubic yard of trench sub-grade gravel complete in place, which price and payment will include labor, materials, tools, equipment, and incidentals necessary to complete work specified, including excavation and shoring as needed, furnishing, hauling and compaction of gravel, and disposal of unsuitable materials.

4.5 MEASUREMENT AND PAYMENT FOR BORROW TRENCH BACKFILL (CONTINGENT ITEM):

- A. The Unit of measure for Borrow Trench Backfill will be per cubic yard, with volumes computed by the average end area method; however, the DC Water may substitute other methods to determine the exact quantity. Measurement shall be limited to the trench pay width although trench width beyond these limits may be required to properly backfill the trench as excavated. Maximum depth measure shall be limited to distance between top of pipe bedding material and roadway elevation at bottom of asphalt patching material.
- B. Payment for Borrow Trench Backfill will be made at the Contract unit price per cubic yard for furnishing material as measured complete in place, which price and payment will include soils base layer and all labor, tools, materials, equipment and incidentals necessary for hauling and furnishing the material to the work site.
- C. Placement and compaction of Borrow Trench Backfill will be included in the cost of Trench Excavation and Backfill.

4.6 MEASUREMENT AND PAYMENT FOR SAMPLING/TESTING:

- A. Work associated with the sampling/testing will not be measured separately for payment.
- B. Payment for sampling/testing shall be considered incidental and included as part of the items that it is associated with in the SOP's, which price and payment will include all

labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

4.7 MEASUREMENT AND PAYMENT FOR TREE PROTECTION:

- A. Work for tree protection and removal shall not be measured separately for payment.
- B. Payment for tree protection and removal shall be considered incidental and included as part of the items that it is associated with in the SOP's, which price and payment will include all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~ END OF SECTION 31 23 10 ~

SECTION 31 23 38

WATER SERVICE TEST HOLES

PART 1 GENERAL

1.1 SUMMARY:

- A. Work includes excavation, backfill, compaction and restoration as required to excavate test holes necessary to locate or determine type and/or condition of materials of construction of underground utilities.

1.2 RELATED DOCUMENTS

- A. Drawing, Technical Specification Sections, General and Supplementary Conditions of the Contract, and other Division 00 and Divisions 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified elsewhere may include but is not limited to:

- A. Section 01 54 50: Construction Safety
- B. Section 01 57 00: Traffic Maintenance and Protection
- C. Section 31 23 10: Trench Excavation and Backfill
- D. Section 31 23 35: Point Excavation and Backfill
- E. Section 32 92 19: Seeding
- F. Section 32 92 23: Sodding

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS

- A. Each test hole location and estimated size shall be identified by DC Water.
- B. Operations shall be scheduled to meet maintenance of traffic provisions.
- C. When water service work is included in proposed water main or sewer pipe projects, trench excavation under Section 31 23 10 will uncover those water service connections crossing the trench when water main installation is between the existing main and the water meter or when proposed sewer will run between the water main and the curb line. For the opposite side of the street, with the water main running between the proposed water main or sewer and opposite curb line, test holes will be required to determine the condition and material of the water service piping.

- D. Test Hole size: Approximately 2 ft. x 4 ft. or as directed by DC Water.
- E. Test Hole depth: Generally 4 ft. minimum; approximately 5 ft. maximum
- F. Test Holes shall be scheduled as directed so that hole backfilling can be completed with the workday.
- G. Test holes shall generally be located with the tree space. Test Holes may be required on both sides of a water meter and at the property line or closest building projection to identify water service line materials.
- H. Salvage all sod, bushes, etc., and reinstall to restore area to acceptable condition. Where salvaged items will be inadequate for restoration, provide new sodding and other features.
- H. It may be necessary to hand excavate portions of water service test hole in order to protect utilities.
- I. Excavated material shall be stored and used for backfill. Borrow fill shall be used only if quantity of excavated material is insufficient, and shall be included as part of work.
- J. When water service test hole is outside roadway and sidewalk areas, backfill shall be thoroughly compacted in 12-inch layers with pneumatic tampers. When pit is within roadway or sidewalk area, compaction shall be per Section 31 23 10.

PART 4 MEASURE AND PAYMENT

4.1 MEASUREMENT

- A. Work for Water Service Test Hole shall not be measured separately for payment.

4.2 PAYMENT

- A. The cost thereof, including all labor, materials, tools, fees, equipment, backfill and incidentals shall be included in the payment for the items of which it is a part.

~ END OF SECTION 31 23 38 ~

SECTION 33 01 34

BUILDING SEWER CONNECTIONS AND CLEANOUTS

PART 1 GENERAL

1.1 SCOPE:

- A. Where indicated in the Contract or directed, building sewers from abutting properties shall be replaced, extended, and/or reconnected to the public sewer to restore full permanent service. Work includes building sewer excavation, shoring, and backfill per Section 31 23 10, providing cleanouts, restoration of landscape features, furnishing and installing pipe, fittings and incidental work to restore full sewer service.
- B. Work shall be per this Section and the D.C. Plumbing Code and shall be performed by plumbers licensed in the District. In case of discrepancy between this Section and the D.C. Plumbing Code, this Section governs.

1.2 RELATED DOCUMENTS:

- A. Drawing, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Divisions 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- 1. Section 01 33 00: Submittals
- 2. Section 31 23 10: Trench Excavation and Backfill
- 3. Section 32 12 16: Paving and Surfacing
- 4. Section 32 92 23: Sodding.
- 5. Section 33 01 30: Sewer Main CCTV Inspection
- 6. Section 33 01 32: Cleaning and TV Inspection of Building Sewers.
- 7. Section 33 19 00: Sanitary Utility Sewage Piping.
- 8. Section 31 23 37: Test Pits

1.4 QUALITY ASSURANCE:

- A. Reference Codes and Specifications:
 - 1. American Society for Testing and Materials:
 - a. ASTM A74: "Cast Iron Soil Pipe and Fittings".
 - b. ASTM C76: "Reinforced Concrete Culvert, Storm Drain and Sewer Pipe".
 - c. ASTM C443: "Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets".

- d. ASTM C700: "Vitrified Clay Pipe, (VCP) Extra Strength, Standard Strength, and Perforated".
 - e. ASTM D2564: "Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe Systems".
 - f. ASTM D2665: "Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings".
 - g. ASTM D331: "Drain, Waste and Vent (DWV) Plastic Fittings Patterns".
2. D. C. Plumbing Code: International Plumbing Code and DCMR 12B (District of Columbia Code Supplement of 1986).

B. General Design Criteria:

- 1. Work shall be per Drawings and shall meet requirements of the District of Columbia Plumbing Code.

1.5 PERMITS:

- A. The Contractor shall obtain a "Water or Sewer Excavation Permit", from the Department of Consumer and Regulatory Affairs, for each address where excavation in public space is required for a building sewer connection and/or cleanout; District permits will be issued without charge to the Contractor.

1.6 SAFETY PRECAUTIONS:

- A. Observe safety precautions in all phases of the work, including but not limited to trench shoring, bracing, lighting, and barricades as dictated by reason and by the District of Columbia.

1.7 OBSTRUCTIONS:

- A. The Contractor's attention is directed to the possible existence of pipe and other underground improvements which may or may not be shown on the Drawings. Preserve and protect any such improvements whether shown on the Drawings or not. Expose such improvements in advance of the pipeline construction to allow for changes in the alignment as necessary. Where it is necessary to remove and replace or to relocate such improvements in order to prosecute the work; they shall be removed, maintained, and permanently replaced by the Contractor at his expense.

1.8 SUBMITTALS:

- A. All PVC pipe and fittings shall be accompanied by a certification from the pipe supplier, per ASTM D3034 and D2855, which will be the basis of acceptance of PVC materials.
- B. A similar certification shall accompany other pipe materials when requested.

PART 2 PRODUCTS

2.1 MATERIALS:

- A. Polyvinyl Chloride (PVC) Pipe:

1. Polyvinyl chloride (PVC) pipe shall meet requirements of ASTM D3034 for SDR 35. Unless otherwise approved, 20-foot lengths of pipe shall be used wherever practicable and lengths of wye-branches shall not exceed three feet. Saddle wye-branches shall not be used. Pipe and fittings will be inspected upon delivery. Rejected pipe and fittings shall be removed by the Contractor.
 2. Pipe fittings and joints shall meet requirements of ASTM D2855. Joints shall be solvent welded with solvent cement meeting requirements of ASTM D2855.
- B. **Vitrified Clay Pipe:**
1. Vitrified clay pipe and fittings shall be used only as directed and shall meet requirements of ASTM C700, Extra Strength.
 2. Joints shall be factory made compression type, conforming to ASTM C-425.
- C. **Concrete Pipe:**
1. Reinforced concrete pipe and fittings shall be per ASTM C76, Class III, Wall B, Class 4000psi concrete, for the diameter specified in the Contract.
 2. Concrete pipe shall be furnished with bell and spigot, rubber gasket joints per ASTM C443. Joints shall pass 13 psi hydrostatic test. The bevel or drop on bevel pipe shall not exceed the pipe wall thickness.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

- A. **General:**
1. No taps of existing public sewers shall be made by the Contractor except under the supervision of the Chief Plumbing Inspector, his authorized assistant or DC Water. Two weeks prior to proposed scheduling of building sewer connection work, the Contractor shall give written notice to the Plumbing Inspector, with a copy to DC Water, stating time of proposed work. All such connections shall be certified in writing by the Inspector per D. C. Plumbing Code.
 2. Joints must be made under dry conditions. If water is present, necessary steps shall be taken to dewater the trench.
 3. Damaged pipe and joints will be rejected and shall be removed from the job site by the Contractor.
 4. The Contractor shall exercise care to avoid damage to water service piping which is normally located above and in proximity to building sewer piping. The Contractor shall repair water services that he damages at no cost to the DC Water.
- B. **Work on Private Property:**
1. In general, building sewer connection work is in public space. The Contractor shall locate all building sewer piping and may be required to conduct some minor work on private property. The Contractor shall obtain written approval from property owners before disturbing any private property, and shall submit a copy of the approval to DC Water.
 2. The Contractor shall make no claim for any time delay associated with obtaining permission to work on private property.

3. The DC Water assumes no responsibility for any work or trespass on private property.

C. Preconstruction Photos:

1. Two preconstruction photographs shall be taken of each property where building sewer connections will be replaced or extended or cleanouts constructed. Views shall be taken as directed to show preconstruction, existing conditions at each property within the area associated with this work.

D. Maintaining Sewer Service:

1. Existing building sewer service shall, in general, be kept in service for the maximum time practicable. Disconnection and reconnection of building sewer and/or cleanout shall be accomplished within the time limits specified herein.
2. Existing service in the street sewer shall be maintained at all times. The Contractor shall conduct his operations so as to maintain flow in the existing sewer. This will require proper coordination for construction of new wye for building sewer connection.
3. The Contractor shall have suitable hose and flow control equipment available to plug, block, bypass and pump sewage around isolated building sewer and street sewer sections until permanent piping is complete and in service.
 - a. When necessary to pump sewage while installing wyes in existing sewers or while replacing or extending building sewer connections, material pumped shall be carried by means of approved hose or other closed, watertight conveyors to the downstream sewer or manhole designated by DC Water.
 - b. In no case shall bypass pumping be permitted other than during hours when the Contractor is present at the site. Sewage diverted during these times shall be returned to the sanitary system and not discharged into storm sewers, streams or the traveled way.
4. No more than three (3) separate service disruptions will be permitted during phases of work for any single building sewer connection, and the duration of each disruption shall not exceed two (2) hours, except in an emergency when DC Water will grant a time extension. The Contractor shall give written notice to DC Water, stating time and duration of proposed disruption sufficiently in advance to provide for emergency sewer service. If proposed disruption time conflicts with essential consumer use, it shall be rescheduled to alleviate interference. DC Water will determine action to be taken for essential consumer use requests.
5. Overtime, weekend, and holiday work may be required at no additional DC Water cost to promptly complete temporary and/or permanent sewer service.

E. Handling PVC Pipe:

1. PVC pipe shall be handled per manufacturer's recommendations and otherwise with care to avoid severe impact blows, abrasion damage, gouging and cutting by metal surfaces or rocks, and never handled with individual chain or single cable, even if padded. Exposure to sources of heat or hot objects such as heaters, boilers, steam lines, and engine exhaust shall be avoided. Handling techniques in cold weather require more care than during hot weather. Each pipe unit will be inspected for straightness and damage before being installed. Defective pipe and

fit-tings shall be removed from the job site and replaced with approved materials at no additional cost to the DC Water.

F. Replace Building Sewer Connection:

1. Work consists of replacing malfunctioning building sewer connections as well as those with service traps, and reconnecting to existing or new street sewers. Work includes excavation and shoring, backfill and compaction to grade per Section 31 23 10, removal and disposal of old building sewer pipe encountered, furnishing and installing new PVC pipe and fittings between property line and street sewer, making approved connections, restoration of surfaces, sodding per Section 32 92 23, and incidental work to restore sewer service. Work may include abandoning existing piping in place and constructing new piping in new trench.
 - a. Wye and cleanout will be paid under separate pay items.
 - b. Other piping materials shall be used only in special situations as directed.
2. Replacement building sewer piping shall be the same diameter as piping replaced unless otherwise shown on the Drawings. However, in no case shall the nominal pipe diameter be less than four inches. Replacement building sewer pipe shall be laid to a minimum two- percent (2%) grade and approved by DC Water prior to backfilling.
3. Routings for building sewer replacements shall comply with Section P-308.4.1 of the D. C. Plumbing Code with respect to clearances from lot lines and separation from water service.
4. Each replacement-building sewer shall have a cleanout installed as near to the property line as practicable per Standard Details S/80.01 and S/80.02.
5. Unless otherwise approved or directed by DC Water, the building sewer shall be connected to a wye-branch installed in the street pipe sewer.
6. All building sewer replacements shall extend from the street sewer to the property line if there is no building projection (areaways, steps, and porches) into public space. If a building projection exists onto public space, the building sewer replacement shall extend to the face of the projection.

G. Extend/Reconnect Building Sewer Connection:

1. Work consists of extending and connecting existing fully functional building sewer connections (no evidence of malfunction, no service traps, no cracks, breaks, sags in line, etc., as determined by DC Water) to new street sewers. Work includes excavation and shoring, backfill and compaction to grade per Section 31 23 10; disconnecting building sewer pipe from old sewer, furnishing and installing extension pipe section, or removal of existing pipe to shorter length as applicable, using same type material for pipe as existing pipe, disposal of removed pipe and fittings, making approved connections; restoration of surfaces, sodding per Section 32 92 23, and incidental work to restore sewer service.
2. Building sewer piping shall be the same diameter as existing piping unless otherwise shown on the Drawings. However, in no case shall the nominal pipe diameter be less than four inches. Building sewer pipe shall be laid to a minimum two- percent (2%) grade and approved by DC Water prior to backfilling.

3. Routings for building sewer piping shall comply with Section P-308.4.1 of the D. C. Plumbing Code with respect to clearance from lot lines and separation from water service.
4. Unless otherwise approved or directed by DC Water, the building sewer shall be connected to a wye-branch, which has been installed in the street pipe sewer.

H. Add or Replace Street Sewer Wye:

1. When, in the course of replacing/extending/reconnecting a building sewer connection to a street sewer, it is found that a wye is not available at the location required in the street sewer for the new connection or existing wye is considered inadequate by the DC Water, the Contractor shall install a new wye.
2. Wye shall be of same material as the pipe sewer, and shall include the proper wye adapter. Concrete collars are not permitted on PVC pipe.
3. As an alternate, when approved, a cast-iron wye thimble may be used to connect building sewer connection pipe to vitrified clay pipe sewer. Such connection shall include cutting neat hole to proper size in pipe sewer, attaching thimble over hole with suitable seal, and securing thimble with a Class 4000psi concrete collar to rigidly connect thimble to pipe.
4. Thimbles are prohibited for connection to PVC pipe sewers; only PVC wye shall be used.
5. When approved, a cast-iron straight thimble may be used to connect building sewer connection pipe to concrete pipe sewer. Such connection shall include cutting neat hole to proper size in pipe sewer, inserting thimble in hole with suitable seal, and securing thimble with a Class 4000psi concrete collar to rigidly connect thimble to pipe.

I. Add Building Sewer Cleanout:

1. When existing building sewer connection is in satisfactory condition (no evidence of malfunction, no service traps, no cracks, breaks, sags in line, root intrusions, etc., as determined by DC Water) but there is no cleanout, work consists of adding a wye and cleanout near property line per Standard Detail S/80.01.
2. The cleanout-to-building sewer connection pipe wye shall be of the same material as the building sewer connection pipe.
3. Work includes excavation and shoring, backfill and compaction to grade per Section 31 23 10; furnishing and installing cleanout, fittings and screw plug, making approved connections; restoration of surfaces, sodding per Section 32 92 23, and incidental work to restore sewer service.

J. Leakage Test:

1. All equipment and materials required to perform leakage tests and all expenses in connection with such tests, except for DC Water personnel engaged in the supervision of testing, shall be included as part of building sewer connection work.
2. Each replacement-building sewer shall be plugged at point of connection with the street sewer and at property line, and filled with water and tested with not less than a ten-foot head of water. The water shall be kept in the system for at least 15 minutes before the leakage test starts.

3. Leakage shall not exceed a rate of 0.0316 gallon per hour per ten feet of building sewer connection pipe.
4. Measurement by DC Water will be made of the rate of leakage from the pipe by determining amount of water required to maintain the ten-foot head of water for a period not exceeding one hour. The Contractor shall provide water for this test by making arrangements with DC Water.
5. The pipe and cleanout shall be watertight within the foregoing leakage limit. Repairs to all defects responsible for leakage shall be by the Contractor at no additional cost to the DC Water.

K. Restoration:

1. Any items disturbed during construction including walls, fences, shrubs, etc., including decorative driveways, sidewalks and patios (brick, stone or decorative concrete), shall be restored by the Contractor upon completion of work.
2. Standard concrete and asphalt-paved areas shall be patched with asphalt per Section 32 12 16.
3. Grassed areas shall be resodded per Section 32 92 23 as part of work.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for Replace Building Sewer Connection, Extend/ Reconnect Building Sewer Connection, and Add Building Sewer Cleanout shall be measured per linear foot, with measurement made on actual length of new pipe in place complete excluding cleanout wye. Measurement shall be made along vertical length of clean-out pipe to discharge end of cleanout wye.
- B. Work for Add or Replace Street Sewer Wye or Thimble shall be measured per each for payment.

4.2 PAYMENT:

- A. Payment for Replace Building Sewer Connection shall be made at Contract unit price per linear foot, under the item that it is associated with in the SOP's, which price and payment shall include minor complications and/or delays, traffic maintenance & protection, excavation, shoring, backfill, compaction, test pits as needed, restoration and sodding (excluding temporary asphalt patching, which will be paid separately), replacing or extending sewer connection pipe and jointing, leakage test, and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.
- B. Payment for Extend/Reconnect Building Sewer Connection shall be made at Contract unit price per linear foot, under the item that it is associated with in the SOP's, which price and payment shall include minor complications and/or delays, traffic maintenance & protection, excavation, shoring, backfill, compaction, test pits as needed, restoration (excluding temporary asphalt patching, which will be paid separately), extending sewer connection pipe and jointing or shortening existing pipe section and jointing, leakage test, and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

- C. Payment for Add or Replace Street Sewer Wye or Thimble shall be made at the Contract unit price per each, under the item that it is associated with in the SOP's, which price and payment shall include minor complications and/or delays, traffic maintenance & protection, furnishing and installing wye or thimble, test pits as needed, maintaining sewer service, and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

- D. Payment for Add Building Sewer Cleanout shall be made at Contract unit price per linear foot, under the item that it is associated with in the SOP's, which price and payment shall include minor complications and/or delays, traffic maintenance & protection, excavation, shoring, backfill, compaction, restoration and sodding (excluding temporary asphalt patching, which will be paid separately), test pits as needed, installation of cleanout including wye and jointing, leakage test, and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~ END OF SECTION 33 01 34 ~

SECTION 33 05 02

WATER UTILITY DISTRIBUTION PIPING - DUCTILE-IRON PIPE

PART 1 GENERAL

1.1 SUMMARY:

- A. Work includes of furnishing and placing water main pipelines complete and ready for continuous service, including pipe, fittings and specials including such as pipe for suction blowoffs and fire hydrants; jointing and harnessing; cutting and connecting to existing system, including additional fittings not shown on Drawings or anticipated in the work but required for a functional system, requisite retainer glands; reconnecting existing mains, testing operations, and providing disinfection, testing, and all incidental work necessary for a complete installation.
- B. All water main system work shall be functional and/or operable whether items are not indicated on the drawings or mentioned in the specifications. Items including additional work which are not shown on drawings or anticipated but required for a functional system shall be the Contractors responsibility to furnish and execute as if indicated on the drawings and mentioned in the specifications.
- C. Contractor shall perform testing operations of all fixtures, equipment, disinfection and all incidental work needed for a complete installation specified in accordance with the drawings, specifications, codes, standards and other contract documents, per direction and to the satisfaction and approval of the DC Water at the agreed prices.
- D. The DC Water reserves the right to furnish any additional fittings required to complete the Contract in a timely manner and in DC Water's interest.
- E. Water main pipe 60-inches and smaller diameter shall be ductile-iron pipe unless otherwise specified.
- F. Water main pipe 12 inches and smaller diameter shall be harnessed at all joints, unless otherwise specified.
- G. Alternate products to be submitted as approved equal shall be approved by the DC Water in writing before ordering the products for delivery.

1.2 RELATED DOCUMENTS:

- A. Drawing, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Divisions 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified elsewhere may include but is not limited to:

- 1. Section 01 78 42: As-Built Drawings
- 2. Section 01 77 00: Project Closeout Procedure
- 3. Section 03 33 00: Cast-In-Place Concrete
- 4. Section 03 40 00: Precast Concrete Products

5. Section 21 11 10: Fire Hydrants
6. Section 31 23 10: Trench Excavation
7. Section 33 06 22: Butterfly Valve Manholes
8. Section 33 11 20: Concrete Thrust Block
9. Section 33 11 22: Concrete In-Line Thrust Block
10. Section 33 14 00: Gate Valves
11. Section 33 14 05: Butterfly Valves

1.4 REFERENCES:

A. Reference Codes and Specifications:

1. American Society for Testing and Materials:
 - a. ASTM A27: "Standard Specification for Steel Castings, Carbon, For General Application".
 - b. ASTM A123: "Standard Specification for Zinc (Hot Galvanized) Coatings On Products Fabricated From Rolled, Pressed, And Forged Steel Shapes, Plates, Bars, And Strip".
 - c. ASTM A283: "Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes, and Bars".
 - d. ASTM A307: "Carbon Steel Externally Threaded Standard Fasteners".
 - e. ASTM A536: "Specification for Ductile-Iron Castings".
 - f. ASTM A563: "Specification for Carbon and Alloy Steel Nuts".
 - g. ASTM E23: "Methods For Notched Bar Impact Testing Of Metallic Materials".
2. American Water Works Association:
 - a. AWWA C104: "Standard for Cement-Mortar Lining for Ductile -Iron and Fittings for Water".
 - b. AWWA C105: "Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems".
 - c. AWWA C110: "Standard For Ductile-Iron and Gray-Iron Fittings, 3-Inch Through 48-Inch for Water and Other Liquids"
 - d. AWWA C111: "Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings".
 - e. AWWA C116: "Standard for Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service".
 - f. AWWA C150: "Standard for the Thickness Design of Ductile-Iron Pipe".
 - g. AWWA C151: "Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids".

- h. AWWA C153: "Standard for Ductile-Iron Compact Fittings, 3-Inch through 24-Inch and 54-Inch Through 64-Inch for Water Service"
 - i. AWWA C203: "Standard for Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel And Tape - Hot Applied".
 - j. AWWA C208: "Standard for Dimensions for Fabricated Steel Water Pipe Fittings".
 - k. AWWA C209: "Standard for Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines".
 - l. AWWA C210: "AWWA Standard for Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines".
 - m. AWWA C213: "AWWA Standard for Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines".
 - n. AWWA C219: "AWWA Standard for Bolted, Sleeve-Type Couplings for Plain-End Pipe".
 - o. AWWA C600: "Standard for Installation of Ductile-Iron Water Mains and Their Appurtenances".
 - p. AWWA C651: "Standard for Disinfecting Water Mains."
 - q. AWWA C800: "Standard for Underground Service Line Valves and Fittings".
3. American Public Health Association:
- a. APHA "Standard Methods for the Examination of Water and Wastewater".

1.5 SUBMITTALS:

A. Shop Drawings:

- 1. Shop drawings shall be submitted for pipe laying schedule, closure pieces, and fittings, specials, joint details, restraint and harnessing, special designs.
- 2. Mechanical and push-on joint restraint methods, including pressure rating from manufacturer, shall be submitted by the Contractor and approved by the DC Water prior to ordering or installing these materials. The gasket dimensions shall conform to the dimensions and tolerances per AWWA C111 Section 11-8, or with special designs and/or shapes shall meet the performance requirements of AWWA C111 Section 11-10. The size, mold number, gasket manufacturer's mark, manufacturer's country, the letters MJ and the year of manufacture shall be molded or permanently marked on the gasket. The molded markings shall not be on the sealing surface.

B. Affidavits/Certificates:

- 1. Data, affidavits and certifications shall be submitted per referenced AWWA specifications and this Section.

C. Catalog data:

1. Manufacturer's recommendations regarding joint deflection shall be submitted for all pipe and fittings.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Ductile-Iron Pipe:

1. Pipe shall be ductile-iron meeting the requirements of AWWA C151 with mechanical or push-on joints. Pipe shall be asphaltic coated outside and cement lined with double thickness and seal coated in accordance with AWWA C104. Pipe shall be furnished in lengths of 18 to 20 feet and shall include all joining materials.
2. Unless otherwise specified, outside diameter of ductile-iron plain end shall be the same as for mechanical-joint cast or ductile-iron pipe.
3. Wall thickness shall be per Table 33 05 02 - 1 unless otherwise specified on Contract Drawings.
4. Fittings or pipe not properly identified for pressure class, thickness or weight as required by ANSI/AWWA Standard C110, C151 or C153 shall not be used.

TABLE 33 05 02 - 1

DUCTILE-IRON PIPE WALL THICKNESS AND PRESSURE CLASSES

Diameter (Inches)	Pressure (psi)	Pressure Class ¹	Special Thickness Class ²	Thickness (Inches)
3	350	.....	52	
4	350	.....	52	
6	350	.....	52	0.31
8	350	.....	52	0.33
12	350	.....	52	0.37
16	350	.....	51	0.37
20	350	350	.....	0.38
24	300	300	.....	0.40
30	200	200	.....	0.38
36	200	200	.....	0.42
42	200	200	.....	0.47
48	200	200	.....	0.52
54	200	200	.....	0.58
60	200	200	.....	0.61

¹ Pressure classes are defined as the rated water working pressure of the ductile-iron pipe in psi. Rated water working pressure for ductile-iron pipe calculations are based on a 2.0 safety factor times the sum of working pressure indicated for each nominal size plus a surge allowance of 100 psi per AWWA C150.

²Special thickness classes were designated as standard thickness classes prior to 1991.

B. Joints and Fittings - Ductile-Iron Pipe:

1. Mechanical and push-on joints for ductile-iron pipe and fittings shall be per AWWA C111.
2. Fittings 48 inches and smaller diameter shall be mechanical joint bell, ductile-iron in accordance with AWWA C-110, including dimensions and weights.
3. Fittings 54 inches and larger diameter shall be push-on bell, ductile-iron, proprietary restrained joints in accordance with AWWA C-153.
4. Coatings for Fittings:
 - a. Provide exterior asphaltic coating per AWWA C-110 and interior cement-mortar lining per AWWA C-104; or
 - b. Provide interior and exterior fusion bonded epoxy coating, 6-8 mills in thickness, conforming to AWWA C-116 .
5. All fittings shall be complete with all joint accessories, rubber gaskets, bolts and nuts.

C. Joint Restraint - Ductile-Iron Pipe:

1. Unless otherwise noted, pressure ratings for pipe harnessing components shall not be less than the pipe working pressures shown in Table 33 05 02-1 for each size of pipe.
2. Push-on joint ductile-iron pipe with proprietary restraint shall be as follows:
 - a. For pipe 36 inches and smaller in diameter: "Flex-Ring Joint Pipe" by American Cast Iron Pipe Company, or "TR-Flex Pipe" by U.S. Pipe and Foundry Company.
 - b. For pipe 42 inches and larger diameter: "Lok-Ring Joint Pipe" by American Cast Iron Pipe Company, or "TR-Flex Pipe" by U.S. Pipe and Foundry Company.
3. Retainer glands for restraint of mechanical joint, ductile-iron pipe 24 inches and smaller diameter shall be designed to fit standard mechanical joint bells conforming to AWWA C111. Glands shall be manufactured of ductile-iron conforming to ASTM A536 with a restraining mechanism of size and arrangement per manufacturer's recommendations, of the following type:
 - a. Ductile-iron wedges in combination with special, heat-treated set screws with or without twist-off nuts, torqued per manufacturer's recommendation; or
 - b. Hardened steel set screws with knurled and cupped points, with or without twist-off nuts.
 - c. "Megalug Series 1100" by EBAA Iron Sales, Inc., or "Uni-Flange Series 1400" by Ford Meter Box Co. are considered acceptable.
 - d. Retainer glands shall meet working pressure ratings for pipe sizes shown in Table 02610-1, except 20-inch and 24-inch diameter glands shall meet working pressure rating of 250 psi.

D. Sleeve Type Couplings:

1. Couplings shall be designed, manufactured and installed in accordance with AWWA C219 except as modified below:
 - a. The Manufacturer shall provide an affidavit certifying compliance with the above standard.
 - b. Couplings shall be designed for the specified operating and test pressures of the lines in which they will be used. The manufacturer shall provide test data to verify that the couplings have been hydrostatically tested to the appropriate pressure.
 - c. The Contractor shall verify the outside diameters of the pipes to be connected, and shall select the correct diameter sleeve-type coupling to ensure a proper fit without utilizing pipe stops.
 2. The entire sleeve assembly shall be lined and coated with factory-applied coating system as follows:
 - a. Fusion bonded epoxy per AWWA C213; 12 mils minimum exterior coating thickness, 15 mils minimum interior coating thickness.
 - b. Liquid epoxy per AWWA C210; 16 mils minimum, 25 mils maximum coating thickness.
 - c. Other coating system as approved by the DC Water.
 3. Bolts, nuts and harness tie rods shall be stainless or galvanized steel.
 4. The Contractor may use mechanical joint sleeve at no additional cost to the DC Water.
- E. Bosses - Ductile-Iron Pipe (30-Inch and Larger Diameter Water Main):**
1. A boss connection shall be utilized only where indicated on the Drawings.
 2. Bosses shall be located within a range of 1½ ft. from the bell end to 4 ft. from the spigot end of the pipe.
 3. Bosses shall be ductile-iron, 60-42-10 grade, or mild to medium grade carbon-steel castings, per ASTM A27.
 4. Pipe sections selected to receive welded-on bossed outlets shall be ferritic grade ductile-iron per the following:
 - a. Minimum Charpy impact test of 10 ft-lbs. per ASTM E23 and AWWA C151.
 - b. Minimum thickness shall be Special Thickness Class-52.
 - 1) Bosses shall be shop welded to ductile-iron pipe by the pipe manufacturer's certified welders, using nickel-iron electrodes such as Ni-Rod FC55 Cored Wire produced by Huntington Alloys, Inc., Huntington, West Virginia or approved equivalent. Field welding of bossed outlets is prohibited.
 - 2) All completed welds shall have 100 percent of their surface inspected at pipe plant using the "Liquid Dye Penetrant Test Method" to insure integrity of welds.
 5. Bosses shall be mechanical joint welded outlets with sockets conforming to AWWA C110, unless otherwise shown on the drawings.

6. Interior and exterior surfaces of the outlet, including welds, shall be factory coated per 2.1, B, 4.
 7. Bossed outlets shall be rated at the same pressure as the main pipe but not less than 250 psi with a safety factor of 2.0. Certified results of hydrostatic tests on each bossed outlet shall be submitted to the DC Water prior to delivery.
 8. Minor damage to pipe cement lining and coating shall be repaired at pipe plant to meet AWWA C104.
 9. Bossed outlets manufactured by U. S. Pipe and Foundry Company or American Cast-Iron Pipe Company shall be conditionally acceptable. The Contractor shall submit statements from the manufacturers stating these products meet the above requirements.
- F. 2-Inch Blowoff Valves:
1. Two-inch gate valve with pentagonal (5-sided) operating key nut shall be iron body, bronze mounted, epoxy coated inside and outside, 100% elastomer-encapsulated symmetrical wedge, non-rising stem type with threaded ends (no flanges), 250 psi working pressure. Rotation of key nut to open shall be clockwise.
- G. Field Applied Coating System:
1. Coating system shall be coal tar epoxy conforming to AWWA C210. "High-Build Tneme-Tar 46H-413" by Tnemec Co. is considered acceptable.
- H. Materials Supplied By DC Water:
1. No materials will be furnished by the DC Water to the Contractor.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

A. General:

1. Pipe delivery and distribution shall be scheduled to provide minimum interference with required maintenance of traffic. Pipe delivery shall be coordinated with pipe installation as directed.
2. Pipe shall be distributed along line of work and outside trench as near as practicable to point of placement, facing in proper direction and properly wedged secure.
3. Pipe shall not be rolled or dragged on the ground. No pipe shall be placed against trees or shrubs or in a manner that may damage private and other property.
4. Proper measures shall be taken to protect pipe, pipe coating and lining, fittings and appurtenances from injury at all times. No material shall be deposited on or against pipe. Skids and wedges shall be arranged and installed to prevent injury of any kind. Suitable approved tools and equipment shall be used for convenient and safe handling of pipe and fittings.
5. Prior to placing pipe and fittings in trench, the interior and exterior of pipe and fittings will be inspected by DC Water. Pipe or fittings damaged beyond acceptable repair will be rejected and shall be removed and replaced at no DC

Water cost. Chipped, cracked, scarred or otherwise injured outer coating on ductile-iron pipe shall be properly repaired as directed at Contractor expense.

6. Just prior to placement, the inside of all pipe and fittings and the ends of outside surfaces shall be thoroughly cleaned; interior surfaces shall be kept clean throughout construction by use of carefully fitted stoppers. When pipe installation is not actually in progress, approved watertight plugs or caps shall be placed in all open ends of installed pipe. Surfaces of both pipe sections to be in contact with rubber gasket seal shall be thoroughly wire brushed to remove all loose rust and foreign matter, leaving clean smooth surfaces for jointing.
7. Trench excavation and suitable bedding shall be complete to proper grade before pipe is placed. Any adjustment due to improper trench grade or settlement shall be accomplished at Contractor expense. If the pipeline floats or collapses from accumulation of water in trench or from other causes, approved repair and replacement shall be at no cost to the DC Water.
8. DC Water reserves the right to limit the amount of pipe laid in advance of backfilling, but in no case shall the amount exceed 50 linear feet.
9. Pipe and fittings shall be lowered into trench so ends nearly abut each other. Pipe shall be moved longitudinally in trench in an approved manner. Entire length of pipe and fittings shall be bedded solidly on trench bottom to required line and grade. Under no condition shall pipe be subjected to a blow or shock to bring it to required line and grade.
10. As part of work, bell holes shall be excavated to adequate size where needed to accommodate proper joints.
11. Springing of joints to change direction is prohibited except as approved by DC Water. Otherwise, change in alignment or grade shall be accomplished by use of pipe fittings which are the same diameter and strength as straight pipe.
12. Straight pipe shall be furnished in standard uniform lengths. Approved short pipe lengths shall be used where needed to meet line and grade as closure pieces.
13. When straight pipe requires cutting, the Contractor shall take field measurements for making, closing, and connecting pieces of correct dimensions. Cutting shall leave a smooth end.
14. Wall openings in pipe, fittings or appurtenances for air valve taps and pitot tap stations will be drilled and tapped for 2-inch diameter Mueller pipe thread and fitted with brass plugs after pipe installation.
15. After completion of water main work, unused pipe, and fittings and joint restraint pieces shall remain the property of the Contractor and be removed from the site. No additional compensation will be made.

B. Maintaining Water Service:

1. Existing water service shall be maintained at all times except when disconnecting or connecting new work. Existing water mains paralleling new water mains shall be kept in service until new water mains are complete, temporarily capped as needed, tested, chlorinated and charged.
2. Where an existing water main must be cut and connection made to a new water main, work shall be scheduled as directed to minimize service interruption.

3. The Contractor shall provide needed facilities and work on a 24 hour basis, to transfer water connections, complete connections and abandon old water mains at no additional cost to DC Water.
4. The Contractor shall notify the DC Water for approval at least 48 hours prior to cutting or abandoning a water main.

C. Cutting-In and Removing Connections:

1. Unless otherwise indicated, the Contractor shall cut existing water mains, remove pipe, fittings, and appurtenances to make required connections; connect new water mains; reconnect existing water mains; and perform all work necessary or incidental thereto.
2. These connections shall be visually inspected for leaks by the DC Water after the pressure has been restored to the pipe line and prior to backfilling the excavated trench.

D. Joints, Ductile-Iron Pipe:

1. Joints shall be assembled per AWWA C600 to insure joints that safely permit movement caused by expansion and contraction as well as slight ground settling or shifting.
2. When horizontal or vertical deflection of pipe from a straight line is necessary, the maximum permissible joint deflection shall not exceed the manufacturer's recommendations. Keep the pipe straight while pushing the pipe home. The joint deflection shall only be completed after the pipe is homed.
3. For mechanical joints, contact surfaces shall be cleaned and coated with an approved lubricant just prior to slipping gasket over plain end and into socket. The plain end shall be centrally placed in the socket.
4. The inside of the socket and the outside of the plain end shall be thoroughly cleaned to remove oil, grit, excess coating and other foreign matter. The circular rubber gasket shall be flexed inward and inserted in the gasket recess of the socket. A thin film of approved gasket lubricant as supplied by the pipe manufacturer shall be applied to either the inside surface of the gasket or to the plain end or both. Pipe plain end shall be entered into the socket with care to keep lubricated surfaces from contracting the ground. The joint shall then be completed by forcing the plain end to the bottom of the socket with an approved forked tool, jack-type tool or other device. Pipe that is not furnished with a depth mark shall be marked before assembly to assure that plain end is inserted to full depth. Field cut pipe lengths shall be filed or ground to resemble the plain end of pipe as manufactured.
5. When tightening tee-head bolts, it is essential that the gland be brought up toward the pipe flange evenly, maintaining about equal distance between gland and flange face at all points around the socket.
 - a. This may be achieved by partially tightening bottom bolt first, then top bolt, then side bolts, then remaining bolts. Cycle shall be repeated until all bolts are within required torque range.
 - b. Nominal tee-head bolt torque range shall be as follows:

Bolt Size (Inches)	Torque Range* (Foot-Pounds)
5/8	45-60
3/4	75-90
1	100-120
1-1/4	120-150

*The Contractor shall use torque measuring or indicating wrenches to apply the above torque loads.

- c. If effective seal is not obtained at maximum specified torque, the joint shall be disassembled, cleaned and reassembled at Contractor's expense. Overstressing of bolts is prohibited.
 - 6. A retainer gland shall not be used on any pipe joint or fitting; connecting ductile-iron pipe to existing cast-iron pipe.
 - 7. After each ductile-iron pipe, fitting and valve is jointed complete, each joint area including restraint elements shall be cleaned, inspected and approved before next section is installed. Bolts, clamps, and all parts including thread areas, etc., shall receive one prime coat and one finish coat of field-applied coating system applied in accordance with AWWA C210. Field coatings shall be complete prior to line tests.
 - 8. Unless otherwise specified, diameter of ductile-iron plain ends shall be the same as for mechanical-joint cast or ductile-iron pipe.
- E. Bosses - Ductile-Iron Pipe (30-Inch & Larger Diameter Water Main):
- 1. Field installation and protection of bossed outlet pipe and field connections thereto shall be strictly per Drawings, as recommended by bossed outlet pipe manufacturer.
- F. Sleeve Type Couplings:
- 1. Pipe end condition
 - a. Pipe for use with sleeve type couplings shall have plain ends, cast or machined at right angles to pipe axis. Use sleeve-type couplings only when indicated on the Drawings.
 - b. Ductile-iron and cast-iron pipe shall be smooth and round for a distance of eight inches from end of the pipe up through 24-inch diameter, and for 12 inches from the end of the pipe for pipe larger than 24-inch diameter. The maximum variation from nominal O.D. shall not exceed:

<u>Pipe Size</u>	<u>Variation Max./Min.</u>
3 thru 16-in.	± 0.06 in.
18 thru 24-in.	+ 0.08 in.
30 thru 42-in.	± 0.10 in.
48-in.	± 0.12 in.
54 thru 60-in.	± 0.15 in.

- c. Maximum actual O.D. of pipe end shall be such as to permit the passing of a ring gauge having an internal bore not greater than 0.01 inch larger than the nominal O.D. plus the variation maximum indicated above.
- d. Steel pipe larger than 10-3/4 inches O.D. shall be free from indentations, projections or roll marks for a distance of eight inches from the end of the pipe and, within this distance, the actual O.D. shall be not more than 1/32 inch smaller than nominal O.D. Maximum actual O.D. of pipe end shall be such as to permit the passing of a ring gauge having an internal bore not greater than 3/32 inch larger than pipe nominal O.D.
- e. For each type pipe, minimum actual O.D. shall be determined by use of a steel tape applied circumferentially to pipe.

2. Assembly:

- a. Provide sleeve type couplings when indicated on the Drawings. Sleeve type couplings without pipe stops shall be used at butterfly valves 16-inches and larger diameter. Couplings shall be of proper sizes for the valve ends.
- b. Provide additional units as needed for flexibility and convenience for completing installation and locate as directed.
- c. Couplings shall be assembled on the job in a manner to insure permanently tight joints under all reasonable conditions of expansion, contraction, shifting and settlement, unavoidable variations in trench gradient, etc.
- d. Clean all dirt, rust, oil, or loose scale from pipe end. Check surfaces where gasket contacts the pipe to insure there are no imperfections such as gouges or grooves that will impair the performance of the gasket seal.
- e. If factory applied coating on sleeve-type coupling components is damaged in the field, the damaged surfaces shall be re-coated in accordance with the manufacture's recommendations before the field connection is made. Any damage from field assembly shall be repaired in similar manner.
- f. Measure back on each pipe end one-half of the middle ring length plus two inches and place a chalk mark to be used for centering the coupling over the joint to be coupled.
- g. Slide follower(s) over pipe end(s).
- h. Wipe gaskets clean and lubricate the gaskets, pipe O.D., and middle ring flares with soapy water or a non-petroleum-base lubricant. (Alcohol may be added to soapy water in freezing weather).
- i. Slide gasket(s) over pipe end(s) and assemble middle ring on one pipe end.
- j. Stab other pipe end into middle ring and center coupling between chalk marks. Pipe end must be past end of gasket a minimum of one inch after deflection has occurred.
- k. Insert bolts for down-stroke tightening where required.
- l. Bolts on opposite sides of pipe will be in opposite directions.

- m. Tighten bolts on opposite sides, drawing up the followers evenly, until all bolts have been tightened to the recommended torque. Check torque on bolts prior to backfilling. Torque bolts as recommended by the manufacturer.
 - n. Laying deflection per coupling shall not exceed manufacturer's recommendations.
 - o. Provide harnessing across all couplings using steel tie rods.
 - 3. The Contractor may use mechanical joint sleeve at no cost to the DC Water.
- G. 6-Inch Blowoffs, Drain/Air:
 - 1. Drain or air blowoffs, exclusive of gate valve, shall be included as part of work and shall be constructed per Standard Details W-50.12 and W-50.13, respectively.
 - 2. Gate valves and valve casings shall be included under Sections 02640 and 02605, respectively.
- H. 2-Inch Dead End and Air Blowoffs:
 - 1. Dead end and air blowoffs shall be included as part of work and shall be constructed per Standard Details W-50.10 and W-50.11, respectively.
 - 2. Valve casings shall be furnished and installed by the Contractor.
 - 3. Air blowoff taps will be drilled by the Contractor.
- I. Thrust Restraint:
 - 1. All thrust due to static and dynamic forces, including water hammer, at bends, tees, wyes, valves, fire hydrants, drain blowoffs, and dead end blowoffs shall be counteracted by an approved restraint method, whether or not indicated on Drawings. When connecting the pipe or fittings to existing facilities, provide sufficient restraint to counteract all thrusts.
 - 2. All 12 inch and smaller diameter mechanical joint water mains and fittings, including valves and fire hydrants, shall be installed using ductile-iron retainer glands in place of standard follower glands.
 - 3. Where shown on Drawings, pipe and fittings shall be restrained by concrete thrust blocks. If required, steel H piles shall be furnished and installed.
 - a. Concrete for thrust blocks shall be Class 4000.
 - b. Provide factory-welded steel thrust collars or retainer glands embedded in in-line thrust blocks where shown on drawings.
 - 4. Restraint of thrust forces in push-on joint ductile-iron pipe shall be provided by an approved proprietary harnessing system installed in accordance with manufacturer's printed instructions. Work includes all excavation necessary to install harnessing.
 - 5. Restraint of mechanical joint ductile-iron pipe shall be accomplished by using approved ductile-iron retainer glands in lieu of follower glands, installed in accordance with manufacturer's printed instructions.
 - 6. Torque range for retainer gland set screws shall be in accordance with manufacturer's recommendations.

7. Provide and install drilled steel thrust collars, rods and other harnessing as shown on drawings.
8. T-bolts, harness tie rods, coupling bolts, flanged joint bolts, etc. shall be installed to provide at least one complete thread projecting beyond the nut when properly tightened. Any such threaded component that fails to meet this requirement shall be replaced at no additional cost to the DC Water.
9. After each ductile-iron restrained joint is complete, the joint restraint elements shall be cleaned and inspected. Restraint elements fabricated from mild steel or other materials subject to corrosion shall be protected against corrosion using field-applied primer and coating system per AWWA C210. All coatings shall be complete before line testing.

J. Extra Fittings/Specials:

1. Prior to making connections to existing pipe, for closure sections and for field changes due to unanticipated interference, the Contractor shall:
 - a. Verify the size of existing pipe in service and provide pipe and fittings with the correct diameter sleeves or sleeve-type couplings per 02610.2.1.D to connect to existing pipe or to complete a closure. Limits of pipe and fittings for this purpose shall be approved on detailed drawings submitted by the Contractor to permit closure or to meet fixed outlet points by field alteration of approach lengths to compensate for differences between design and actual laying lengths; and/or
 - b. Verify unanticipated interference and provide additional fittings as needed and as approved on detailed drawings submitted by the Contractor to permit field changes in line and grade needed due to unanticipated obstructions in the actual locations of interfering underground structures or junction water main, including use of additional fittings.
2. Fittings and adjustments necessary to facilitate closures and proper connections shall be included in the work whether or not indicated on the Drawings.
 - a. Drawings show the more likely arrangement of fittings and specials, but these details cannot be guaranteed due to inevitable field conditions and adjustments.
 - b. Where connections to existing pipe, closure sections or unanticipated obstructions require a change in line or grade of proposed water main alignment, Extra Fittings - Contractor Furnished and requisite retainer glands for 24-inch and smaller diameter ductile-iron pipe water main shall be furnished and installed.
 - c. For such cases, when in the DC Water's interest and as determined by the DC Water, the DC Water may furnish Extra Fittings - DC Water Furnished including gaskets, retainer glands and incidentals for 24-inch and smaller diameter ductile-iron pipe water main.

3.2 WATER MAIN TESTS:

A. General:

1. The Contractor shall be responsible for the planning, coordination and execution of a combined pressure and leakage testing of water mains prior to them being placed in service. The pressure and leakage test shall be conducted in accordance with ANSI/AWWA C-600, except as modified herein.
 - a. After water main pipe has been installed, it shall be subjected to combined pressure and leakage test. Regardless of length of water main in project, all segments shall be tested unless otherwise approved by the DC Water.
 - b. Contract work shall remain separated from the existing distribution system, except for test connections, until pressure and leakage test, chlorination work has been completed and connection to the water distribution system is approved by the DC Water. Testing against closed valves shall not be permitted.
 - c. The Contractor shall perform all work necessary to complete testing. This shall include furnishing all labor, materials and equipment including pumps, gauges, charts, meters, and water source connections. Test gauges shall have pressure scale increments of no more than two (2) psi. And the gauges shall have been purchased new or have been tested and their calibration certified within one year of the proposed date of the test.
 - d. The Contractor shall provide and install approved caps and plugs in sections to be tested. Openings in pipe and fittings shall be closed tight to prevent leakage. All temporary plugged and capped ends shall be properly blocked to prevent displacement and leakage. The Contractor shall install a water source connection to the isolated pipe section for test purposes as directed. If a water main tap is approved for test connection to new water main, the tap will be furnished and installed by the Contractor.
 - e. If the Contractor should choose to conduct tests prior to backfilling, he shall be responsible for providing and installing temporary blocking to properly restrain pipe. Temporary blocking shall be approved by the DC Water prior to testing.
 - f. Upon test completion and approval of samples tested for bacteriological quality, the Contractor shall remove temporary caps, plugs and other temporary construction and shall complete connections of new work to the water distribution system.
 - g. All materials and equipment furnished by the Contractor for water main testing, including, closure caps, plugs and other temporarily required accessories shall remain the property of the Contractor upon completion of testing.”

B. Pressure and Leakage Test:

1. Pressure Test (psi) = (R.E.P. - Test Sec. El.) x .433 or 150 psi which ever is greater.
2. Where: R.E.P. = Reference Elevation for Testing from Table 02610-2 for the appropriate service area, and

3. Test Sec. El. = Elevation based on the low point elevation in the line or section under test.
4. Gauge reading shall be corrected for the elevation difference between gauge and low point in test section.

TABLE 33 05 02-2

REFERENCE ELEVATIONS FOR PRESSURE AND LEAKAGE TEST

WEST OF ANACOSTIA RIVER						EAST OF ANACOSTIA RIVER		
LOW	1 ST HIGH H	2 ND HIGH	3 RD HIGH	4 TH HIGH (East) ⁽¹⁾	4 TH HIGH (West) ⁽¹⁾	LOW	1 ST HIGH	2 ND HIGH
403	481	566	655	716	787	403	489	613

(1) 4th High Service East or West of Rock Creek

C. Field Pressure and Leakage Test:

1. Each segregated section to be tested shall be subjected to a hydrostatic test pressure per subsection C, which shall:
 - a. Be of at least two hours duration; and
 - b. Not vary by more than ± 5 psi from the specified test pressure for the duration of the test.
2. Leakage shall not exceed the total computed from the Table 33 05 02-3 as determined by the following formula:

$$L = \frac{SD \times P^{0.5}}{133,200}$$

Where:

L = Allowable leakage in gallons per hour

S = Length of pipe tested in feet

D = Nominal diameter of the pipe in inches

P = Average test pressure during the test in pounds per square inch

TABLE 33 05 02-3
 MAXIMUM ALLOWABLE LEAKAGE PER 1000 FEET OF PIPELINE* - GPH
 6 Through 48-Inch Nominal Diameter Pipe

Average Test Pressure		6-inch	8-inch	12-inch	16-inch	20-inch
Psi.	(Bar)					
450	(31)	0.95	1.27	1.91	2.55	3.18
400	(28)	0.90	1.20	1.80	2.40	3.00
350	(24)	0.84	1.12	1.69	2.25	2.81
300	(21)	0.78	1.04	1.56	2.08	2.60
275	(19)	0.75	1.00	1.49	1.99	2.49
250	(17)	0.71	0.95	1.42	1.90	2.37
225	(16)	0.68	0.90	1.35	1.80	2.25
200	(14)	0.64	0.85	1.28	1.70	2.12
175	(12)	0.59	0.80	1.19	1.59	1.98
150	(10)	0.55	0.74	1.10	1.47	1.84

Average Test Pressure		24-inch	30-inch	36-inch	42-inch	48-inch
Psi.	(Bar)					
450	(31)	3.82	4.78	5.73	6.69	7.64
300	(21)	3.12	3.90	4.68	5.46	6.24
275	(19)	2.99	3.73	4.48	5.23	5.98
250	(17)	2.85	3.56	4.27	4.99	5.70
225	(16)	2.70	3.38	4.05	4.73	5.41
200	(14)	2.55	3.19	3.82	4.46	5.09
175	(12)	2.38	2.98	3.58	4.17	4.77
150	(10)	2.21	2.76	3.31	3.86	4.41

*If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

3. Any section that fails the pressure and leakage test shall be repaired by the Contractor. The Contractor shall then retest the section until approved at no additional costs to the DC Water.
4. All visible leaks shall be repaired regardless of the amount of leakage.

D. Pressurization:

1. Each section of pipe shall be slowly filled with water and the specified test pressure shall be applied by means of a pump connected to the pipe in a manner satisfactory to the DC Water.
2. The system shall be allowed to stabilize at the test pressure before conducting the test.

E. Air Removal:

1. Before applying the specified test pressure, air shall be expelled completely from the pipe, valves and hydrants. If permanent air valves are not located at all high points the Contractor shall expose the entire pipe circumference at those points and install corporation cocks at such points so that trapped air can be expelled as the line is filled with water.
2. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied.
3. At conclusion of pressure and leakage tests, the Contractor will remove the corporation cocks and plug the tapped holes with brass plugs.

F. Examination:

1. Any damaged or defective pipe, fittings, valves or hydrants that are discovered following the pressure and leakage test shall be replaced by the Contractor and the test shall be repeated until work is satisfactory.

G. Chlorination:

1. The Contractor shall disinfect all water mains installed under this Contract by chlorination. Disinfection operations shall be in accordance with the American Water Works Association Standard for Disinfecting Water Mains (ANSI/AWWA C651).
2. The Contractor shall submit for review and approval his detailed plan for disinfection of each water main segment.
 - a. The plan shall include the location(s) where the disinfectant is to be introduced, the type and the amount of disinfection to be applied, the target residual concentration and contact period.
 - b. The plan shall include specific information on the locations where flushing is to be accomplished, rates of flushing, and locations of drainage facilities. Flushing water shall be directed to a sanitary or combined sewer unless impracticable. If discharge to an alternate location (e.g. storm sewer or natural stream) is proposed, details on methods of dechlorination shall be provided in the plan.
 - c. The plan shall include information on location of sample locations. At least one sample tap shall be provided for each main or branch greater than 50 feet long, at a spacing interval of no more than 500 feet, and at

the end of the main. Temporary sample taps along the water main shall be provided as shown on Standard Detail W-50.25, "Temporary Water Sampling Installation".

3. The Contractor shall furnish all labor, materials and equipment including piping, pumps, gauges, charts, meters, and water source connections necessary to complete disinfection and sampling for water quality tests.
 4. Disinfectant to be used shall be either calcium hypochlorite granules or tablets. Chlorination plan shall include the amount of disinfectant to be applied and the target residual concentration and contact period.
 5. Samples for bacteriological tests will be taken by the DC Water inspector using sterile bottles with sodium thiosulfate dechlorinating reagent added. Initial samples will be taken of the water that has stood in the new or restored main for at least 16 hours after final flushing has been completed. Confirmatory samples will be taken at least 24 hours after the first sample.
 6. Disinfection operations shall be considered successful if test results show the water main segment to be free of coliform contamination. Should the first round of tests fail these criteria, the mains shall be reflushed, redisinfecting and resampled for compliance.
 7. New fittings and short pipe segments necessary for reconnection of the new main or out-of-service main to the existing distribution system shall be spray disinfected or swabbed with a minimum 1 percent solution of chlorine immediately prior to connection.
 8. Contractor shall submit a summary report on each disinfection operation within one month of acceptance of the pipe for service. The report shall outline the limits of the main disinfected, the method of disinfection used, dosage of disinfectant applied, and results of bacteriological sample analysis provided by DC Water.
- H. Testing Time Period:
1. Ten consecutive calendar days have been included in "Contract Time" for testing and chlorination of water mains.
- I. Connection:
1. All joints assembled for connection to existing pipe that are not tested shall not be backfilled before pipe line is placed under pressure and visually inspected for leaks. All leaks shall be repaired and the repairs approved by the DC Water prior to backfilling the trench.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for water utility distribution piping (DIP) shall be measured per linear foot for payment.

4.2 PAYMENT:

- A. Payment for water utility distribution piping (DIP) shall be made at the contract unit price per linear foot in the SOP's, complete in place, which price and payment shall include but

not limited to test pits, trench excavation, backfill and compaction, disposal of unsuitable excavated material, shoring, sheeting and bracing, trench plating as needed, traffic maintenance & protection, minor complication and/or delays, valve boxes, casings, joint fittings, extra fittings, reducers, harnessing, in-line thrust block restraints, concrete thrust blocks, abandonment of valves and casings, removal and disposal of existing water main sections, temporary and permanent paving and surfacing restoration, disinfection tests subsequent to first test, chlorination, testing and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~ END OF SECTION 33 05 02 ~

SECTION 33 06 20

VALVE CASINGS

PART 1 GENERAL

1.1 SCOPE:

- A. Work includes of excavation, backfill and compaction beyond trench excavation limits; disposal of excess material; furnishing and placing valve casings complete with concrete base, piers as needed, precast concrete rings and casing frames and covers at locations where as directed by DC Water.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specifications, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to the Section, and this Section is directly pertinent to them.

1.3 QUALITY ASSURANCE:

- A. Reference Codes and Specifications:
 - 1. ASTM A48: "Standard Specification for Gray Iron Castings".
 - 2. ASTM C32: "Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)".
 - 3. ASTM C361: "Standard Specification for Reinforced Concrete Low-Head Pressure Pipe".
 - 4. ASTM C478: "Standard Specification for Precast Reinforced Concrete Manhole Sections".

1.4 RELATED SECTIONS: Specified elsewhere may include but is not limited to:

- A. Section 01 33 00: Submittal
- B. Section 03 20 00: Reinforcing Steel
- C. Section 03 30 00: Cast-In-Place Concrete
- D. Section 31 23 10: Trench Excavation and Backfill.

PART 2 PRODUCTS

2.1 GENERAL:

- A. Section 03 20 00: Reinforcing Steel.
- B. Section 03 30 00: Concrete Base: Cast-in-place, Class 4000, or precast per ASTM C478.
- C. Section 03 30 00: Concrete Piers: Precast but meeting requirements, Class 4000.
- D. Concrete Risers: Precast per ASTM C478 modified as follows:

1. Basis of Acceptance - Development of concrete mix proportions shall be determined per Section 03300 prior to production.
 2. Manufacture - Concrete shall contain a minimum of 564-lbs. cement per cubic yard per Table 03 30 00 - 1.
- E. Casing Brick:
1. Brick shall meet physical requirements of ASTM C32, Grade MS for casings and shall be 2-1/4 x 3-3/4 x 8 inches in size.
- F. Casing Frames and Covers:
1. Gray iron castings shall be per ASTM A48, Class 30A.
 2. Iron castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow-holes and other defects affecting their strength and value for the service intended.
 3. Castings shall be boldly filleted at the angles and arises shall be sharp and perfect.
 4. All castings shall be sandblasted or otherwise effectively cleaned of scale and sand so as to present a smooth, clean and uniform surface.
 5. Water casing frame and cover bearing surfaces between cover and frame shall be machine finished to ANSI roughness symbol 250, tolerance -0 + 1/16 inch. The word WATER shall be cast in one-inch high letters flush with surface of cover.
- G. Mortar:
1. Joint mortar for valve casing brickwork shall consist of one part Type II Portland cement and 2-1/4 parts fine aggregate by volume per Section 03 30 00 and sufficient water to make a stiff mix.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

- A. Casings shall be furnished and constructed over gate valves, suction and dead end air/drain blow-offs, two-inch air valves, 6-inch drain blow-offs and 6-inch air blow-offs per Standard Details W-20.01, W-50.10, W-50.11, W-50.12 and W-50.13. Excavation and backfill shall be included as part of work, and shall be per Section 31 23 10.
- B. Casings shall be constructed of precast concrete rings per Standard Detail W-20.01. Frames and covers shall be per Standard Details W-90.01 and W-90.02. The bottom flange of frame shall have two 3/4-inch diameter holes drilled or cast therein, directly opposite each other. Corresponding holes shall be drilled, a minimum of two inches deep, into the precast concrete ring or brick masonry upon which the frame sits. Steel dowels shall be inserted through and into these holes to prevent lateral movement of frame and cover during backfill operations. Dowels shall be #5 rebars, three inches minimum length. Brick masonry, not exceeding four inches vertical depth, may be used to adjust frame and cover to finished grade.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for Valve Casings shall be measured per each for payment.

4.2 PAYMENT:

- A. Payment for Valve Casings shall be made at the Contract unit price per each, under the item that it is associated with in the SOP's, complete in place, which price and payment shall include but not limited to test pits, trench excavation, backfill and compaction, disposal of unsuitable excavated material, shoring, sheeting and bracing, trench plating as needed, traffic maintenance & protection, minor complication and/or delays including excavation beyond the trench excavation pay limits; forming, furnishing and placing reinforcing steel, concrete base and piers, risers, frames, covers, placing and curing concrete, temporary and permanent paving and surface restoration and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~ END OF SECTION 33 06 20 ~

SECTION 33 06 22

BUTTERFLY VALVE MANHOLES

PART 1 GENERAL

1.1 SUMMARY:

- A. Work consists of excavation, backfill and compaction beyond trench excavation limits, disposal of excess material, furnishing and placing butterfly valve manholes complete with concrete base, frames and covers at locations indicated in the Contract documents and/or as directed. Butterfly valve manholes shall be built over butterfly valves 12 inches through 36 inches diameter.

1.2 RELATED DOCUMENTS:

- A. Drawing, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Divisions 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- A. Section 01 33 00: Submittals
- B. Section 03 20 00: Reinforcing Steel
- C. Section 03 30 00: Cast-in-Place Concrete
- D. Section 31 23 10: Trench Excavation and Backfill
- E. Section 33 05 02: Water Utility Distribution Piping
- F. Section 33 14 00: Gate Valves
- G. Section 33 14 05: Butterfly Valves

1.4 QUALITY ASSURANCE:

- A. Reference Codes and Specifications:
- B. ASTM A48: "Specification for Gray Iron Castings".
- C. ASTM A74: "Specification for Cast-Iron Soil Pipe and Fittings".
- D. ASTM A615: "Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement".
- E. ASTM C32: "Specification for Sewer and Manhole Brick (Made From Clay or Shale)".
- F. ASTM D2146: "Specification for Polypropylene Plastic Molding and Extrusion Materials".

1.5 SUBMITTALS:

- A. Shop Drawings shall be submitted for cast iron frames and covers.

PART 2 PRODUCTS

2.1 MATERIALS:

- A. Section 03 10 00: Concrete Formwork
- B. Section 03 20 00: Reinforcing Steel:
- C. Section 03 30 00: Cast-In-Place Concrete:
- D. Section 33 11 20: Concrete Thrust Blocks
- E. Brick shall meet physical requirements of ASTM C32, Grade MS, and shall be 2-1/4 x 3-3/4 x 8-inches in size.

2.2 MANHOLE STEPS:

- A. Manhole steps shall be reinforced plastic steps composed of ASTM A615, Grade 60, reinforcing bar (#4) completely encapsulated in copolymer polypropylene per ASTM D2146, Type II, Grade 43758, as manufactured by M. A. Industries, Inc., Peachtree City, Georgia, Model PS2-PF for concrete riser sections and Model PS1-B for brick sections, or approved equivalent reinforced plastic step.

2.3 MANHOLE FRAMES AND COVERS:

- A. Gray-iron castings shall be per ASTM A48, Class 30A.
- B. Iron castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow-holes and other defects affecting their strength and value for the service intended.
- C. Castings shall be boldly filleted at the angles and arises shall be sharp and perfect.
- D. All castings shall be sandblasted or otherwise effectively cleaned of scale and sand so as to present a smooth, clean and uniform surface.
- E. Manhole frame and cover bearing surfaces between cover and frame shall be machine finished to ANSI roughness symbol 250, tolerance - 0 + 1/16 inch. The word WATER shall be cast in one inch high letters flush with surface of cover.
- F. Manholes designated in Contract documents to be fitted with "lock-type" frame and cover, ventilating or pressure type shall be furnished with heavy-duty cast-iron frames, 36-inch I.D. at bottom flange, and corresponding covers with a minimum of four-counter sunk bronze head cap screws and concealed pickholes. Ventilating type shall have a minimum of eight 3/4-inch diameter ventilating holes cored therein. Pressure type shall have a rubber gasket seal. Lock-type frame and cover, Type R-1916-H, as manufactured by Neenah Foundry Company, Neenah, Wisconsin, or approved equivalent is acceptable.

2.4 CAST IRON SUMP:

- A. Cast iron soil pipe shall be per ASTM A74, Service classification.

2.5 MORTAR:

- A. Joint and parging mortar for manhole brickwork shall consist of one part Type II Portland cement and 2-1/4 parts fine aggregate per Section 03300 by volume and sufficient water to make a stiff mix.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

- A. Manholes shall be constructed over butterfly valves up to 36-inches diameter per Office Standard Details W21.01, W/21.05, W/21.10 and W/21.11. Excavation and backfill shall be per applicable subsections of Section 31 23 10.
- B. Manholes shall be constructed of brickwork on a reinforced concrete base, with manhole frames and covers set to approved grade per Drawings. Manhole brickwork shall be plumb, true to line, with level and accurately spaced courses, with each course breaking joint with the course below. Joints shall not be less than 3/8 inch nor more than 1/2 inch with a minimum of one header course to every six stretcher courses. Each brick shall be placed with a full joint in a full bed of mortar, shoved up against adjacent brick so that the mortar rises between and completely fills vertical joint. Exterior surfaces of manholes shall be completely coated with a 1/2-inch mortar parging and made watertight. Manhole steps shall be placed with step legs embedded 7-3/8 inches into the brickwork. Brick masonry walls shall be nine inches thick; thickness shall be increased to 13 inches when manhole depth exceeds 15 feet.
- C. Brick masonry shall not be placed when ambient air temperature is below 40 deg. F or when it appears probable that temperatures below 40 deg. F will be encountered before mortar can set, unless adequate approved means are provided for protecting the work from freezing. Work shall be protected by heating and maintaining the temperature of the masonry materials at not less than 40 deg. F and maintaining the air temperature above 40 deg. F on both sides of the masonry for not less than 72 hours. Working with, or on frozen materials is prohibited.
- D. During hot weather, masonry shall be protected from direct rays of the sun. All finished work shall be covered and kept damp for a period of seven days after placement.
- E. Mortar shall be freshly mixed for prompt use; no mortar shall be used after setting or beyond one hour after the addition of water. Retempered mortar and freeze preventive chemical additives are prohibited. The mixing machine, batch size, and mixing time shall be approved by the DC Water. When hand mixing is used, mixing shall be accomplished in a clean, leakproof, nonporous mortar box constructed for the purpose. Manhole steps shall be aligned on sidewall opposite valve operator.
- F. The bottom flange of the manhole frame shall have two 3/4-inch diameter holes drilled or cast therein, 180 degrees opposed. With frame in proper position at required grade, corresponding holes shall be drilled, a minimum of two inches deep, into the brick masonry upon which the frame sits. Steel dowels shall be inserted through and into these holes to prevent lateral movement of frame and cover during backfill operations. Dowels shall be No. 5 rebars, three inches minimum length, or approved equivalent.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for Butterfly MH shall be measured per each for payment.

4.2 PAYMENT:

- A. Payment for Butterfly Valve Manhole shall be made at the Contract unit price per each in the SOP's, complete in place, which price and payment shall include but not limited to excavation and backfill beyond trench excavation pay limits, concrete base, riser sections, castings and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~ END OF SECTION 33 06 22 ~

SECTION 33 11 20

CONCRETE THRUST BLOCK

PART 1 GENERAL

1.1 SCOPE:

- A. Work includes of excavation; backfill and compaction beyond trench excavation limits, disposal of excess material, furnishing and constructing reinforced concrete thrust block(s) complete. Thrust block(s) for pressurized sewer mains 12-inch and smaller in diameter shall be constructed as per Standard Details S-40.01. Thrust blocks for pressurized sewer mains larger than 12-inch in diameter shall be designed by a Professional Engineer from the District of Columbia and approved by DC Water.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to the Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include but Is Not Limited To:

- A. Section 01 33 00: Submittals
- B. Section 01 57 00: Traffic Maintenance & Protection
- C. Section 03 10 00: Concrete Formwork
- D. Section 03 20 00: Reinforcing Steel
- E. Section 03 30 00: Cast-In-Place Concrete
- F. Section 31 23 10: Trench Excavation and Backfill.
- G. Section 33 05 02: Water Utility Distribution Piping-DIP

1.4 SUBMITTALS:

- A. Shop Drawings:
 - 1. Contractor shall submit concrete thrust block design to be used on pressurized sewer mains larger than 12-inches in diameter. The design must be signed by a Professional Engineer from the District of Columbia and be accompanied with a complete set of design calculations.
 - 2. Drawings shall be submitted for reinforcing steel layout.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

- A. Concrete shall cure for a minimum of four days prior to backfilling. Backfill shall be per Section 31 23 10.

PART 4 MEASUREMENT AND PAYMENT

1.1 MEASUREMENT:

- A. Work for Concrete Thrust Block shall be measured per each for payment.

1.2 PAYMENT:

- A. Payment for Concrete Thrust Blocks shall be made at the Contract unit price per each in the SOP's, complete in place, which price and payment shall include but not limited to test pits, trench excavation, backfill and compaction, disposal of unsuitable excavated material, shoring, sheeting and bracing, trench plating as needed, traffic maintenance & protection, minor complication and/or delays including excavation beyond the trench excavation limits; forming, furnishing and placing reinforcing steel, complete in place, furnishing, placing and curing concrete, temporary and permanent paving and surfacing restoration and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~ END OF SECTION 33 11 20 ~

SECTION 33 11 22

CONCRETE-IN-LINE THRUST BLOCK

PART 1 GENERAL

1.1 SUMMARY:

- A. Work includes excavation, backfill and compaction beyond trench excavation limits, disposal of excess material, furnishing and constructing reinforced in-line concrete thrust block(s) complete.
- B. In-line thrust block(s) for pressurized sewer mains greater than 12-inch in diameter shall be designed by a Professional Engineer from the District of Columbia and approved by DC Water.
- C. In-line thrust block(s) for pressurized sewer mains 12-inch and smaller in diameter shall be constructed as per standard Detail Drawing S-40.02.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified elsewhere may include but is not limited to:

- 1. Section 01 33 00: Submittals
- 2. Section 01 57 00: Traffic Maintenance & Protection
- 3. Section 03 10 00: Concrete Formwork
- 4. Section 03 20 00: Reinforcing Steel
- 5. Section 03 30 00: Cast-In-Place Concrete
- 6. Section 31 23 10: Trench Excavation and Backfill.
- 7. Section 33 05 02: Water Utility Distribution Piping – D.I.P.

1.4 SUBMITTALS:

- A. Shop Drawings:
 - 1. Contractor shall submit in-line thrust block design to be used on pressurized sewer mains larger than 12-inches in diameter. The design must be signed by a Professional Engineer from the District of Columbia and be accompanied with a complete set of design calculations.
 - 2. Drawings shall be submitted for reinforcing steel layout.

PART 2 PRODUCTS

(NOT USED)

PART 3 EXECUTION

3.3 CONSTRUCTION REQUIREMENTS:

- A. In-line thrust block(s) shall be constructed per Standard Detail Drawing S-40.02.
- B. Concrete shall cure for a minimum of four days prior to backfilling. Backfill shall be per Section 31 23 10.

PART 4 MEASUREMENT AND PAYMENT

4.3 MEASUREMENT:

- A. Work for Concrete In-Line Thrust Block shall be measured per each for payment.

4.4 PAYMENT:

- A. Payment for Concrete In-Line Thrust Block shall be at Contract unit price per each in the SOP's, complete in place, which price and payment shall include but not limited to test pits, trench excavation, backfill and compaction, disposal of unsuitable excavated material, shoring, sheeting and bracing, trench plating as needed, minor complications and/or delays, traffic maintenance & protection including excavation beyond the trench excavation limits; forming, furnishing and placing reinforcing steel, complete in place; furnishing and placing follower glands to anchor in-line thrust block; furnishing, placing and curing concrete, temporary and permanent paving and surfacing restoration and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~END OF SECTION 33 11 22~

SECTION 33 12 33

WATER METERS

PART 1 GENERAL

1.1 SCOPE:

- A. Work includes the installation and placing water meters and appurtenant piping in accordance with the Standard Detail Drawings and as directed by DC Water. The Water Meter shall be provided by DC Water at no additional cost to the Contractor..

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- 1. Section 31 23 10: Trench Excavation and Backfill.
- 2. Section 33 05 02: Water Utility Distribution Piping – Ductile-Iron Pipe
- 3. Section 33 12 13: Water Service Connections.

1.4 QUALITY ASSURANCE:

- A. ANSI/AWWA C 700-77: "AWWA Standard for Cold Water Meters-Displacement Type".

1.5 SUBMITTALS:

- A. Shop Drawings:
 - 1. Affidavits, certifications and manufacturer's test results shall be submitted per this Section.

PART 2 PRODUCTS

2.1 MATERIALS:

- A. Water Meter: Water meters shall conform to AWWA C-700-77, modified or supplemented as follows:
 - 1. Meters shall be magnetic drive, positive displacement oscillating piston or mutating disc type sealed register cold water meters.
 - 2. An affidavit of compliance and a certificate of testing for accuracy are required for water meters.
 - 3. Size and number of meters shall be as shown on the Standard Detail Drawings.
 - 4. Corrosion protection for cast-iron frost protection covers may be by an inner liner or coating.

5. Modifications of test specifications for operating at higher temperatures are not required.
6. Markings: The manufacturer's meter serial number shall be imprinted permanently on the outer case as well as on the register box lid.
7. Cases: Cast iron frost bottoms shall be provided on 5/8", 3/4" and 1" meters. 1-1/2" and 2" meters shall be split case type with bronze lower and upper shell assemblies.
8. Water meter sizes 5/8" x 3/4" and 1-1/4" shall not be supplied.
9. Water meter sizes 1-1/2" and 2" are to be furnished with flanges on both ends.
10. Companion flanges, gaskets, bolts and nuts shall be provided. Nuts and bolts shall be stainless steel.
11. Registers: Registers shall be straight reading, hermetically sealed and shall read in cubic feet. In piston type meters all reduction gearing shall be contained in a permanently hermetically sealed, tamperproof enclosure made from a corrosion resistant material and will be secured to the upper maincase by means of a locking device. In disc type meters, the register is to be located in a bronze register box mounted to the meter case by use of a tamperproof-locking device.
12. Neither a remote register nor an encoder type register is required.
13. Magnetic coupled drive is required.

2.2 QUALIFIED PRODUCTS:

- A. With respect to water meters described in this specification, only meters which have, prior to the time set for opening of bids, been tested and approved for inclusion in the qualified list below. Manufacturers who wish to have a water meter tested for qualification are urged to communicate with the Chief, Department of Water Measurement and Billing, DC Water and Sewer Authority on A.C. 202-727-2044. Manufacturers having products not yet listed, but which have been qualified, are requested to submit evidence of such qualification with their bids, so that they may be given consideration.
- B. The following meters are included on the qualified list:
 1. Rockwell Sealed Register,
 2. Trident Model 8 Frost Proof,
 3. Hersey Model M.H.T.,
 4. Badger A Easy Read

PART 3 EXECUTION

3.1 GENERAL:

- A. Existing water service shall be maintained at all times. Existing water mains shall be kept in service until new water mains are completed, temporarily capped as needed, tested, chlorinated and charged.
- B. Work By DC Water:
 1. The DC Water, (Department of Customer Services work includes retrieving the existing meters (removed and stored in the meter box by the Contractor), attaching

and activating the MTU on the new cover (lid). Any existing meters found to be not AMR type will be administered on a case-by-case basis by DC Water's Department of Customer Service.

2. Meters shall be furnished by DC Water's Department of Customer Service.

C. Tap, Meter, Meter Box, Frame and Cover Work By Contractor:

1. DC Water will provide the meters and the Contractor shall install the meters. The Contractors shall responsible for the safe transport and care of the meters provided by DC Water. Replacement of any meter damaged, lost, or stolen while in the possession of the Contractor will be at the Contractor's expense.
2. The Contractor shall furnish and install pipe, yoke, couplings, shunt, meter valves, meter housing, meter housing gravel foundation, meter box frame and cover.
3. If the existing meter is an AMR type greater than or equal to 1" diameter, the Contractor shall reinstall the existing meter (minimum 1" diameter meter yoke). Otherwise, the Contractor shall:
 - a. request, coordinate and pick-up new water meters from DC Water;
 - b. remove existing meters, protect existing meters to be in a "reusable condition" and placed in a 42 gallon capacity, 3-mil plastic bag with twist tie or other device to seal the bag, all provided by the Contractor and placed in the bottom of new meter box.
 - c. connect the new meter to the meter yoke.
4. The definition of "reusable condition" is that the meter is in working condition, as determined by the Manager of Meter Operations, Department of Customer Service, and the following is not observed: clogging with dirt, mud or debris; missing or broken MTU boxes; broken, cut or frayed wires; broken registers; or damaged and cracked housing. All water meters and MTUs found to not be in "reusable condition" shall be replaced by DC Water and installed by the Contractor.
5. The Contractor shall schedule meter pickup with the Manager of Meter Operations, Department of Customer Service at 202-612-3495 (8:30 AM to 5:00 PM) or designee at least five (5) business days in advance of any proposed meter work.
6. The Contractor shall install all new water service connection taps at the water main, and shall remove and plug all existing corporation stops.
 - a. For each new installation (within 48 hours of making the installation), the Contractor shall complete and submit the Tap Card herein Appendix "B".
 - b. For each premise where service work (test pit or service pipe replacement/adjustment) is performed, the contractor shall collect the necessary data to populate the daily and weekly reporting spreadsheets in Appendix-B. The daily reporting sheet shall be filled and submitted to the project manager each day that a full or partial lead service replacement (LSR) is performed. The weekly reporting sheet shall be filled and submitted to the project manager every Monday for the duration of the

project. The weekly reporting sheet must detail all of the week's prior work including replacements (lead and non-lead) and test pits.

7. Where any unmetered water service is encountered, the piping, yoke, fittings, meter box, shunt, frame and cover will be installed in Public Space in accordance with Standard Detail W-80.01 by the Contractor and meters shall be provided by DC Water and installed by the Contractor.
 8. Wherever an existing meter is located on Private Property or inside the building, as directed by the DC Water, the Contractor shall relocate/install said piping, yoke, fittings, meter box frame and cover in Public Space. Meters shall be installed by the Contractor only as directed by the DC Water.
 9. Meters shall be reinstalled at their existing location unless specifically directed by the DC Water.
 10. If new meter is not available, a meter jumper line will be used and shall be furnished and installed by the Contractor.
 11. When the new meter becomes available, the Contractor shall remove the jumper line and install the meter; all costs related to furnish and install the meter jumper line including all labor, materials, tools, fees, equipment and incidentals shall be included in the payment for the items of which it is apart. No separate payment shall be made.
 12. The Contractor shall coordinate with DC Water before and after the installation of the meters.
- D. Preconstruction Photos:
1. A minimum of two (2) preconstruction photographs shall be taken of each property where water service will be adjusted or replaced. Views shall be taken as directed to show preconstruction existing conditions at each property within the area associated with the work.
- E. For additional information refer to Section 33 12 13 "Water Service Connection".

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for Water Meter installation shall be measured per each for payment.

4.2 PAYMENT:

- A. Payment for Water Meter installation shall be made at Contract unit price per each, under the item that it is associated with in the SOP's, which price and payment shall include but not limited to excavation, backfill and compaction, if needed, traffic maintenance and protection, minor complications and/or delays, temporary and permanent surfacing restoration, installation of meters and meter housing, and all labor, materials, tools, equipment and incidentals necessary to complete work specified within this Contract.

~END OF SECTION 33 12 33~

SECTION 33 14 00
GATE VALVES

PART 1 GENERAL

1.1 SUMMARY:

- A. Work consists of furnishing and installing gate valves. Gate valves may be either standard or resilient-seated type. Work includes gate valves for drain blowoffs.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract, and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to the Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- A. Section 00 70 00: General Conditions
- B. Section 01 00 00: General Requirements
- C. Section 33 05 02: Water Utility Distribution Piping-DIP
- D. Section 33 06 20: Valve Casings
- E. Section 33 48 00: Concrete Valve/Venturi Vaults

1.4 QUALITY ASSURANCE:

A. Reference Codes and Specifications:

1. ANSI B16.1: "Cast-Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800".
2. ASTM A48: "Specification for Gray Iron Castings".
3. ASTM A153: "Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware".
4. ASTM A536: "Specification for Ductile-Iron Castings".
5. ASTM B584: "Specification for Copper Alloy Sand Castings for General Applications".
6. AWWA C104: "AWWA Standard for Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water".
7. AWWA C203: "AWWA Standard for Coal-Tar Protective Coatings for Steel Water Pipelines - Enamel and Tape - Hot Applied".
AWWA C500: "AWWA Standard for Gate Valves, 3 through 48-In. NPS, For Water and Sewage Systems".
8. AWWA C504: "AWWA Standard for Rubber-Seated Butterfly Valves".
9. AWWA C509: "AWWA Standard for Resilient-Seated Gate Valves, 3 Thru 12 NPS, For Water and Sewage Systems".

10. AWWA C550: "AWWA Standard for Protective Interior Coatings for Valves and Hydrants".
11. U. S. Army Corps of Engineers C200.

1.5 SUBMITTALS:

A. Shop Drawings:

1. Drawings shall be submitted for valve and joint details.

B. Affidavits, certifications, and manufacturer's test results shall be submitted per this Section, including:

1. For Gate Valves:

a. Catalog Data

- 1) Prior to purchase of the valve, the Contractor shall submit to DC Water, for approval, catalog data, net weight, and certified assembly drawings. No valve shall be furnished or installed unless approved in writing by DC Water.

b. Affidavit:

- 1) An affidavit of compliance shall be furnished by the manufacturer that specifies tests have been performed and that all components and the product comply in all respects with requirements of specifications.

c. Records of Tests

- 1) Record of physical and chemical properties, operating and hydrostatic tests shall be furnished.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Standard Gate Valves:

1. Per AWWA C500, hand operated iron-body, bronze mounted, and double-disc, for water works service under operating pressure of 150 psi.
2. AWWA C500 is modified or supplemented as follows:
3. Valves shall be per New York Pattern, Metropolitan Gate Valves.
4. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.
5. The valve shall be designed so that during operation, or cycling of the valve, there is no friction or abrasion or rubbing together that could wear away any coating material and expose bare metal.
6. The interior of the valve body shall be free of pocket or ledges where sediments or debris can collect.
7. Valve shall be capable of operating through 500 full cycles with zero leakage and without regard to direction of valve discharge or operating pressures.

8. Size and type: Size shall be 12-inch and smaller. Type shall be iron-body, bronze-mounted, gate valves with double-disc gates having parallel seats and side wedges intended for ordinary water service. Each valve shall have 1/2-inch diameter pipe plug in the bonnet for testing. Valves shall be non-rising stem inside screw type except for exposed valves at the Wastewater Treatment Plant (WTP) which shall be rising stem, outside screw and yoke type.
9. Intended position of Valves: Valves shall be installed in line in a vertical position.
10. Type of Valve Ends: Valves shall be furnished with mechanical-joint ends complete with bolts, nuts, retainer glands and gaskets.
11. Orientation of Boltholes in Flanges of Mechanical Joint: Manufacturer's option.
12. Solid-Bronze Disc Gates: Not required.
13. Method of Fastening Gate Rings: Manufacturer's option.
14. Type of Stem Seal: Double O-ring seals shall be furnished on all gate valves (stuffing boxes prohibited). O-ring seal plates shall be cast-iron; seal plate bolts and nuts shall be zinc coated per ASTM A153.
15. Wrench Nuts: Special pentagonal operating nut shall be furnished for 6-inch and 8-inch diameter valves; drawing furnished by the DC Water upon request. Square operating nut furnished for 12-inch valves.
16. Direction of Wrench Nut Rotation to Open: Right (clockwise) except for exposed valves at the WTP, which shall open, left (counter-clockwise).
17. Steel Gears: Not permitted on gate valves.
18. Cast-Iron Gears: Not permitted on gate valves.
19. Type of Gear Case: Not permitted on gate valves.
20. Position Indicator: Not required.
21. Markings: Insofar as practicable, markings shall be readable by an observer looking down on the valve in line position.
22. Disc and Disc Seat Rings: Cast-iron discs in valves 6-inch through 12-inch diameter shall be accurately machined to receive bronze disc seat rings. The disc seat ring surfaces in contact with the iron disc and the dovetail projections shall be fully machined and the disc rings rolled, peened, or pressed into the machined grooves on the iron disc and, when secured in place, a rough and finish cut shall be taken over the disc seat bearing surface.
23. Minimum Diameter of Stem and Minimum Thickness of Body and Bonnet:

Valve Min. Dia. (Inches)	Dia. of Valve Stem at Base of Thread (Inches)	Min. Body/Bonnet Thickness (Inches)
6	1.125	0.625
8	1.25	0.6875
12	1.50	0.750

24. Valve Stems: Stem material shall be per ASTM B584, alloy UNS No. 86700, or equivalent alloy with minimum 30,000 psi yield and approved for use in potable water service.
25. Valve Wedges: Valve wedges for 6 and 8-inch valves shall be bronze; wedges for 10 and 12-inch valves shall be cast-iron.
26. Valve Stem Thrust Collar Housings. Housings for valve stem thrust collars shall be carefully machined and fully bronze lined for all gate valves.
27. Painting: Valve body and bonnet shall be coated on all interior surfaces, in accordance with AWWA C550. Valve body exterior shall be coated with an appropriate coating of bonded epoxy to insure corrosion prevention. Exposed valves shall be shop painted as directed.

B. Resilient-Seated Gate Valves: Per AWWA C509.

1. AWWA C509 is modified or supplemented as follows:
 - a. Size and type: Size shall be 12-inch and smaller. Valves shall be non-rising stem, inside screw type except for exposed valves at the WTP which shall be rising stem, outside screw and yoke type.
 - b. Waterway shall be smooth and shall have no depressions or cavities in seat area.
 - c. Valves shall have an unobstructed waterway equal to or greater than the full nominal diameter of the valve.
 - d. The valve shall be designed so that during operation, or cycling of the valve, there is no friction or abrasion or rubbing together that could wear away any coating material and expose bare metal.
 - e. The interior of the valve body shall be free of pocket or ledges where sediments or debris can collect.
 - f. Valve shall be capable of operating through 500 full cycles with zero leakage and without regard to direct ion of valve discharge or operating pressures.
 - g. Type of Valve Ends: Valves shall be furnished with mechanical-joint ends complete with bolts, nuts, retainer glands and gaskets.
 - h. Type of Stem Seal: Double O-ring seals shall be furnished on all gate valves. O-ring seal plates shall be cast-iron; seal plate bolts and nuts shall be zinc coated per ASTM A153.
 - i. Valve Stems: Stem material shall be per ASTM B584, alloy UNS No. 86700, or equivalent alloy with minimum 30,000 psi yield and approved for use in potable water service.
 - j. Gate shall seat against seating surfaces arranged symmetrically about centerline of the valve stem.
 - k. Wrench Nuts: Special pentagonal operating nuts shall be furnished for 6-inch and 8-inch diameter valves; drawing furnished by the District upon request. Square operating nut furnished for 12-inch valves.

- l. Direction of Wrench Nut Rotation to Open: Right (clockwise) except for exposed valves at the WTP, which shall open, left (counter-clockwise). The number of turns for 6-inch valves shall be 20; the number of turns for 8-inch valves shall be 26; the number of turns for 12-inch valves shall be 38.
 - m. If bonnet is two-piece, parts shall be bolted through; tapped holes with stud bolts prohibited.
 - n. Valve body and bonnet shall be coated on all exterior and interior surfaces with a fusion-bonded epoxy per AWWA C550. Painted surfaces and spray applied epoxy coatings are not acceptable.
 - o. The manufacturer's name, pressure rating, year of manufacture and size shall be cast on valve body.
 - p. All valves shall be tested and approved in strict accordance with AWWA C509/515.
 - q. Each valve shall be tested to 400-psi hydrostatic pressure.
- C. Multi Stem Valves: (If Required)
- 1. Contractor shall replace existing multi stem valves with the comparable number of valves depending on the number of stems.
 - 2. If Contractor replaces and/or removes the original multi stem valve they shall replace it with a tee, cross or as directed by DC Water, establishing the distribution connection.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

- A. Prior To Installation Inspection:
- 1. Valves shall be inspected at the time of receipt for damage in shipment, compliance with specifications, direction of opening, size and shape of operating nut, number of turns, and type of end connections. A visual inspection of the bronze gate rings and body rings shall be performed to detect any damage in shipment or scoring of the seating surfaces. Any foreign material in the interior portion of the valve shall be removed. The valve shall be cycled through one complete opening and closing cycle.
- B. Installation:
- 1. Six-inch through 12-inch diameter gate valves shall be installed vertically in the water main by means of standard mechanical joints per Section 33 05 02.
 - 2. Valves shall be installed in the closed position.
- C. After Installation Inspection:
- 1. After installation and before pressurization of the valve, all pressure-containing bolting (bonnet, seal plate, bypass, and end connections) shall be inspected for adequate tightness of all tapped and plug openings to the valve interior. The Contractor shall make any adjustments or alterations as directed.
- D. Tests:

1. Pressure test shall be conducted as part of water main test per Section 33 05 02.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for 6", 8" and 12" Gate Valves shall be measured per each for payment.
- B. Greater than 12" Gate Valves shall be measured as time and material.
- C. Work under Multi Stem Valves shall not be measured separately for payment.

4.2 PAYMENT:

- A. Payment for 6", 8" and 12" Gate Valves shall be made at Contract unit price per each in the SOP, which price and payment will include minor complications and/or delays, flanged and mechanical joint ends, flanged and plain-end pieces where needed along with sleeve couplings, restoration of landscape features, sod and all labor, materials, tools, equipment and incidentals needed to complete work specified.
- B. Payment for greater than 12" Gate Valves shall be considered upon a if needed basis under time and material/crew days, under the item that it is associated with in the SOP's, complete in place, which price and payment will include minor complications and/or delays, flanged and mechanical joint ends, flanged and plain-end pieces where needed along with sleeve couplings, restoration of landscape features, sod and all labor, materials, tools, equipment and incidentals needed to complete work specified.
- C. Payment for Multi Stem Valves shall be considered incidental and included in the payment for the items of which it is a part in the SOP's, complete in place, which price and payment shall include but not limited minor complications and/or delays, abandonment of multi stem valves, tee and cross connections, flanged and mechanical joint ends, flanged and plain-end pieces where needed along with sleeve couplings, restoration of landscape features, sod and all labor, materials, tools, equipment and incidentals needed to complete work specified.
- D. Payment for Butterfly Valves shall be considered incidental and included in the payment for the items of which it is a part in the SOP's, complete in place, which price and payment shall include but not limited to traffic maintenance and protection, minor complications and/or delays, excavation, backfill and compaction beyond trench excavation pay limits, flanged and mechanical joint ends, flanged and plain-end pieces where needed along with sleeve couplings, temporary and permanent surface restoration and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~END OF SECTION 33 14 00~

SECTION 33 14 05

BUTTERFLY VALVES

PART 1 GENERAL

1.1 SUMMARY:

- A. Work consists of furnishing and installing butterfly valves.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract, and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to the Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- A. Section 00 70 00: General Conditions.
- B. Section 01 00 00: General Requirements.
- C. Section 33 06 20: Valve Casings.
- D. Section 33 06 22: Butterfly Valve Manholes.
- E. Section 33 05 02: Water Utility Distribution Piping - DIP
- F. Section 33 48 00: Concrete Valve/Venturi Vaults.

1.4 QUALITY ASSURANCE:

- A. Reference Codes and Specifications:
 - 1. ANSI B16.1: "Cast-Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800".
 - 2. ASTM A48: "Specification for Gray Iron Castings".
 - 3. ASTM A153: "Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware".
 - 4. ASTM A536: "Specification for Ductile-Iron Castings".
 - 5. ASTM B584: "Specification for Copper Alloy Sand Castings for General Applications".
 - 6. AWWA C104: "AWWA Standard for Cement-Mortar Lining for Ductile-Iron and Gray-Iron Pipe and Fittings for Water".
 - 7. AWWA C203: "AWWA Standard for Coal-Tar Protective Coatings for Steel Water Pipelines - Enamel and Tape - Hot Applied".
 - 8. AWWA C504: "AWWA Standard for Rubber-Seated Butterfly Valves".
 - 9. AWWA C509: "AWWA Standard For Resilient-Seated

10. AWWA C550: "AWWA Standard for Protective Interior Coatings for Valves and Hydrants".
11. U. S. Army Corps of Engineers C200.

1.5 SUBMITTALS:

- A. Shop Drawings:
 1. Drawings shall be submitted for valve and joint details.
- B. Affidavits, certifications, and manufacturer's test results shall be submitted per this Section, including:
 1. Test data shall be furnished by manufacturer.
 2. The Contractor shall submit manufacturer's certified drawings of the valves including valve operators, gear ratios, electrical schematics (where electrical operators are furnished), and parts lists.
 3. An affidavit from the manufacturer shall be submitted stating that valves furnished comply with all pertinent provisions of this specification.
 4. Certified test reports covering performance, leakage, and hydrostatic tests shall be furnished.
 5. A statement shall be submitted by the Contractor giving required number of turns of the operating nut to move the disc from fully open to fully closed (or vice versa) position.

PART 2 PRODUCTS

2.1 MATERIALS:

- A. Butterfly Valves:
 1. Per AWWA C504 except as otherwise supplemented herein. Butterfly valves of the "wafer type" are not acceptable.
 2. The manufacturer shall be regularly engaged in the design, manufacture, and maintenance of butterfly valves. The manufacturer must furnish satisfactory evidence of adequate facilities for furnishing repair parts and for maintenance of valves furnished.
 3. The valve shall be designed so that during operation, or cycling of the valve, there is no friction or abrasion or rubbing together that could wear away any coating material and expose metal.
 4. The interior of the valve body shall be free of pockets or ledges where sediment or debris can collect.
 5. Valve shall be capable of operating through 500 full cycles with zero leakage and without regard to direction of valve discharge or operating pressures.
 6. AWWA C504 is modified or supplemented as follows:
 - a. Size shall be 16-inch and larger as specified.
 - b. Valve Bodies

- 1) Butterfly valves 16-inches through 24-inches in diameter shall be furnished with mechanical joint ends complete with bolts, nuts, retainer glands and gaskets.
 - 2) Butterfly valves 30-inches diameter and larger shall be furnished with flanged joint ends with accompanying flanged and plain-end pieces assembled to the valve's flanged ends with bolts, nuts and gaskets. Each flanged and plain-end piece shall have an overall laying length of not less than 12-inches nor more than 18-inches.
- c. Class: All parts shall be designed for Class 150B for use on water mains carrying filtered water with an approximate average Ph of 7.5.
- d. Valve Shafts: Valve shafts shall be fabricated of either Type 316 or Type 304 wrought stainless steel and shall be either a one-piece unit extending completely through the valve disc or be of the "stub shaft" type.
- e. Valve Discs: Discs shall be cast-iron per ASTM A48, Class 40 or ductile-iron per ASTM A536, Grade 65-45-12.
- f. Valve Seats: Seats shall be mechanically retained either in the valve disc or in the body:
- 1) 360-degree rubber seat edge on disc, retained by corrosion resistant disc retainer ring and Type 304 stainless cap screws. Mating seat in valve body shall consist of a Type 304 stainless steel separate ring, set integral with body.
 - 2) 360-degree rubber seat in valve body retained by corrosion resistant disc retainer ring segments and Type 304 stainless cap screws. Mating seat on valve disc shall consist of either Type 316 stainless steel or Monel disc edge on the cast or ductile-iron disc.
- g. Valve Bearings: A jacking or adjusting device to provide axial adjustment of the shaft and attached disc shall be provided for valves larger than 24-inch diameter. The jacking or adjusting assembly shall be protected from break-off or thread damage by recessing, cover plate, or other approved method. As an alternate to the afro-mentioned, a factory adjusted and set thrust bearing may be provided to carefully center the disc in the valve body. The thrust bearing shall be of adequate strength to carry all axial loads.
- h. Shaft seals shall be designed for use of standard O-ring seals only. Seals of the type utilizing a stuffing box and pull-down packing gland are prohibited.
- i. Type of Installation: Buried, except for WTP, which may be buried or exposed.
- j. Type of Operator: Manual unless otherwise specified.
- k. Direction of Operating Stem Rotation to Open Valve: Right (clockwise) except for exposed valves at the WTP, which shall open, left (counter-clockwise).

1. Valve Operators: Unless otherwise approved or shown on the drawings, a manual operator shall be furnished, assembled to each valve. The operating stem shall be provided with a 2-inch square nut.
 - 1) Manual operators shall be totally enclosed worm gear or link lever design.
 - 2) Operators on valves 24-inch and smaller diameter may be of the traveling nut design, but in either case, the valve operator shall require a minimum of 35 turns from closed to open position.
 - 3) Operators shall have adjustable stop limiting devices, for open and closed positions, which must withstand an input torque of 300 foot pounds on the square key nut without damaging the valve or operator. Stop limiting devices shall be factory set at time of valve testing.
 - 4) Shall conform to AWWA C504.
- m. Valve Position Indicators: shall be totally enclosed with no exposed moving parts. A highly visible and corrosive resistant valve position indicator shall be provided on all valves. The valve position indicator shall be such that the position of the valve (open-closed) may be determined from above at the operating level. The valve-operating stem shall be in the vertical position at all times. Indicators shall be Beacon type or approved equivalent product manufactured by Westlock Controls Corporation, 280 Midland Avenue, Saddle Brook, New Jersey.
- n. Markings: All identifying or data plates or markings bearing serial numbers, ratings, and other essential information shall be placed on the valve body or operator so they are readable from above.
- o. Painting: Valve body exterior and interior shall have a fusion bonded epoxy coating in accordance with AWWA C555. Exposed valves shall be shop painted as directed.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

A. Prior To Installation Inspection:

1. Valves will be inspected at the time of receipt for damage in shipment, compliance with specifications, direction of opening, size and shape of operating nut, number of turns, and type of end connections. A visual inspection of the bronze gate rings and body rings will be performed to detect any damage in shipment or scoring of the seating surfaces. Any foreign material in the interior portion of the valve shall be removed. The valve will be cycled through one complete opening and closing cycle.

B. Installation:

1. Valves 16-inches through 24-inches diameter shall be butterfly valves installed with mechanical joints.
2. Valves 30-inches diameter and larger shall be butterfly valves installed with flanged joint ends bolted to accompanying flanged and plain-end pieces such that

the plain-ends will accommodate flexible rubber-packed mechanical sleeve couplings, and shall meet requirements for tolerance of ends of steel pipe to be coupled in a similar manner as described in AWWA C201 or C202. The exterior of the flanged and plain-end pieces shall be coated with a suitable bituminous coating and the interior lined with cement mortar per AWWA C104.

3. Valves shall be installed in the closed position.

C. After Installation Inspection:

1. After installation and before pressurization of the valve, all pressure-containing bolting (bonnet, seal plate, bypass, and end connections) will be inspected for adequate tightness of all tapped and plug openings to the valve interior. The Contractor shall make any adjustments or alterations as directed.

D. Tests:

1. Pressure test will be conducted as part of water main test per Section 33 05 02.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

A. Work for Butterfly Valves shall not be measured separately for payment.

4.2 PAYMENT:

A. Payment for Butterfly Valves shall be considered incidental and included in the payment for the items of which it is a part in the SOP's, complete in place, which price and payment shall include but not limited to traffic maintenance and protection, minor complications and/or delays, excavation, backfill and compaction beyond trench excavation pay limits, flanged and mechanical joint ends, flanged and plain-end pieces where needed along with sleeve couplings, temporary and permanent surface restoration and all labor, materials, tools, equipment and incidentals necessary to complete the work specified within this Contract.

~END OF SECTION 33 14 05~

SECTION 33 19 00

SANITARY UTILITY SEWAGE PIPING - GRAVITY

PART 1 GENERAL

1.1 SCOPE:

- A. Work consists of furnishing and placing Reinforced Concrete Pipe (RCP) and Polyvinyl Chloride (PVC) Sewer Pipes, and all associated work for a complete operable pipe system.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly pertinent to this Section, and this Section is directly pertinent to them.

1.3 RELATED SECTIONS: SPECIFIED ELSEWHERE MAY INCLUDE BUT IS NOT LIMITED TO:

- 1. Section 01 33 00: Submittals
- 2. Section 01 57 00: Traffic Maintenance & Protection
- 3. Section 31 23 10: Trench Excavation and Backfill
- 4. Section 33 01 30: Sewer Main CCTV Inspection.
- 5. Section 33 01 34: Building Sewer Connection & Cleanouts
- 6. Section 33 19 10: Sewer Manholes
- 7. Section 33 44 00: Catch Basins & Connecting Pipe

1.4 QUALITY ASSURANCE:

- A. Reference Codes and Specifications:
 - 1. American Society for Testing and Materials:
 - a. ASTM C33 - 97: "Concrete Aggregates".
 - b. ASTM C76 - 98: "Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe".
 - c. ASTM C443 - 98: "Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets".
 - d. ASTM D3034 - 98: "Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings".
 - e. ASTM D3212 - 96a: "Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals".
 - f. ASTM F679 - 95: "Poly(Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings".

- g. ASTM F789 - : "Specification for Type PS-46 Polyvinylchloride, (PVC) Plastic Gravity Flow Sewer Pipe and Fittings."
- h. ASTM F794 - 97: "Poly(Vinyl Chloride) (PVC) Profiled Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter."

1.5 SUBMITTALS:

- A. Shop drawings shall be submitted for pipe laying schedule, fittings, specials and bevel pipe.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Concrete Pipe:

1. Reinforced concrete pipe shall be of Class 4000 concrete, Class III minimum, Wall B minimum for the diameter(s) specified in the Contract and per ASTM C76 modified as follows:
 - a. Basis of Acceptance - Development of concrete mix proportions shall be determined per subsection 03 30 00, prior to production.
 - b. Manufacture - Concrete shall contain a minimum of 564-lbs. cement per cubic yard per Table 03 30 00-1.
 - c. Concrete pipe shall be furnished with rubber gasket joints per ASTM C443. Joints shall pass 13 psi hydrostatic test performed by pipe manufacturer. The bevel or drop on bevel pipe shall not exceed the pipe wall thickness.
2. Except for closure sections and as otherwise specified, concrete pipe shall be furnished in minimum eight foot lengths in sizes 12-inch through 72-inch diameter and minimum six foot lengths in sizes larger than 72-inch diameter.
3. Branches and specials shall have standard reinforcement deflected to facilitate opening for the branch or special and shall be formed at time of pipe manufacture. Additional reinforcement shall be welded to longitudinal and circumferential steel where deflection or opening results in bar spacing in excess of one and one half times the wall thick-ness. Branches and specials design and fabrication shall be submitted for approval prior to manufacture.
4. Pipe 12-inch through 72-inch diameter will be accepted from a manufacturer's existing stock provided crushing strength tests meet ASTM C76 requirements. Crushing tests shall be performed under the supervision of a DC WASA inspector on the manufacturer's testing machine.
5. Pipe 78-inch diameter and larger will be accepted based on tests of quality of the concrete as placed in the pipe and by examination of the quality, amount, and accuracy of placement of the steel reinforcement per ASTM C76.
6. The DC Water will monitor all pipe-manufacturing operations; the Contractor shall notify DC Water sufficiently in advance of pipe manufacture to facilitate monitoring.

B. PVC Pipe:

1. Polyvinyl chloride (PVC) pipe and fittings shall be per ASTM D3034 SDR 35 for pipe up to 15-inch diameter, and ASTM F679 and wall thickness T-1 for pipe 18 thru 27-inch diameter. Unless otherwise approved, lengths of pipe sections shall not exceed 13 feet and lengths of Y-branches shall not exceed three feet. Saddle Y-branches shall not be used.
2. Joints for both the pipe and fittings shall be of the integral bell type with integral wall section per ASTM D3212. Solid cross section elastomeric gasket seal shall be per ASTM F477, factory assembled and securely locked or cemented in the socket.
3. All pipe and fittings furnished shall be accompanied by a certification, per ASTM D3034, which will be the basis of acceptance of the material. Pipe and fittings will be inspected upon delivery. Rejected pipe and fittings shall be removed by the Contractor.

C. Pipe Bedding:

1. Pipe bedding for sewer pipe shall be per ASTM C33, Size No. 57.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

A. General:

1. Trench excavation shall be complete per Section 31 23 10. If actual trench width below a horizontal plane 1'-0" above top of pipe exceeds the trench design width the pipe installation shall be contingent upon the Contractor's submission, and approval, of pipe design reevaluation.
2. The DC Water reserves the right to limit the amount of pipe laid in advance of backfilling, but in no case shall the amount exceed 100 feet for sewer work. Trench excavation shall be completed at least 25 feet in advance of pipe laying, except that at the end of a work day or at the discontinuance of work, the pipe laying may be completed to within five feet of the end of the open trench.

B. Maintaining Sewer Service:

1. Existing sewer service shall be maintained at all times. The Contractor shall conduct his operations so as to maintain flows in existing sewers draining through the project area. This will require the proper coordination between construction replacement and abandonment so as not to block the flow in existing sewers that are to remain in service.
2. When necessary to pump sewage while replacing and installing relief sewers, the material pumped shall be carried by means of approved hose or other closed, watertight conveyors to the downstream sewer or manhole designated by DC Water. Sewage shall not be allowed to flow into or over the street surfaces. Overtime, weekend, and holiday work may be required at no additional DC Water cost to promptly complete temporary and/or permanent sewer service.

C. Pipe Bedding:

1. Gravel bedding material shall be placed to full trench width and specified depth for proper pipe installation. For pipe of 48-inches and larger diameter, gravel

bedding material shall be compacted with an approved vibratory compactor to the satisfaction of DC Water.

2. Pipe shall be accurately placed on bedding to line and grade and to uniform bearing throughout its length. After pipe sections have been jointed as specified, remaining bedding material shall be placed, leaving no voids, and compacted under and around sides of the pipe to specified limits; pipe alignment, grade and jointing shall not be disturbed.

D. Pipe Installation - Concrete Pipe:

1. Pipe shall be accurately placed to line and grade and supported uniformly throughout its entire length by the pipe bedding material. Bell holes shall be carefully excavated to provide total pipe bearing in bedding material. An approved pipe-laying tee shall be used when placing pipe six feet or longer in laying length. A pipe hoist, crane, or other suitable device shall be used in laying all pipes greater than 18-inches diameter. No lifting holes of any sort will be permitted in pipe.
2. After the pipe is aligned for coupling, the groove or bell of the preceding pipe and the spigot of the pipe ready to be coupled shall be liberally coated with an approved type of lubricant. The spigot end, with the gasket placed in the groove and relubricated after placement, shall be entered into the bell of the pipe already installed, making sure that both pipes are properly aligned. The pipe shall be then forced "home" by the use of a wedge puller or other approved means. A wedge, if used, shall be placed at least three pipe lengths back from the pipe being jointed. Before the joint is fully home, the position of the gasket in the joint shall be determined by means of a suitable feeler gauge. If the gasket is found to be improperly positioned, the pipes shall be separated and the gasket repositioned if undamaged; damaged gaskets shall be replaced. Each section of pipe shall be laid in such a manner as to form a close, concentric joint with the adjoining section and to prevent sudden offsets in the flow line. The maximum allowable joint opening shall be three-fourths inch; any larger opening will be cause for rejection.
3. After the pipes have been joined, the annular joint space remaining on the inside and outside of the pipes shall be filled with mortar and the inside joint troweled smooth.
4. When laying straight sewer pipe to a curved line, opening of a pipe joint shall be limited to not more than three-fourths inch; beveled pipe shall be used in any case where it is necessary to exceed this limit, whether the drawings note this condition or not, at no additional cost to the DC Water.
5. No sand, mud, mortar, concretes or other materials shall be allowed on the inside of the sewer. Upon completion, the sewer shall be left straight, clean, smooth, and acceptable in every respect. Concrete shall be allowed to set before backfilling or walking is allowed on the sewer, and care shall be taken not to disturb the pipe bedding and joints.
6. During suspension of the work at night or other times, a suitable stopper shall be placed in the last pipe section to prevent earth or other foreign matter from washing in.
7. After pipe units have been joined as specified, pipe bedding material shall be placed and compacted under and around the sides of the pipes to the full specified

thickness and height, care being taken so that no voids exist and that the alignment and the grade of the pipes are not disturbed.

E. Pipe Installation - PVC Pipe:

1. PVC pipe shall be handled with care to avoid severe impact blows, abrasion damage, gouging and cutting by metal surfaces or rocks, and never handled with individual chain or single cable, even if padded. Exposure to sources of heat or hot objects such as heaters, boilers, steam lines, and engine exhaust shall be avoided. Gaskets shall be protected from excessive exposure to heat, direct sunlight, ozone, oil and grease. Handling techniques in cold weather require more care than during hot weather. Each pipe unit will be inspected for straightness and damage before being installed in the work.
 - a. Defective pipe and fittings shall be removed and replaced with approved materials at no additional cost to the DC Water.
2. Assembly of the gasket joint shall be performed as recommended by pipe manufacturer. All joint surfaces shall be cleaned immediately before joining; the bell and beveled spigot shall be lubricated with an approved lubricant; then carefully pushed into place. A suitable device shall be used to force the pipe units together. Good alignment of the pipe is essential for ease of assembly. Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly; do not swing spigot into bell. Generally, the spigot end of the pipe is marked by the manufacturer to indicate the proper depth of insertion. If undue resistance to insertion of the end is encountered or the reference mark does not position properly, disassemble the joint and check the position of the gasket. If it is twisted or pushed out of its seat, inspect components, repair or replace damaged items, clean components, and repeat the assembly steps. If gasket was not out of position, verify proper location of the reference mark. Relocate the reference mark if it is out of position.
3. To join field-cut pipe, the pipe end shall be prepared first; a square cut is required for proper assembly. The pipe can be easily cut with a hacksaw, handsaw, or a power handsaw with a steel blade or abrasive disc. The pipe shall be marked around its entire circumference prior to cutting to insure a square cut.
 - a. Use a factory-finished beveled end as a guide for proper bevel angle, depth of bevel, plus the distance to the insertion reference mark. The end shall be beveled using a pipe beveling tool or a wood rasp to the correct taper. A portable sander or abrasive disc also may be used to bevel the pipe end. Round off any sharp edges on the leading edge of the bevel with a pocketknife or a file; then assemble as stated above.
4. Because concrete does not bond to PVC pipe or fittings, only PVC adapters shall be used to connect to the various other types of pipe. In addition, only PVC caps or plugs shall be used to bulkhead the ends.
5. Pipe bedding material shall be carefully placed in four separate courses per Standard Detail S/15.01.
 - a. Material shall not be dropped directly on the pipe. After first course is placed to pipe grade, attention shall be given to carefully placing pipe and excavating for socket joints. Bedding gravel shall then be placed around pipe haunch in second course to provide correct alignment. Then, third

course and finally fourth course shall be placed and consolidated to avoid pipe deflection.

- b. Compaction equipment shall not be used directly over pipe until sufficient backfill has been placed to insure that such equipment will not damage or disturb pipes, usually a minimum of 30-inches depth.

F. Leakage Tests:

1. A leakage test shall be conducted on completed sections of all pipe sewer sections on the sanitary and combined sewer systems. Field leakage tests are not required for storm drainpipe.
2. Air Test.
 - a. Pipe sewer up to 42-inch diameter shall be tested with air under low pressure and will not be accepted by the DC Water until the sewer retains the air for the specified time. Sewers over 42-inches diameter shall be air tested if approved test equipment is available per DC Water and Sewer Authority requirements. All tests shall be conducted in the presence of DC Water representatives.
 - b. The Contractor shall have test equipment supplier furnish DC Water certification that actual test equipment to be used has been calibrated and is accurate. Tests shall not commence until the certification has been accepted.
 - c. All equipment and materials required to perform pressure air testing of sewers and all expenses in connection with such tests, except for equipment specifically designated as being furnished by DC Water and DC Water personnel engaged in the supervision of testing, shall be included as part of pipe sewer work.
 - d. Failure of leakage tests will require investigation and repair by the Contractor at no additional cost to DC Water.
 - e. DC Water will participate in one test and one retest, if required, of each specific section of sewer without charge to the Contractor. If additional retests are required, all costs of DC Water personnel and equipment associated with the retesting will be deducted from the Contractor's final payment.
 - f. Before an air test is scheduled, all backfill shall be completed and trench-dewatering methods discontinued. Sewers to be tested, including manholes, shall be thoroughly cleaned, free from all debris and shall be inspected for any water leakage sufficient to constitute a noticeable trickle or flow. Such leakage shall be corrected and eliminated prior to beginning the air test. Leakage tests shall be scheduled with DC Water at least 48 hours in advance.
3. Test Procedure:
 - a. Test plugs shall be furnished and installed within the pipe at each manhole and shall be securely braced.
 - b. If the pipe to be tested is expected to be below ground water table, a small diameter perforated vertical pipe shall be installed from the invert elevation of the sewer to the ground surface prior to backfilling, or a pipe

probe inserted by a boring or driving into the backfill material adjacent to the invert elevation of the pipe, to determine the ground water level above the pipe invert immediately prior to air testing the sewer.

- 1) All gauge pressures in the test shall be increased by the amount of this backpressure due to ground water submergence over the end of the probe.
- 2) Air shall be added slowly to the portion of the pipe under test until the internal air pressure is raised to 4.0 psig. The air temperature shall be allowed to stabilize for at least two minutes with the pipe subjected to an internal pressure of 4.0 psig by adding only the amount of air required to maintain this pressure. After the two-minute period, the hose and compressor shall be disconnected completely from the pipe being tested to assure that no additional air is added.
- 3) As a safety precaution, no one shall be allowed in manholes after the air pressure is increased in the sewer line. If the DC Water suspects that the test plug may be leaking, the pressure first shall be relieved before any adjustments are made to eliminate air leakage at the plug. The plug may be pre-coated with a soap solution to check the plug for leakage.
- 4) If the internal pressure decreases, the time required for the pressure to drop from 3.5 to 2.5 psig shall be observed and recorded. This time interval shall be compared with Table 02730-1. Pipe which fails to maintain the stipulated pressure for a period equal to or greater than the holding time shown in the table shall be deemed to have failed the low pressure air test. A sewer that fails to pass this test shall be repaired by the Contractor at no additional cost to the DC Water. Following repairs, the sewer shall be retested per designated procedure.
- 5) The DC Water will prepare a report on the required form for each section of sewer tested. The report form shall be executed by the Contractor and submitted to the DC Water.

TABLE 33 19 00-1

Minimum Air Test Holding Time in Minutes and Seconds

Required For Pressure Drop From 3.50 to 2.50 psig

Pipe Diameter, 10-Inch Thru 36-Inch

Length (Feet)	10"	12"	15"	18"	21"	24"	27"	30"	33"	36"	
25		1:00	1:00	1:02	1:29	2:01	2:38	3:20	4:08	4:59	5:56
50		1:00	1:19	2:04	2:58	4:03	5:17	6:41	8:15	9:59	11:53
75		1:23	1:59	3:06	4:27	6:04	7:55	10:01	12:23	14:58	17:00
100		1:50	2:38	4:08	5:56	8:05	10:34	12:45	14:11	15:35	"
125		2:18	3:18	5:09	7:26	9:55	11:20	" "	" "	" "	" "
150		2:45	3:58	6:11	8:30	" "	" "	" "	" "	" "	" "
175		3:13	4:37	7:05	" "	" "	" "	" "	" "	" "	" "
200		3:40	5:17	" "	" "	" "	" "	" "	" "	" "	" "
225		4:08	5:40	" "	" "	" "	" "	" "	" "	" "	" "
250		4:35	" "	" "	" "	" "	" "	" "	" "	" "	" "
≥ 275		4:43	5:40	7:05	8:30	9:55	11:20	12:45	14:11	15:35	17:00

Pipe Diameter, 42-Inch Thru 108-Inch

Length (Feet)	42"	48"	54"	60"	66"	72"	78"	84"	90"	96"	108"
25	8:05	10:34	13:22	16:30	19:58	23:45	27:53	32:20	37:08	42:15	50:56
50	16:10	21:08	25:28	28:18	31:08	33:58	36:47	39:32	42:27	45:17	50:56
≥ 275	19:49	22:38	25:28	28:18	31:08	33:58	36:47	39:32	42:27	45:17	50:56

4. Hydrostatic Test:

- a. Sewers over 42-inches diameter and manholes shall be tested by the hydrostatic method if approved air test procedure is not available.
- b. Leakage shall not exceed a rate of 100 gallons per inch diameter per 24 hours per mile of sewer.
- c. All equipment and materials required to perform tests and all expenses in connection with such tests, except for DC Water personnel engaged in the supervision of testing, shall be included as part of pipe sewer work.

d. Test Procedure:

- 1) Where ground water is encountered in the trench during construction and the water level is expected to be over the top of the sewer pipe, the completed and connected pipe shall be tested for infiltration leakage by the exact measurement of the amount of water entering it after the pumping of ground water has been discontinued for at least three days.
- 2) Where the ground water level is expected to be below the top of the pipe and where the slope of the pipe between adjacent manholes will permit, the sewer shall be subjected to an internal pressure by plugging the pipe lower end and then filling the sewer and manholes with clean water to a height of two feet above the top of the pipe. Upper end plugs may be needed as directed. Measurements will be made of the rate of leakage

from the pipe by determining amount of water required to maintain the initial level of two feet above the top of pipe. The Contractor shall provide water for this test by making arrangements with the DC Water.

- 3) Each manhole and appurtenance to the system shall be watertight within the foregoing leakage limit. Repairs to all defects responsible for leakage shall be by the Contractor at no additional cost to the DC Water.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for Reinforced Concrete Pipe (RCP) shall be measured per linear foot, with measure taken inside face of the sewer manhole along the centerline of the pipe complete in place.
- B. Work for Polyvinyl Chloride (PVC)) Sanitary Sewer Pipe shall be measured per linear foot, with measure taken inside face of the sewer manhole along the centerline of the pipe complete in place.

4.2 PAYMENT:

- A. Payment for Reinforced Concrete Pipe (RCP) shall be made at Contract unit price per linear foot in the SOP's, complete in place, which price and payment shall include furnishing and placing required pipe, bedding, jointing, maintaining sewer service, leakage tests, and all labor, materials, tools, equipment and incidentals needed to complete work specified within this Contract.
- B. Payment for Polyvinyl Chloride (PVC)) Sanitary Sewer Pipe shall be made at Contract unit price per linear foot in the SOP's, complete in place, which price and payment shall include furnishing and placing required pipe, bedding, jointing, maintaining sewer service, leakage tests, and all labor, materials, tools, equipment and incidentals needed to complete work specified within this Contract.

~END OF SECTION 33 19 00~

SECTION 33 19 10
SEWER MANHOLES

PART 1 GENERAL

1.1 SUMMARY:

- A. Work consists of excavation, backfill and compaction beyond trench pay limits, furnishing and placing manhole covers, placing new manholes complete, either over existing or new sewers, including concrete base and manhole frames and covers. Manhole risers shall, in general, be constructed of precast concrete elements unless otherwise specified. Brick masonry may be used in lieu of precast riser units for conditions as approved by DC Water.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- A. Section 01 33 00: Submittals
- B. Section 01 57 00: Traffic Maintenance & Protection
- C. Section 03 10 00: Concrete Formwork
- D. Section 03 20 00: Reinforcing Steel
- E. Section 03 30 00: Cast-In-Place Concrete
- F. Section 03 40 00: Precast Concrete Products
- G. Section 31 23 10: Trench Excavation and Backfill
- H. Section 33 39 22: Manhole Frame Chimney Seals
- I. Section 33 19 09: Manhole Testing

1.4 QUALITY ASSURANCE:

- A. Reference Codes and Specifications:
 - 1. ASTM A48: "Standard Specification for Gray Iron Castings".
 - 2. ASTM C32: "Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)".
 - 3. ASTM C443: "Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets".
 - 4. ASTM C478: "Standard Specification for Precast Reinforced Concrete Manhole Sections".

PART 2 PRODUCTS

2.1 MATERIALS:

- A. Unless otherwise specified, manhole bases shall be precast or cast-in-place reinforced concrete, set on a minimum six-inch depth of compacted gravel on undisturbed material. An acceptable steel ring form shall be used to form a groove for the tongue of the bottom precast riser section. The granular subbase shall be checked for level prior to setting.
- B. Invert channels shall be formed of brickwork and/or Class 4000 concrete conforming to the adjoining pipe sizes. Invert sides shall be smooth curves with longest possible radius tangent to adjoining pipe centerlines. Depths of smaller pipes shall match 0.8 depth of the main pipe. A one-inch wash shall be provided from the inside edge of the manhole base to the edges of the shaped channels.
- C. Manhole Bases shall have a monolithic base slab with riser barrel conforming to ASTM C478, AASHTO M199, and designed for AASHTO 1120 loading.
- D. Precast Concrete Risers:
 - 1. Precast manhole risers shall be per ASTM C478 and AASHTO M199 modified as follows.
 - 2. Basis of Acceptance - Development of concrete mix proportions shall be determined per Section 03 30 00 prior to production.
 - 3. Manufacture - Concrete shall contain a minimum of 564-lbs. cement per cubic yard per the Table in Section 03 30 00.
 - 4. Risers shall be cast with joint groove to receive "O" ring compression seal.
- E. Manhole Brick:
 - 1. Brick shall meet the physical requirements of ASTM C32, Grade MS for manholes and Grade SS for sewer invert surfaces, and shall be 2-1/4 x 3-3/4 x 8 inches in size.
- F. Concrete Grade Rings:
 - 1. Concrete grade rings shall meet requirements of ASTM C478.
- G. Manhole Steps:
 - 1. Manhole steps shall be reinforced plastic steps composed of ASTM A615, Grade 60 reinforcing bar (#4) completely encapsulated in copolymer polypropylene per ASTM D2146, Type II, Grade 43758, as made by M. A. Industries, Inc., Peachtree City, Georgia:
 - 2. Model PS1-PF for new manholes for concrete bases and riser sections and replacement steps on existing manholes, where width of steps equals 12"; and Model PS1-B for brick masonry manholes.
 - 3. Steps shall be placed in vertical alignment in preformed holes as per step manufactures instructions.
 - 4. Steps shall resist a pullout force of over 1500 lbs.
- H. Compression Seals:
 - 1. "O" ring compression seals for precast sewer manhole risers shall be per ASTM C443.
- I. Manhole Entry Seals:

1. Manhole pipe entry seals shall be equivalent to "Press Wedge II" gaskets manufactured by Press-Seal Gaskets Corp., Fort Wayne, Ind.; "A-Lok" gaskets manufactured by A-Lok Products Corp., Trenton, NJ; or "Kor-n-Seal", manufactured by National Pollution Control Systems, Inc., Nashua, N. H.

J. Mortar:

1. Joint and paring mortar for manhole brickwork shall consist of one part Type II Portland cement and 2-1/4 parts fine aggregate per Specification by volume and sufficient water to make a stiff mix. Lime in mortar is prohibited.

K. Manhole Frames and Covers:

1. Gray iron castings shall be per ASTM A48, Class 30A. Iron castings shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blowholes and other defects.
2. Castings shall be boldly filleted at the angles and the arrises shall be sharp and perfect.
3. All castings shall be sandblasted or otherwise effectively cleaned of scale and sand so as to present a smooth, clean and uniform surface.
4. Manhole frame and cover bearing surfaces between cover and frame shall be machine finished to ANSI roughness symbol 250, tolerance -0 + 1/16 inch.
5. The word "SEWER" shall be cast in one-inch high letters flush with surface of cover.
6. Manholes designated in Contract documents to be fitted with "lock type" frame and cover, ventilating or pressure type shall be furnished with heavy-duty cast-iron frames, 36-inch I.D. at bottom flange, and corresponding covers with a minimum of four counter-sunk bronze hexagonal-head cap screws and concealed pickholes.
7. Ventilating type shall have a rubber gasket seal. Lock type frame and cover, Type R-1916-H as manufactured by Neenah Foundry Company, Neenah, Wisconsin or approved equivalent is acceptable.

PART 3 EXECUTION

3.1 SUBMITTALS:

- A. Shop drawings shall be submitted for precast risers, cast-iron frames and covers.

3.2 CONSTRUCTION REQUIREMENTS

A. Maintaining Sewer Service:

1. Existing sewer service shall be maintained at all times. The Contractor shall conduct his operations so as to maintain flows in existing sewers through the project area. This will require proper coordination between construction replacement and abandonment so as not to block existing sewers that are to remain in service.
2. When necessary to pump sewage while replacing and installing manholes, the material pumped shall be carried by means of approved hose or other closed, watertight conveyor to the downstream sewer or manhole designated by DC Water. Sewage shall not be allowed to flow onto or over the street surface. Overtime, weekend, and holiday work may be required at no additional DC Water cost to promptly complete temporary and/ or permanent sewer service.

B. Excavation/Backfill:

1. Excavation for manholes over all sewers shall be extended as needed beyond trench limits, and the excavation shall be maintained and shored as necessary for proper construction. After the manhole is complete and concrete and parging have cured, the remaining excavation shall be backfilled per Project Manual Specifications; the portion of backfill beyond trench limits shall be included as part of Sewer Manhole work. For manholes over existing sewers, all excavation shall be included as part of Sewer Manhole work.

C. Manhole Floors

1. Manhole floors shall be made of grout and the work shall be free of any rough corners or sudden changes in direction such that a steady uniform flow with a minimum of wave action will be provided.
2. Changes in direction and grade will consist of the largest curve radius the manhole diameter will permit.
3. Free vertical drop from any branch or service line shall not exceed one half the mainline pipe diameter measured from the mainline upstream invert.

D. Concrete Manhole Sections:

1. Manhole bases shall be precast or cast-in-place reinforced concrete, set on firm foundation. Flow channels and benches shall be shaped with brick; or concrete may be used as needed, with brick facing.
2. Bases for new manholes shall be precast with base riser cast integral with base slab.
3. Manhole steps shall be built into walls of manhole base as indicated on the Drawings, with step legs embedded 3-3/8 inches into the concrete.
4. Before press fitting steps into inserts or drilled holes, concrete must have attained 2,500-psi minimum field strength.
5. When constructing a new manhole over an existing sewer, the manhole base shall be constructed around the existing sewer before cutting the sewer. Precast concrete riser with doghouse openings cast in lower end shall be used as base riser and fitted over existing pipe, except over PVC pipe.
6. Riser and base sections shall have cast or augured cutouts of the required diameter for connections and outlet pipes; maximum size of cutouts shall be equal to the outside pipe diameter plus four-inches. A clearance of at least nine inches of concrete shall remain between adjacent connection and outlet pipe holes and between riser joints and holes in precast risers and bases.
7. Lesser clearance will be considered only if additional reinforcing steel is provided and details are submitted for approval.
8. For manholes on sanitary and combined flow sewer 24-inches and smaller diameter, the Contractor shall install a lubricated, rubber gasket entry seal into the manhole wall to effect a watertight connection between the connecting sewer pipe and the manhole.
9. Entry pipes shall be cut flush with the inside wall of the manhole.
10. Two-inch diameter lifting holes spaced 180 degrees apart are permitted provided PVC or rubber plugs are installed to make manhole watertight after installation.
11. Manhole risers shall be constructed of precast concrete elements where feasible, otherwise of brick masonry. Risers and cone tops shall be furnished with manhole steps 12 inches on center.

12. After the precast concrete riser joints have been joined, the annular joint space remaining on the inside and outside of the precast concrete riser joints shall be filled with mortar and the inside joint trowelled smooth.
13. Manhole steps shall be aligned on vertical section of sidewall having no pipe entry, with step legs embedded 3-3/8 inches into the concrete.
14. Manholes shall have a precast slab or eccentric cone top with proper size access hole to accommodate the required frame and cover. Brick masonry shall be used to adjust the frame and cover to approved grade.
15. Not more than 18 inches of brick shall be used unless approved by DC Water.

E. Brick Manhole Sections:

1. Manhole brickwork shall be plumb except for eccentric top section, true to line with level and accurately spaced courses, with each course breaking joint with the course below. Joints shall not be less than 3/8-inch nor more than 1/2 inch with a minimum of one header course to every six-stretcher courses. Each brick shall be placed with a full joint in a full bed of mortar, shoved up against adjacent brick so that the mortar rises between and completely fills vertical joint. Exterior surfaces of brick manholes shall be completely coated with a 1/2-inch mortar parging and made watertight. Brick masonry walls shall be nine inches thick for standard manhole depth; when the manhole depth exceeds 15 feet brick wall thickness shall be increased to 13-inches below 15 feet elevation.
2. Brick masonry shall not be placed when ambient air temperature is below 40 deg. F when it appears probable that temperature below 40 deg. F will be encountered before mortar can set, unless adequate approved means are provided for protecting the work from freezing. Work shall be protected by heating and maintaining the temperature of the masonry materials at not less than 40 deg. F on both sides of the masonry for not less than 72 hours. Work with, or on, frozen materials are prohibited.
3. During hot weather, masonry shall be protected from direct rays of the sun. All finished work shall be covered and kept damp for a period of seven (7) days after placement.
4. Mortar shall be freshly mixed for prompt use; no mortar shall be used after setting or beyond one hour after the addition of water. Retempered mortar and freeze preventive chemical additives are prohibited. The mixing machine, batch size, and mixing time shall be approved by the DC Water. When hand mixing is done, mixing shall be accomplished in a clean, leakproof, nonporous mortar box constructed for the purpose.
5. Proper size manhole steps shall be aligned on section of sidewall that is vertical to frame and cover, with step legs embedded 7-3/8-inches into the brickwork.
6. The Contractor shall furnish manhole frames drilled with two 3/4-inch diameter holes, 180 degrees opposed in frame flange. With frame in proper position at required grade, corresponding holes shall be drilled with a minimum of two inches into the brick masonry upon which the frame sits. Steel dowels shall be inserted through these holes to prevent lateral movement of frames during backfill and paving operations.
7. Dowels shall be No. 5 rebars, three inches minimum length, or approved equivalent. A mortar bed shall be constructed around the frame flange.
8. Excavation shall be backfilled per Project Manual Specification.

F. Combined Concrete/Brick Sections:

1. Where approved by DC Water, manholes may be constructed from a combination of precast sections, brick masonry, and cast-in-place reinforced concrete. At the point where the different materials join, a watertight joint shall be provided that leaves interior walls straight and smooth.

G. Field Cut Pipe Entry Openings:

1. Field cuts in concrete sections of manholes shall be accomplished with proper tools. Unless otherwise approved, the outline of the proposed hole shall be clearly marked and shall be line drilled not more than five inches apart. The hole shall be made smooth to receive the pipe entry seal and the pipe. Pipe entry seals shall be used when connecting a proposed sanitary or combined sewer of 24-inches and smaller diameter to an existing manhole. Nonshrink mortar shall be used to fill void between entry seal and pipe. For storm sewer connections made in the field, the annular space around the connection pipe shall be filled with nonshrink mortar. Field cut entry holes will not be permitted in proposed manholes unless approved.
2. When precast manhole bases are used for sanitary or combined sewer applications, an approved resilient entry seal shall be cast in the base during manufacture.
3. Pipe entry holes in brick sections of existing manholes shall be made by carefully removing sections of brickwork.

H. Replace Manhole Invert:

1. Remove and replace invert in existing manhole to redirect sewage flow. New invert shall be per Section 33 39 18 "Sewer Manhole Rehabilitation-General".

I. Coating:

1. Bituminous waterproofing coating shall be applied to the exterior surface of the manhole.
2. When designated on the Contract Drawings, the interior of the manhole shall be coated with a corrosion resistant material.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for precast concrete sewer manholes shall be measured per vertical linear foot for 48-inch, 60-inch and 72-inch diameter manholes, with measure taken from sewer outlet invert to top of frame for manholes over existing or new sewers.
- B. Work for brick sewer and stormwater manholes shall be measured per vertical linear foot for payment.
- C. Work for reinforced concrete sewer manhole bases shall be measured per each for 48-inch, 60-inch and 72-inch diameter bases.
- D. Work for precast concrete sewer manhole risers shall be measured per vertical linear foot for 48-inch, 60-inch and 72-inch diameter risers.

4.2 PAYMENT:

- A. Payment for Precast Sewer and Brick Sewer/Stormwater Manholes shall be made at the Contract unit price per vertical linear foot, under the items that it is associated with in the SOP's, which price and payment shall include excavation, shoring and backfill beyond trench pay width for manholes over new sewers; excavation, shoring and backfill for manholes over existing sewers; furnishing and placing precast or cast-in-place reinforced concrete manhole base on all sewers 48-inches, 60-inch and 72-inch diameter; precast or brick manhole risers, precast reinforced concrete slab or eccentric cone top, brick masonry to adjust

manhole frames and covers to correct grades; furnishing and placing manhole frames and covers, furnishing and placing manhole steps, maintaining sewer service, and all labor, materials, tools, equipment and incidentals needed to complete work specified within this Contract.

- B. Payment for Reinforced Concrete Sewer Manhole Bases shall be made at the Contract unit price per each, under the items that it is associated with in the SOP's, which price and payment shall include excavation, shoring and backfill beyond trench pay width for manholes over new sewers; excavation, shoring and backfill for manholes over existing sewers; furnishing and placing reinforced concrete manhole base including benches and inverts; furnishing and placing pipe that protrudes into the manhole base, maintaining sewer service, and all labor, materials, tools, equipment and incidentals needed to complete work specified within this Contract.
- C. Payment for Precast Concrete Sewer Manhole Risers shall be made at the Contract unit price per vertical linear foot, under the items that it is associated with in the SOP's, which price and payment shall include excavation, shoring and backfill beyond trench pay width for manholes over new sewers; excavation, shoring and backfill for manholes over existing sewers; furnishing and placing reinforced concrete manhole base; furnishing and placing pipe that protrudes into the manhole base; furnishing and placing manhole steps; maintaining sewer service, and all labor, materials, tools, equipment and incidentals needed to complete work specified within this Contract.

~ END OF SECTION 33 19 10 ~

SECTION 33 48 00

CONCRETE VALVE/VENTURI VAULTS

PART 1 GENERAL

1.1 SCOPE:

- A. Work consists of excavation, backfill and compaction beyond trench excavation limits, disposal of excess material, furnishing and constructing reinforced concrete vaults complete with gravel base, piers, joints, armored seats for top slabs, sumps, steps, water stops, anchor bolts, stack risers, valve box extension, lifting inserts, and manhole frames and covers at locations indicated in the Contract documents and/or as directed.

1.2 RELATED DOCUMENTS:

- A. Drawings, Technical Specification Sections, General and Supplementary Conditions of the Contract, and other Division 00 and Division 01 Specifications Sections, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.3 RELATED SECTIONS: Specified Elsewhere May Include But Is Not Limited To:

- A. Section 01 33 00: Submittals
- B. Section 03 25 00: Concrete Accessories
- C. Section 03 20 00: Reinforcing Steel
- D. Section 03 30 00: Cast-In-Place Concrete
- E. Section 33 05 02: Ductile-Iron Pipe Water Main
- F. Section 33 14 00: Gate Valves
- G. Section 33 14 05: Butterfly Valves

1.4 QUALITY ASSURANCE:

- A. Reference Codes and Specifications
 1. ASTM A48: "Standard Specification for Gray Iron Castings".
 2. ASTM A615: "Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement".
 3. ASTM C32: "Standard Specification for Sewer and Manhole Brick (Made from Clay or Shale)".
 4. ASTM C361: "Standard Specification for Reinforced Concrete Low-Head Pressure Pipe".
 5. ASTM C443: "Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets".

6. ASTM C478: "Standard Specification for Precast Reinforced Concrete Manhole Sections".
7. ASTM D1850: "Standard Specification for Concrete Joint Sealer, Cold Application Type".

1.5 SUBMITTALS:

A. Shop Drawings:

1. Drawings shall be submitted for reinforcing steel layout, cast-iron frames and covers, vault steps and anchor bolts for venturi.

PART 2 PRODUCTS

2.1 MATERIALS:

A. Precast Concrete Rings:

1. Precast valve manhole rings and reducer rings shall be per ASTM C478. Precast manhole rings shall be cast with joint groove to receive compression seal.

B. "O"-Ring Seals:

1. O-Ring compression seals for precast sewer manhole rings shall be per ASTM C361 or ASTM C443.

C. Manhole Brick:

1. Brick shall meet physical requirements of ASTM C32, Grade MS for manholes and shall be 2-1/4 x 3-3/4 x 8-inches in size.

D. Manhole Steps:

1. Manhole steps shall be reinforced plastic steps composed of ASTM A615, Grade 60 reinforcing bar (#4) completely encapsulated in copolymer polypropylene per ASTM D2146, Type II, Grade 43758, as made by M. A. Industries, Inc., Peachtree City, Georgia, Model PS2-PF for concrete riser sections and Model PS1-B for brick sections, or approved equivalent reinforced plastic step.

E. Manhole Frames, Covers and Sumps:

1. Gray-iron castings for frames and covers shall be per ASTM A48, Class 30A. Castings for sumps shall be per ASTM A48, Class 35B.
2. Precast rings may be used in lieu of brick stack risers; an adapter shall be provided in vault opening to receive precast unit.
3. Vaults shall be constructed per Contract Drawings.
4. Sumps shall be recessed to provide a flush surface between grate top and vault floor.
5. Manhole steps shall be cast into walls as indicated.
6. The bottom flange of manhole frame shall have two 3/4-inch diameter holes drilled or cast therein, directly opposite each other. Corresponding holes shall be drilled, a minimum of two inches deep, into the precast concrete ring or brick masonry upon which the frame sits. Steel dowels shall be inserted through and

into these holes to prevent lateral movement of frame and cover during backfill operations. Dowels shall be #5 rebars, three inches minimum length. Brick masonry, not exceeding four inches vertical depth, may be used to adjust frame and cover to approved grade when riser stack consists of precast rings.

7. Equipment for the installation or extrusion of sealant into joint spaces should be a heavy-duty air operated pump, capable of continuously feeding the compound under pressure, and capable of completely filling the joint space without discontinuities and without the formation of voids or entrapped air. Joints shall be dry, cleaned of scale, dirt, dust, curing compound and foreign matter prior to application. Cleaning should be accomplished in a neat workmanlike manner with suitable tool(s) designed for cleaning concrete joints. The joint sidewalls should be sandblasted and blown clean of loose sand prior to sealant application.
8. Place suitable bond breaker in joint recess. Bond breaker should be compatible with the sealant, and should not adhere to the sealant. Avoid overfilling the joint space. Joints should be filled in a neat workmanlike manner from flush to 3/16 inch below the adjacent surface.
9. After curing, remaining excavated area around vaults shall be backfilled per Section 31 23 10.

PART 3 EXECUTION

3.1 CONSTRUCTION REQUIREMENTS:

A. Painting:

1. Prime and intermediate coats:
 - a. Vault piping and appurtenances shall be shipped with non-bitumastic shop primers. All main line piping, valves and appurtenances shall be sandblasted to SSPC-SP6 (commercial) after installation. A 4 mil prime coat plus a 4 mil intermediate coat of polyamide epoxy shall then be applied to all surfaces. Prime and intermediate paint shall be Series 20 Pota-Pox as manufactured by Tnemec Company, Inc., or approved equal. All paints shall be applied in accordance with the manufacturer's recommendations.
2. Final coats:
 - a. After the prime and intermediate coats have dried, a 1/8-inch thick condensation preventative coating shall be applied. Paint shall be Seculate, as manufactured by Seculate of North America, Berkeley, California. A decorative finish provided by Seculate shall be applied to color code the pipe to DCWATER standards. The Contractor shall mix a water-based tint with light untinted base material until a color acceptable to the DC Water is obtained.

PART 4 MEASUREMENT AND PAYMENT

4.1 MEASUREMENT:

- A. Work for concrete valves/venturi vaults shall measured per each for payment.

4.2 PAYMENT:

- A. Payment for concrete valves/venturi vaults shall be made at the Contract unit price per each in the SOP's, which price and payment shall include excavation and backfill beyond trench excavation pay limits, waterproofing, steps, sumps and all labor, materials, equipment, tools, and incidentals necessary to complete the work specified within this Contract.

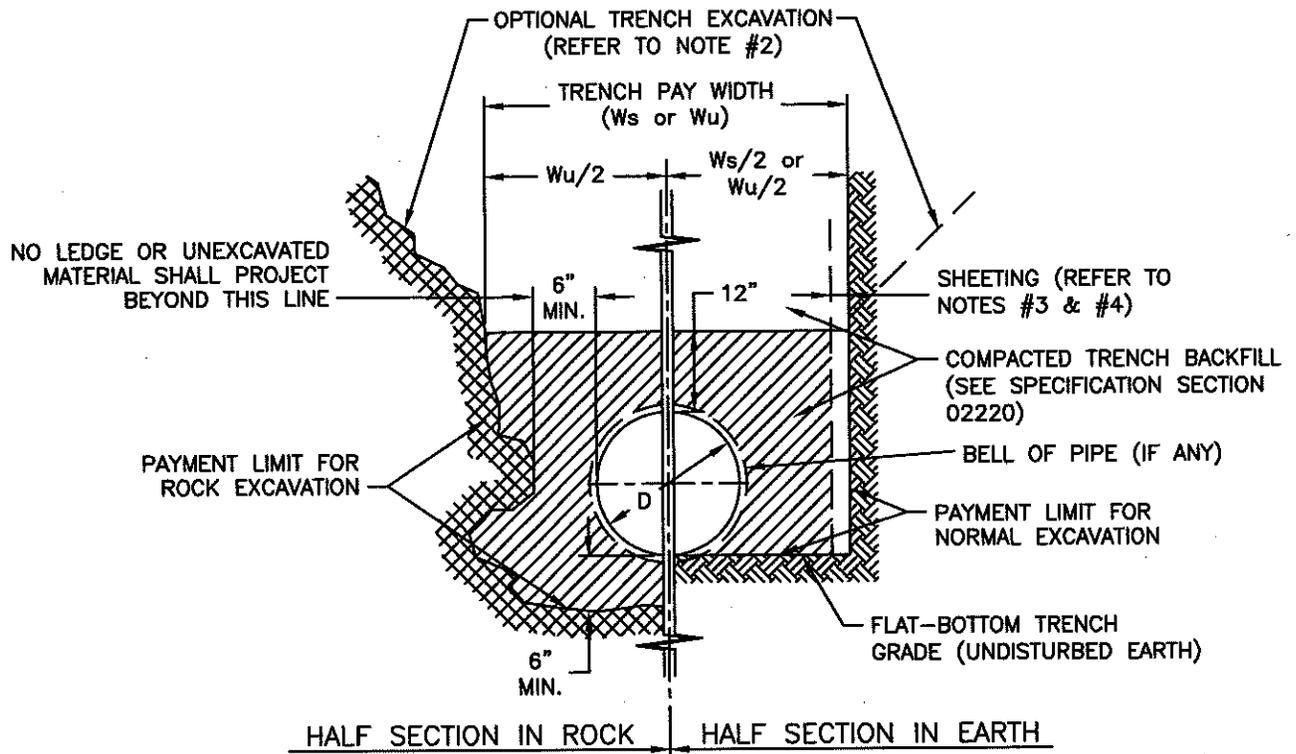
~END OF SECTION 33 48 00~

**DC WATER AND SEWER AUTHORITY
OFFICE MANUAL DRAWINGS
STANDARD DETAILS**

**MINNESOTA AVENUE REVITALIZATION PHASE 1
FROM A STREET, SE TO SOUTH BENNING ROAD, NE**

<u>NAME</u>	<u>TITLE</u>	<u>DATE</u>
W-10.01	Ductile Iron Water Main Pipe Laying Condition Type 2A (Trench Installation)	6/20/03
W-20.01	Valve Casing for 12" and Smaller Gate Valve	6/20/03
W-40.01	Concrete Thrust Block for Horizontal Pipe Bend and Tee 12" Diameter and Smaller Water Main	6/20/03
W-40.02	In-Line Thrust Block, 12" Diameter and Smaller Ductile Iron Water Mains	6/20/03
W-50.01	Traffic Fire Hydrant Installation	6/20/03
W-80.01	Water Service Connections 1" Thru 2" Diameter	6/20/03
W-90.01	24"-Cast Iron Manhole Cover	6/20/03
W-90.02	24" AND 36" DIAMETER CAST IRON FRAMES	6/20/03

END OF OFFICE MANUAL DRAWINGS



APPROVED DATE: June 20, 2003
Digitally signed by Leonard Benson
 Date: 2004.11.24 14:09:07 -0500
LRB
 DIRECTOR, DEPARTMENT OF ENGINEERING
 AND TECHNICAL SERVICES

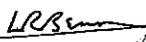
REVISION NO.: 0
 DATE: 6/20/03
 PREPARED BY: OBG/BKJV
 CHECKED BY: W.DARROW

STANDARD DETAIL
 DUCTILE IRON WATER MAIN
 PIPE LAYING CONDITION TYPE 2A
 (TRENCH INSTALLATION)

TRENCH PAY WIDTH (Ws OR Wu)		
PIPE DIAMETER D	SHEETED EXCAVATION Ws	UNSHEETED EXCAVATION Wu
8"	2' - 10"	2' - 4"
12"	3' - 2"	2' - 8"
16"	3' - 6"	3' - 0"
20"	3' - 10"	3' - 4"
24"	4' - 2"	3' - 8"
30"	4' - 8"	4' - 2"
36"	6' - 1"	5' - 7"
42"	6' - 7"	6' - 1"
48"	7' - 1"	6' - 7"

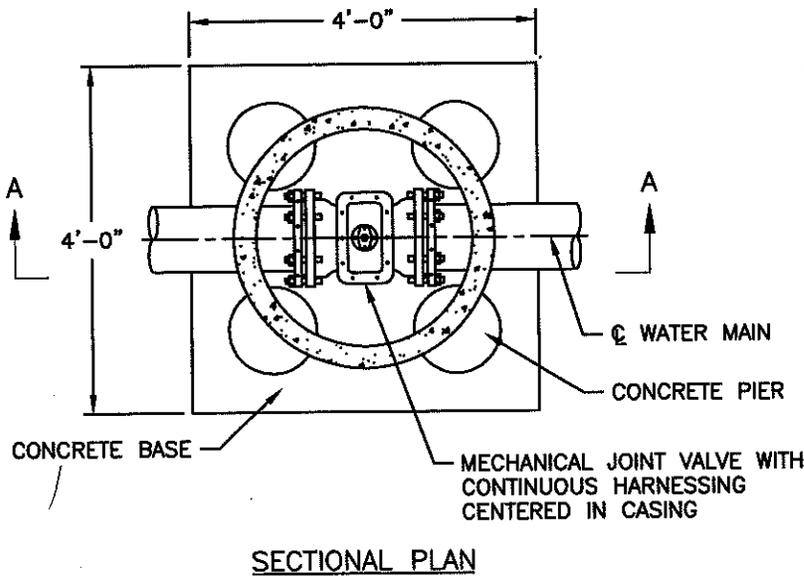
NOTES:

1. PIPE LAYING CONDITION TYPE 2A (TRENCH INSTALLATION) SHALL BE USED FOR ALL WATER MAIN CONSTRUCTION UNLESS OTHERWISE SPECIFIED OR SHOWN ON DRAWINGS.
2. TRENCHES MAY BE EXCAVATED WIDER THAN THE TRENCH PAY WIDTH (Ws OR Wu) ABOVE A LINE 1' - 0" FROM TOP OF PIPE, AT CONTRACTOR'S OPTION AND AT NO ADDITIONAL COST TO THE AUTHORITY.
3. IF EXCAVATION BELOW NORMAL DEPTH OF WATER MAIN INSTALLATION (DEPTHS GREATER THAN 4.5 FEET) IS REQUIRED, EXCAVATION SUPPORT SHEETING MAY BE ORDERED OR TRENCH SHIELDS UTILIZED AT CONTRACTORS OPTION. COSTS UNDER THIS OPTION SHALL BE PART OF THE UNIT PRICE BID FOR EXCAVATION.
4. SHEETING, IF USED, SHALL BE REMOVED IN CONJUNCTION WITH THE BACKFILLING OPERATION UNLESS OTHERWISE SPECIFIED OR SHOWN ON DRAWINGS. HOWEVER, IF APPROVED IN WRITING, SHEETING MAY BE CUT-OFF AND LEFT IN PLACE BELOW A LINE 1' - 0" ABOVE THE TOP OF PIPE OR AS DIRECTED BY THE ENGINEER.

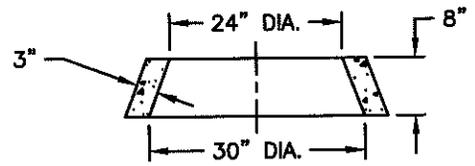
APPROVED DATE: June 20, 2003

Digitally signed by Leonard Benson
 Date: 2004.11.28 15:17:48 -0500
 DIRECTOR, DEPARTMENT OF ENGINEERING
 AND TECHNICAL SERVICES

REVISION NO.: 0
 DATE: 6/20/03
 PREPARED BY: OBG/BKJV
 CHECKED BY: W.DARROW

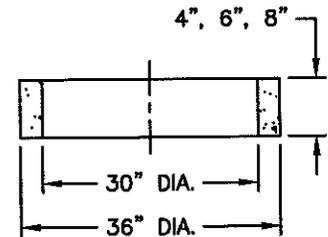
STANDARD DETAIL
 DUCTILE IRON WATER MAIN
 PIPE LAYING CONDITION TYPE 2A
 (TRENCH INSTALLATION)



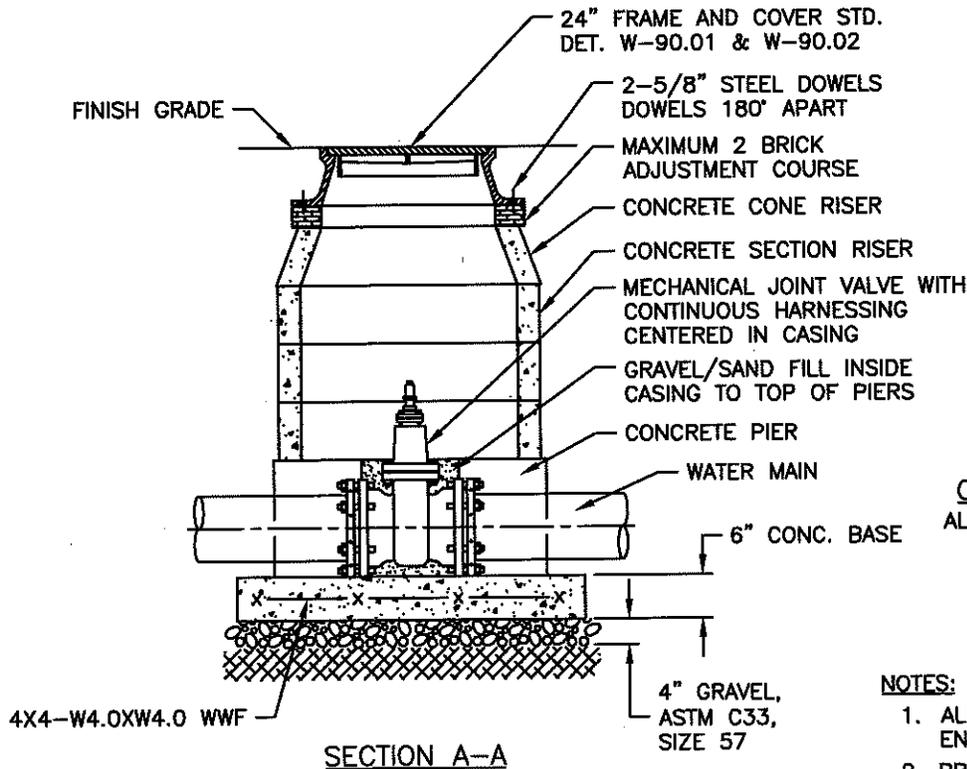
SECTIONAL PLAN



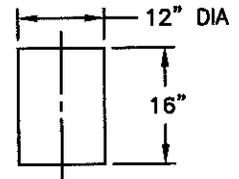
SECTION CONE RISER
ALL BEARING SURFACES TRUE,
FLAT, PARALLEL PLANES



SECTION RISER
ALL BEARING SURFACES TRUE,
FLAT, PARALLEL PLANES



SECTION A-A



CONCRETE PIER DETAIL
ALL BEARING SURFACES TRUE,
FLAT, PARALLEL PLANES

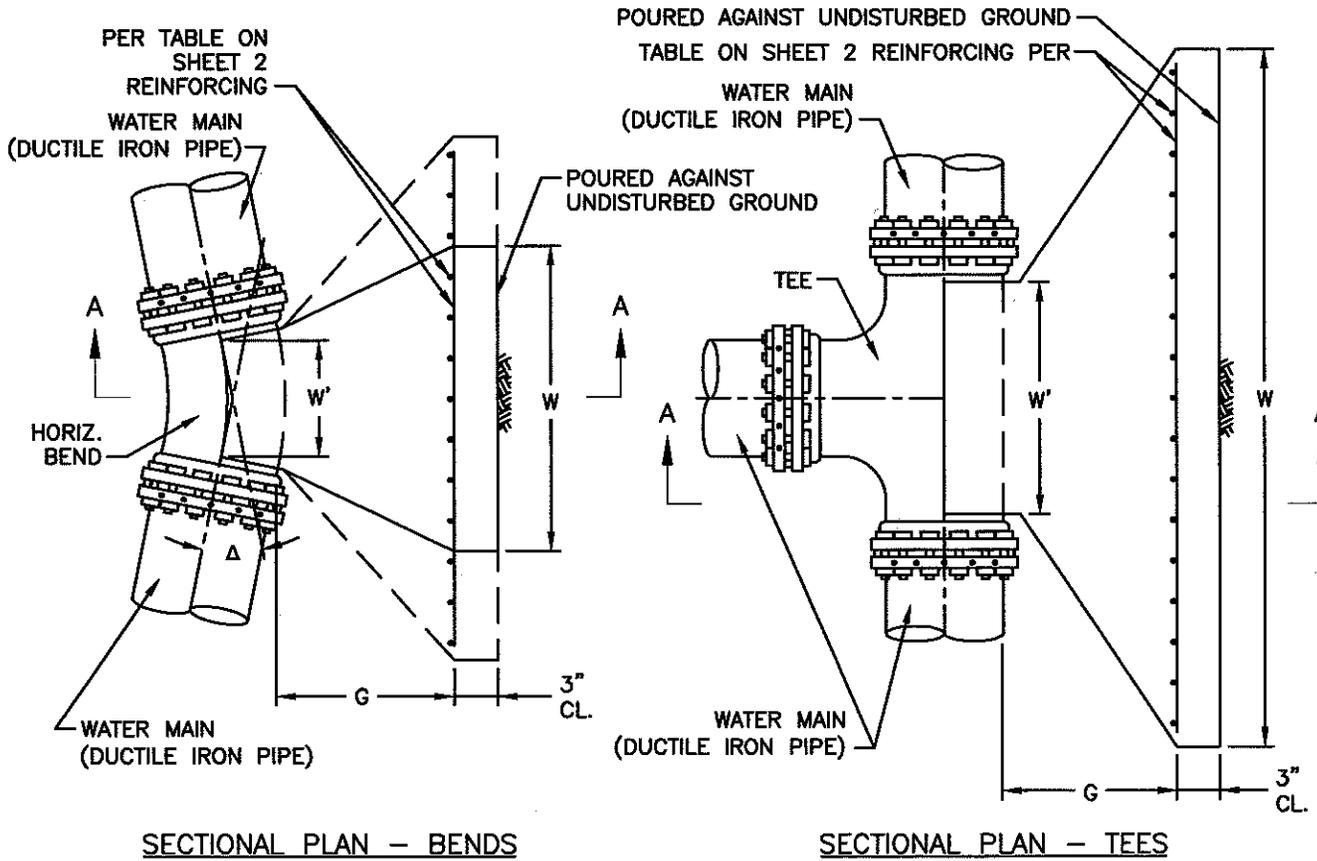
NOTES:

1. ALL CONCRETE CLASS 4000, AIR ENTRAINED, TYPE II CEMENT
2. PRECAST ELEMENTS INCLUDING REINFORCING TO BE PER ASTM C478.
3. WWF PER ASTM A185

APPROVED DATE: June 20, 2003
Digitally signed by Leonard A. Benson Date: 2004.11.26 16:19:41 -0500
LRBenson
 DIRECTOR, DEPARTMENT OF ENGINEERING AND TECHNICAL SERVICES

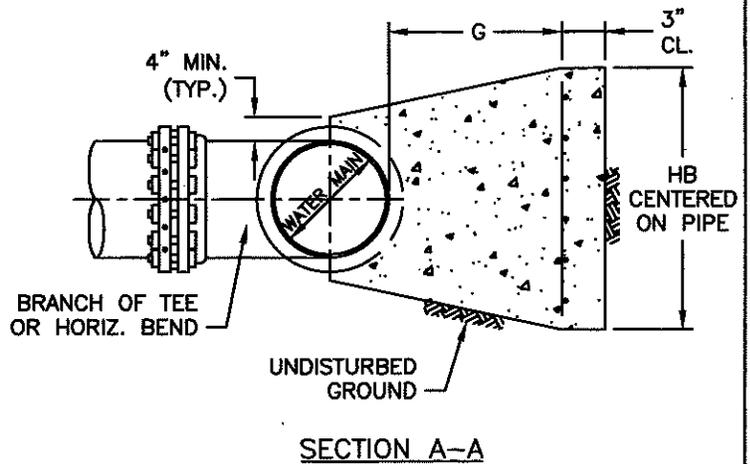
REVISION NO.: 0
 DATE: 6/20/03
 PREPARED BY: OBG/BKJV
 CHECKED BY: W.DARROW

STANDARD DETAIL
 VALVE CASING
 FOR 12" AND SMALLER GATE VALVE



LEGEND

- Δ - ANGLE OF BEND
- HB - HEIGHT OF BLOCK
- W - WIDTH AGAINST UNDISTURBED GROUND
- W' - WIDTH AT FITTING
- G - DEPTH OF BLOCK



APPROVED DATE: June 20, 2003
Digitally signed by Leonard Benson Date: 2004.11.26 15:21:26 -0500
LRB
 DIRECTOR, DEPARTMENT OF ENGINEERING AND TECHNICAL SERVICES

REVISION NO.: 0
 DATE: 6/20/03
 PREPARED BY: OBG/BKJV
 CHECKED BY: W.DARROW

STANDARD DETAIL
 CONCRETE THRUST BLOCK
 FOR HORIZONTAL PIPE BEND & TEE
 12" DIAMETER & SMALLER WATER MAINS

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY

W-40.01
2 OF 2

BRANCH OF TEE OR PIPE DIA	BEND TYPE	W	HB	W'	G	REINF. (E.W.)
6"	11.25°	1'-6"	1'-6"	0'-8"	1'-0"	#4 @12"
	22.5°	1'-9"	1'-6"	0'-8"	1'-0"	#4 @12"
	45°	2'-8"	2'-0"	0'-8"	1'-0"	#4 @12"
	90°	4'-6"	2'-3"	0'-10"	1'-0"	#5 @12"
	TEE	3'-0"	3'-0"	0'-10"	1'-0"	#5 @12"
8"	11.25°	1'-6"	1'-6"	0'-8"	1'-0"	#4 @12"
	22.5°	1'-9"	1'-6"	0'-8"	1'-0"	#4 @12"
	45°	2'-8"	2'-0"	0'-8"	1'-0"	#4 @12"
	90°	5'-0"	3'-9"	1'-0"	1'-6"	#6 @12"
	TEE	4'-0"	3'-6"	1'-4"	1'-0"	#5 @12"
12"	11.25°	2'-6"	2'-6"	1'-0"	1'-0"	#4 @12"
	22.5°	3'-6"	2'-6"	1'-0"	1'-3"	#4 @12"
	45°	7'-0"	4'-6"	1'-4"	1'-6"	#6 @12"
	90°	10'-0"	4'-6"	1'-4"	1'-6"	#6 @12"
	TEE	8'-6"	5'-0"	1'-4"	1'-6"	#6 @12"

NOTES:

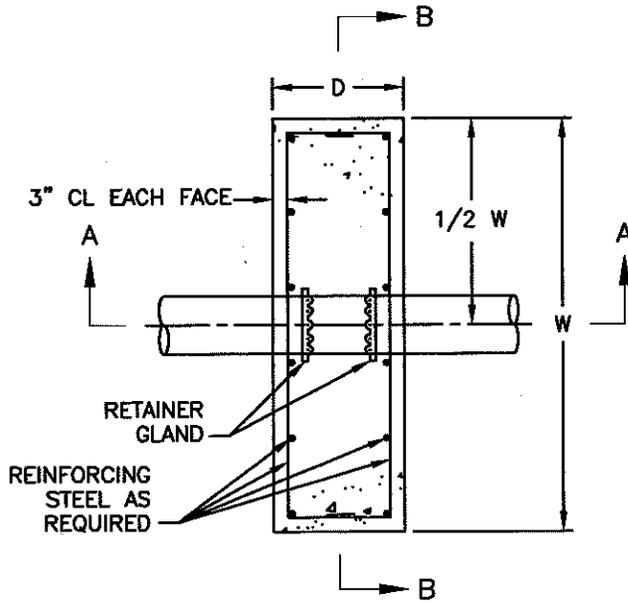
1. ALL CONCRETE TO BE CLASS 4000, AIR ENTRAINED, TYPE II CEMENT
2. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60
3. NOMINAL DEPTH OF COVER ON WATER MAIN IS FOUR FEET
4. UNIT WEIGHT OF SOIL, 120 PCF
5. DESIGN BASED ON $\phi = 30'$ AND TEST PRESSURE = 195 PSI
6. HB - HEIGHT OF BLOCK, W'-WIDTH AT FITTING AND W-WIDTH AGAINST UNDISTURBED GROUND SHOULD BE CENTERED ON PIPE AND FITTING.
7. FOR PIPE SIZE GREATER THAN 12", BLOCKS BEDDED IN SOILS WEAKER THAN $\phi = 30'$, OR FOR MAINS WITH A TEST PRESSURE GREATER THAN 195 PSI, THE THRUST BLOCK MUST BE SPECIFICALLY DESIGNED FOR EACH APPLICATION.

APPROVED DATE: June 20, 2003

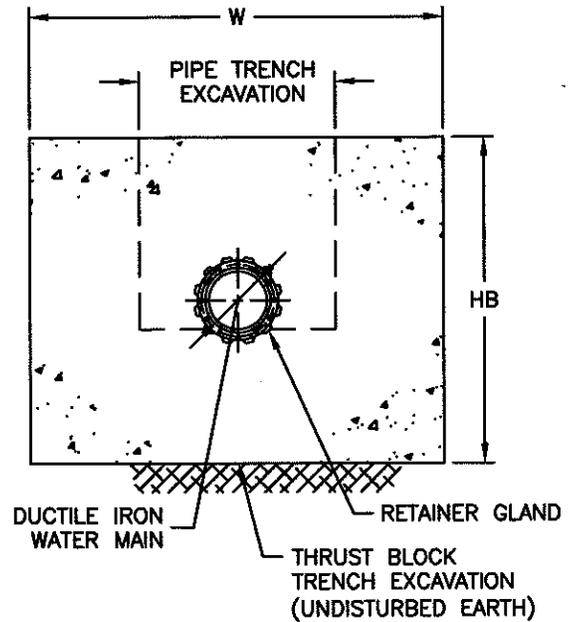
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Baron
Date: 2004.11.28 15:21:43 -0500
 DIRECTOR, DEPARTMENT OF ENGINEERING
AND TECHNICAL SERVICES

REVISION NO.: 0
 DATE: 6/20/03
 PREPARED BY: OBC/BKJV
 CHECKED BY: W.DARROW

STANDARD DETAIL
 CONCRETE THRUST BLOCK
 FOR HORIZONTAL PIPE BEND & TEE
 12" DIAMETER & SMALLER WATER MAINS

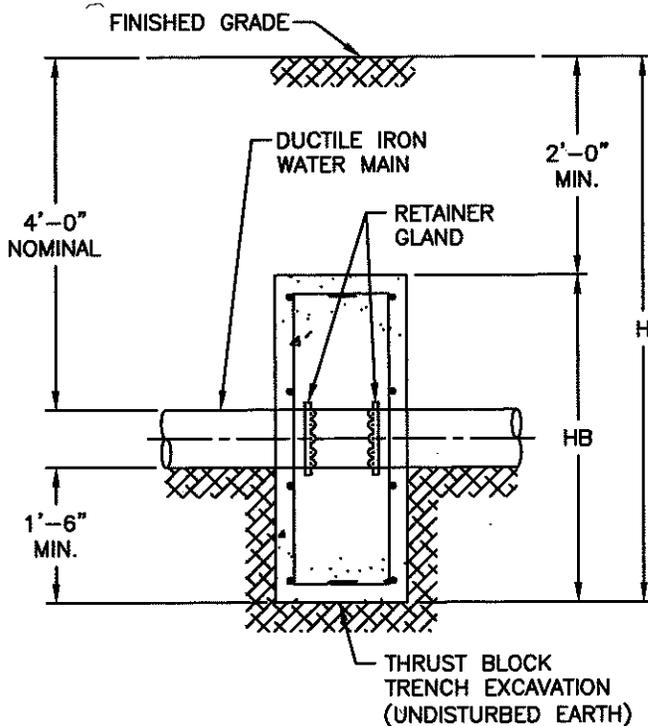


SECTIONAL PLAN



SECTION B-B

REINFORCING STEEL
NOT SHOWN FOR
CLARITY



SECTION A-A

LEGEND

- W - WIDTH OF BLOCK
- HB - HEIGHT OF BLOCK
- D - DEPTH OF BLOCK
- H - HEIGHT FROM FINISHED GRADE TO BOTTOM OF BLOCK

APPROVED DATE: June 20, 2003

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Digitally signed by Leonard Benson
Date: 2004.11.28 15:22:00 -0500

DIRECTOR, DEPARTMENT OF ENGINEERING
AND TECHNICAL SERVICES

REVISION NO.: 0

DATE: 6/20/03

PREPARED BY: OBG/BKJ

CHECKED BY: W.DARROW

STANDARD DETAIL
IN-LINE THRUST BLOCK
12" DIAMETER & SMALLER
DUCTILE IRON WATER MAINS

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY

W-40.02
2 OF 2

PIPE SIZE		W	D	HB	H	REINF. (E.W.E.F.)
PIPE	6"	4' - 7"	1' - 0"	3' - 7"	6' - 1"	#4 @12"
	8"	4' - 9"	1' - 6"	3' - 9"	6' - 3"	#4 @10"
	12"	5' - 0"	2' - 0"	5' - 0"	7' - 0"	#4 @8"
REDUCER	8" X 6"	3' - 8"	1' - 0"	3' - 2"	6' - 2"	#4 @12"
	12" X 8"	4' - 9"	1' - 6"	3' - 9"	6' - 6"	#4 @10"
	12" X 6"	4' - 9"	1' - 6"	3' - 9"	6' - 6"	#4 @10"

NOTES:

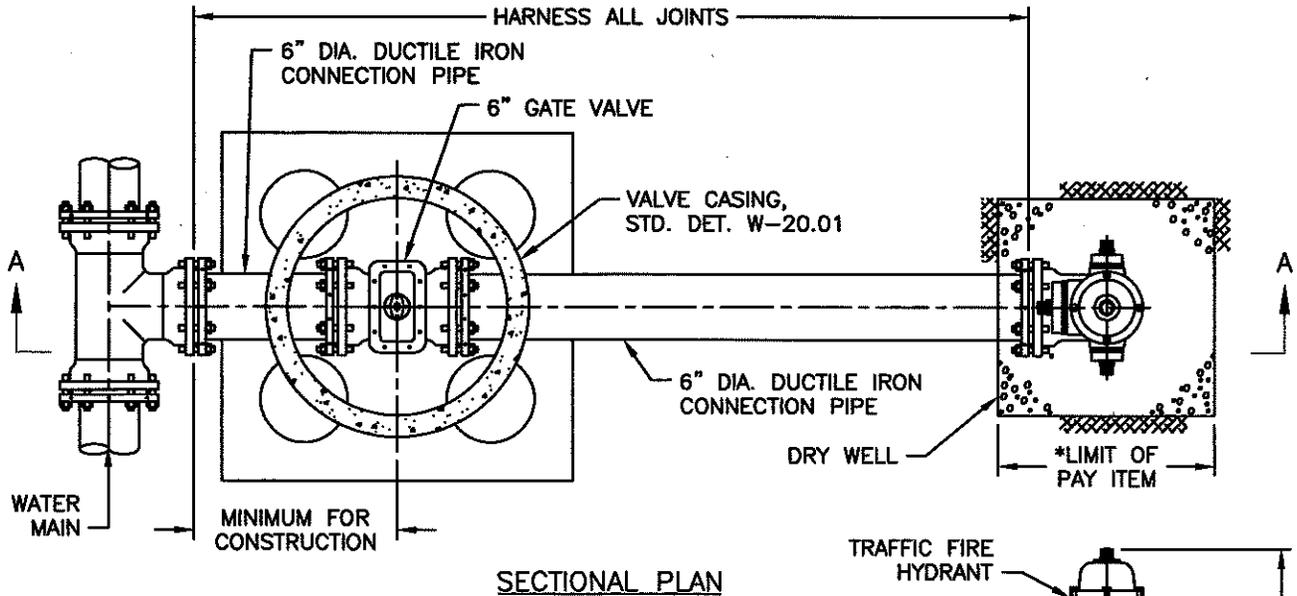
1. RETAINER GLANDS WITH DUCTILE IRON WEDGES IN COMBINATION WITH SPECIAL HEAT TREATED SET SCREWS. TORQUE PER MANUFACTURER INSTRUCTIONS.
2. ALL CONCRETE TO BE CLASS 4000, AIR ENTRAINED, TYPE II CEMENT.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60.
4. EXCAVATION BACKFILL, PER SPECIFICATIONS 02220.
5. UNIT WEIGHT OF SOIL, 120 PCF.
6. NOMINAL DEPTH OF COVER ON WATER MAIN IS FOUR FEET.
7. DESIGN BASED ON $\phi=30'$, AND TEST PRESSURE = 195 PSI.
8. FOR PIPE SIZE LARGER THAN 12", BLOCKS BEDDED IN SOILS WEAKER THAN $\phi30'$, OR FOR MAINS WITH A TEST PRESSURE GREATER THAN 195 PSI, THE THRUST BLOCK MUST BE SPECIFICALLY DESIGNED FOR EACH APPLICATION.

APPROVED DATE: June 20, 2003

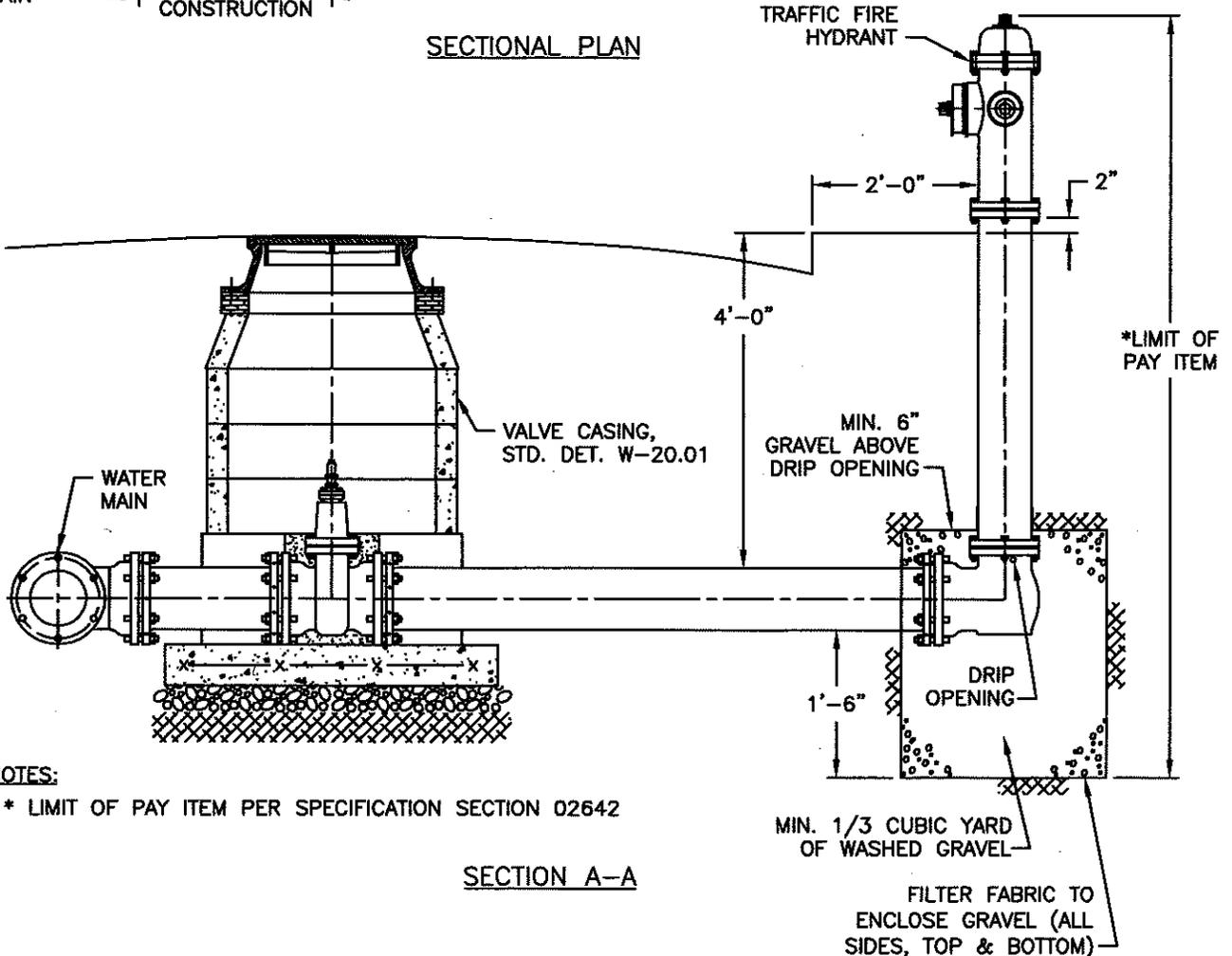
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DIRECTOR, DEPARTMENT OF ENGINEERING
AND TECHNICAL SERVICES

REVISION NO.: 0
DATE: 6/20/03
PREPARED BY: QBG/BKJV
CHECKED BY: W.DARROW

STANDARD DETAIL
IN-LINE THRUST BLOCK
12" DIAMETER & SMALLER
DUCTILE IRON WATER MAINS



SECTIONAL PLAN



SECTION A-A

NOTES:

* LIMIT OF PAY ITEM PER SPECIFICATION SECTION 02642

MIN. 1/3 CUBIC YARD
OF WASHED GRAVEL

FILTER FABRIC TO
ENCLOSE GRAVEL (ALL
SIDES, TOP & BOTTOM)

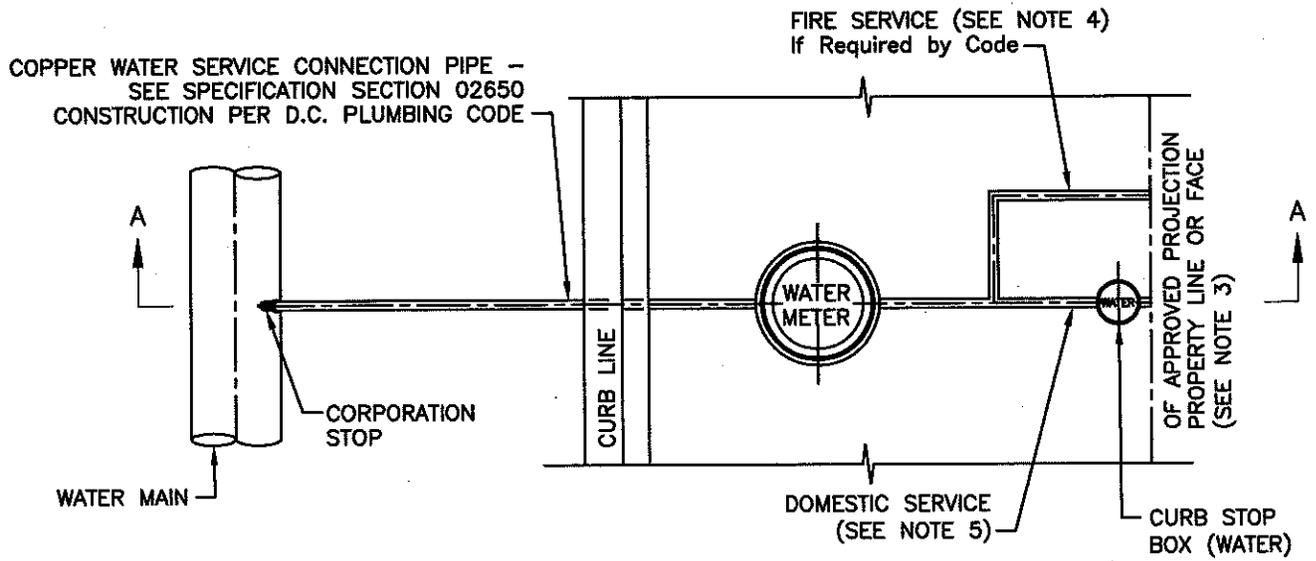
APPROVED DATE: June 20, 2003
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Digitally signed by Leonard Benson
Date: 2004.11.29 15:22:58 -0800
DIRECTOR, DEPARTMENT OF ENGINEERING
AND TECHNICAL SERVICES

REVISION NO.: 0
DATE: 6/20/03
PREPARED BY: OBG/BKJV
CHECKED BY: W.DARROW

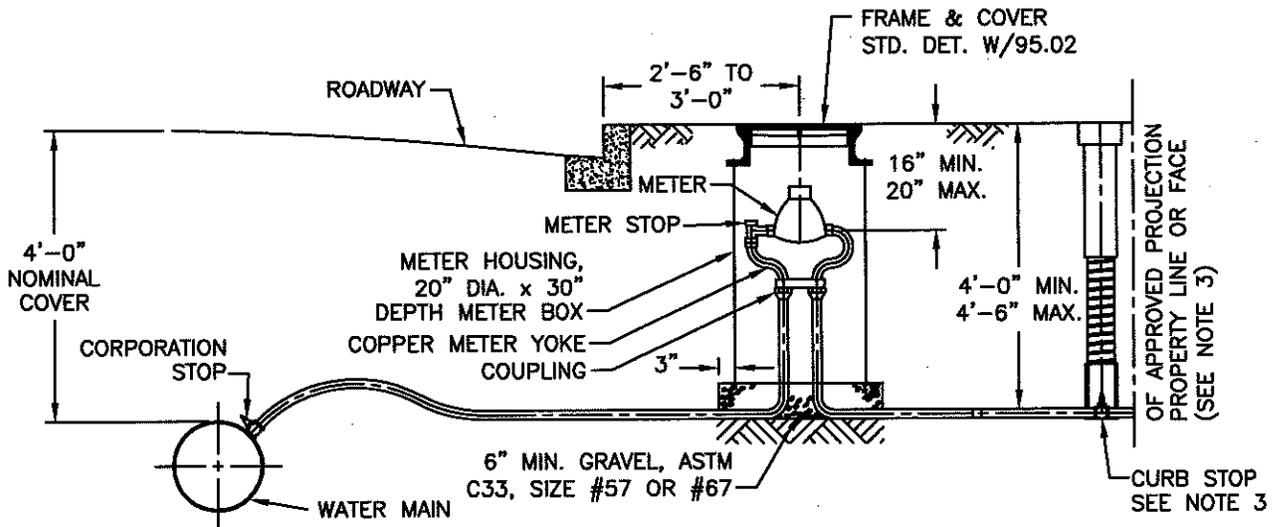
STANDARD DETAIL
TRAFFIC FIRE HYDRANT INSTALLATION

DISTRICT OF COLUMBIA
WATER AND SEWER AUTHORITY

W-80.01
1 OF 1



PLAN



SECTION A-A

NOTES:

1. 1" DOMESTIC METER SETTER AS SHOWN.
2. 1 1/2" - 2" METER SETTER REQUIRES A METER VALVE ON EACH SIDE (NOT SHOWN ON DETAIL)
3. IF THE BUILDING OR APPROVED PROJECTION IS AT OR EXTENDS BEYOND THE PROPERTY LINE, THE CURB STOP SHALL BE PLACED 18 INCHES FROM FACE OF BUILDING OR APPROVED PROJECTION.
4. FOR NEW BUILDING CONSTRUCTION ONLY (IF REQUIRED): THE FIRE SERVICE LINE SHALL INCLUDE A SHUT-OFF VALVE INSTALLED INSIDE THE BUILDING.
5. FOR NEW BUILDING CONSTRUCTION ONLY (IF REQUIRED): THE DOMESTIC SERVICE LINE SHALL INCLUDE A PRESSURE REDUCING VALVE AND SHUT-OFF VALVE INSTALLED INSIDE THE BUILDING.

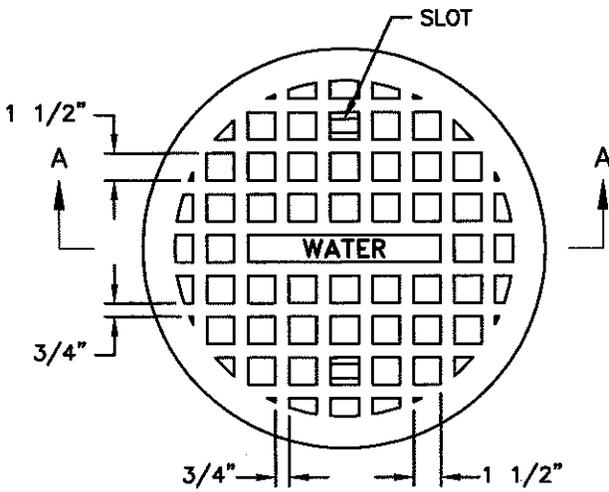
APPROVED DATE: January 2, 2004

LRB
Digitally signed by Leonard
Date: 2004.11.28 15:27:02 -0500
DIRECTOR, DEPARTMENT OF ENGINEERING
AND TECHNICAL SERVICES

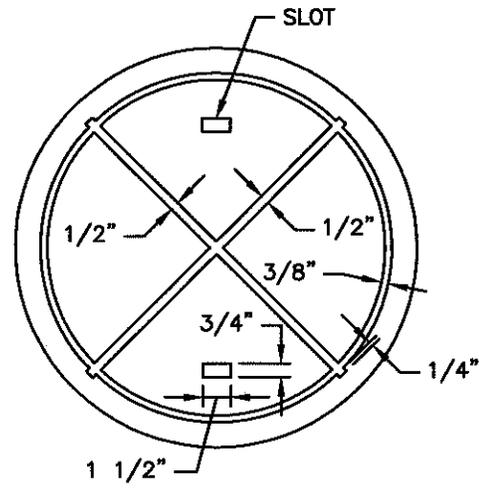
REVISION NO.: 1
DATE: 6/20/03
PREPARED BY: J. Shabelaki
CHECKED BY: W.DARROW

STANDARD DETAIL

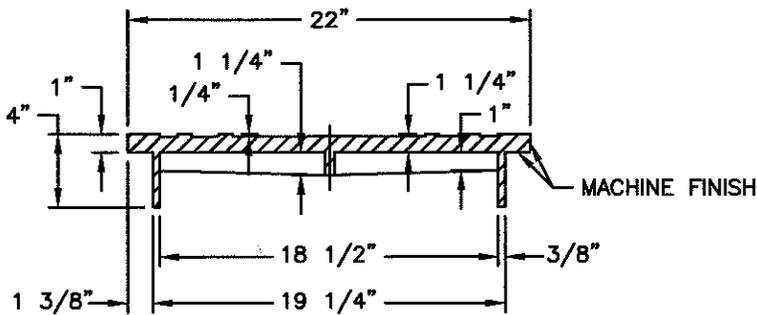
WATER SERVICE CONNECTIONS
1" THRU 2" DIAMETER



PLAN - COVER



PLAN - COVER BOTTOM



SECTION A-A

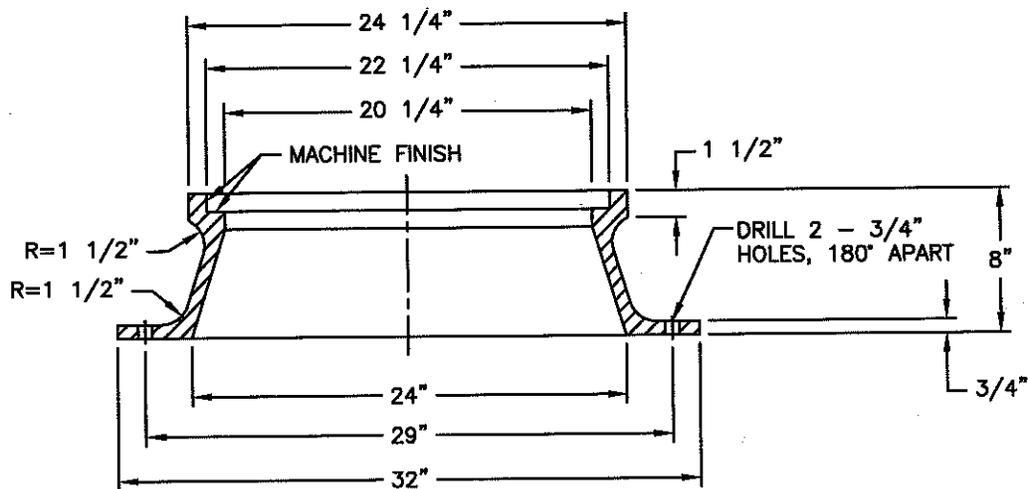
NOTE:

1. GRAY IRON CASTINGS PER ASTM A48, CLASS 30A OR 35.
2. ALL MACHINE FINISH TO BE A.S.A. SPECIFICATION, ROUGHNESS SYMBOL 250, TOLERANCE $-0^{\prime\prime} +1/16^{\prime\prime}$.
3. THE WORD "WATER" IN 1" LETTERS SHALL BE CAST IN THE DEPRESSION SHOWN IN THE CENTER OF TOP OF COVER AND TO BE FLUSH WITH SURFACE OF COVER.

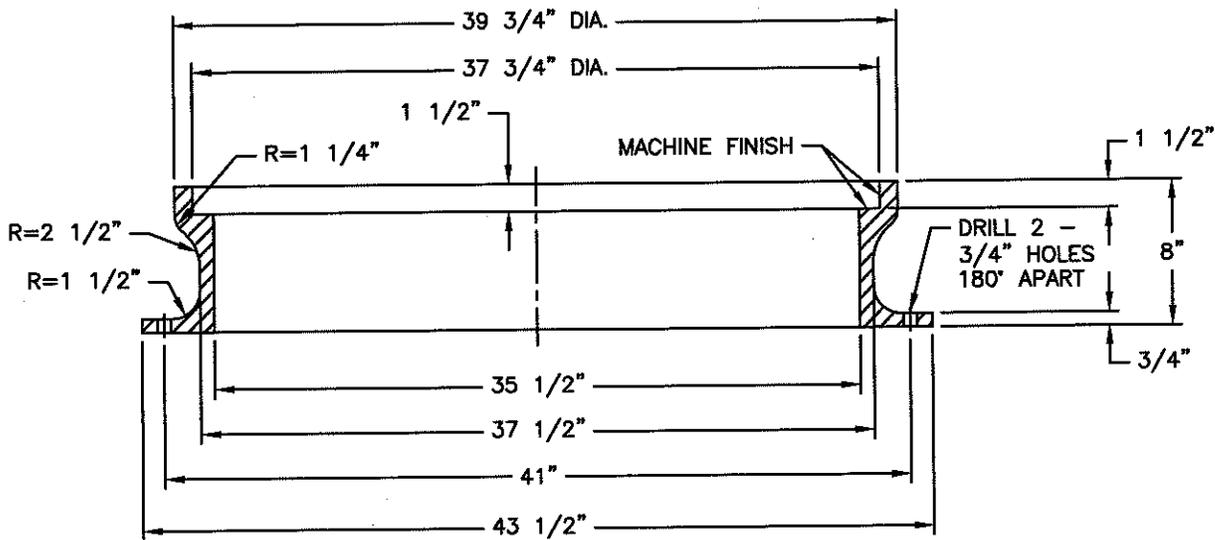
APPROVED DATE: June 20, 2003
LRB
Digitally signed by Leonard
Berson
Date: 2004.11.28 15:27:19 -0500
 DIRECTOR, DEPARTMENT OF ENGINEERING
AND TECHNICAL SERVICES

REVISION NO.: 0
 DATE: 6/20/03
 PREPARED BY: OBG/BKJV
 CHECKED BY: W.DARROW

STANDARD DETAIL
 24" CAST IRON MANHOLE COVER



SECTION OF 24-INCH DIAMETER FRAME



SECTION OF 36-INCH DIAMETER FRAME

NOTE:

1. GRAY IRON CASTINGS PER ASTM A48, CLASS 30A OR 35.
2. ALL MACHINE FINISH TO BE A.S.A. SPECIFICATION, ROUGHNESS SYMBOL 250, TOLERANCE $-0'' +1/16''$.

APPROVED DATE: June 20, 2003
Digitally signed by Leonard
 Date: 2004.11.28 15:27:44 -05'00'

DIRECTOR, DEPARTMENT OF ENGINEERING
AND TECHNICAL SERVICES

REVISION NO.: 0
 DATE: 6/20/03
 PREPARED BY: QBG/BKJV
 CHECKED BY: W.DARROW

STANDARD DETAIL

24" AND 36" DIAMETER CAST IRON FRAMES

General Decision Number: DC140001 05/09/2014 DC1

Superseded General Decision Number: DC20130001

State: District of Columbia

Construction Types: Heavy (Heavy and Sewer and Water Line) and Highway

County: District of Columbia Statewide.

HEAVY CONSTRUCTION PROJECTS (Including Sewer and Water Lines
HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	01/03/2014
1	01/24/2014
2	01/31/2014
3	04/11/2014
4	04/25/2014
5	05/09/2014

ASBE0024-001 10/01/2012

	Rates	Fringes
Asbestos Worker/Heat and Frost Insulator Includes the application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.....	\$ 33.13	13.60

ASBE0024-002 10/01/2012

	Rates	Fringes
HAZARDOUS MATERIAL HANDLER Includes preparation,		

wetting, stripping,
 removal, scrapping,
 vacuuming, bagging and
 disposing of all
 insulation materials,
 whether they contain
 asbestos or not, from
 mechanical systems.....\$ 20.86 5.61

ASBE0024-005 10/01/2012

	Rates	Fringes
Fire Stop Technician.....	\$ 26.06	6.05

Includes the application of materials or devices within or around penetrations and openings in all rated wall or floor assemblies, in order to prevent the passage of fire, smoke of other gases. The application includes all components involved in creating the rated barrier at perimeter slab edges and exterior cavities, the head of gypsum board or concrete walls, joints between rated wall or floor components, sealing of penetrating items and blank opening

BOIL0193-001 01/01/2014

	Rates	Fringes
Boilermakers:.....	\$ 38.07	22.58

BRDC0001-001 04/30/2013

	Rates	Fringes
Bricklayer.....	\$ 28.17	8.03

* BRMD0001-004 05/04/2014

	Rates	Fringes
BRICKLAYER		
Refractory (Firebrick).....	\$ 36.08	8.78

 CARP0132-001 05/01/2013

	Rates	Fringes
Carpenter/Lather.....	\$ 26.81	8.13
Piledriver.....	\$ 26.62	8.15

CARP1831-001 04/01/2013

	Rates	Fringes
MILLWRIGHT.....	\$ 31.59	8.58

CARP2311-002 05/01/2013

	Rates	Fringes
DIVER TENDER.....	\$ 29.00	8.15
DIVER.....	\$ 37.74	8.15

ELEC0026-001 11/04/2013

	Rates	Fringes
Electricians.....	\$ 40.95	14.63

ELEC0070-001 05/06/2013

	Rates	Fringes
Line Construction:		
Cable Splicers.....	\$ 33.00	19%+5.00
Equipment Operators.....	\$ 33.00	19%+5.00
Groundman.....	\$ 15.35	19%+5.00
Linemen.....	\$ 33.00	19%+5.00
Truck Driver.....	\$ 17.45	19%+5.00

ENGI0077-001 05/01/2013

	Rates	Fringes
Power equipment operators:		

(HEAVY AND HIGHWAY
CONSTRUCTION)

GROUP 1.....	\$ 33.96	8.45+a+b
GROUP 2.....	\$ 32.89	8.45+a+b
GROUP 3.....	\$ 32.40	8.45+a+b
GROUP 4.....	\$ 31.65	8.45+a+b
GROUP 5.....	\$ 29.50	8.45+a+b
GROUP 6.....	\$ 24.68	8.45+a+b
GROUP 7.....	\$ 34.34	8.45+a+b

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Tower Cranes and Cranes 100 ton and over.

GROUP 2: 35 ton cranes & above, tower & climbing cranes, derricks, concrete boom pump, drill rigs (equivalent to L Double L), mole.

GROUP 3: Backhoes, cableways, cranes, cherry pickers, elevating graders, hoists, paving mixers, power shovels, tunnel shovels, batch plants, shields, tunnel mining machines, gradalls, front end loaders, 3 1/2 cu. yds. and above, power driven wheel scoops and scrapers (50 cu. yds. struck capacity or above), rail tamper, draglines boomcat, mucking machines, graders in tunnels, pile drivin engines.

GROUP 4: Front end loaders below 3 1/2 cu. yds, boom truck hydraulic backhoes 1/2 yds. capacity or below rubber or track mounted, tug boats, power driven wheel scoops & scrapers, blade graders, motor graders, bulldozers, trenching machines, concrete mixer, speed swing pettibone, ballast regulator, concrete pump, mechanic, welder, mechanic welder, shotcrete machines, Hoeram, locomotive (standard, narrow gauge), tuggers.

GROUP 5: High lifts above 10 feet, boilers (skelton), asph spreaders, bullfloat finishing machines, concrete finishin machines, concrete spreaders, fine graders, air compressors, welding machines, pumps, generators, well points, deep wells, hydraulic pumps, elevators, freeze uniits, tunnel motorman or dinky operator, roller, conveyors, well drilling machines, grout pump, fireman.

GROUP 6: Fork lifts, ditch witch, bobcat 1/3 cu. yd. and below, space heaters, sweepers, assistant engineers, oiler

GROUP 7: Master mechanic.

a. PAID HOLIDAYS: New Years Day, Inaugural Day, Decoration Day, Independence Day, Labor Day, Martin Luther King's Birthday, Veterans' Day, Thanksgiving Day, Friday after Thanksgiving and Christmas Day.

b. PREMIUM PAY:

Tower crane and cranes 100-ton and over to receive \$1.00 p hour premium over Group One.

ENGI0077-002 06/01/2013

	Rates	Fringes
Power equipment operators: (PAVING AND INCIDENTAL GRADING)		
GROUP 1.....	\$ 27.49	7.00
GROUP 2.....	\$ 24.50	7.00
GROUP 3.....	\$ 21.04	7.00
GROUP 4.....	\$ 18.95	7.00
GROUP 5.....	\$ 28.15	6.80

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Gradall operator, Crane.

GROUP 2: Boom Truck, Milling Machine, Excavator, Rubber Ti Backhoe, Asphalt Paver, Asphalt Plant Engineer, Motor Grader, Track Loader, Rubber Tire Loader, Track Dozer, Concrete Paver.

GROUP 3: Broom Truck, Asphalt Roller.

GROUP 4: Air Compressor, Grade Rollers.

GROUP 5: Mechanic.

ENGI0077-003 07/01/2013

	Rates	Fringes
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Power equipment operators:
 (SEWER, GAS AND WATER LINE
 CONSTRUCTION)

GROUP 1.....	\$ 24.30	7.15+a
GROUP 2.....	\$ 23.90	7.15+a
GROUP 3.....	\$ 23.39	7.15+a
GROUP 4.....	\$ 23.07	7.15+a
GROUP 5.....	\$ 22.25	7.15+a

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Excavators, Cranes, Gradalls.

GROUP 2: Backhoes, Front-end Loaders, Fork alift/Lull, Bulldozers, Motor Graders. Qualified Mechanics, Hydraulic Tamper and Hoe Pack, Paving Mixers, Pile Driving Engines, Batch Plant, Concrete Pumps, Low-Boy Driver, Lube Truck.

GROUP 3: Trenching Machine, Well Drilling Machines, Concre Mixers, Motor Graders, Truck Driver.

GROUP 4. Roller, Air Compressors, Pumps, Welding Machines, Well Points, Firemen.

GROUP 5: Oiler

a. PAID HOLIDAYS: New Year's Day, Inaugural Day, Washington Birthday, Decoration Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Christmas Day and Martin Luther King's Birthday.

 IRON0005-001 06/01/2013

	Rates	Fringes
Ironworkers:		
Structural, Ornamental and		
Chain Link Fence.....	\$ 30.00	16.04

 IRON0201-001 05/01/2012

	Rates	Fringes
Ironworkers:		
Reinforcing.....	\$ 26.50	16.68

LABO0657-003 06/01/2012

	Rates	Fringes
Laborers: (HEAVY AND HIGHWAY AND SEWER & WATER LINES CONSTRUCTION)		
GROUP 1.....	\$ 22.23	6.83
GROUP 2.....	\$ 22.59	6.83
GROUP 3.....	\$ 22.79	6.83
GROUP 4.....	\$ 22.96	6.83
GROUP 5.....	\$ 23.45	6.83
GROUP 6.....	\$ 24.08	6.83
GROUP 7.....	\$ 24.68	6.83
GROUP 8.....	\$ 25.49	6.83

LABORERS CLASSIFICATIONS:

GROUP 1: Carloaders, choker setter, concrete crewman, crus feeder, demolition laborers, including salvaging all mater loading, cleaning up, wrecking, dumpmen, flagmen, fence erector and installer (other than chain link), including installation and erection of fence, guard rails, medial ra reference posts, guide posts and right-of-way markers, for strippers, general laborers, railroad track laborers, ripr man, scale man, stake jumper, structure mover, includes foundation, separation, preparation, cribbing, shoring, jacking and unloading of structures, water nozzleman, timb bucket and faller, truck loader, water boys, tool room men

GROUP 2: Combined air and water nozzleman, cement handler, dope pot fireman (nonmechanical), form cleaning machine, mechanical railroad equipment (includes spiker, puller, ti cleaner, tamper, pipe wrapper, power driven wheelbarrows, operators of hand derricks, towmasters, scootcretes, buggymobiles and similar equipment), tamper or rammèr operator, trestle scaffold builders over one tier high, po tool operator (gas, electric or pneumatic), sandblast or gunnite tailhose man, scaffold erector, (steel or wood),

vibrator operator (up to 4 feet), asphalt cutter, mortar m shorer and lagger, creosote material handler, corrosive en or equl, paver breaker and jackhammer operators.

GROUP 3: Multi-section pipe layer, non-metallic clay and concrete pipe layer (including caulker, collarman, jointer rigger and jacker, thermal welder and corrugated metal cul pipe layer.

GROUP 4: Asphalt block pneumatic cutter, asphalt roller, walker, chainsaw operator with attachment, concrete saw (walking), high scalers, jackhammer operator (using over 6 feet of steel), vibrator operator (4 feet and over), well point installer, air trac operator.

GROUP 5: Asphalt screeder, big drills, cut of the hole dri (1 1/2 " piston or larger), down the hole drills (3 1/2" piston or larger) gunnite or sandblaster nozzleman, asphal raker, asphalt tamper, form setter, demolition torch opera shotcrete nozzlelemen and potman.

GROUP 6: Powderman, master form setters.

GROUP 7: Brick paver (asphalt block paver, asphalt block sawman, asphalt block grinder, hastings block or similar t

GROUP 8: Licensed powdermen.

LABO0657-004 06/01/2012

	Rates	Fringes
Laborers: (HAZARDOUS WASTE REMOVAL, EXCEPT ON MECHANICAL SYSTEMS: Preparation for, removing and encapsulation of hazardous materials from non-mechanical systems)		
Skilled Asbestos Abatement Laborers.....	\$ 18.21	6.83
Skilled Toxic and Hazardous Waste Removal		

Laborers.....\$ 21.53 6.83

LABO0657-005 06/01/2012

	Rates	Fringes
Laborers: (TUNNEL, RAISE & SHAFT (FREE AIR) FOR HEAVY AND SEWER & WATER LINES CONSTRUCTION)		
GROUP 1.....	\$ 23.04	6.83
GROUP 2.....	\$ 23.77	6.83
GROUP 3.....	\$ 25.61	6.83
GROUP 4.....	\$ 26.40	6.83

LABORERS CLASSIFICATIONS:

GROUP 1: Brakeman, Bull Gang, Dumper, Trackmen, Concrete M

GROUP 2: Chuck Tender, Powdermen in Prime House, Form Sett and Movers, Nippers, Cableman, Houseman, Groutman, Bell or Signalman, Top or Bottom Vibrator Operator.

GROUP 3: Miners, Re-Bar Underground, Concrete or Gunnite Nozzlemen, Powdermen, Timbermen and Re-Timbermen, Wood Ste Including Liner plate or Other Support, Material Motorman, Caulkers, Diamond Drill Operators, Riggers, Cement Finishe Underground, Welders and Burners, Shield Driver, Air Trac Operator, Shotcrete Nozzlemen and Potman.

GROUP 4: Mucking Machine Operator (Air).

LABO0657-006 06/01/2012

	Rates	Fringes
Laborers: (TUNNEL, RAISE AND SHAFT (COMPRESSED AIR) FOR HEAVY CONSTRUCTION ONLY		
Gauge Pressure Work Period		
(Pounds)	(Hours)	
1-14	7.....	\$ 30.32 6.83
14-18	6.....	\$ 35.66 6.83

	Rates	Fringes
Mosaic & Terrazzo Worker, Tile Layer.....	\$ 25.78	9.72

MARB0003-004 07/01/2013

	Rates	Fringes
Marble, Tile & Terrazzo Finisher.....	\$ 20.98	8.81

PAIN0051-001 06/01/2013

	Rates	Fringes
Painters:		
All Industrial Work.....	\$ 29.18	8.91
Bridges, Heavy Highway, Lead Abatement and Flame/Thermal Spray.....	\$ 32.66	8.91
Commercial and Mold Remediation, Painters, Wallcovers and Drywall Finishers.....	\$ 24.89	8.91
Metal Polishing and Refinishing.....	\$ 25.89	8.91

PLAS0891-001 02/01/2014

	Rates	Fringes
Cement Masons:		
HEAVY CONSTRUCTION ONLY.....	\$ 27.15	9.61

PLAS0891-002 06/01/2013

	Rates	Fringes
Cement Masons: (PAVING & INCIDENTAL GRADING)		
Cement Masons.....	\$ 19.00	6.62
Concrete Saw Operators.....	\$ 19.00	6.62

Form Setters.....\$ 19.00 6.62

PLUM0005-001 08/01/2013

	Rates	Fringes
Plumbers.....	\$ 38.17	16.25+a

a. PAID HOLIDAYS: Labor Day, Veterans' Day, Thanksgiving Day and the day after Thanksgiving, Christmas Day, New Year's Day, Martin Luther King's Birthday, Memorial Day and the Fourth of July.

PLUM0602-005 08/01/2012

	Rates	Fringes
Steamfitter, Refrigeration & Air Conditioning Mechanic.....	\$ 37.62	18.07+a

a. PAID HOLIDAYS: New Year's Day, Martin Luther King's Birthday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and the day after Thanksgiving and Christmas Day.

SHEE0100-001 07/01/2013

	Rates	Fringes
Sheet Metal Worker.....	\$ 39.93	15.38+a

a. PAID HOLIDAYS: New Year's Day, Martin Luther King's Birthday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and Christmas Day

TEAM0639-001 08/01/2013

	Rates	Fringes
Truck drivers: (HEAVY &		

HIGHWAY CONSTRUCTION)

Tractor trailer, Low Boy.....	\$ 22.05	2.10+a
Truck Drivers.....	\$ 20.05	2.10+a

a. VACATION: Employees will receive one (1) week's paid vacation after one (1) year of service.

TEAM0639-005 08/01/2013

	Rates	Fringes
Truck drivers: (PAVING & INCIDENTAL GRADING)		
All paving projects where the grading is incidental to the paving.....	\$ 20.05	2.10

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

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

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetic order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January. }

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-05/13/2010. SU indicates the rates are not union majority rates. LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

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

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including request for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2 and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

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

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

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

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

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

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

4.) All decisions by the Administrative Review Board are fin

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END OF GENERAL DECISION

