

2. AMENDMENT/MODIFICATION NO. 0001	3. EFFECTIVE DATE SEP 05, 2003	4. REQUISITION/PURCHASE REQ. NO. N/A	5. PROJECT NO. (If applicable) SPEC. NO. 1356
6. ISSUED BY LOS ANGELES DISTRICT , COE CESPL-CT-WEST REGION BRANCH P.O. BOX 532711 LOS ANGELES, CALIFORNIA 90053-2325		7. ADMINISTERED BY (If other than Item 6) LOS ANGELES DISTRICT , COE CESPL-CT-WEST REGION BRANCH P.O. BOX 532711 LOS ANGELES, CALIFORNIA 90053-2325	

8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)	(√)	9A. AMENDMENT OF SOLICITATION NO. DACA09-03-B-0010
	X	9B. DATED (SEE ITEM 11) AUG. 08, 2003
		10A. MODIFICATION OF CONTRACTS/ORDER NO. N/A
		10B. DATED (SEE ITEM 13) N/A
CODE	FACILITY CODE	

**11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS**

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers  is extended,  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 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT 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 telegram or letter, provided each telegram or letter 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)  
N/A

NOTE: ITEM 13 BELOW IS N/A.

**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. N/A
	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 FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority) N/A

**E. IMPORTANT:** Contractor  is not,  is required to sign this document and return \_\_\_\_\_ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)  
**INDEFINITE DELIVERY/INDEFINITE QUANTITY (IDIQ) CONTRACT FOR MAINTAINING AND REPAIRING WATER, GAS AND SEWER LINES AT MILITARY INSTALLATIONS WITHIN LOS ANGELES DISTRICT, U.S. ARMY CORPS OF ENGINEERS**

**NOTE: The Closing Date has been changed to: September 18, 2003.**

- 1 Encl
1. Revised Pages: Pricing Schedule, Section 01270, 02316-6, Section 02510

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)	

BEST AND FINAL OFFER

**YEAR 1 (LINE ITEMS 0001 THRU 0026)**

ITEM	DESCRIPTION	QUANTITY	U/I	UNIT PRICE	AMOUNT
<b>0001</b>	<b>WORK SITE TRAFFIC CONTROL</b>	<b>15.00</b>	<b>EA</b>	\$ _____	\$ _____
<b>0002</b>	<b>PCC REMOVAL/ REPLACEMENT</b>				
0002AA	PCC CURB & GUTTER REMOVAL/ REPLACEMENT	500.00	LF	\$ _____	\$ _____
0002AB	PCC REMOVAL/ REPLACEMENT (1" TO 6")	1,500.00	SF	\$ _____	\$ _____
0002AC	PCC REMOVAL/ REPLACEMENT (6" TO 15")	1,000.00	SF	\$ _____	\$ _____
<b>0003</b>	<b>ASPHALT CONCRETE REMOVAL/ REPLACEMENT</b>	<b>10,000.00</b>	<b>SF</b>	\$ _____	\$ _____
<b>0004</b>	<b>ROCK/ HARD MATERIAL EXCAVATION</b>	<b>1,000.00</b>	<b>CY</b>	\$ _____	\$ _____
<b>0005</b>	<b>IMPORT SELECT FILL MATERIAL</b>	<b>1,000.00</b>	<b>CY</b>	\$ _____	\$ _____
<b>0006</b>	<b>PVC INSTALLATION</b>				
0006AA	PLACE 3/4 INCH PVC SCHEDULE 40 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0006AB	PLACE 1 INCH PVC SCHEDULE 40 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0006AC	PLACE 1 1/2 INCH PVC SCHEDULE 40 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0006AD	PLACE 2 INCH PVC SCHEDULE WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0006AE	PLACE 2 1/2 INCH PVC SCHEDULE 40 WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0006AF	PLACE 3 INCH PVC SCHEDULE 40 WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0006AG	PLACE 4 INCH PVC C900 WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0006AH	PLACE 6 INCH PVC C900 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0006AJ	PLACE 8 INCH PVC C900 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0006AK	PLACE 10 INCH PVC C900 WATER PIPE	2,000.00	LF	\$ _____	\$ _____
0006AL	PLACE 12 INCH PVC C900 WATER PIPE	6,000.00	LF	\$ _____	\$ _____
0006AM	PLACE 14 INCH PVC C905 WATER PIPE	2,000.00	LF	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
<b>0007</b>	<b>PLACE HDPE WATER PIPE</b>				
0007AA	PLACE 4 INCH HDPE WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0007AB	PLACE 6 INCH HDPE WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0007AC	PLACE 8 INCH HDPE WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0007AD	PLACE 10 INCH HDPE WATER PIPE	2,000.00	LF	\$ _____	\$ _____
0007AE	PLACE 12 INCH HDPE WATER PIPE	6,000.00	LF	\$ _____	\$ _____
0007AF	PLACE 18 INCH HDPE WATER PIPE	2,000.00	LF	\$ _____	\$ _____
<b>0008</b>	<b>INSTALL WATER SERVICE</b>				
0008AA	PLACE WATER SERVICE 3/4" TO 2"	200.00	EA	\$ _____	\$ _____
0008AB	PLACE WATER SERVICE 2 1/2" TO 3"	200.00	EA	\$ _____	\$ _____
<b>0009</b>	<b>RESERVED</b>				
<b>0010</b>	<b>INSTALL VALVES</b>				
0010AA	PLACE 4 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0010AB	PLACE 6 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0010AC	PLACE 8 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0010AD	PLACE 10 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0010AE	PLACE 12 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0010AF	PLACE 14 INCH VALVE BELOW GRADE	50.00	EA	\$ _____	\$ _____
0010AG	PLACE 16 INCH VALVE BELOW GRADE	50.00	EA	\$ _____	\$ _____
0010AH	PLACE 4 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0010AJ	PLACE 6 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0010AK	PLACE 8 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0010AL	PLACE 10 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0010AM	PLACE 12 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0010AN	PLACE 14 INCH VALVE ABOVE GRADE	50.00	EA	\$ _____	\$ _____
0010AP	PLACE 16 INCH VALVE ABOVE GRADE	50.00	EA	\$ _____	\$ _____
<b>0011</b>	<b>INSTALL 6" Post Indicator Valve</b>	<b>40.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0012</b>	<b>JACK 18" STEEL SLEEVE SCHEDULE 40</b>	<b>500.00</b>	<b>LF</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0013</b>	<b>INSTALL PIPE DEEPER THAN 5' (INC. SHORING)</b>	<b>3,000.00</b>	<b>CY</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0014</b>	<b>INSTALL FIRE HYDRANT HEAD</b>	<b>30.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0015</b>	<b>INSTALL BACK FLOW PREVENTERS</b>				
0015AA	INSTALL 3/4" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AB	INSTALL 1" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AC	INSTALL 1 1/2" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AD	INSTALL 2" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AE	INSTALL 2 1/2" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AF	INSTALL 3" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AG	INSTALL 4" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AH	INSTALL 6" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AJ	INSTALL 8" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AK	INSTALL 10" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0015AL	INSTALL 12" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
<b>0016</b>	<b>IRRIGATION</b>				

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0016AA	INSTALL IRRIGATION CONTROLLER	50.00	EA	\$ _____	\$ _____
0016AB	INSTALL 3/4" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0016AC	INSTALL 1" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0016AD	INSTALL 1 1/2" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0016AE	INSTALL 2" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0016AF	INSTALL 3" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0016AG	INSTALL IRRIGATION HEADS	1,000.00	EA	\$ _____	\$ _____
<b>0017</b>	<b>PROVIDE AND INSTALL ALTITUDE VALVE (UP TO 8")</b>	<b>20.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0018</b>	<b>INSTALL SEWER PIPE</b>				
0018AA	INSTALL 4 INCH PVC SDR 35 SEWER PIPE	10,000.00	LF	\$ _____	\$ _____
0018AB	INSTALL 6 INCH PVC SDR 35 SEWER PIPE	5,000.00	LF	\$ _____	\$ _____
0018AC	INSTALL 8 INCH PVC SDR 35 SEWER PIPE	5,000.00	LF	\$ _____	\$ _____
0018AD	INSTALL 10 INCH PVC SDR 35 SEWER PIPE	5,000.00	LF	\$ _____	\$ _____
0018AE	INSTALL 12 INCH PVC SDR 35 SEWER PIPE	4,000.00	LF	\$ _____	\$ _____
0018AF	INSTALL SEWER MANHOLE UP TO 6' DEEP	100.00	EA	\$ _____	\$ _____
0018AG	INSTALL MANHOLE RINGS IN 1' INCREMENTS	50.00	EA	\$ _____	\$ _____
0018AH	RECONNECT SEWER LATERALS	1,000.00	EA	\$ _____	\$ _____
<b>0019</b>	<b>INSTALL CMP</b>				
0019AA	INSTALL 12" CMP STORM DRAIN PIPE	500.00	LF	\$ _____	\$ _____
0019AB	INSTALL 18" CMP STORM DRAIN PIPE	5,000.00	LF	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
<b>0020</b>	<b>INSTALL PE GAS PIPE</b>				
0020AA	INSTALL 3/4" PE GAS PIPE	2,000.00	LF	\$ _____	\$ _____
0020AB	INSTALL 1" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0020AC	INSTALL 1 1/4" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0020AD	INSTALL 1 1/2" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0020AE	INSTALL 2" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0020AF	INSTALL 2 1/2" PE GAS PIPE	1,500.00	LF	\$ _____	\$ _____
0020AG	INSTALL 3" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0020AH	INSTALL 4" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0020AJ	INSTALL 5" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0020AK	INSTALL 6" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0020AL	INSTALL 8" PE GAS PIPE	1,000.00	LF	\$ _____	\$ _____
<b>0021</b>	<b>INSTALL STEEL GAS PIPE</b>				
0021AA	INSTALL 2" STEEL GAS PIPE	1,000.00	LF	\$ _____	\$ _____
0021AB	INSTALL 3" STEEL GAS PIPE	1,000.00	LF	\$ _____	\$ _____
0021AC	INSTALL 4" STEEL GAS PIPE	1,000.00	LF	\$ _____	\$ _____
0021AD	INSTALL 8" STEEL GAS PIPE	500.00	LF	\$ _____	\$ _____
0021AE	INSTALL 10" STEEL GAS PIPE	500.00	LF	\$ _____	\$ _____
<b>0022</b>	<b>INSTALL RISER, REGULATOR &amp; METER</b>	<b>100.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0023</b>	<b>INSTALL PE GAS VALVES</b>				
0023AA	INSTALL PE GAS VALVES (3/4" TO 1 1/2")	400.00	EA	\$ _____	\$ _____
0023AB	INSTALL PE GAS VALVES (2" TO 2 1/2")	400.00	EA	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0023AC	INSTALL PE GAS VALVE (4")	150.00	EA	\$ _____	\$ _____
0023AE	INSTALL PE GAS VALVE (6")	150.00	EA	\$ _____	\$ _____
0023AF	INSTALL PE GAS VALVE (8")	100.00	EA	\$ _____	\$ _____
<b>0024</b>	<b>LABOR POOL (DOLLAR AMOUNT NOT TO EXCEED \$35,000 PER TASK ORDER)</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>0025</b>	<b>EQUIPMENT POOL (DOLLAR AMOUNT NOT TO EXCEED \$35,000 PER TASK ORDER)</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>0026</b>	<b>MATERIAL POOL (DOLLAR AMOUNT NOT TO EXCEED \$35,000 PER TASK ORDER)</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>TOTAL YEAR 1</b>					<b>\$ _____</b>

BEST AND FINAL OFFER

**YEAR TWO (LINE ITEMS 0027 THRU 0052)**

\* THE GOVERNMENT RESERVES THE RIGHT TO AWARD OPTION YEAR 1-4 AT A LATER DATE IN INCREMENTS OF ONE YEAR.A14

ITEM	DESCRIPTION	QUANTITY	U/I		
<b>0027</b>	<b>WORK SITE TRAFFIC CONTROL</b>	<b>15.00</b>	<b>EA</b>	\$ _____	\$ _____
<b>0028</b>	<b>PCC REMOVAL/ REPLACEMENT</b>				
0028AA	PCC CURB & GUTTER REMOVAL/ REPLACEMENT	500.00	LF	\$ _____	\$ _____
0028AB	PCC REMOVAL/ REPLACEMENT (1" TO 6")	1,500.00	SF	\$ _____	\$ _____
0028AC	PCC REMOVAL/ REPLACEMENT (6" TO 15")	1,000.00	SF	\$ _____	\$ _____
<b>0029</b>	<b>ASPHALT CONCRETE REMOVAL/ REPLACEMENT</b>	<b>10,000.00</b>	<b>SY</b>	\$ _____	\$ _____
<b>0030</b>	<b>ROCK/ HARD MATERIAL EXCAVATION</b>	<b>1,000.00</b>	<b>CY</b>	\$ _____	\$ _____
<b>0031</b>	<b>IMPORT SELECT FILL MATERIAL</b>	<b>1,000.00</b>	<b>CY</b>	\$ _____	\$ _____
<b>0032</b>	<b>PVC INSTALLATION</b>				
0032AA	PLACE 3/4 INCH PVC SCHEDULE 40 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0032AB	PLACE 1 INCH PVC SCHEDULE 40 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0032AC	PLACE 1 1/2 INCH PVC SCHEDULE 40 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0032AD	PLACE 2 INCH PVC SCHEDULE WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0032AE	PLACE 2 1/2 INCH PVC SCHEDULE 40 WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0032AF	PLACE 3 INCH PVC SCHEDULE 40 WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0032AG	PLACE 4 INCH PVC C900 WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0032AH	PLACE 6 INCH PVC C900 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0032AJ	PLACE 8 INCH PVC C900 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0032AK	PLACE 10 INCH PVC C900 WATER PIPE	2,000.00	LF	\$ _____	\$ _____
0032AL	PLACE 12 INCH PVC C900 WATER PIPE	6,000.00	LF	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0032AM	PLACE 14 INCH PVC C905 WATER PIPE	2,000.00	LF	\$ _____	\$ _____
<b>0033</b>	<b>PLACE HDPE WATER PIPE</b>				
0033AA	PLACE 4 INCH HDPE WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0033AB	PLACE 6 INCH HDPE WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0033AC	PLACE 8 INCH HDPE WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0033AD	PLACE 10 INCH HDPE WATER PIPE	2,000.00	LF	\$ _____	\$ _____
0033AE	PLACE 12 INCH HDPE WATER PIPE	6,000.00	LF	\$ _____	\$ _____
0033AF	PLACE 18 INCH HDPE WATER PIPE	2,000.00	LF	\$ _____	\$ _____
<b>0034</b>	<b>INSTALL WATER SERVICE</b>				
0034AA	PLACE WATER SERVICE 3/4" TO 2"	200.00	EA	\$ _____	\$ _____
0034AB	PLACE WATER SERVICE 2 1/2" TO 3"	200.00	EA	\$ _____	\$ _____
<b>0035</b>	<b>RESERVED</b>				
<b>0036</b>	<b>INSTALL VALVES</b>				
0036AA	PLACE 4 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0036AB	PLACE 6 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0036AC	PLACE 8 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0036AD	PLACE 10 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0036AE	PLACE 12 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0036AF	PLACE 14 INCH VALVE BELOW GRADE	50.00	EA	\$ _____	\$ _____
0036AG	PLACE 16 INCH VALVE BELOW GRADE	50.00	EA	\$ _____	\$ _____
0036AH	PLACE 4 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0036AJ	PLACE 6 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0036AK	PLACE 8 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0036AL	PLACE 10 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0036AM	PLACE 12 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0036AN	PLACE 14 INCH VALVE ABOVE GRADE	50.00	EA	\$ _____	\$ _____
0036AP	PLACE 16 INCH VALVE ABOVE GRADE	50.00	EA	\$ _____	\$ _____
<b>0037</b>	<b>INSTALL 6" Post Indicator Valve</b>	<b>40.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0038</b>	<b>JACK 18" STEEL SLEEVE SCHEDULE 40</b>	<b>500.00</b>	<b>LF</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0039</b>	<b>INSTALL PIPE DEEPER THAN 5' (INC. SHORING)</b>	<b>3,000.00</b>	<b>CY</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0040</b>	<b>INSTALL FIRE HYDRANT HEAD</b>	<b>30.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0041</b>	<b>INSTALL BACK FLOW PREVENTERS</b>				
0041AA	INSTALL 3/4" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AB	INSTALL 1" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AC	INSTALL 1 1/2" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AD	INSTALL 2" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AE	INSTALL 2 1/2" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AF	INSTALL 3" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AG	INSTALL 4" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AH	INSTALL 6" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AJ	INSTALL 8" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AK	INSTALL 10" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0041AL	INSTALL 12" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
<b>0042</b>	<b>IRRIGATION</b>				

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0042AA	INSTALL IRRIGATION CONTROLLER	50.00	EA	\$ _____	\$ _____
0042AB	INSTALL 3/4" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0042AC	INSTALL 1" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0042AD	INSTALL 1 1/2" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0042AE	INSTALL 2" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0042AF	INSTALL 3" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0042AG	INSTALL IRRIGATION HEADS	1,000.00	EA	\$ _____	\$ _____
<b>0043</b>	<b>PROVIDE AND INSTALL ALTITUDE VALVE (UP TO 8")</b>	<b>20.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0044</b>	<b>INSTALL SEWER PIPE</b>				
0044AA	INSTALL 4 INCH PVC SDR 35 SEWER PIPE	10,000.00	LF	\$ _____	\$ _____
0044AB	INSTALL 6 INCH PVC SDR 35 SEWER PIPE	5,000.00	LF	\$ _____	\$ _____
0044AC	INSTALL 8 INCH PVC SDR 35 SEWER PIPE	5,000.00	LF	\$ _____	\$ _____
0044AD	INSTALL 10 INCH PVC SDR 35 SEWER PIPE	5,000.00	LF	\$ _____	\$ _____
0044AE	INSTALL 12 INCH PVC SDR 35 SEWER PIPE	4,000.00	LF	\$ _____	\$ _____
0044AF	INSTALL SEWER MANHOLE UP TO 6' DEEP	100.00	EA	\$ _____	\$ _____
0044AG	INSTALL MANHOLE RINGS IN 1' INCREMENTS	50.00	EA	\$ _____	\$ _____
0044AH	RECONNECT SEWER LATERALS	1,000.00	EA	\$ _____	\$ _____
<b>0045</b>	<b>INSTALL CMP</b>				
0045AA	INSTALL 12" CMP STORM DRAIN PIPE	500.00	LF	\$ _____	\$ _____
0045AB	INSTALL 18" CMP STORM DRAIN PIPE	5,000.00	LF	\$ _____	\$ _____
<b>0046</b>	<b>INSTALL PE GAS PIPE</b>				
0046AA	INSTALL 3/4" PE GAS PIPE	2,000.00	LF	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0046AB	INSTALL 1" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0046AC	INSTALL 1 1/4" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0046AD	INSTALL 1 1/2" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0046AE	INSTALL 2" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0046AF	INSTALL 2 1/2" PE GAS PIPE	1,500.00	LF	\$ _____	\$ _____
0046AG	INSTALL 3" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0046AH	INSTALL 4" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0046AJ	INSTALL 5" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0046AK	INSTALL 6" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0046AL	INSTALL 8" PE GAS PIPE	1,000.00	LF	\$ _____	\$ _____
<b>0047</b>	<b>INSTALL STEEL GAS PIPE</b>				
0047AA	INSTALL 2" STEEL GAS PIPE	1,000.00	LF	\$ _____	\$ _____
0047AB	INSTALL 3" STEEL GAS PIPE	1,000.00	LF	\$ _____	\$ _____
0047AC	INSTALL 4" STEEL GAS PIPE	1,000.00	LF	\$ _____	\$ _____
0047AD	INSTALL 8" STEEL GAS PIPE	500.00	LF	\$ _____	\$ _____
0047AE	INSTALL 10" STEEL GAS PIPE	500.00	LF	\$ _____	\$ _____
<b>0048</b>	<b>INSTALL RISER, REGULATOR &amp; METER</b>	<b>100.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0049</b>	<b>INSTALL PE GAS VALVES</b>				
0049AA	INSTALL PE GAS VALVES (3/4" TO 1 1/2")	400.00	EA	\$ _____	\$ _____
0049AB	INSTALL PE GAS VALVES (2" TO 2 1/2")	400.00	EA	\$ _____	\$ _____
0049AC	INSTALL PE GAS VALVE (4")	150.00	EA	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0049AE	INSTALL PE GAS VALVE (6")	150.00	EA	\$ _____	\$ _____
0049AF	INSTALL PE GAS VALVE (8")	100.00	EA	\$ _____	\$ _____
<b>0050</b>	<b>LABOR POOL (DOLLAR AMOUNT NOT TO EXCEED \$35,000 PER TASK ORDER)</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>0051</b>	<b>EQUIPMENT POOL (DOLLAR AMOUNT NOT TO EXCEED \$35,000 PER TASK ORDER)</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>0052</b>	<b>MATERIAL POOL (DOLLAR AMOUNT NOT TO EXCEED \$35,000 PER TASK ORDER)</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>TOTAL YEAR 2</b>					<b>\$ _____</b>

BEST AND FINAL OFFER

**YEAR THREE (LINE ITEMS 0053 THRU 078)**

\* THE GOVERNMENT RESERVES THE RIGHT TO AWARD OPTION YEAR 1-4 AT A LATER DATE IN INCREMENTS OF ONE YEAR.A14

ITEM	DESCRIPTION	QUANTITY	U/I		
<b>0053</b>	<b>WORK SITE TRAFFIC CONTROL</b>	<b>15.00</b>	<b>EA</b>	\$ _____	\$ _____
<b>0054</b>	<b>PCC REMOVAL/ REPLACEMENT</b>				
0054AA	PCC CURB & GUTTER REMOVAL/ REPLACEMENT	500.00	LF	\$ _____	\$ _____
0054AB	PCC REMOVAL/ REPLACEMENT (1" TO 6")	1,500.00	SF	\$ _____	\$ _____
0054AC	PCC REMOVAL/ REPLACEMENT (6" TO 15")	1,000.00	SF	\$ _____	\$ _____
<b>0055</b>	<b>ASPHALT CONCRETE REMOVAL/ REPLACEMENT</b>	<b>10,000.00</b>	<b>SY</b>	\$ _____	\$ _____
<b>0056</b>	<b>ROCK/ HARD MATERIAL EXCAVATION</b>	<b>1,000.00</b>	<b>CY</b>	\$ _____	\$ _____
<b>0057</b>	<b>IMPORT SELECT FILL MATERIAL</b>	<b>1,000.00</b>	<b>CY</b>	\$ _____	\$ _____
<b>0058</b>	<b>PVC INSTALLATION</b>				
0058AA	PLACE 3/4 INCH PVC SCHEDULE 40 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0058AB	PLACE 1 INCH PVC SCHEDULE 40 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0058AC	PLACE 1 1/2 INCH PVC SCHEDULE 40 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0058AD	PLACE 2 INCH PVC SCHEDULE WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0058AE	PLACE 2 1/2 INCH PVC SCHEDULE 40 WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0058AF	PLACE 3 INCH PVC SCHEDULE 40 WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0058AG	PLACE 4 INCH PVC C900 WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0058AH	PLACE 6 INCH PVC C900 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0058AJ	PLACE 8 INCH PVC C900 WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0058AK	PLACE 10 INCH PVC C900 WATER PIPE	2,000.00	LF	\$ _____	\$ _____
0058AL	PLACE 12 INCH PVC C900 WATER PIPE	6,000.00	LF	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0058AM	PLACE 14 INCH PVC C905 WATER PIPE	2,000.00	LF	\$ _____	\$ _____
<b>0059</b>	<b>PLACE HDPE WATER PIPE</b>				
0059AA	PLACE 4 INCH HDPE WATER PIPE	4,000.00	LF	\$ _____	\$ _____
0059AB	PLACE 6 INCH HDPE WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0059AC	PLACE 8 INCH HDPE WATER PIPE	3,000.00	LF	\$ _____	\$ _____
0059AD	PLACE 10 INCH HDPE WATER PIPE	2,000.00	LF	\$ _____	\$ _____
0059AE	PLACE 12 INCH HDPE WATER PIPE	6,000.00	LF	\$ _____	\$ _____
0059AF	PLACE 18 INCH HDPE WATER PIPE	2,000.00	LF	\$ _____	\$ _____
<b>0060</b>	<b>INSTALL WATER SERVICE</b>				
0060AA	PLACE WATER SERVICE 3/4" TO 2"	200.00	EA	\$ _____	\$ _____
0060AB	PLACE WATER SERVICE 2 1/2" TO 3"	200.00	EA	\$ _____	\$ _____
<b>0061</b>	<b>RESERVED</b>				
<b>0062</b>	<b>INSTALL VALVES</b>				
0062AA	PLACE 4 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0062AB	PLACE 6 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0062AC	PLACE 8 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0062AD	PLACE 10 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0062AE	PLACE 12 INCH VALVE BELOW GRADE	100.00	EA	\$ _____	\$ _____
0062AF	PLACE 14 INCH VALVE BELOW GRADE	50.00	EA	\$ _____	\$ _____
0062AG	PLACE 16 INCH VALVE BELOW GRADE	50.00	EA	\$ _____	\$ _____
0062AH	PLACE 4 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0062AJ	PLACE 6 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0062AK	PLACE 8 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0062AL	PLACE 10 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0062AM	PLACE 12 INCH VALVE ABOVE GRADE	100.00	EA	\$ _____	\$ _____
0062AN	PLACE 14 INCH VALVE ABOVE GRADE	50.00	EA	\$ _____	\$ _____
0062AP	PLACE 16 INCH VALVE ABOVE GRADE	50.00	EA	\$ _____	\$ _____
<b>0063</b>	<b>INSTALL 6" Post Indicator Valve+B69</b>	<b>40.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0064</b>	<b>JACK 18" STEEL SLEEVE SCHEDULE 40</b>	<b>500.00</b>	<b>LF</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0065</b>	<b>INSTALL PIPE DEEPER THAN 5' (INC. SHORING)</b>	<b>3,000.00</b>	<b>CY</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0066</b>	<b>INSTALL FIRE HYDRANT HEAD</b>	<b>30.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0067</b>	<b>INSTALL BACK FLOW PREVENTERS</b>				
0067AA	INSTALL 3/4" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AB	INSTALL 1" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AC	INSTALL 1 1/2" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AD	INSTALL 2" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AE	INSTALL 2 1/2" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AF	INSTALL 3" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AG	INSTALL 4" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AH	INSTALL 6" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AJ	INSTALL 8" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AK	INSTALL 10" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
0067AL	INSTALL 12" BACK FLOW PREVENTER	10.00	EA	\$ _____	\$ _____
<b>0068</b>	<b>IRRIGATION</b>				

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0068AA	INSTALL IRRIGATION CONTROLLER	50.00	EA	\$ _____	\$ _____
0068AB	INSTALL 3/4" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0068AC	INSTALL 1" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0068AD	INSTALL 1 1/2" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0068AE	INSTALL 2" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0068AF	INSTALL 3" IRRIGATION CONTROL VALVE	100.00	EA	\$ _____	\$ _____
0068AG	INSTALL IRRIGATION HEADS	1,000.00	EA	\$ _____	\$ _____
<b>0069</b>	<b>PROVIDE AND INSTALL ALTITUDE VALVE (UP TO 8")</b>	<b>20.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0070</b>	<b>INSTALL SEWER PIPE</b>				
0070AA	INSTALL 4 INCH PVC SDR 35 SEWER PIPE	10,000.00	LF	\$ _____	\$ _____
0070AB	INSTALL 6 INCH PVC SDR 35 SEWER PIPE	5,000.00	LF	\$ _____	\$ _____
0070AC	INSTALL 8 INCH PVC SDR 35 SEWER PIPE	5,000.00	LF	\$ _____	\$ _____
0070AD	INSTALL 10 INCH PVC SDR 35 SEWER PIPE	5,000.00	LF	\$ _____	\$ _____
0070AE	INSTALL 12 INCH PVC SDR 35 SEWER PIPE	4,000.00	LF	\$ _____	\$ _____
0070AF	INSTALL SEWER MANHOLE UP TO 6' DEEP	100.00	EA	\$ _____	\$ _____
0070AG	INSTALL MANHOLE RINGS IN 1' INCREMENTS	50.00	EA	\$ _____	\$ _____
0070AH	RECONNECT SEWER LATERALS	1,000.00	EA	\$ _____	\$ _____
<b>0071</b>	<b>INSTALL CMP</b>				
0071AA	INSTALL 12" CMP STORM DRAIN PIPE	500.00	LF	\$ _____	\$ _____
0071AB	INSTALL 18" CMP STORM DRAIN PIPE	5,000.00	LF	\$ _____	\$ _____
<b>0072</b>	<b>INSTALL PE GAS PIPE</b>				
0072AA	INSTALL 3/4" PE GAS PIPE	2,000.00	LF	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0072AB	INSTALL 1" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0072AC	INSTALL 1 1/4" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0072AD	INSTALL 1 1/2" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0072AE	INSTALL 2" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0072AF	INSTALL 2 1/2" PE GAS PIPE	1,500.00	LF	\$ _____	\$ _____
0072AG	INSTALL 3" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0072AH	INSTALL 4" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0072AJ	INSTALL 5" PE GAS PIPE	5,000.00	LF	\$ _____	\$ _____
0072AK	INSTALL 6" PE GAS PIPE	3,000.00	LF	\$ _____	\$ _____
0072AL	INSTALL 8" PE GAS PIPE	1,000.00	LF	\$ _____	\$ _____
<b>0073</b>	<b>INSTALL STEEL GAS PIPE</b>				
0073AA	INSTALL 2" STEEL GAS PIPE	1,000.00	LF	\$ _____	\$ _____
0073AB	INSTALL 3" STEEL GAS PIPE	1,000.00	LF	\$ _____	\$ _____
0073AC	INSTALL 4" STEEL GAS PIPE	1,000.00	LF	\$ _____	\$ _____
0073AD	INSTALL 8" STEEL GAS PIPE	500.00	LF	\$ _____	\$ _____
0073AE	INSTALL 10" STEEL GAS PIPE	500.00	LF	\$ _____	\$ _____
<b>0074</b>	<b>INSTALL RISER, REGULATOR &amp; METER</b>	<b>100.00</b>	<b>EA</b>	<b>\$ _____</b>	<b>\$ _____</b>
<b>0075</b>	<b>INSTALL PE GAS VALVES</b>				
0075AA	INSTALL PE GAS VALVES (3/4" TO 1 1/2")	400.00	EA	\$ _____	\$ _____
0075AB	INSTALL PE GAS VALVES (2" TO 2 1/2")	400.00	EA	\$ _____	\$ _____
0075AC	INSTALL PE GAS VALVE (4")	150.00	EA	\$ _____	\$ _____
0075AE	INSTALL PE GAS VALVE (6")	150.00	EA	\$ _____	\$ _____

BEST AND FINAL OFFER

ITEM	DESCRIPTION	QUANTITY	U/I		
0075AF	INSTALL PE GAS VALVE (8")	100.00	EA	\$ _____	\$ _____
0076	LABOR POOL (DOLLAR AMOUNT NOT TO EXCEED \$35,000 PER TASK ORDER)	N/A	N/A	N/A	N/A
0077	EQUIPMENT POOL (DOLLAR AMOUNT NOT TO EXCEED \$35,000 PER TASK ORDER)	N/A	N/A	N/A	N/A
0078	MATERIAL POOL (DOLLAR AMOUNT NOT TO EXCEED \$35,000 PER TASK ORDER)	N/A	N/A	N/A	N/A
<b>TOTAL YEAR 3</b>					\$ _____
<b>GRAND TOTAL YEARS 1-3</b>					\$ _____

**Notes**

- All prices shall include overhead and profit where applicable.
- All extensions of the unit price shown shall be subject to verification by the Government. In case of a variation between the unit price and the extension, the unit price will be considered to be the offer.
- If an offer or modification to an offer based on unit prices is submitted which provides for a lump sum adjustment to the total estimated amount, the application of the lump sum adjustment to each unit price in the Schedule(s) must be stated. If it is not stated, the offeror agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the schedule(s)
- Amounts and price shall be indicated in either words or figures, not both.
- The Government will obligate itself to order services priced at not less than 2% of the total estimated amount in the Year 1, or \$500,000.00, whichever is less; 1% of the total estimated amount for each Year 2 and 3, or \$250,000.00 whichever is less. EFARS 16.604 "Indefinite Quantity Contracts."
- Additional Work

Labor Pool: A pool of labor hours has been set aside to accomplish work not covered in the contract line items, listed in the Schedule(s). The Contractor is required to include direct labor rates, related labor costs, mix of trades, overhead, General and Administrative expense and Profit in the development of composite labor rate. The justification for and dollar amount will be negotiated for each delivery order, as needed.

Equipment Pool: This pool is established to accomplish work not covered in the contract line items listed in the Schedule(s). The Contractor is required to provide copies of invoices for rental of equipment and/or provide rate schedules in support of these costs. This is equipment required to implement a delivery order. The justification for and dollar amount will be negotiated for each delivery order, as needed, and will not be included in the price proposal.

Equipment Pool: This pool is established to accomplish work not covered in the contract line items listed in the Schedule(s). The Contractor is required to provide copies of invoices and/or purchase orders for rental of material required/utilized in support of these costs. It includes supplies that are required to implement a delivery order. The justification for and dollar amount will be negotiated for each delivery order, as needed.

## MEASUREMENT AND PAYMENT

### PART 1 GENERAL

The number in parentheses for each item of work listed below, indicates the Base Year Item Number. The succeeding numbers are for each option year.

Example:

1. WORK SITE TRAFFIC CONTROL [(0001) 0027, 0053]

### PART 2 PRODUCTS

Not used.

### PART 3 EXECUTION

- 3.1 WORK SITE TRAFFIC CONTROL [(0001) 0027, 0054]

Work includes furnishing and placing all barriers, guards, lights, signs, flag persons and watch persons at the work site in compliance with applicable safety requirements. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order. For bidding purposes, use the following quantities, 3 barriers(std length), 20 orange plastic guard posts, 3 construction flood lights, 3 portable traffic warning signs, 2 flagmen-8 hrs/day for 10 days, security watchman-8 hrs/day for 10 days.

- 3.2 PCC CURB & GUTTER REMOVAL/REPLACEMENT [(0002AA,) 0028AA, 0054AA,]

Work includes the removal and replacement of Portland Cement Concrete (PCC) curb and gutter. Removal of the curb and gutter requires saw cutting, removal and disposal of debris; replacement requires subgrade preparation, setting forms, furnishing and placing PCC, finishing (including joints), stripping of forms, backfilling and cleanup. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

- 3.3 PCC REMOVAL/REPLACEMENT (1"-6") [(0002AB) 0028AB, 0054AB]

Work includes the removal and replacement of PCC walks, cross gutters, access ramps, driveways, aprons and pavement up to 6 inches in thickness. Removal requires saw cutting, removal and disposal of debris; replacement requires subgrade preparation, furnishing, placing and compacting base material, setting forms, furnishing and placing PCC, finishing (including joints), stripping of forms, backfilling and cleanup. Measurement will be by square foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

- 3.4 PCC REMOVAL/REPLACEMENT (6" to 15") [(0002AC) 0028AC, 0054AC]

Work includes the removal and replacement of PCC pavements, slabs and foundations with thickness greater than 6 inches up to a maximum of 15 inches. The Contractor will not be required to remove PCC items within the flight line operations area which includes runway pavements, taxiways or aprons. Removal requires saw cutting removal and disposal of debris; replacement requires subgrade preparation, furnishing, placing and compacting base material setting forms, furnishing and placing PCC, finishing (including joints), stripping of forms, backfilling and cleanup. Measurement will be by square foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

### 3.5 ASPHALT CONCRETE REMOVAL/REPLACEMENT [(0003) 0029, 0055]

Work includes the removal and replacement of asphalt concrete berms, walks, drainage swales and pavements. Removal requires saw cutting, removal and disposal of debris; replacement requires furnishing, placing and compacting base material, application of a prime coat and a tack coat, furnishing and placing up to 4-inches of asphalt concrete. Measurement will be by square foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

### 3.6 ROCK/HARD MATERIAL EXCAVATION [(0004) 0030, 0056]

work includes the excavation, loading, transportation and disposal of rock or hard material encountered in trench excavation activities. Measurement will be by the cubic yard. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this activity in conformity with the Task Order.

### 3.7 IMPORTED SELECTED FILL MATERIAL [(0005) 0031, 0057]

Work includes the excavation, loading, transportation and placement of imported selected material required to replace unsuitable material, rock or hard material encountered in trench activities. Work also includes transportation and disposal of unsuitable material. Measurement will be by the cubic yard. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this activity in conformity with the Task Order.

### 3.8 PLACE 3/4" SCHEDULE 40 WATER PIPE [(0006AA) 0032AA, 0058AA]

Work includes the repair or replacement of 3/4" PVC Schedule 40 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

### 3.9 PLACE 1" PVC SCHEDULE 40 WATER PIPE [(0006AB) 0032AB, 0058AB]

Work includes the repair or replacement of 1" PVC Schedule 40 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing and placing warning and identification tape, backfilling and compacting with

native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.10 PLACE 1-1/2" PVC SCHEDULE 40 WATER PIPE [(0006AC) 0032AC, 0058AC]

Work includes the repair or replacement of 1-1/2" PVC Schedule 40 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.11 PLACE 2" PVC SCHEDULE 40 WATER PIPE [(0006AD), 0032AD, 0058AD]

Work includes the repair or replacement of 2" PVC Schedule 40 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.12 PLACE 2-1/2" PVC SCHEDULE 40 WATER PIPE [(0006AE) 0032AE, 0058AE]

Work includes the repair or replacement of 2-1/2" PVC Schedule 40 water pipe. Repair or replacement work includes trenching excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.13 PLACE 3" PVC SCHEDULE 40 WATER PIPE [(0006AF) 0032AF, 0058AF]

Work includes the repair or replacement of 3" PVC Schedule 40 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing sand bedding furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.14 PLACE 4" PVC C900 WATER PIPE [(0006AG) 0032AG, 0058AG]

Work includes the repair or replacement of 4" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will

be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

3.15 PLACE 6" PVC C900 WATER PIPE [(0006AH) 0032AH, 0058AH]

Work includes the repair or replacement of 6" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe fittings, furnishing and placing warning and identification tape, backfilling and compacting and native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.16 PLACE 8" PVC C900 WATER PIPE [(0006AJ) 0032AJ, 0058AJ]

Work includes the repair or replacement of 8" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe fittings, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.17 PLACE 10" PVC C900 WATER PIPE [(0006AK) 0032AK, 0058AK]

Work includes the repair or replacement of 10" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe fittings, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.18 Place 12" PVC C900 WATER PIPE [(0006AL) 0032AL, 0058AL]

Work includes the repair or replacement of 12" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe and fittings, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.19 PLACE 14" PVC C905 WATER PIPE [(0006AM) 0032AM, 0058AM]

Work includes the repair or replacement of 14" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe and fittings, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials,

tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

3.20 RESERVED

3.21 RESERVED

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3.25 RESERVED

3.26 PLACE WATER SERVICE 3/4" TO 2" [(0008AA) 0034AA, 0059AA]

Work includes furnishing and installing a double strap service saddle and corporation stop, including the connection to a structure and restoring work site to previous condition. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.27 PLACE WATER SERVICE 2-1/2" TO 3 [(0008AB) 0034AB, 0060AB]

Work includes furnishing and installing a tapping saddle, tapping valve and connection to a structure and restoring the work site to its previous condition. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.28 RESERVED

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3.42 PLACE 4" VALVE BELOW GRADE [(0010AA) 0036AA, 0062AA]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and doing all work required to complete this item of work in conformity with the Task order.

3.43 PLACE 6" VALVE BELOW GRADE [(0010AB) 0036AB, 0062AB]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.44 PLACE 8" VALVE BELOW GRADE [(0010AC) 0036AC, 0062AC]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.45 PLACE 10" VALVE BELOW GRADE [(0010AD) 0036AD, 0062AD]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.46 PLACE 12" VALVE BELOW GRADE [(0010AE) 0036AE, 0062AE]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.47 PLACE 14" VALVE BELOW GRADE [(0010AF) 0036AF, 0062AF]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.48 PLACE 16" VALVE BELOW GRADE [(0010AG) 0036AG, 0062AG]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.49 PLACE 4" VALVE ABOVE GRADE [(0010AH) 0036AH, 0062AH]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

3.50 PLACE 6" VALVE ABOVE GRADE [(0010AJ) 0036AJ, 0062AJ]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

3.51 PLACE 8" VALVE ABOVE GRADE [(0010AK) 0036AK, 0062AK]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.52 PLACE 10" VALVE ABOVE GRADE [(0010AL) 0036AL, 0062AL]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.53 PLACE 12" VALVE ABOVE GRADE [(0010AM) 0036AM, 0062AM]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.54 PLACE 14" VALVE ABOVE GRADE [(0010AN) 0036AN, 0062AN]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.55 PLACE 16" VALVE ABOVE GRADE [(0010AP) 0036AP, 0062AP]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.56 PLACE 6" PIV [(0011) 0037, 0063]

Work includes furnishing and installing this valve as required. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.57 JACK 18" STEEL SLEEVE SCHEDULE 40 [(0012) 0038, 0064]

Work includes excavating jacking pits, furnishing and installing an 18", steel sleeve, hauling and disposal of spoil, and restoring work site. Measurement will be by lineal foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.58 PIPE PLACEMENT DEEPER THAN 5' PER FOOT OF DEPTH [(0013) 0039, 0065]

Work includes trench excavating, providing access to trench, placing shoring, backfilling and compacting. Measurement will be by cubic yard. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.59 INSTALL FIRE HYDRANT [(0014) 0040, 0066]

Work includes furnishing and installing a fire hydrant head. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.60 INSTALL 3/4" BACK FLOW PREVENTER [(0015AA) 0041AA, 0067AA]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.61 INSTALL 1" BACK FLOW PREVENTER [(0015AB) 0041AB, 0067AB]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.62 INSTALL 1-1/2" BACK FLOW PREVENTER [(0015AC) 0041AC, 0067AC]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.63 INSTALL 2" BACK FLOW PREVENTER [(0015AD) 0041AD, 0067AD]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.64 INSTALL 2-1/2 BACK FLOW PREVENTER [(0015AE) 0041AE, 0067AE]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.65 INSTALL 3" BACK FLOW PREVENTER [(0015AF) 0041AF, 0067AF]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.66 INSTALL 4" BACK FLOW PREVENTER [(0015AG) 0041AG, 0067AG]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.67 INSTALL 6" BACK FLOW PREVENTER [(0015AH) 0041AH, 0067AH]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.68 INSTALL 8" BACK FLOW PREVENTER [(0015AJ) 0041AJ, 0067AJ]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.69 INSTALL 10" BACK FLOW PREVENTER [(0015AK) 0041AK, 0067AK]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.70 INSTALL 12" BACK FLOW PREVENTER [(0015AL) 0041AL, 0067AL]

Work includes furnishing and installing a back flow preventer. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.71 INSTALL IRRIGATION CONTROLLER [(0016AA) 0042AA, 0068AA]

Work includes furnishing and installing an irrigation controller. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.72 INSTALL 12 STATION 3/4" IRRIGATION CONTROL VALVE [(0016AB) 0042AB, 0068AB]

Work includes furnishing and installing an irrigation controller. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.73 INSTALL 12 STATION 1" IRRIGATION CONTROL VALVE [(0016AC) 0042AC, 0068AC]

Work includes furnishing and installing an irrigation controller. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.74 INSTALL 12 STATION 1-1/2" IRRIGATION CONTROL VALVE ((0016AD) 0042AD, 0068AD]

Work includes furnishing and installing an irrigation controller. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.75 INSTALL 12 STATION 2" IRRIGATION CONTROL VALVE [(0016AE) 0042AE, 0068AE]

Work includes furnishing and installing an irrigation controller. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.76 INSTALL 12 STATION 3" IRRIGATION CONTROL VALVE [(0016AF) 0042AF, 0068AF]

Work includes furnishing and installing an irrigation controller. Payment shall include full compensation of furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

3.77 INSTALL IRRIGATION HEADS [(0016AG) 0042AG, 0068AG]

Work includes furnishing and installing irrigation heads. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.78 ALTITUDE VALVE (UP to 8 INCH) [(0017) 0043, 0069]

Work includes furnishing and installing an altitude valve. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.79 PLACE 4" PVC SDR 35 SEWER PIPE [(0018AA) 0044AA, 0070AA]

Work includes trench excavation, control of ground and surface water, removal of existing pipe, furnishing and placing new pipe and fittings, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.80 PLACE 6" PVC SDR 35 SEWER PIPE [(0018AB) 0044AB, 0070AB]

Work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe and fittings, furnishing and placing sand bedding, furnishing and placing warning identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus soil and

debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.81 PLACE 8" PVE SDR 35 SEWER PIPE [(0018AC) 0044AC, 0070AC]

Work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe and fittings, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

8.62 PLACE 10" PVC SDR 35 SEWER PIPE [(0018AD) 0044AD, 0070AD]

Work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe and fittings, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.83 PLACE 12" PVC SDR 35 SEWER PIPE [(0018AE) 0044AE, 0070AE]

Work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe and fittings, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.84 INSTALL SEWER MANHOLE UP TO 6' DEEP [(0018AF) 0044AF, 0070AF]

Work includes furnishing and placing a sewer manhole and cover up to a depth of six feet. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.85 INSTALL MH RINGS IN 1' INCREMENTS [(0018AG) 0044AG, 0070AG]

Work includes furnishing and placing a manhole ring to provide for depths beyond six feet. Measurement will be per manhole rings in one foot increments until the required depth is reached. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.86 RECONNECT SEWER LATERALS [(0018AH) 0044AH, 0070AH]

Work includes reconnecting service laterals to the replacement or repaired sewer line. Measurement will be per connection. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.87 PLACE 12 " CMP STORM DRAIN PIPE [(0019AA) 0045AA, 0071AA]

Work includes the placement of 12" CMP storm drain pipe. Work includes trench excavation or ditch grading, furnishing and placing new pipe and fittings, furnishing and placing bedding material, backfilling and compacting to requirements, hauling and disposal of debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

3.88 PLACE 18" CMP STORM DRAIN PIPE [(0019AB) 0045AB, 0071AB]

Work includes the placement of 18" CMP storm drain pipe. Work includes trench excavation or ditch grading, furnishing and placing new pipe and fittings, furnishing and placing bedding material, backfilling and compacting to requirements, hauling and disposal of debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.89 PLACE OR REPAIR 3/4" PE GAS PIPE [(0020AA) 0046AA, 0072AA]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joints; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work describe.

3.90 PLACE OR REPAIR 1" PE GAS PIPE [(0020AB) 0046AB, 0072AB]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joints; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95%. and finish trench to accept top condition as described in Task Order. Measurement will be by linear foot and shall include all work described.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

3.91 PLACE OR REPAIR 1-1/4" PE GAS PIPE [(0020AC) 0046AC, 0072AC]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joints; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work described.

3.92 PLACE OR REPAIR 1-1/2" PE GAS PIPE [(0020AD) 0046AD, 0072AD]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30", Stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joint; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work described.

3.93 PLACE OR REPAIR 2" PE GAS PIPE [(0020AE) 0046AE, 0072AE]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30", stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joints; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape;

Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will by linear foot and shall include all work described.

3.94 PLACE OR REPAIR 2-1/2" PE GAS PIPE [(0020AF) 0046AF, 0072AF]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joints; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work described.

3.95 PLACE OR REPAIR 3" PE GAS PIPE [(0020AG) 0046AG, 0072AG]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joints; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work described.

3.96 PLACE OR REPAIR 4" PE GAS PIPE [(0020AH) 0046AH, 0072AH]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30", Stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joints; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work described.

3.97 PLACE OR REPAIR 5" PE GAS PIPE [(0020AJ) 0046AJ, 0072AJ]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30", Stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joints; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work described.

3.98 PLACE OR REPAIR 6" PE GAS PIPE [(0020AK) 0046AK, 0072AK]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install gas pipe and fittings including heat fusion joints; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work described.

3.99 PLACE OR REPAIR 10" PE GAS PIPE [(0020AL) 0046AL, 0072AL]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30", Stockpile soil for re-use; Prepare sand bedding; Install epoxy coated steel gas pipe and fittings including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work described.

3.100 PLACE OR REPAIR 2" STEEL GAS PIPE [(0021AA) 0047AA, 0073AA]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; stockpile soil for re-use; Prepare sand bedding; Install epoxy coated steel gas pipe and fittings including coated joints or fittings; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as-described in Task Order.

Repair work shall include all the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

Measurement will be by linear foot and shall include all work described.

3.101 PLACE OR REPAIR 3" STEEL GAS PIPE [(0021AB) 0047AB, 0073AB]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install epoxy coated steel gas pipe and fittings including coated joints or fittings; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order. Measurement will be by linear foot and shall include all work described.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

3.102 PLACE OR REPAIR 4" STEEL GAS PIPE [(0021AC) 0047AC, 0073AC]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install epoxy coated steel gas pipe and fittings including coated joints or fittings; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order. Measurement will be by linear foot and shall include all work described.

Repair work shall include all of the above plus removal of existing pipe material and finishing of both ends of repair pieces for connection to new pipe.

3.103 PLACE OR REPAIR 8" STEEL GAS [(0021AD) 0047AD, 0073AD]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install epoxy coated steel gas pipe and fittings including tracer wire and warning tape; Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order. Measurement will be by linear foot and shall include all work described.

3.104 PLACE OR REPAIR 10" STEEL GAS PIPE [(0021AE) 0047AE, 0073AE]

Work includes the following - Excavate trench width equal to pipe diameter plus 16 inches to depth of 30"; Stockpile soil for re-use; Prepare sand bedding; Install epoxy coated steel gas pipe and fittings including coated joints or fittings; Test pipe under pressure; Backfill sand bed and soil including tracer wire and warning tape;

Compact bedding and soil to 95% and finish trench to accept top condition as described in Task Order. Measurement will be by linear foot and shall include all work described.

3.105 PLACE OR REPAIR RISER, REGULATOR AND METER [(0022), 0048, 0074]

Work includes the following - Repair includes removal of all piping and equipment on the leaving side of shut-off valve. Install riser pipe with earthquake valve, dielectric union, regulator and meters as described in Task Order.

Measurement shall be each assembly and shall include all work described.

3.106 PLACE OR REPAIR 3/4" OR 1" OR 1-1/2" PE GAS VALVE [(0023AA) 0049AA, 0075AA]

Work will include the following - Excavate trench at valve location to expose pipe; Prepare ends of pipe after proper cutting or location of new material; Install restraining block, epoxy coated rebar anchor, valve stem sleeve and traffic cover as shown on typical detail.

Measurement shall be each assembly and shall include all work describe.

3.107 PLACE OR REPAIR 2" OR 2/12" PE GAS VALVE [(0023AB) 0049AB, 0075AB]

Work will include the following - Excavate trench at valve location to expose pipe; Prepare ends of pipe after proper cutting or location of new material; Install restraining block, epoxy coated rebar anchor, valve stem sleeve and traffic cover as shown on typical detail.

Measurement shall be each assembly and shall include all work described.

3.108 PLACE OR REPAIR 4" PE GAS VALVE [(0023AC) 0049AC, 0075AC]

Work will include the following - Excavate trench at valve location to expose pipe; Prepare ends of pipe after proper cutting or location of new material; Install restraining block, epoxy coated rebar anchor, valve stem sleeve and traffic cover as shown on typical detail.

Measurement shall be each assembly and shall include all work described.

3.109 PLACE OF REPAIR 5" PE GAS VALVE [(0023RD) 0049AD, 0075AD]

Work will include the following - Excavate trench at valve location to expose pipe; Prepare ends of pipe after proper cutting or location of new material; Install restraining block, epoxy coated rebar anchor, valve stem sleeve and traffic cover as shown on typical detail.

Measurement shall be each assembly and shall include all work described.

3.110 PLACE OR REPAIR 6" PE GAS VALVE [(0023AE) 0049AE, 0075AE]

Work will include the following - Excavate trench at valve location to expose pipe; Prepare ends of pipe after proper cutting or location of new material;

Install restraining block, epoxy coated rebar anchor, valve stem sleeve and traffic cover as shown on typical detail.

Measurement shall be each assembly and shall include all work described.

3.111 PLACE OR REPAIR 8" PE GAS VALVE [(0023AF) 0049AF, 0075AF]

Work will include the following - Excavate trench at valve location to expose pipe; Prepare ends of pipe after proper cutting or location of new material; Install restraining block, epoxy coated rebar anchor, valve stem sleeve and traffic cover as shown on typical detail.

Measurement shall be each assembly and shall include all work describe.

3.112 PLACE 4" HDPE WATER PIPE [(0007AA) 0033AA, 0059AA]

Work includes the repair or replacement of 4"PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task order.

3.113 PLACE 6" HDPE WATER PIPE [(0007AB) 0033AB, 0059AB]

Work includes the repair or replacement of 6" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing warning and identification tape, backfilling and compacting and native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.114 PLACE 8" HDPE WATER PIPE [(0007AC) 0033AC, 0059AC]

Work includes the repair or replacement of 8" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.115 PLACE 10" HDPE WATER PIPE [(0007AD) 0033AD, 0059AD]

Work includes the repair or replacement of 10"PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.116 PLACE 12" HDPE WATER PIPE [(0007AE) 0033AE, 0059AE]

Work includes the repair or replacement of 8" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing new pipe, furnishing and placing sand bedding, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

3.117 PLACE 18" HDPE WATER PIPE [(0007AF) 0033AF, 0059AF]

Work includes the repair or replacement of 10" PVC C900 water pipe. Repair or replacement work includes trench excavation, control of ground and surface waters, removal of existing pipe, furnishing and placing warning and identification tape, backfilling and compacting with native soil, and hauling and disposal of surplus trench soil and debris. Measurement will be by linear foot. Payment shall include full compensation for furnishing all labor, materials, tools and equipment, and doing all work required to complete this item of work in conformity with the Task Order.

-- End of Section -

recommended trench widths are exceeded, redesign, stronger pipe, or special installation procedures shall be utilized by the Contractor. The cost of redesign, stronger pipe, or special installation procedures shall be borne by the Contractor without any additional cost to the Government.

#### 3.1.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Bell holes shall be excavated to the necessary size at each joint or coupling to eliminate point bearing. Stones of 2 inches or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

#### 3.1.1.2 Removal of Unyielding Material

Where unyielding material is encountered in the bottom of the trench, such material shall be removed 6 inches below the required grade and replaced with suitable materials as provided in paragraph BACKFILLING AND COMPACTION.

#### 3.1.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in paragraph BACKFILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

#### 3.1.1.4 Excavation for Appurtenances

Excavation for manholes, catch-basins, inlets, or similar structures shall be of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Rock shall be cleaned of loose debris and cut to a firm surface either level, stepped, or serrated, as shown or as directed. Loose disintegrated rock and thin strata shall be removed. Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

#### 3.1.1.5 Jacking, Boring, and Tunneling

Unless otherwise indicated, excavation shall be by open cut except that sections of a trench may be jacked, bored, or tunneled if, in the opinion of the Contracting Officer, the pipe, cable, or duct can be safely and properly installed and backfill can be properly compacted in such sections. Refer to Section 02510, WATER DISTRIBUTION SYSTEM, para 3.1.10, Casing Pipe, for utility line casing requirements.

#### 3.1.2 Stockpiles

Stockpiles of satisfactory and wasted materials shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment, excavated satisfactory and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness

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## SECTION 02510A

## WATER DISTRIBUTION SYSTEM

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN RAILWAY ENGINEERING & MAINTENANCE-OF-WAY ASSOCIATION  
(AREMA)

AREMA Manual (1999) Manual for Railway Engineering (4 Vol.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M (1997a) Carbon Structural Steel

ASTM A 53 (1999b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM B 88 (1996) Seamless Copper Water Tube

ASTM B 88M (1996) Seamless Copper Water Tube (Metric)

ASTM C 76 (1999) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

ASTM C 76M (1999a) Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric)

ASTM D 1599 (1999) Resistance to Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing, and Fittings

ASTM D 1784 (1999a) Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

ASTM D 1785 (1999) Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

ASTM D 2241 (1996b) Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)

ASTM D 2464 (1999) Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80

ASTM D 2466 (1999) Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40

ASTM D 2467	(1999) Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D 2564	(1996a) Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D 2657	(1997) Heat Fusion Joining Polyolefin Pipe and Fittings
ASTM D 2774	(1994) Underground Installation of Thermoplastic Pressure Piping
ASTM D 2855	(1996) Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM D 2996	(1995) Filament-Wound "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM D 2997	(1995) Centrifugally Cast "Fiberglass" (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe
ASTM D 3139	(1998) Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
ASTM D 3839	(1994a) Underground Installation of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe
ASTM D 4161	(1996) "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe Joints Using Elastomeric Seals
ASTM F 477	(1999) Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F 1483	(1998) Oriented Poly(Vinyl Chloride), PVC-O, Pressure Pipe

## ASME INTERNATIONAL (ASME)

ASME B1.20.1	(1983; R 1992) Pipe Threads, General Purpose (Inch)
ASME B16.1	(1998) Cast Iron Pipe Flanges and Flanged Fittings
ASME B16.3	(1992) Malleable Iron Threaded Fittings
ASME B16.26	(1988) Cast Copper Alloy Fittings for Flared Copper Tubes
ASME B36.10M	(1996) Welded and Seamless Wrought Steel Pipe

## AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA B300	(1992) Hypochlorites
AWWA B301	(1992) Liquid Chlorine
AWWA C104	(1995) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C110	(1993) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
AWWA C111	(1995) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C115	(1996) Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
AWWA C151	(1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C153	(1994; Errata Nov 1996) Ductile-Iron Compact Fittings, 3 In. Through 24 In. (76 mm through 610 mm) and 54 In. through 64 In. (1,400 mm through 1,600 mm) for Water Service
AWWA C200	(1997) Steel Water Pipe - 6 In. (150 mm) and Larger
AWWA C203	(1997) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C205	(1995) Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. (100 mm) and Larger - Shop Applied
AWWA C207	(1994) Steel Pipe Flanges for Waterworks Service - Sizes 4 In. Through 144 In. (100 mm through 3,600 mm)
AWWA C208	(1996) Dimensions for Fabricated Steel Water Pipe Fittings
AWWA C300	(1997) Reinforced Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids
AWWA C301	(1992) Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, for Water and Other Liquids
AWWA C303	(1995) Concrete Pressure Pipe, Bar-Wrapped, Steel Cylinder Type
AWWA C500	(1993; C500a) Metal-Sealed Gate Valves for Water Supply Service

AWWA C502	(1994; C502a) Dry-Barrel Fire Hydrants
AWWA C503	(1997) Wet-Barrel Fire Hydrants
AWWA C504	(1994) Rubber-Seated Butterfly Valves
AWWA C509	(1994; Addendum 1995) Resilient-Seated Gate Valves for Water Supply Service
AWWA C600	(1993) Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA C606	(1997) Grooved and Shouldered Joints
AWWA C651	(1992) Disinfecting Water Mains
AWWA C700	(1995) Cold-Water Meters - Displacement Type, Bronze Main Case
AWWA C701	(1988) Cold-Water Meters - Turbine Type, for Customer Service
AWWA C702	(1992) Cold-Water Meters - Compound Type
AWWA C703	(1996) Cold-Water Meters - Fire Service Type
AWWA C704	(1992) Propeller-Type Meters Waterworks Applications
AWWA C706	(1996) Direct-Reading, Remote-Registration Systems for Cold-Water Meters
AWWA C707	(1982; R 1992) Encoder-Type Remote-Registration Systems for Cold-Water Meters
AWWA C800	(1989) Underground Service Line Valves and Fittings
AWWA C900	(1997; C900a) Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In., for Water Distribution
AWWA C901	(1996) Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. Through 3 In., for Water Service
AWWA C905	(1997) Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14 In. Through 36 In.
<u>AWWA C906</u>	<u>(1999) Polyethylene (PE) Pressure Pipe and Fittings, 4 in. Through 63 in., for Water Distribution</u>
AWWA C909	(1998) Molecularly Oriented Polyvinyl Chloride (PVC) Pressure Pipe, 4 IN

through 12 IN (100 mm through 300 mm), for Water Distribution

AWWA C950 (1995) Fiberglass Pressure Pipe

AWWA M23 (1980) Manual: PVC Pipe - Design and Installation

ASBESTOS CEMENT PIPE PRODUCERS ASSOCIATION (ACPPA)

ACPPA 1344 (1988) Recommended Work Practices for A/C Pipe

DUCTILE IRON PIPE RESEARCH ASSOCIATION (DIPRA)

DIPRA TRD (1997) Thrust Restraint Design for Ductile Iron Pipe

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS)

MSS SP-80 (1997) Bronze Gate, Globe, Angle and Check Valves

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 24 (1995) Installation of Private Fire Service Mains and Their Appurtenances

NFPA 49 (1994) Hazardous Chemicals Data

NFPA 325-1 (1994) Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids

NFPA 704 (1996) Identification of the Fire Hazards of Materials for Emergency Response

NFPA 1961 (1997) Fire Hose

NSF INTERNATIONAL (NSF)

NSF 14 (1998) Plastics Piping Components and Related Materials

NSF 61 (1999) Drinking Water System Components - Health Effects (Sections 1-9)

PLASTICS PIPE INSTITUTE HANDBOOK OF POLYETHYLENE PIPE (PPI)

PPI PPI Handbook (Latest Edition)

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC Paint 21 (1991) White or Colored Silicone Alkyd Paint

SSPC Paint 25 (1991) Red Iron Oxide, Zinc Oxide, Raw Linseed Oil and Alkyd Primer (Without Lead and Chromate Pigments)

## 1.2 PIPING

This section covers water service lines, and connections to building service at a point approximately 5 feet outside buildings and structures to which service is required. The Contractor shall have a copy of the manufacturer's recommendations for each material or procedure to be utilized available at the construction site at all times. For HDPE, the Contractor shall have a copy of the Plastic Pipe Institute Handbook of Polyethylene Pipe (PPI Handbook) and the specific pipe manufacturer's recommendations.

### 1.2.1 Service Lines

Piping for water service lines less than 3 inches in diameter shall be polyvinyl chloride (PVC) plastic, unless otherwise shown or specified. Piping for water service lines 3 inches and larger shall be polyvinyl chloride (PVC) plastic or HDPE, DR11, unless otherwise shown or specified.

### 1.2.2 Potable Water Lines

Piping and components of potable water systems which come in contact with the potable water shall conform to NSF 61.

### 1.2.3 Plastic Piping System

Plastic piping system components (PVC and HDPE, polyethylene and thermosetting resin) intended for transportation of potable water shall comply with NSF 14 and be legibly marked with their symbol.

### 1.2.4 Excavation, Trenching, and Backfilling

Excavation, trenching, and backfilling shall be in accordance with the applicable provisions of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS, except as modified herein.

## 1.3 MANUFACTURER'S REPRESENTATIVE

The Contractor shall have a manufacturer's field representative present at the jobsite during the installation and testing of PE pipe to provide technical assistance and to verify that the materials are being installed in accordance with the manufacturer's prescribed procedures. When the representative feels that the Contractor is installing and testing the PE pipe in a satisfactory manner, certification shall be written to note which individuals employed by the Contractor are capable of properly installing the pipe. The field representative shall advise the Contractor of unsatisfactory conditions immediately when they occur. Such conditions include improper diameter of pipe ends, damaged interior liner, poorly prepared joints, improper curing of joints, moving pipe before joints are cured, bending pipe to follow abrupt changes in trench contours, leaving pipe ends open in trench overnight, not properly drying joints after rain storms, exceeding effective adhesive life, sharp objects in trench bed, backfill that could damage pipe, improper procedure for concrete encasement of pipe, omission of thrust blocks at changes in direction or any other condition which could have an adverse effect on the satisfactory completion and operation of the piping system.

## 1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Installation;

The manufacturer's recommendations for each material or procedure to be utilized.

Satisfactory Installation;

A statement signed by the principal officer of the contracting firm stating that the installation is satisfactory and in accordance with the contract drawings and specifications, and the manufacturer's prescribed procedures and techniques, upon completion of the project and before final acceptance.

SD-06 Test Reports

Bacteriological Disinfection;

Test results from commercial laboratory verifying disinfection.

SD-07 Certificates

Manufacturer's Representative;

The name and qualifications of the manufacturer's representative and written certification from the manufacturer that the representative is technically qualified in all phases of PE, pipe laying and jointing and experienced to supervise the work and train the Contractor's field installers, prior to commencing installation.

Installation;

A statement signed by the manufacturer's field representative certifying that the Contractor's personnel are capable of properly installing the pipe on the project.

1.5 HANDLING

Pipe and accessories shall be handled to ensure delivery to the trench in sound, undamaged condition, including no injury to the pipe coating or lining. If the coating or lining of any pipe or fitting is damaged, the repair shall be made by the Contractor in a satisfactory manner, at no additional cost to the Government. No other pipe or material shall be placed inside a pipe or fitting after the coating has been applied. Pipe shall be carried into position and not dragged. Use of pinch bars and tongs for aligning or turning pipe will be permitted only on the bare ends

of the pipe. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Government. Rubber gaskets that are not to be installed immediately shall be stored in a cool and dark place.

#### 1.5.1 Polyethylene (PE) Pipe Fittings and Accessories

PE pipe, fittings, and accessories shall be handled in conformance with AWWA C901.

#### 1.5.2 Miscellaneous Plastic Pipe and Fittings

Polyvinyl Chloride (PVC) ~~and HDPE,~~ pipe and fittings shall be handled and stored in accordance with the manufacturer's recommendations. Storage facilities shall be classified and marked in accordance with NFPA 704, with classification as indicated in NFPA 49 and NFPA 325-1.

### PART 2 PRODUCTS

#### 2.1 PIPE

Pipe shall conform to the respective specifications and other requirements specified below.

##### 2.1.1 Plastic Pipe

###### 2.1.1.1 PE Plastic Pipe

Pipe, tubing, and heat-fusion fittings shall conform to AWWA C901.

###### 2.1.1.2 PVC Plastic Pipe

Pipe, couplings and fittings shall be manufactured of material conforming to ASTM D 1784, Class 12454B.

###### a. Pipe Less Than 4 inch Diameter:

(1) Screw-Joint: Pipe shall conform to dimensional requirements of ASTM D 1785 Schedule 80, with joints meeting requirements of 150 psi working pressure, 200 psi hydrostatic test pressure, unless otherwise shown or specified. Pipe couplings when used, shall be tested as required by ASTM D 2464.

(2) Elastomeric-Gasket Joint: Pipe shall conform to dimensional requirements of ASTM D 1785 Schedule 40, with joints meeting the requirements of 150 psi working pressure, 200 psi hydrostatic test pressure, unless otherwise shown or specified, or it may be pipe conforming to requirements of ASTM D 2241, elastomeric joint, with the following applications:

SDR	Maximum Working Pressure psi	Minimum Hydrostatic Pressure psi
26	100	133
21	120	160
17	150	200
13.5	200	266

(3) Solvent Cement Joint: Pipe shall conform to dimensional requirements of ASTM D 1785 or ASTM D 2241 with joints meeting the requirements of 150 psi working pressure and 200 psi hydrostatic test pressure.

- b. Pipe 4 through 12 inch Diameter: Pipe, couplings and fittings shall conform to AWWA C900, Class 150, CIOD pipe dimensions, elastomeric-gasket joint, unless otherwise shown or specified.
- c. Pipe 14 through 36 inch Diameter: Pipe shall conform to AWWA C905 unless otherwise shown or specified.

2.1.1.3 HDPE Plastic Pipe

a. Pipe Less Than 4-Inch Diameter:

HDPE Pipe 3-inches or less in diameter shall conform to the ductile-iron system as indicated in AWWA C901. All HDPE pipe shall be DR11 with a minimum wall thickness as per applicable Table of AWWA C901 and a working pressure of 160 psi.

b. Pipe 4-Inches and Greater:

HDPE Pipe and greater in diameter shall conform to the ductile-iron system as indicated in AWWA C906. All HDPE Pipe shall be DR11 with a minimum wall thickness as per applicable Table of AWWA C906 and a working pressure of 160 psi.

2.2 FITTINGS AND SPECIALS

2.2.1 PVC Pipe System

- a. For pipe less than 4 inch diameter, fittings for threaded pipe shall conform to requirements of ASTM D 2464, threaded to conform to the requirements of ASME B1.20.1 for use with Schedule 80 pipe and fittings; fittings for solvent cement jointing shall conform to ASTM D 2466 or ASTM D 2467; and fittings for elastomeric-gasket joint pipe shall be iron conforming to AWWA C110 or AWWA C111. Iron fittings and specials shall be cement-mortar lined (standard thickness) in accordance with AWWA C104.
- b. For pipe 4 inch diameter and larger, fittings and specials shall be iron, bell end in accordance with AWWA C110, 150 psi pressure rating unless otherwise shown or specified, except that profile of bell may have special dimensions as required by the pipe manufacturer; or fittings and specials may be of the same material as the pipe with elastomeric gaskets, all in conformance with AWWA C900. Iron fittings and specials shall be cement-mortar lined (standard thickness) in accordance with AWWA C104. Fittings shall

be bell and spigot or plain end pipe, or as applicable. Ductile iron compact fittings shall be in accordance with AWWA C153.

c. HDPE Fittings and Adapters

Fittings and adapters shall be of the same material as the HDPE pipe. The fittings and adapters shall conform to AWWA C906 and are intended to be joined to the HDPE piping by thermal heat fusion.

Fittings and adapters shall have a pressure rating equal to or greater than the 160 psi working pressure rating of the HDPE pipe. Nominal burst values must equal or exceed 3 1/2 times the 160 psi working pressure.

2.3 JOINTS

2.3.1 Plastic Pipe Jointing

2.3.1.1 PE Pipe

Joints for pipe fittings and couplings shall be strong tight joints as specified for PE in Paragraph INSTALLATION. Joints connecting pipe of differing materials shall be made in accordance with the manufacturer's recommendation, and as approved by the Contracting Officer.

2.3.1.2 PVC Pipe

Joints, fittings, and couplings shall be as specified for PVC pipe. Joints connecting pipe of differing materials shall be made in accordance with the manufacturer's recommendations, and as approved by the Contracting Officer.

2.3.1.3 HDPE Pipe

HDPE pipe and fitting joining methods shall conform to AWWA C901 and AWWA C906. Joints to be made as per Part 3 Execution.

2.3.2 Isolation Joints

Isolation joints shall be installed between nonthreaded ferrous and nonferrous metallic pipe, fittings and valves. Isolation joints shall consist of a sandwich-type flange isolation gasket of the dielectric type, isolation washers, and isolation sleeves for flange bolts. Isolation gaskets shall be full faced with outside diameter equal to the flange outside diameter. Bolt isolation sleeves shall be full length. Units shall be of a shape to prevent metal-to-metal contact of dissimilar metallic piping elements.

- a. Sleeve-type couplings shall be used for joining plain end pipe sections. The two couplings shall consist of one steel middle ring, two steel followers, two gaskets, and the necessary steel bolts and nuts to compress the gaskets.
- b. Split-sleeve type couplings may be used in aboveground installations when approved in special situations and shall consist of gaskets and a housing in two or more sections with the necessary bolts and nuts.

2.4 VALVES

#### 2.4.1 Gate Valves

Gate valves shall be designed for a working pressure of not less than 150 psi- for PVC pipe and 160 psi for HDPE pipe. Valve connections shall be as required for the piping in which they are installed. Valves shall have a clear waterway equal to the full nominal diameter of the valve, and shall be opened by turning counterclockwise. The operating nut or wheel shall have an arrow, cast in the metal, indicating the direction of opening.

- a. Valves smaller than 3 inches shall be all bronze and shall conform to MSS SP-80, Type 1, Class 150.
- b. Valves 3 inches and larger shall be iron body, bronze mounted, and shall conform to AWWA C500. Flanges shall not be buried. An approved pit shall be provided for all flanged connections.
- c. Resilient-Seated Gate Valves: For valves 3 to 12 inches in size, resilient-seated gate valves shall conform to AWWA C509.

#### 2.4.2 Vacuum and Air Relief Valves

Vacuum and air relief valves shall be of the size shown and shall be of a type that will release air and prevent the formation of a vacuum. The valves shall automatically release air when the lines are being filled with water and shall admit air into the line when water is being withdrawn in excess of the inflow. Valves shall be iron body with bronze trim and stainless steel float.

#### 2.4.3 Indicator Post for Valves

Each valve shown on the drawings with the designation "P.I.V." shall be equipped with indicator post conforming to the requirements of NFPA 24. Operation shall be by a wrench which shall be attached to each post.

#### 2.5 VALVE BOXES

Valve boxes shall be cast iron or concrete, except that concrete boxes may be installed only in locations not subjected to vehicular traffic. Cast-iron boxes shall be extension type with slide-type adjustment and with flared base. The minimum thickness of metal shall be 3/16 inch. Concrete boxes shall be the standard product of a manufacturer of precast concrete equipment. The word "WATER" shall be cast in the cover. The box length shall adapt, without full extension, to the depth of cover required over the pipe at the valve location.

#### 2.6 VALVE PITS

Valve pits shall be constructed at locations indicated or as required above and in accordance with the details shown. Concrete shall have compressive strength of 3000 psi.

#### 2.7 FIRE HYDRANTS

Hydrants shall be dry-barrel type conforming to AWWA C502 with valve opening at least 5 inches in diameter and designed so that the flange at the main valve seat can be removed with the main valve seat apparatus remaining intact, closed and reasonably tight against leakage and with a breakable valve rod coupling and breakable flange connections located no

more than 8 inches above the ground grade. Hydrants shall have a 6 inch bell connection, two 2-1/2 inch hose connections and one 4-1/2 inch pumper connection. Outlets shall have American National Standard fire-hose coupling threads. Working parts shall be bronze. Design, material, and workmanship shall be equal to the latest stock pattern ordinarily produced by the manufacturer. Hydrants shall be painted with 1 coat of red iron oxide, zinc oxide primer conforming to SSPC Paint 25 and 2 finish coats of silicone alkyd paint conforming to SSPC Paint 21, of the installation's standard colors or as directed by the Contracting Officer. Suitable bronze adapter for the 4-1/2 inch outlet, with caps, shall be furnished.

## 2.8 MISCELLANEOUS ITEMS

### 2.8.1 Service Clamps

Service clamps shall have a pressure rating not less than that of the pipe to be connected and shall be either the single or double flattened strap type. Clamps shall have a galvanized malleable-iron body with cadmium plated straps and nuts. Clamps shall have a rubber gasket cemented to the body.

### 2.8.2 Corporation Stops

Corporation stops shall have standard corporation stop thread conforming to AWWA C800 on the inlet end, with flanged joints, compression pattern flared tube couplings, or wiped joints for connections to goosenecks.

### 2.8.3 Goosenecks

Copper tubing for gooseneck connections shall conform to the applicable requirements of ASTM B 88, Type K, annealed. Length of cable requirement connections shall be in accordance with standard practice.

### 2.8.4 Service Stops

Service stops shall be water-works inverted-ground-key type, oval or round flow way, tee handle, without drain. Pipe connections shall be suitable for the type of service pipe used. All parts shall be of bronze with female iron-pipe-size connections or compression-pattern flared tube couplings, and shall be designed for a hydrostatic test pressure not less than 200 psi.

### 2.8.5 Tapping Sleeves

Tapping sleeves of the sizes indicated for connection to existing main shall be the cast gray, ductile, or malleable iron, split-sleeve type with flanged or grooved outlet, and with bolts, follower rings and gaskets on each end of the sleeve. Construction shall be suitable for a maximum working pressure of 150 psi. Bolts shall have square heads and hexagonal nuts. Longitudinal gaskets and mechanical joints with gaskets shall be as recommended by the manufacturer of the sleeve. When using grooved mechanical tee, it shall consist of an upper housing with full locating collar for rigid positioning which engages a machine-cut hole in pipe, encasing an elastomeric gasket which conforms to the pipe outside diameter around the hole and a lower housing with positioning lugs, secured together during assembly by nuts and bolts as specified, pretorqued to 50 foot-pound.

### 2.8.6 Service Boxes

Service boxes shall be cast iron or concrete and shall be extension service boxes of the length required for the depth of the line, with either screw or slide-type adjustment. The boxes shall have housings of sufficient size to completely cover the service stop or valve and shall be complete with identifying covers.

#### 2.8.7 Disinfection

Chlorinating materials shall conform to the following:

Chlorine, Liquid: AWWA B301.

Hypochlorite, Calcium and Sodium: AWWA B300.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

##### 3.1.1 Cutting of Pipe

Cutting of pipe shall be done in a neat and workmanlike manner without damage to the pipe. Unless otherwise recommended by the manufacturer and authorized by the Contracting Officer, cutting shall be done with an approved type mechanical cutter. Wheel cutter shall be used when practicable. Squeeze type mechanical cutters shall not be used for ductile iron.

##### 3.1.2 Adjacent Facilities

###### 3.1.2.1 Sewer Lines

Where the location of the water pipe is not clearly defined in dimensions on the drawings, the water pipe shall not be laid closer horizontally than 10 feet from a sewer except where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, in which case the water pipe shall not be laid closer horizontally than 6 feet from the sewer. Where water lines cross under gravity-flow sewer lines, the sewer pipe, for a distance of at least 10 feet each side of the crossing, shall be fully encased in concrete or shall be made of pressure pipe with no joint located within 3 feet horizontally of the crossing. Water lines shall in all cases cross above sewage force mains or inverted siphons and shall be not less than 2 feet above the sewer main. Joints in the sewer main, closer horizontally than 3 feet to the crossing, shall be encased in concrete.

###### 3.1.2.2 Water Lines

Water lines shall not be laid in the same trench with sewer lines, gas lines, fuel lines, or electric wiring.

##### 3.1.3 Joint Deflection

###### ~~3.1.3.1 Allowable for Reinforced Concrete Pipe~~

~~Maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets, shall be 5 degrees for reinforced concrete pipe unless a lesser amount is recommended by the manufacturer. Long radius curves in reinforced concrete pipe shall be formed by straight pipe in which spigot rings are placed on a bevel. Slight deflections may be made by straight pipe, provided that the maximum~~

~~joint opening caused by such deflection does not exceed the maximum recommended by the pipe manufacturer. Short radius curves and closures shall be formed by shorter lengths of pipe, bevels, or fabricated specials specified.~~

#### 3.1.3.1 Offset for Flexible Plastic Pipe

Maximum offset in alignment between adjacent pipe joints shall be as recommended by the manufacturer and approved by the Contracting Officer, but shall not exceed 5 degrees.

#### 3.1.4 Placing and Laying

Pipe and accessories shall be carefully lowered into the trench by means of derrick, ropes, belt slings, or other authorized equipment. Water-line materials shall not be dropped or dumped into the trench. Abrasion of the pipe coating shall be avoided. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate bells, couplings, and joints. Pipe that has the grade or joint disturbed after laying shall be taken up and relaid. Pipe shall not be laid in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until joints are complete. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substance will enter the pipes or fittings. Where any part of the coating or lining is damaged, the repair shall be made by and at the Contractor's expense in a satisfactory manner. Pipe ends left for future connections shall be valved, plugged, or capped, and anchored, as shown.

##### 3.1.4.1 Plastic Pipe Installation

~~RTRP shall be installed in accordance with ASTM D 3839. RPMP shall be installed in accordance with the manufacturer's recommendations. PE Pipe, including HDPE pipe, shall be installed in accordance with ASTM D 2774. PVC pipe shall be installed in accordance with AWWA M23.~~

##### 3.1.4.2 Piping Connections

Where connections are made between new work and existing mains, the connections shall be made by using specials and fittings to suit the actual conditions. When made under pressure, these connections shall be installed using standard methods as approved by the Contracting Officer. Connections to existing asbestos-cement pipe shall be made in accordance with ACPA 1344.

##### 3.1.4.3 Penetrations

Pipe passing through walls of valve pits and structures shall be provided with ductile-iron or Schedule 40 steel wall sleeves. Annular space between walls and sleeves shall be filled with rich cement mortar. Annular space between pipe and sleeves shall be filled with mastic.

##### 3.1.4.4 Flanged Pipe

Flanged pipe shall only be installed above ground or with the flanges in valve pits.

#### 3.1.5 Jointing

##### 3.1.5.1 PE Pipe Requirements

Jointing shall comply with ASTM D 2657, Technique I-Socket Fusion or Technique II-Butt Fusion.

#### 3.1.5.2 PVC Plastic Pipe Requirements

- a. Pipe less than 4 inch diameter: Threaded joints shall be made by wrapping the male threads with approved thread tape or applying an approved lubricant, then threading the joining members together. The joint shall be tightened using strap wrenches to prevent damage to the pipe and/or fitting. To avoid excessive torque, joints shall be tightened no more than one thread past hand-tight. Preformed rubber-ring gaskets for elastomeric-gasket joints shall be made in accordance with ASTM F 477 and as specified. Pipe ends for push-on joints shall be beveled to facilitate assembly and marked to indicate when the pipe is fully seated. The gasket shall be prelubricated to prevent displacement. The gasket and ring groove in the bell or coupling shall match. The manufacturer of the pipe or fitting shall supply the elastomeric gasket. Couplings shall be provided with stops or centering rings to assure that the coupling is centered on the joint. Solvent cement joints shall use sockets conforming to ASTM D 2467. The solvent cement used shall meet the requirements of ASTM D 2564; the joint assembly shall be made in accordance with ASTM D 2855 and the manufacturer's specific recommendations.
- b. Pipe 4 through 12 inch diameter: Joints shall be elastomeric gasket as specified in AWWA C900. Jointing procedure shall be as specified for pipe less than 4 inch diameter with configuration using elastomeric ring gasket.
- c. Pipe 14 through 36 inch diameter: Joints shall be elastomeric gasket push-on joints made in accordance with AWWA M23.

#### 3.1.5.3 Isolation Joints and Dielectric Fittings

Isolation joints and dielectric fittings shall be installed in accordance with details specified in paragraph JOINTS. Dielectric unions shall be encapsulated in a field-poured coal-tar covering, with at least 1/8 inch thickness of coal tar over all fitting surfaces.

#### 3.1.5.4 Transition Fittings

Connections between different types of pipe and accessories shall be made with transition fittings approved by the Contracting Officer.

#### 3.1.5.5 HDPE Pipe Requirements

- a. Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself.

- b. Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be 1/4 inch larger than the size of the outlet branch being fused.
- c. Mechanical joining will be used where the butt fusion method can not be used. Mechanical joining will be accomplished by either using a HDPE flange adapter with a Ductile Iron back-up ring or HDPE Mechanical Joint adapter with a Ductile Iron back-up ring.
- d. Socket fusion, hot gas fusion, threading, solvents, and epoxies will not be used to join HDPE pipe.

3.1.5.6 Installation of Tracer Wire

Install a continuous length of tracer wire (2.5 mm) for the full length of each run of nonmetallic pipe. Attach wire to top of pipe in such manner that it will not be displaced during construction operations.

3.1.6 Installation of Service Lines

Service lines shall include the pipeline connecting building piping to water distribution lines to the connections with the building service at a point approximately 5 feet outside the building where such building service exists. Where building services are not installed, the Contractor shall terminate the service lines approximately 5 feet from the site of the proposed building at a point designated by the Contracting Officer. Such service lines shall be closed with plugs or caps. All service stops and valves shall be provided with service boxes. Service lines shall be constructed in accordance with the following requirements:

3.1.6.1 Service Lines 50 mm (2 Inches) and Smaller

Service lines 2 inches and smaller shall be connected to the main by a directly-tapped corporation stop or by a service clamp. A corporation stop and a copper gooseneck shall be provided with either type of connection. Maximum sizes for directly-tapped corporation stops and for outlets with service clamps shall be as in TABLE I. Where 2 or more gooseneck connections to the main are required for an individual service, such connections shall be made with standard branch connections. The total clear area of the branches shall be at least equal to the clear area of the service which they are to supply.

TABLE I. SIZE OF CORPORATION STOPS AND OUTLET

Pipe Size Inches	Corporation Stops, Inches For Ductile-Iron Pipe	Outlets w/Service Clamps, Inches Single & Double Strap
3	--	1
4	1	1
6	1-1/4	1-1/2
8	1-1/2	2

TABLE I. SIZE OF CORPORATION STOPS AND OUTLET

Pipe Size Inches	Corporation Stops, Inches For Ductile-Iron Pipe	Outlets w/Service Clamps, Inches Single & Double Strap
10	1-1/2	2
12 & larger	2	2

NOTE:

- a. Service lines 1-1/2 inches and smaller shall have a service stop.
- b. Service lines 2 inches in size shall have a gate valve.

3.1.6.2 Service Lines Larger than 50 mm (2 Inches)

Service lines larger than 2 inches shall be connected to the main by a tapped saddle, tapping sleeve and valve, service clamp or reducing tee, depending on the main diameter and the service line diameter, and shall have a gate valve. Lines 3 inches and larger may use rubber-seated butterfly valves as specified above, or gate valves.

3.1.6.3 Service Lines for Sprinkler Supplies

Water service lines used to supply building sprinkler systems for fire protection shall be connected to the water distribution main in accordance with NFPA 24.

3.1.7 Setting of Fire Hydrants, Meters, Valves and Valve Boxes

3.1.7.1 Location of Fire Hydrants

Fire hydrants shall be located and installed as shown. Each hydrant shall be connected to the main with a 6 inch branch line having at least as much cover as the distribution main. Hydrants shall be set plumb with pumper nozzle facing the roadway, with the center of the lowest outlet not less than 18 inches above the finished surrounding grade, and the operating nut not more than 48 inches above the finished surrounding grade. Fire hydrants designated on the drawings as low profile shall have the lowest outlet not less than 18 inches above the finished surrounding grade, the top of the hydrant not more than 24 inches above the finished surrounding grade. Except where approved otherwise, the backfill around hydrants shall be thoroughly compacted to the finished grade immediately after installation to obtain beneficial use of the hydrant as soon as practicable. The hydrant shall be set upon a slab of concrete not less than 4 inches thick and 15 inches square. Not less than 7 cubic feet of free-draining broken stone or gravel shall be placed around and beneath the waste opening of dry barrel hydrants to ensure drainage.

3.1.7.2 Location of Valves

After delivery, valves, including those in hydrants, shall be drained to prevent freezing and shall have the interiors cleaned of all foreign matter before installation. Stuffing boxes shall be tightened and hydrants and valves shall be fully opened and fully closed to ensure that all parts are

in working condition. Check, pressure reducing, vacuum, and air relief valves shall be installed in valve pits. Valves and valve boxes shall be installed where shown or specified, and shall be set plumb. Valve boxes shall be centered on the valves. Boxes shall be installed over each outside gate valve unless otherwise shown. Where feasible, valves shall be located outside the area of roads and streets. Earth fill shall be tamped around each valve box or pit to a distance of 4 feet on all sides of the box, or the undisturbed trench face if less than 4 feet.

#### 3.1.7.3 Location of Service Boxes

Where water lines are located below paved streets having curbs, the boxes shall be installed directly back of the curbs. Where no curbing exists, service boxes shall be installed in accessible locations, beyond the limits of street surfacing, walks and driveways.

#### 3.1.8 Tapped Tees and Crosses

Tapped tees and crosses for future connections shall be installed where shown.

#### 3.1.9 Thrust Restraint

Plugs, caps, tees and bends deflecting 11.25 degrees or more, either vertically or horizontally, on waterlines 4 inches in diameter or larger, and fire hydrants shall be provided with thrust restraints. Valves shall be securely anchored or shall be provided with thrust restraints to prevent movement. Thrust restraints shall be either thrust blocks or, for ductile-iron pipes, restrained joints.

##### 3.1.9.1 Thrust Blocks

Thrust blocking shall be concrete of a mix not leaner than: 1 cement, 2-1/2 sand, 5 gravel; and having a compressive strength of not less than 2,000 psi after 28 days. Blocking shall be placed between solid ground and the hydrant or fitting to be anchored. Unless otherwise indicated or directed, the base and thrust bearing sides of thrust blocks shall be poured directly against undisturbed earth. The sides of thrust blocks not subject to thrust may be poured against forms. The area of bearing shall be as shown or as directed. Blocking shall be placed so that the fitting joints will be accessible for repair. Steel rods and clamps, protected by galvanizing or by coating with bituminous paint, shall be used to anchor vertical down bends into gravity thrust blocks.

##### 3.1.10 Casing Pipe

Install utility pipe (termed the carrier pipe) in a casing pipe (sleeve) where indicated on design plans or as directed by the Contracting Officer. Casing pipe shall conform to Table 5.5 of AREMA Manual for Railway Engineering, Section 5.3 "Specifications for Pipelines Conveying Nonflammable Substances." Inside diameter of casing pipe as per paragraph 5.3.4. Casing pipe to have a protective coating to inhibit corrosion. Length of casing pipe as per paragraph 5.3.4.3 when installed under railroad tracks, depth of installation as per paragraph 5.3.5.2. Sand bedding or suitable pipe support shall be provided for the pipe through the casing.

#### 3.2 HYDROSTATIC TESTS

Where any section of a water line is provided with concrete thrust blocking for fittings or hydrants, the hydrostatic tests shall not be made until at least 5 days after installation of the concrete thrust blocking, unless otherwise approved.

### 3.2.1 Pressure Test

After the pipe is laid, the joints completed, fire hydrants permanently installed, and the trench partially backfilled leaving the joints exposed for examination, the newly laid piping or any valved section of piping shall, unless otherwise specified, be subjected for 1 hour to a hydrostatic pressure test of 200 psi. Each valve shall be opened and closed several times during the test. Exposed pipe, joints, fittings, hydrants, and valves shall be carefully examined during the partially open trench test. Joints showing visible leakage shall be replaced or remade as necessary. Cracked or defective pipe, joints, fittings, hydrants and valves discovered in consequence of this pressure test shall be removed and replaced with sound material, and the test shall be repeated until the test results are satisfactory. The requirement for the joints to remain exposed for the hydrostatic tests may be waived by the Contracting Officer when one or more of the following conditions is encountered:

- a. Wet or unstable soil conditions in the trench.
- b. Compliance would require maintaining barricades and walkways around and across an open trench in a heavily used area that would require continuous surveillance to assure safe conditions.
- c. Maintaining the trench in an open condition would delay completion of the project.

The Contractor may request a waiver, setting forth in writing the reasons for the request and stating the alternative procedure proposed to comply with the required hydrostatic tests. Backfill placed prior to the tests shall be placed in accordance with the requirements of Section 02316 EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

### 3.2.2 Leakage Test

Leakage test shall be conducted after the pressure tests have been satisfactorily completed. The duration of each leakage test shall be at least 2 hours, and during the test the water line shall be subjected to not less than 200 psi pressure. Water supply lines designated on the drawings shall be subjected to a pressure equal to 200 psi. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved or approved section, necessary to maintain pressure within 5 psi of the specified leakage test pressure after the pipe has been filled with water and the air expelled. Piping installation will not be accepted if leakage exceeds the allowable leakage which is determined by the following formula:

$$L = 0.0001351ND(P \text{ raised to } 0.5 \text{ power})$$

L = Allowable leakage in gallons per hour

N = Number of joints in the length of pipeline tested

D = Nominal diameter of the pipe in inches

P = Average test pressure during the leakage test, in psi gauge

Should any test of pipe disclose leakage greater than that calculated by

the above formula, the defective joints shall be located and repaired until the leakage is within the specified allowance, without additional cost to the Government.

### 3.2.3 Time for Making Test

Except for joint material setting or where concrete thrust blocks necessitate a 5-day delay, pipelines jointed with rubber gaskets, mechanical or push-on joints, or couplings may be subjected to hydrostatic pressure, inspected, and tested for leakage at any time after partial completion of backfill. Cement-mortar lined pipe may be filled with water as recommended by the manufacturer before being subjected to the pressure test and subsequent leakage test.

### 3.2.4 Concurrent Hydrostatic Tests

The Contractor may elect to conduct the hydrostatic tests using either or both of the following procedures. Regardless of the sequence of tests employed, the results of pressure tests, leakage tests, and disinfection shall be as specified. Replacement, repair or retesting required shall be accomplished by the Contractor at no additional cost to the Government.

- a. Pressure test and leakage test may be conducted concurrently.
- b. Hydrostatic tests and disinfection may be conducted concurrently, using the water treated for disinfection to accomplish the hydrostatic tests. If water is lost when treated for disinfection and air is admitted to the unit being tested, or if any repair procedure results in contamination of the unit, disinfection shall be reaccomplished.

## 3.3 BACTERIALDISINFECTION

### 3.3.1 Bacteriological Disinfection

Before acceptance of potable water operation, each unit of completed waterline shall be disinfected as prescribed by AWWA C651. After pressure tests have been made, the unit to be disinfected shall be thoroughly flushed with water until all entrained dirt and mud have been removed before introducing the chlorinating material. The chlorinating material shall be either liquid chlorine, calcium hypochlorite, or sodium hypochlorite, conforming to paragraph MISCELLANEOUS ITEMS. The chlorinating material shall provide a dosage of not less than 50 ppm and shall be introduced into the water lines in an approved manner. Polyvinyl Chloride (PVC) pipe lines shall be chlorinated using only the above specified chlorinating material in solution. The agent shall not be introduced into the line in a dry solid state. The treated water shall be retained in the pipe long enough to destroy all non-spore forming bacteria.

Except where a shorter period is approved, the retention time shall be at least 24 hours and shall produce not less than 25 ppm of free chlorine residual throughout the line at the end of the retention period. Valves on the lines being disinfected shall be opened and closed several times during the contact period. The line shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm. During the flushing period, each fire hydrant on the line shall be opened and closed several times. From several points in the unit, personnel from the Contractor's commercial laboratory shall take at least 3 water samples from different points, approved by the Contracting Officer, in proper sterilized containers and perform a bacterial examination in accordance with state

approved methods. The commercial laboratory shall be certified by the state's approving authority for examination of potable water. The disinfection shall be repeated until tests indicate the absence of pollution for at least 2 full days. The unit will not be accepted until satisfactory bacteriological results have been obtained.

#### 3.4 CLEANUP

Upon completion of the installation of water lines, and appurtenances, all debris and surplus materials resulting from the work shall be removed.

-- End of Section --