Standard Drawings for Water & Wastewater Construction



Dallas Water Utilities



City of Dallas Water Utilities Department

OCTOBER 2009

Standard Drawings For Water & Wastewater Construction

First Edition	JANUARY	1984
Revised	JANUARY	1985
Revised	DECEMBER	1986
Revised	MARCH	1989
Revised	MARCH	1991
Revised & Retitled	MAY	1998
Revised	OCTOBER	2003
Revised	OCTOBER	2009

Printed Copies Available (For Fee Payment) At Mapping & Capital Services – Vaults, Maps & Plans 320 E. Jefferson Blvd. Room 215 Dallas, Texas 75203 214 - 948 – 4584

Copies Also Available On-line At: http://www.dallascityhall.com/dwu/dwu_design_standards.html



City of Dallas Water Utilities Department

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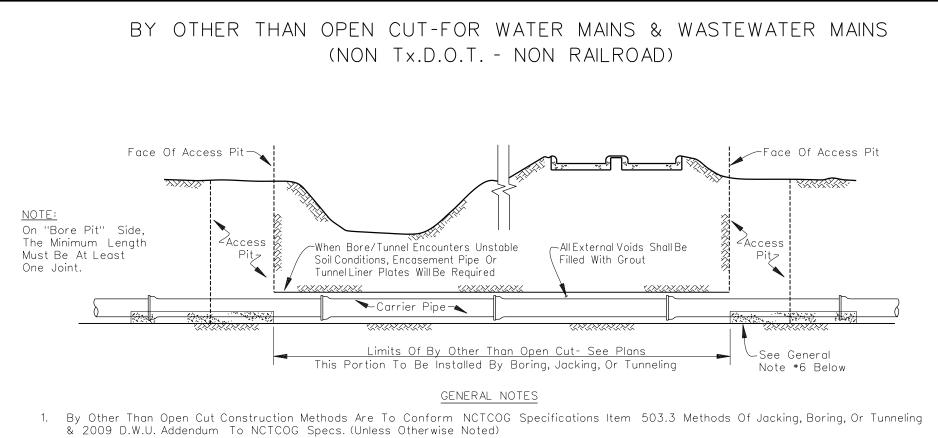
COMMON FOR WATER & WASTEWATER MAIN CONSTRUCTION



City of Dallas Water Utilities Department

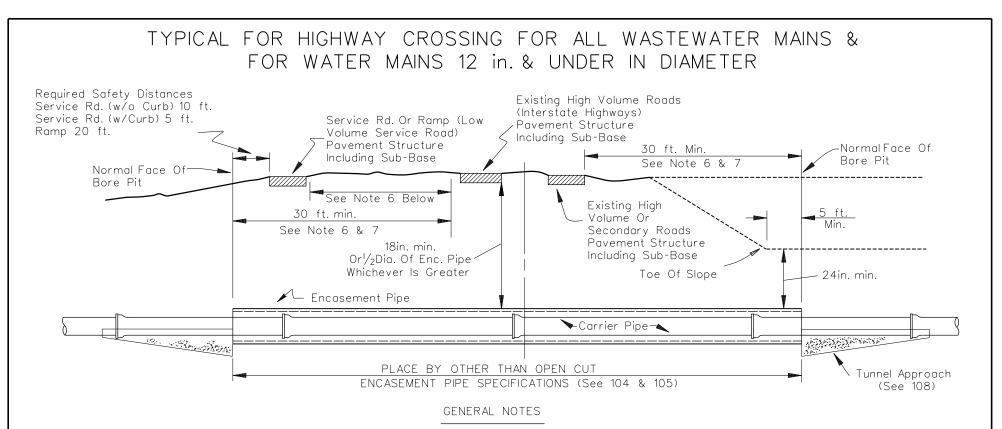
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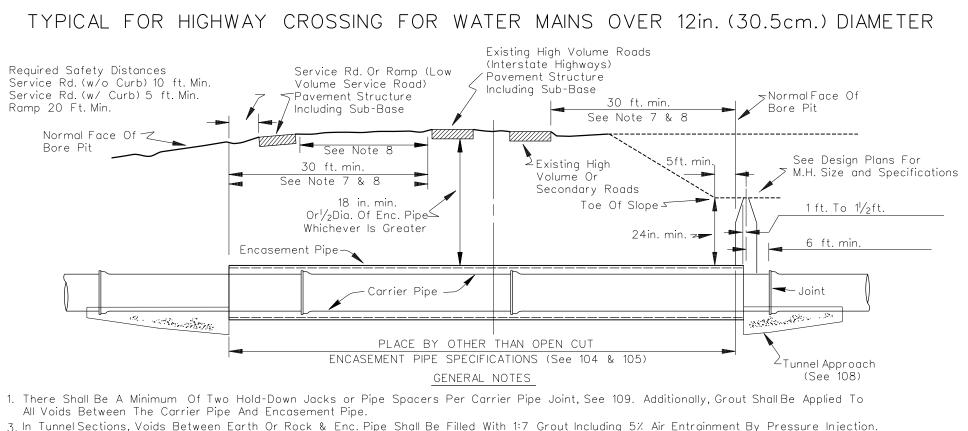
- 2. Carrier Pipe To Be Made Up Outside The Limits Of By Other Than Open Cut Area, Then Pushed Through Shaft Area.
- 3. The Carrier Pipe Must Be Restrained (Weighted) In Place Prior To The Placing Of Grout To Prevent The Carrier Pipe From Floating.
- 4. The Voids Between The Carrier Pipe, Or Encasement Pipe/TunnelLiner (If Used), And The Earthen Bore Are To Be Filled With Grout.
- 5. Hold-Down Jacks Or Pipe Spacers (If Required By Design) Shall Conform To Page 109. Additionally, Grout WIII Be Applied To All Voids Between The Carrier Pipe And Encasement Pipe.
- 6. When Main Is Installed With An Encasement Pipe Or Tunnel Liner Plate, The Carrier Pipe Is To Be Supported By A Class "B" Concrete Cradle As Shown On Page 108.
- 7. The Contractor Must Submit An Encasement Design For Approval By The Owner. For Encasement Pipes Greater Than 15 Inches (I.D.), The Submittal Must Be Sealed By A Professional Engineer Registered Within The State Of Texas.

NCTCOG Spec: 203.5.7.2 - Tunneling NCTCOG Spec: 503.3- Methods Of Jacking, Boring Or Tunneli 2009 DWU Addendum 503.3.3.1 General				Or Tunneling
	BY OTHER THAN OPEN CUT		DWU	(Page No.) 101
	(Non-Tx.D.O.T. & Non-Railroad)		oct. 2009	



- 1. Carrier Pipe To Be Made Up Outside The Encasement Pipe And Pushed Through WIth The Bell Of The Pipe Resting On The Encasement Pipe Or A Class "B" Concrete Cradle Where Applicable.
- 2. Carrier Pipe Shall Be Supported On A Continuous Class "B" Concrete Cradle, Within Corrugated Metal And Flange Liner Encasements.
- 3. Carrier Pipe Must Be Restrained (Weighted) In Place Prior To The Placing Of Grout To Prevent The Carrier Pipe From Floating.
- 4. Construct Tapered Concrete Tunnel Approach At Each End Of Enc. Pipe. See Detail On 108.
- 5. In Tunnel Sections, Voids Between Earth Or Rock & Enc. Pipe Shall Be Filled With 1:7 Grout Including 5% Air Entrainment By Pressure Injection.
- 6. Where Circumstances Necessitate The Excavation Of A Bore Pit Or Trench Closer To The Edge Of Pavement Than Set Forth On This Sheet, Guard Fence Or Other Approved Protective Devices Will Be Installed For The Protection Of The Traveling Public.
- 7. If Construction Site Is Wider Than Required Safety Distances And If Side Slopes Will Allow, Construction Of Bore Pits May Be Allowed (With Tx.D.O.T. Approval) But Access To Those Pits Must Be By Means Other Than Main Traffic Lanes.
- 8. The Contractor Must Submit An Encasement Design For Approval By The Owner. For Encasement Pipes Great Than 15 Inches (I.D.), The Submittal Must Be Sealed By A Professional Engineer Restered Within The State Of Texas.

REFER TO PAGES:	103	104		NCTCOG Spec:509 NCTCOG Spec:702.		
	105 107 109	106 108	HIGHWAY CROSSING FOR ALL WASTEWATER MAINS & FOR		DWU	^(Page No.) 102
			WATER MAINS 12" & UNDER IN DIAMETER.		DATE OCT. 2009	



4. Carrier Pipe Shall Be Supported On A Continuous Class "B" Concrete Cradle, Within Corrugated Metal And Flange Liner Encasements.

5. Construct Tapered Concrete Tunnel Approach At Each End Of Enc. Pipe. See Detail On 108.

6. When Standard Pipe Is Made Up Inside Larger Enc. Pipe, The Carrier Pipe Shall Be Laid To Grade On A Class "B" Concrete Embedment Which Shall Extend To The ¹/₄ Point Of The Diameter Of The Carrier Pipe. When Mechanical Joint Pipe Is Used As A Carrier Pipe In Larger Enc. Pipe, Precast Concrete Blocks May Be Placed Back Of Each Bell. Each Block Will Have Minimum Dimensions Of 9 in. In Length By 0.866 "D" In Breadth (Where "D" Is The External Diameter Of The Placed Carrier Pipe) With A Sufficient Thickness To Clear The Bells From The Enc. Pipe And To Bring The Carrier Pipe To Grade.

7. Where Circumstances Necessitate The Excavation Of A Bore Pit Or Trench Closer To The Edge Of Pavement Than Set Forth On This Sheet, Guard Fence Or Other Approved Protective Devices Will Be Installed For The Protection Of The Traveling Public.

- 8. If Construction Site Is Wider Than Required Safety Distances And If Side Slopes Will Allow, Construction Of Bore Pits May Be Allowed (With Tx.D.O.T. Approval) But Access To Those Pits Must Be By Means Other Than Main Traffic Lanes.
- 9. The Contractor Must Submit An Encasement Design For Approval By The Owner. For Encasement Pipes Greater Than 15 Inches (I.D.), The Submittal Must Be Sealed By A ProfessionalEngineer Registered Within The State Of Texas. NCTCOG Spec: 509.2 - State Highway Crossing

NCTCOG Spec: 702.2.4 - Quality Of Concrete

REFER TO PAGES: 102 104 105 106 107 108	HIGHWAY CROSSING FOR	DWU	(Page No.) 103
109	WATER MAINS OVER 12" DIAMETER	DATE OCT. 2009	

ENC. PIPE I.D.	H-20		H-2C		ME	JGATED TAL	COUPL BAN	1D		I		or Open-Cu		STEEL	
I.D.	Gauge	Max. Cov.	Gauge	Max. Cov.	Gauge	Max. Cov.	Min. Width	Gauge	Class	Wall		aximum Co		Wall Thick.	Max. Cov.
in.	Ga.	Ft.	Ga.	Ft.	Ga.	Ft.	ln.	Ga.				(M) Embedr		ln.	Ft.
											Class ''C''	Class "B"	Class "A"		
12''			A		6		Q				Õ			3/16''	œ
15''											·			1⁄4''	œ
18''														1/4''	œ
21''														5⁄16''	œ
24''	AV AIL ABLE	ABLE	AV AIL ABLE	ABLE			 M_ @	I M			<u>س</u> ۵			3/8''	œ
27''	AVAII	AVAILABL	AVAIL	AVAILABL				~						7/16''	∞
30''	NOT	NOT -	N	L ON										7/16''	∞
36''		L _		L _										1/2"	∞
42''	V	V	V	V				• •						1/2"	∞
48''	14	∞	12	∞	 			• [
54''	14	∞	12	∞											
60''	14	∞	12	∞				<u>)</u> <u>- 62</u>							
66''	14	∞	12	∞	8										
72''	14	∞	12	∞											
		AL T	. ''B'' —											AL 1	. "D"——
)TE:															
Infinity							Y CRO							DWU	(Page No 102
							EMENT							DATE	
					GAL	JGF. C	LASS,	COVI	FR					CT. 2009	

ENC. PIPE	H-20	NG. LINER 4 FLNG. LINE 20-L.L. H-20-L.L.			ME	UGATED TAL	COUPL BAN	١D		R.C.	CULVERT	PIPE or Open-Cu	t	STEEL	
I.D.	Gauge	Max. Cov.	Gauge	Max. Cov.	Gauge	Max. Cov.	Min. Width		Class	Wall		aximum Co		Wall Thick.	
in.	Ga.	Ft.	Ga.	Ft.	Ga.	Ft.	ln.	Ga.				(M) Embedr		ln.	Ft.
											Class "C"	Class "B"	Class ''A''		
78''	12	œ	12	00			0	\bigcirc			0	0			
84''	12	∞	12	00	-		ۍ ح				u u				
90''	10	œ	10	∞				7							
96''	10	∞	10	∞	$\square \bigcirc $										
102''	10	∞	10	00	L M C		M C				Q				
108''	10	∞	8	∞											
114''	8	∞	8	∞											
120''	8	∞	8	30'											
126''	8	31'	8	27'											
126''	8	29'	8	22'											
138''	8	28'	8	22'											
					ٽ ا	\approx \odot		$\tilde{\mathbf{A}}$			5	\approx \bigcirc			
	4	AL T .	. ''B'' —											AL T	Г. ''D'' ——
DTE:															
00	Infinity						Y CRO							DWU	(Page 1
						ENCAS	EMENT	PIPE	,						+ 10;
							LASS,							CT. 2009	

STATE HIGHWAY CROSSINGS

All State Highway crossings shall conform to Tx.D.O.T.'s Public Transportation Utility Accommodation Policy Manual Special Specifications, and the following requirements:

All excavations within the State controlled right-of-way shall be back filled by tamping in 6 inch horizontal layers. All surplus material shall be removed from the right-of-way and the excavation area shall be restored flush with the surrounding natural ground.

All areas of sod that are disturbed by the construction operations are to be restored at completion of project. Areas with slopes of 2% or less are to be restored by mulch sodding. Areas with slopes greater the 2% are to be restored with block sod.

Crossings below paved roadways by water and wastewater mains within the State controlled right-of-way are to be installed by boring or tunneling methods. Optional "Wet"bore or "Slurry" bore methods must be approved by Tx.D.O.T. Water or other fluids used in the boring operation may only be used for lubricating the cutting head of the tunneling machine. Bores may not be installed by water jetting or jacking.

Highway crossings for all wastewater lines and water lines 12 inches and under will require an encasement pipe at least 2 inches greater than the largest outside diameter of the carrier pipe. The diameter of the encasement pipe for water lines over 12 inches will be determined by the Design Engineer and indicated on design plans. Encasement pipes will be of sectional liner or smooth bore steel pipe to suit conditions of crossing. Manholes will be specified on design plans. For all mains, voids between encasement and carrier pipe will be filled with 1:7 Grout with 5% Air Entrainment. Regardless of method used for installing the encasement pipe, it will be installed with even bearing throughout its length, and all voids between the encasement pipe and the earth or rock shall be filled with grout. Timber supports shall not be used. Trench excavations and bore pits shall not be closer than 30 feet from the edge of the nearest through traffic lane of High Volume Roadways. For other paved areas (Service Roads), open trenching and bore pits shall not be closer than 10 feet from the edge of pavement or 5 feet from the face of curb. The carrier pipe will be the kind and class designed to carry the water and wastewater. No explosives shall be used within limits of Highway without written permission from the Tx.D.O.T.

See 102, 103, 104, 105, 107

NCTCOG Spec: 509.2 - State Highway Crossing

HIGHWAY CROSSING Tx.D.O.T. REQUIREMENTS DWU 106

STATE HIGHWAY CROSSINGS Continued

Depth of Cover

If depth of cover is insufficient to support live and dead loads, encasement or carrier pipe shall be installed concurrently as excavation of hole progresses so as to leave no more than 2 linear feet of unprotected hole at one time.

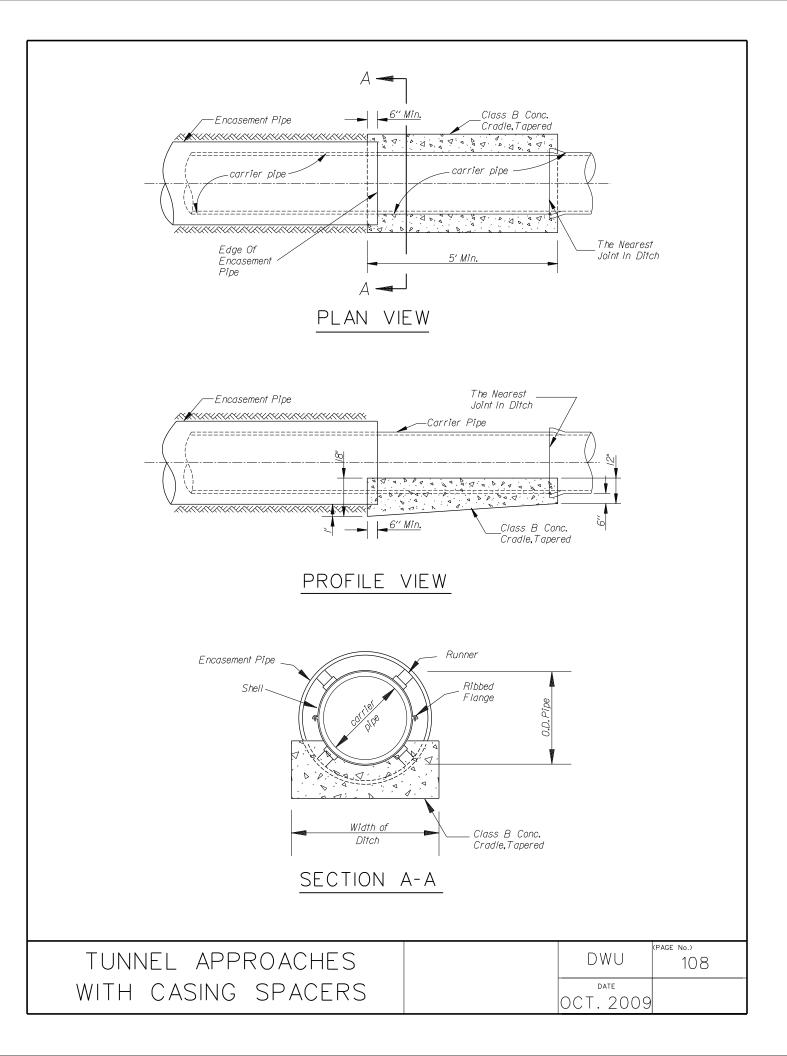
Open Cutting Of Pavement

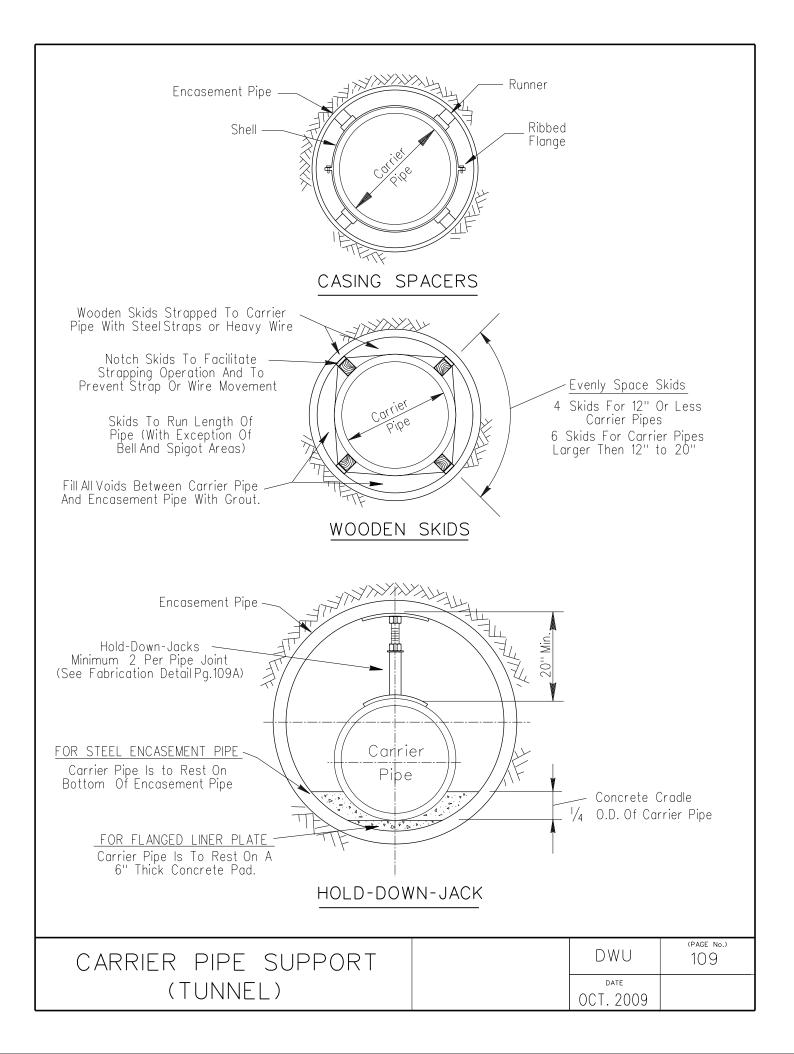
Specific Tx.D.O.T. written approval is required for open cutting of all State Highway pavements. Any approved open cutting of pavement must conform to the special Tx.D.O.T. specification "Utility Facilities Involving Open Cutting of Pavement".

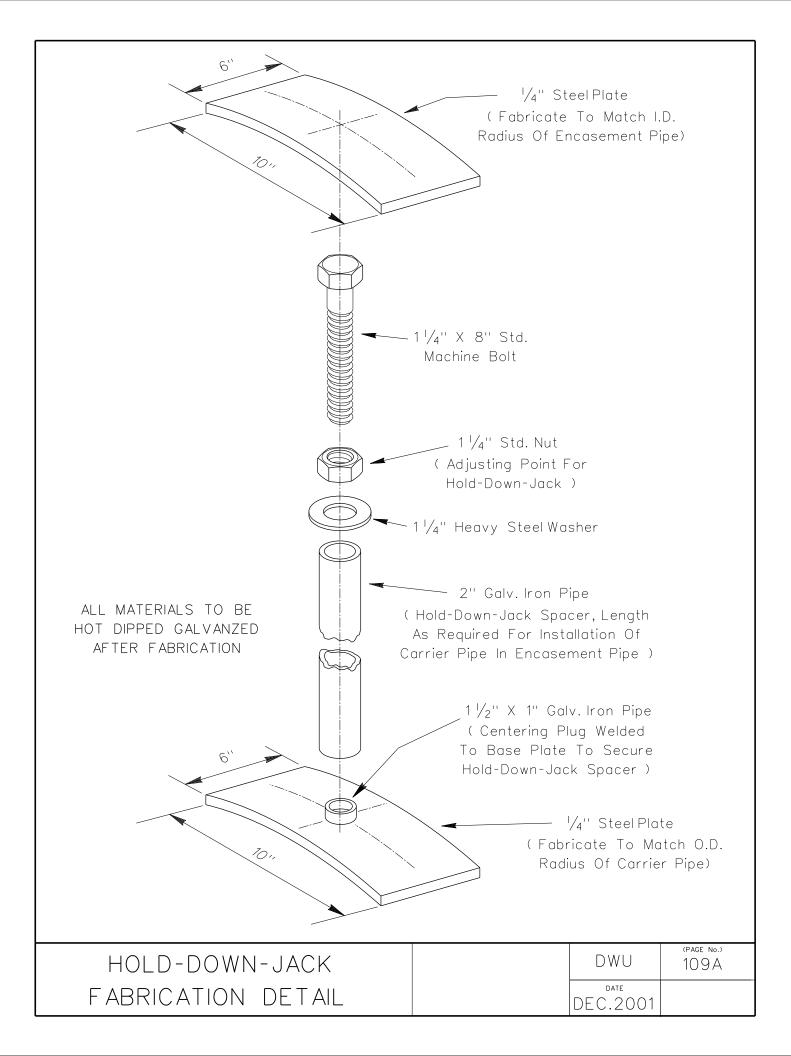
See 102, 103, 104, 105, 106

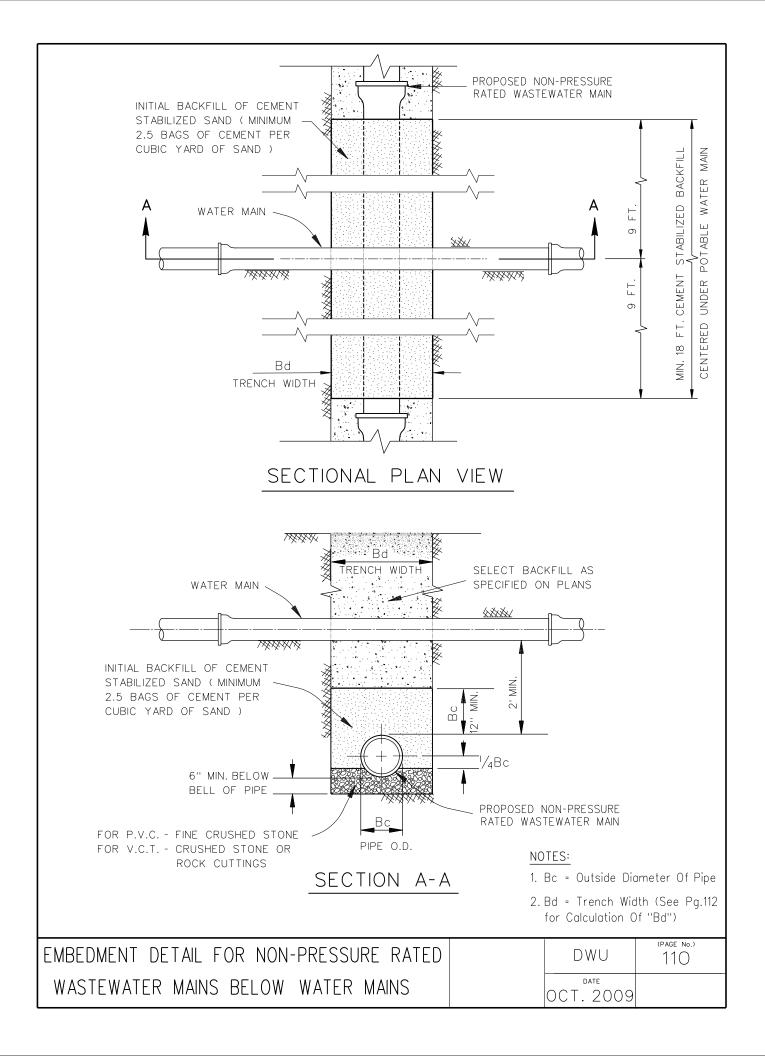
NCTCOG Spec: 509.2 - State Highway Crossing

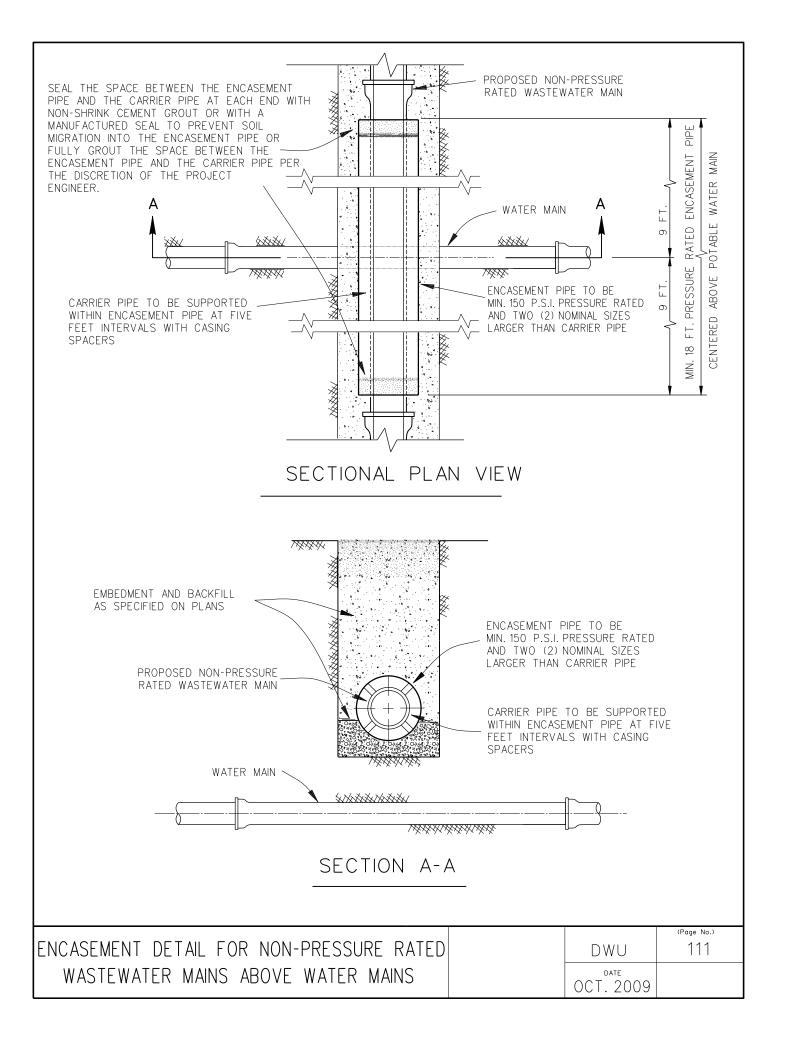
HIGHWAY CROSSING Tx.D.O.T. REQUIREMENTS DWU 107 DATE OCT. 2009

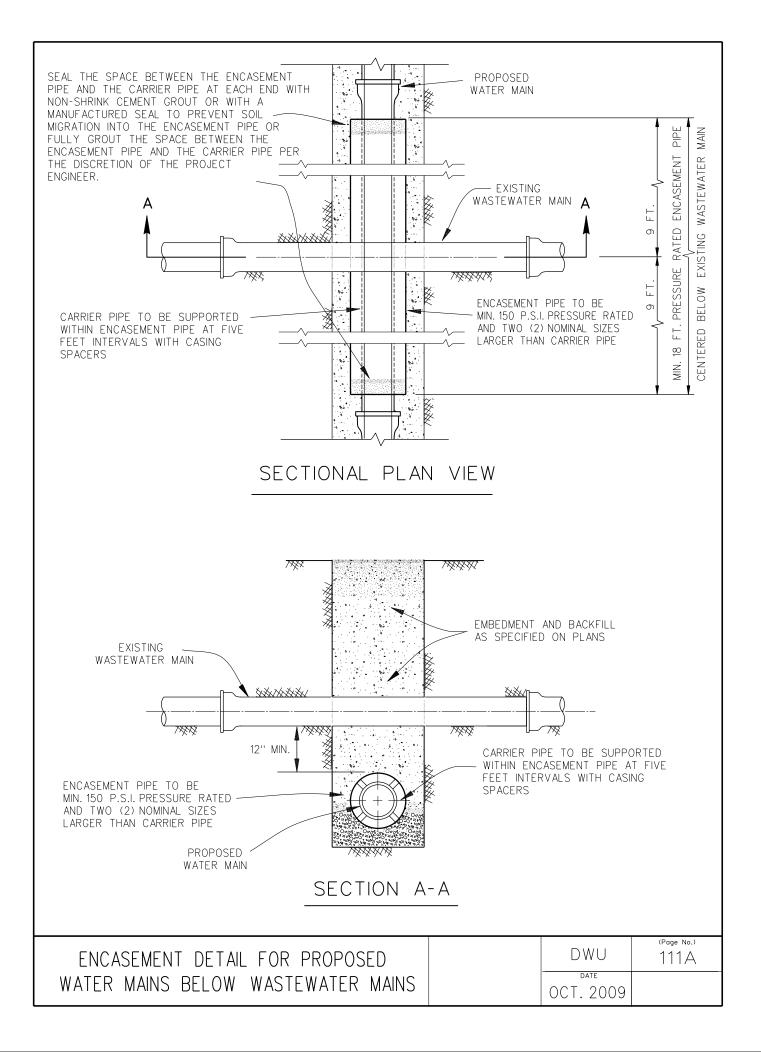












TRENCH WIDTH FOR WATER & WASTEWATER MAINS ARE LIMITED TO "Bd" AS CALCULATED BY THE FOLLOWING FORMULAS:

For 12" Diameter Pipe and Smaller :

Minimum - "Bd" (Trench Width) = Outside Diameter of Pipe Bell plus 12 inches or a minimum of 24", Whichever is greater

Maximum - "Bd" (Trench Width) = Shall Not Exceed 32"

For Pipe Diameters Greater Than 12" to 24":

"Bd" (Trench Width) Shall Be Limited To Outside Diameter of Pipe Bell plus 12 inches

For Pipe Diameters Greater Than 24" to 72" :

"Bd" (Trench Width) Shall Be Limited To Outside Diameter of Pipe plus 24 inches

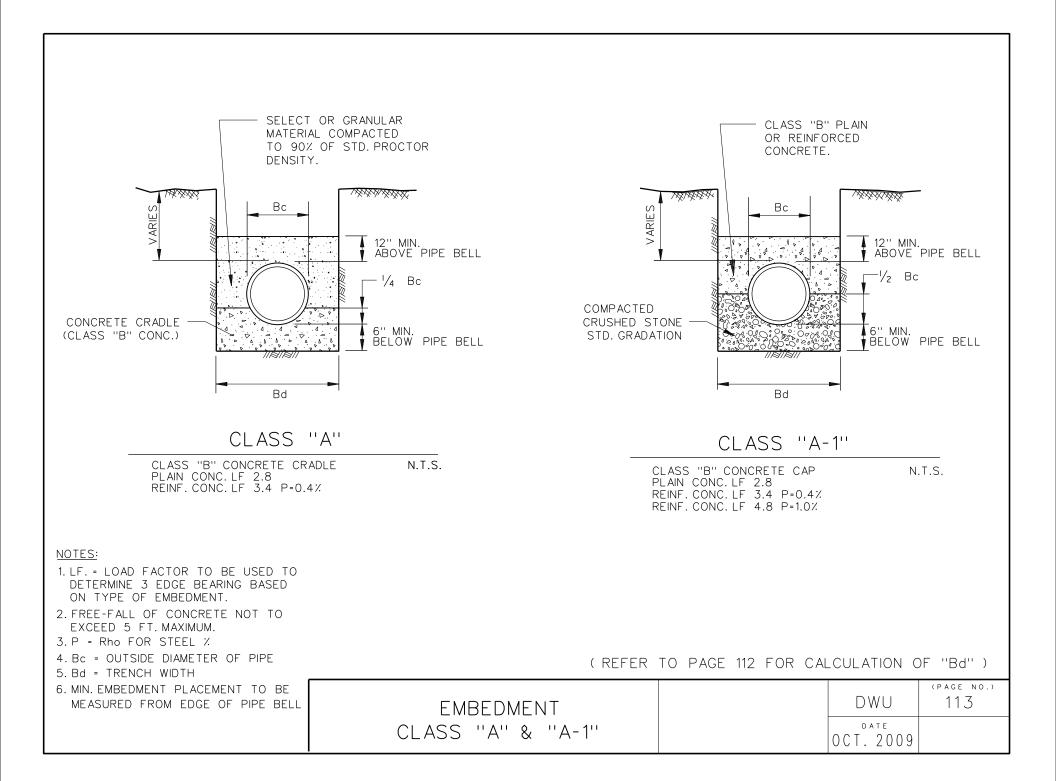
For Pipe Diameters Greater Than 72" :

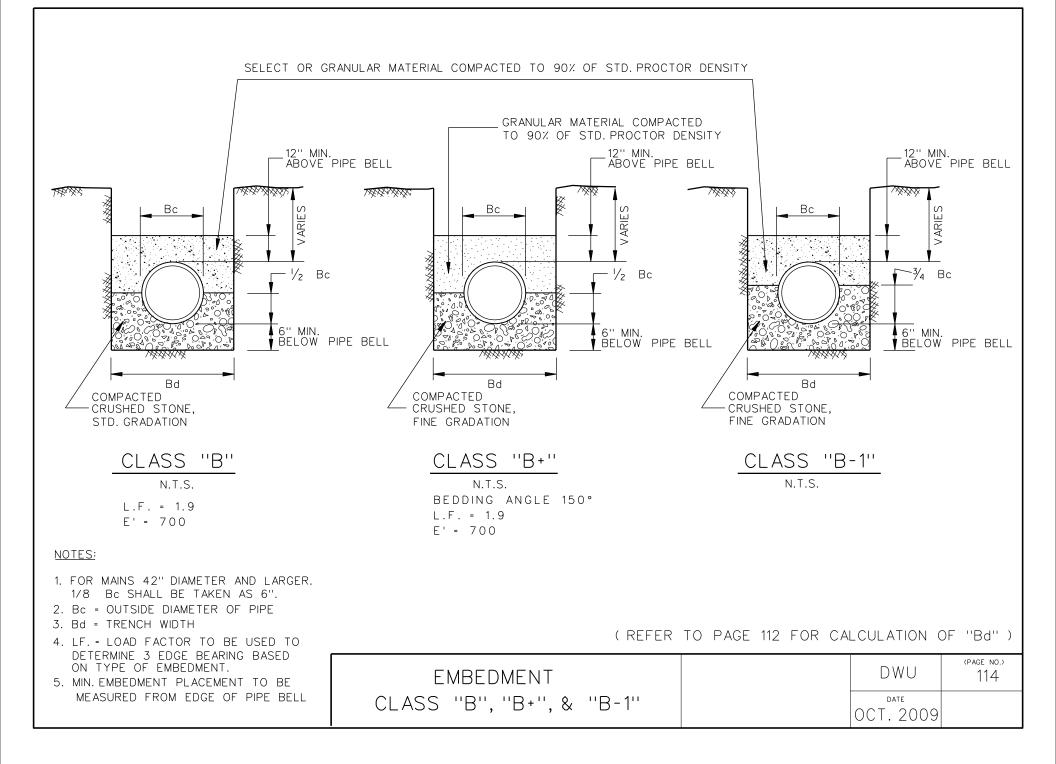
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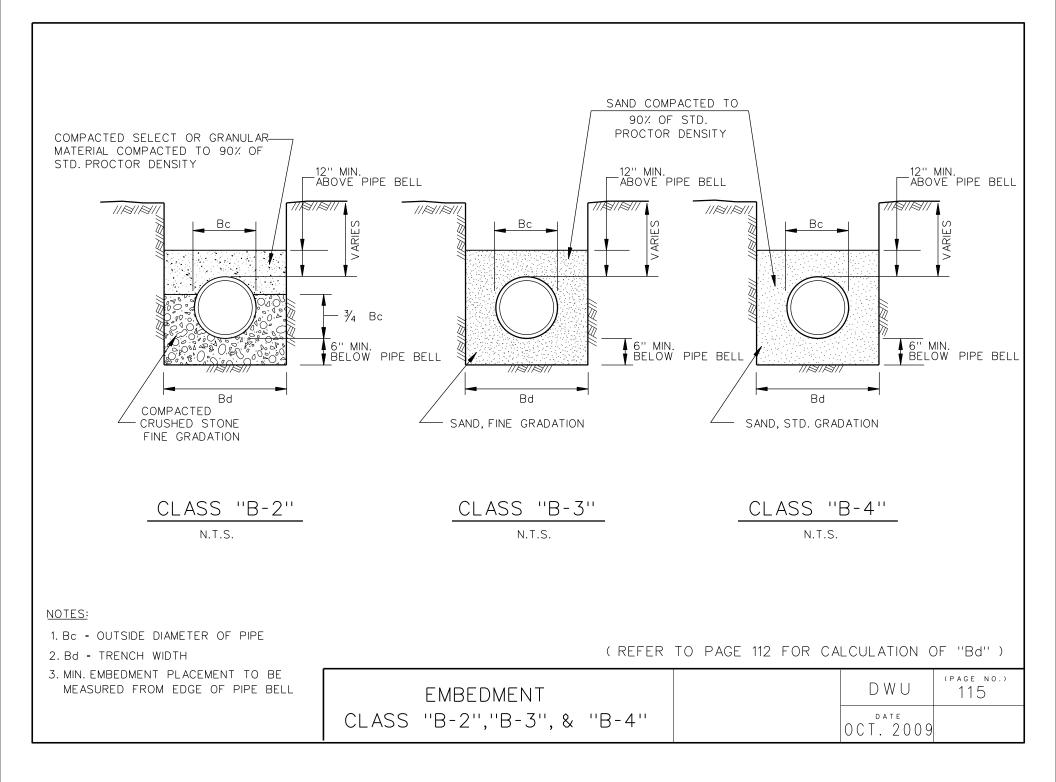
"Bd" (Trench Width) Shall Be Limited To Outside Diameter of Pipe Times (X) 1.25 plus 12 inches

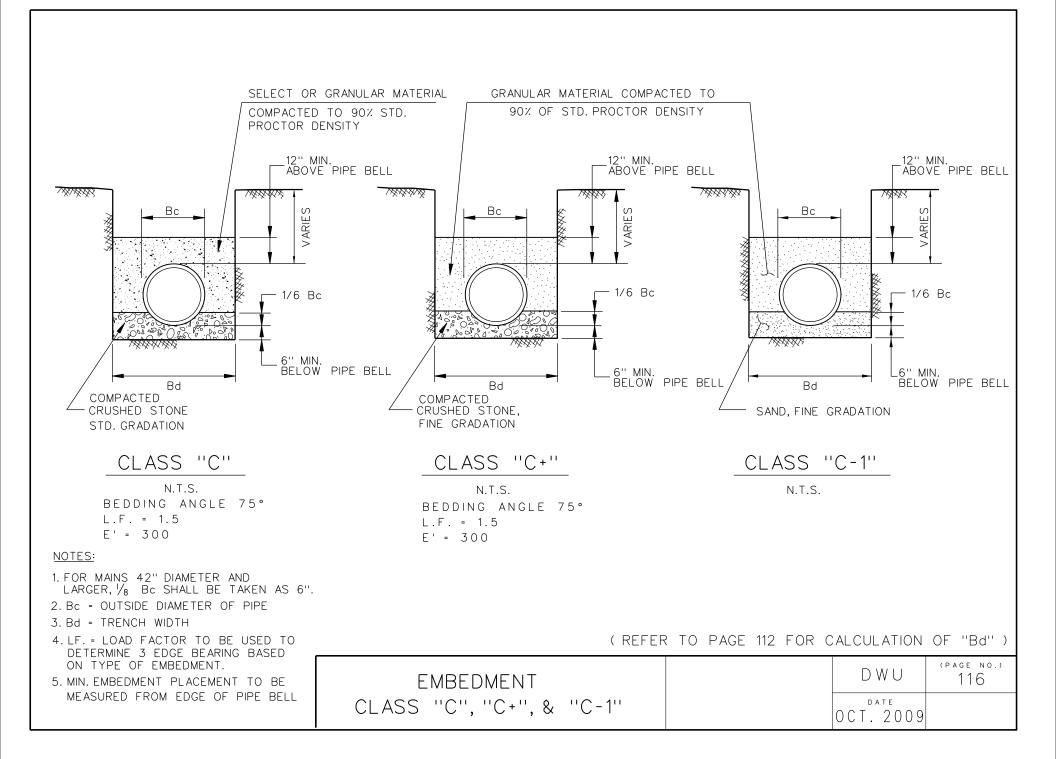
(RE	FER	ТО	PAGES	113	THRU	119	FOR	USAGE	OF	''Bd'')

TRENCH WIDTH	DWU	(Page No.) 112
ALCULATIONS FOR ''Bd''	FEB.2005	9

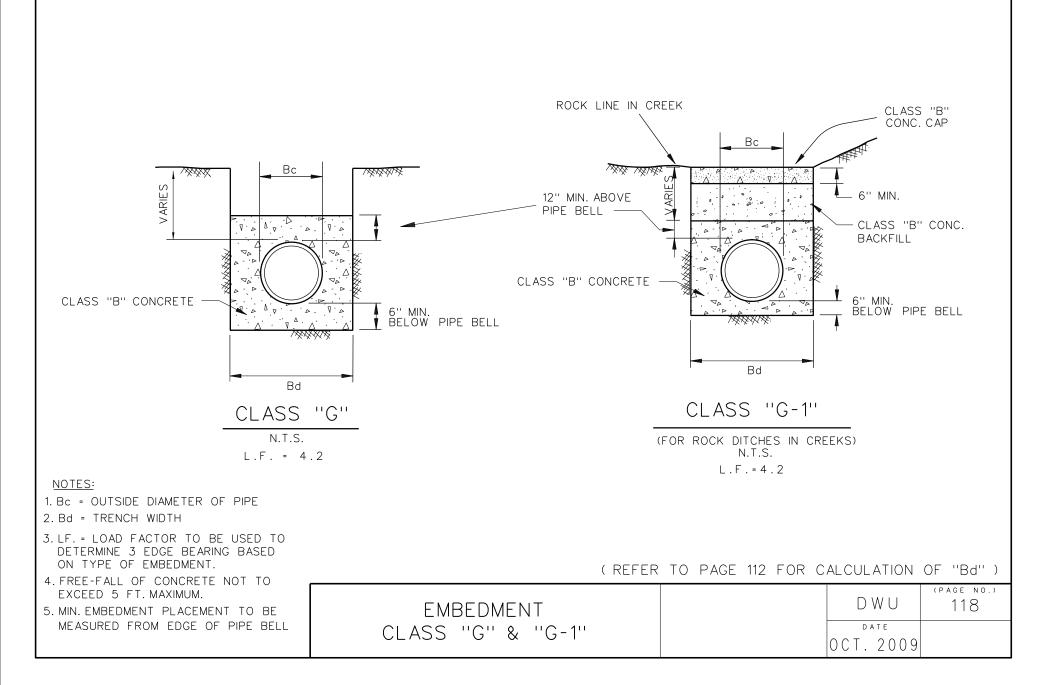


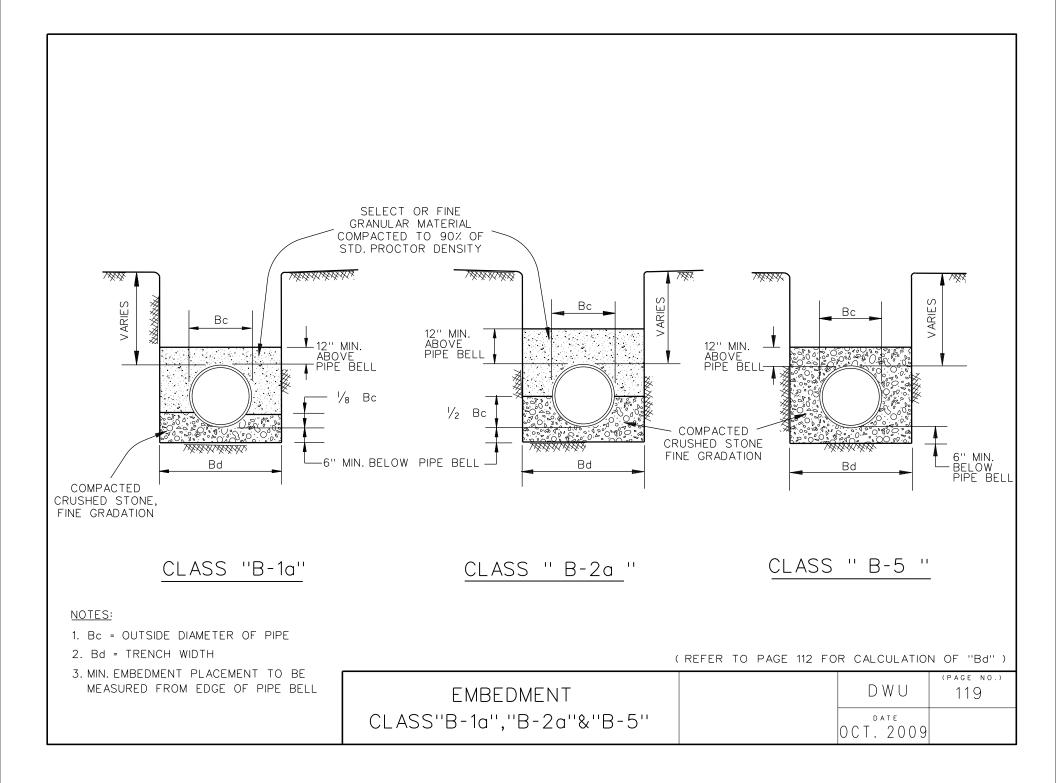


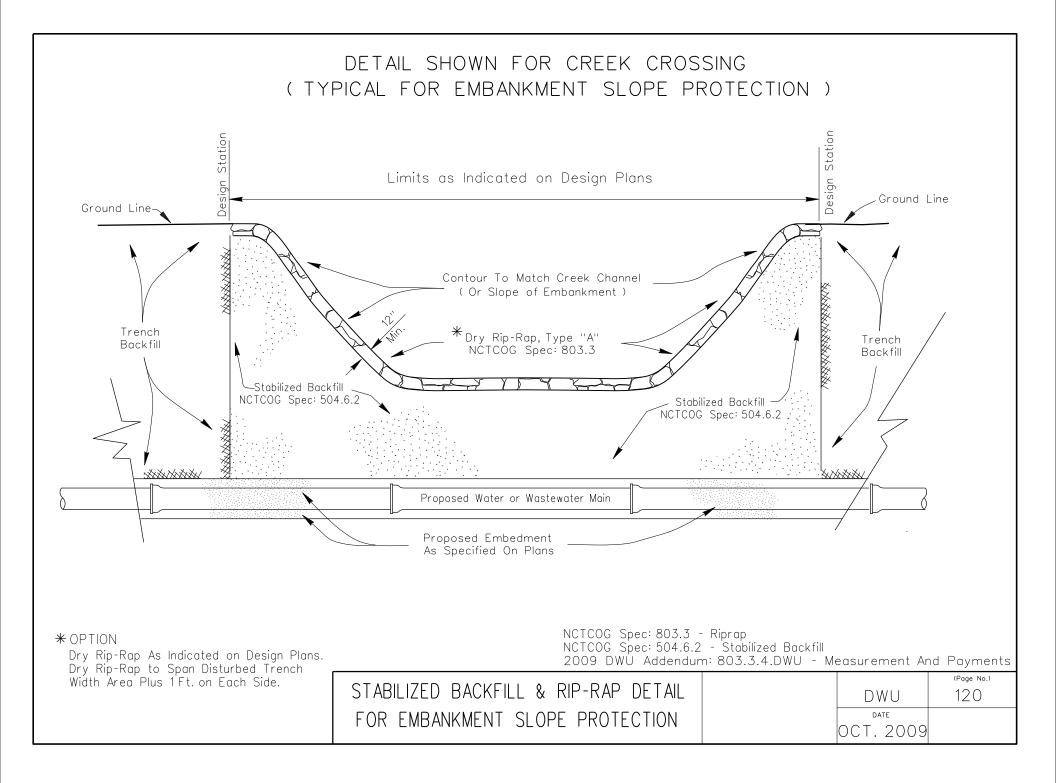


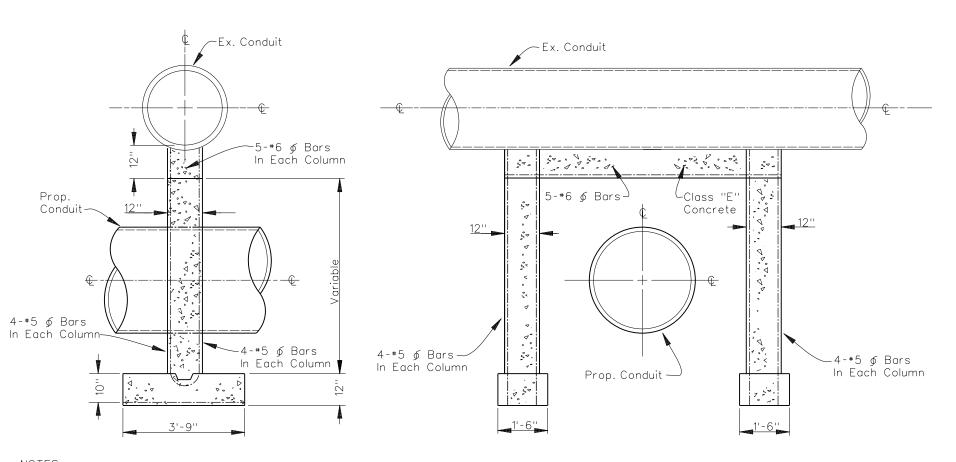


	COMPACTED 4 STD. PROCTOR 4.	SELECT MATERIAL COMPACTED TO 90% STD. PROCTOR DENSITY.
A A A A A A A A A A A A A A A A A A A	ABOVE PIPE BELL	SURVE PIPE BELL 6" MIN. BC 6" MIN. BELOW PIPE BELL 6" MIN. BELOW PIPE BELL
CLASS "	C-2''	CLASS "D+"
N.T.S.		N.T.S. BEDDING ANGLE 30° L.F. = 1.3 E' = 200
NOTES:		
1. FOR MAINS 42" DIAMETER AND LARGER, $ \prime_8$ Bc SHALL BE TAKEN AS 6".		
2. Bc = OUTSIDE DIAMETER OF PIPE 3. Bd = TRENCH WIDTH		
4. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED		(REFER TO PAGE 112 FOR CALCULATION OF "Bd")
ON TYPE OF EMBEDMENT. 5. MIN. EMBEDMENT PLACEMENT TO BE	EMBEDMENT	DWU (PAGE NO.) 117
MEASURED FROM EDGE OF PIPE BELL	CLASS "C-2" & "D+	0 C T . 2009









<u>NOTES:</u>

- 1. Contractor Must Contact Owner Of Existing Conduit 48 Hours Prior To Construction.
- 2. Columns May Be 12" Square or 12" Round.
- 3. The Engineer Shall Determine If A Foundation Is Required.
- 4. The Bottom Elevation Of The Vertical Columns Shall Be At The Base Of The Excavation, As Minimum, Or Lower As Determined By The Engineer.
- 5. The Vertical Columns Must Have A Minimum Horizontal Clearance Equal To The Minimum Ditch Width As Outlined In Sheet 113.

NCTCOG Spec: 702.2 – Mix Design And Mixing Concrete For Structures NCTCOG Spec: 303.2.9 – SteelReinforcement 2009 DWU Addendum:Item 702.DWU – Concrete Structures						
TYPE "A"		DWU	^(Page No.) 121			
UTILITY SUPPORT	00	CT. 2009				



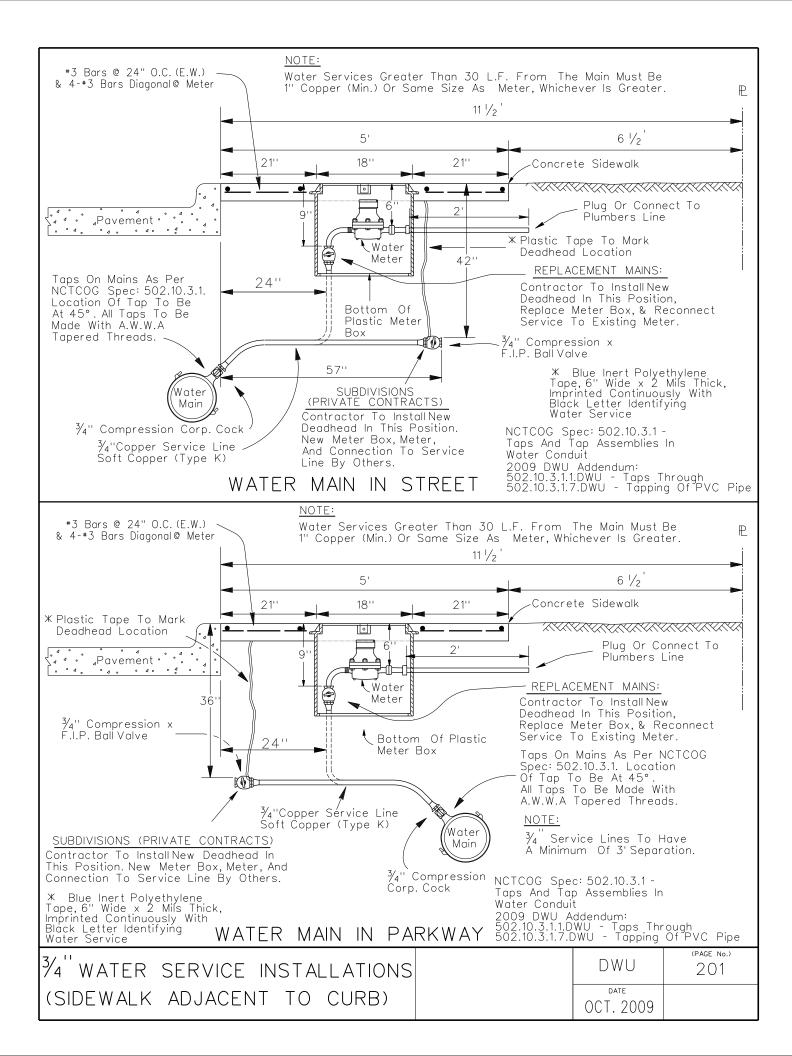
WATER MAIN CONSTRUCTION

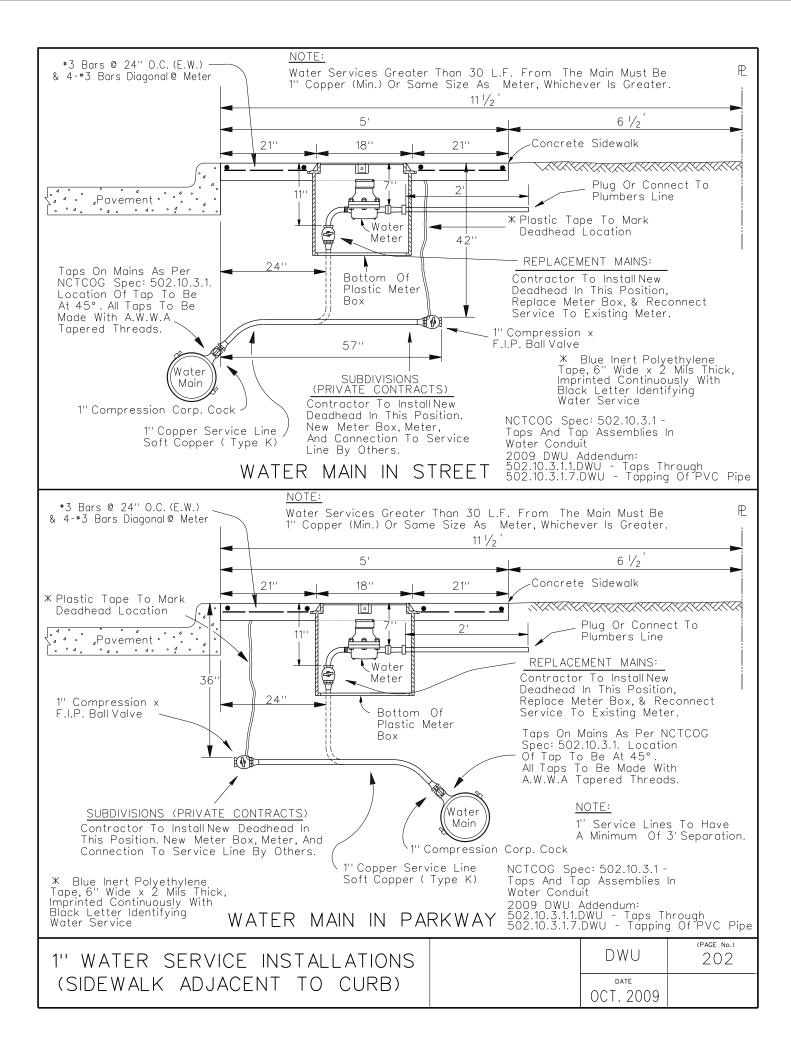


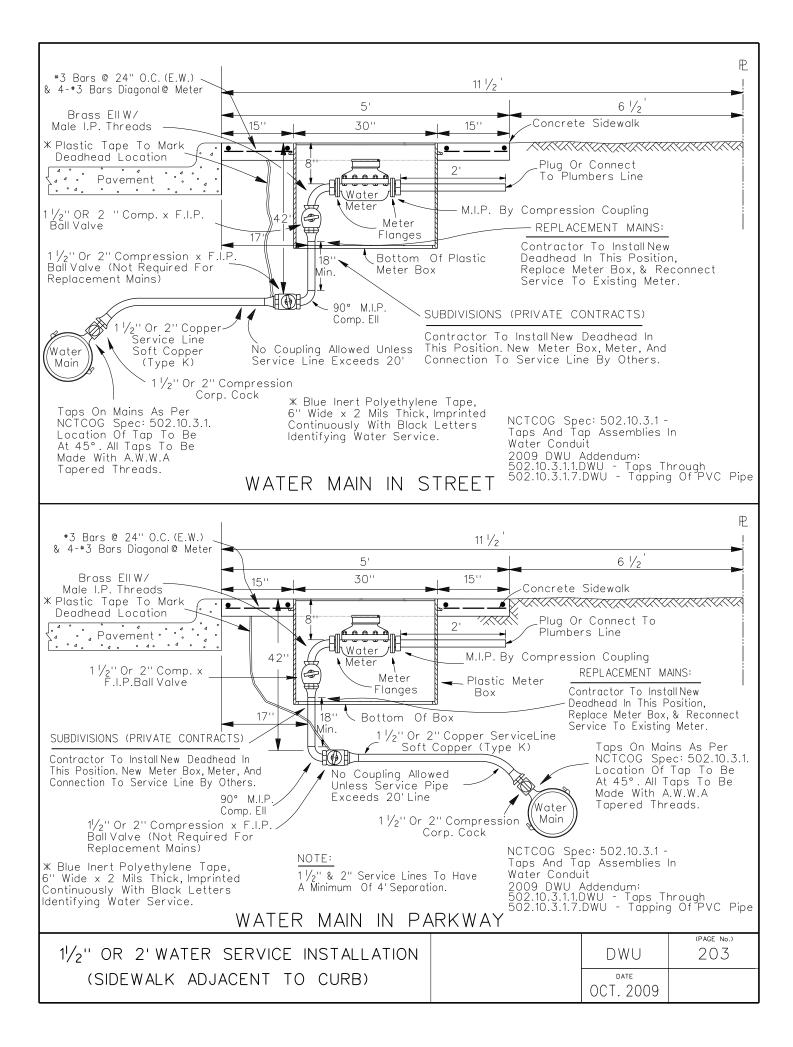
City of Dallas Water Utilities Department

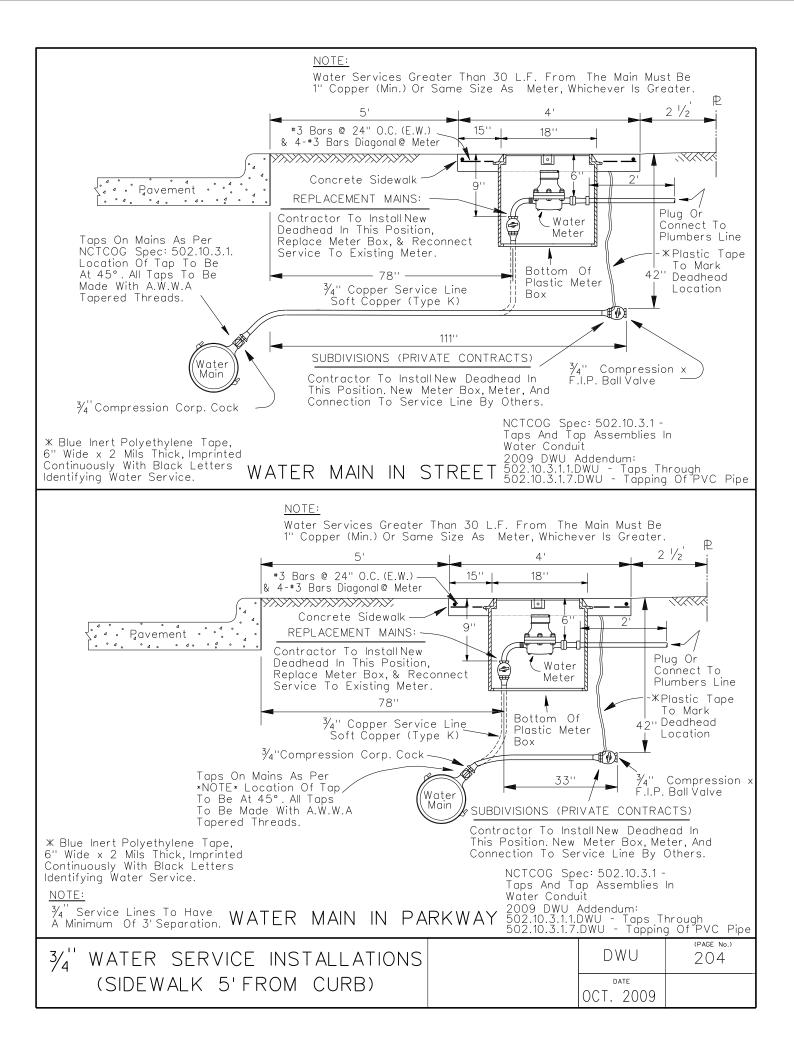
PART 2						
WATER MAIN CONSTRUCTION						
TITLE						

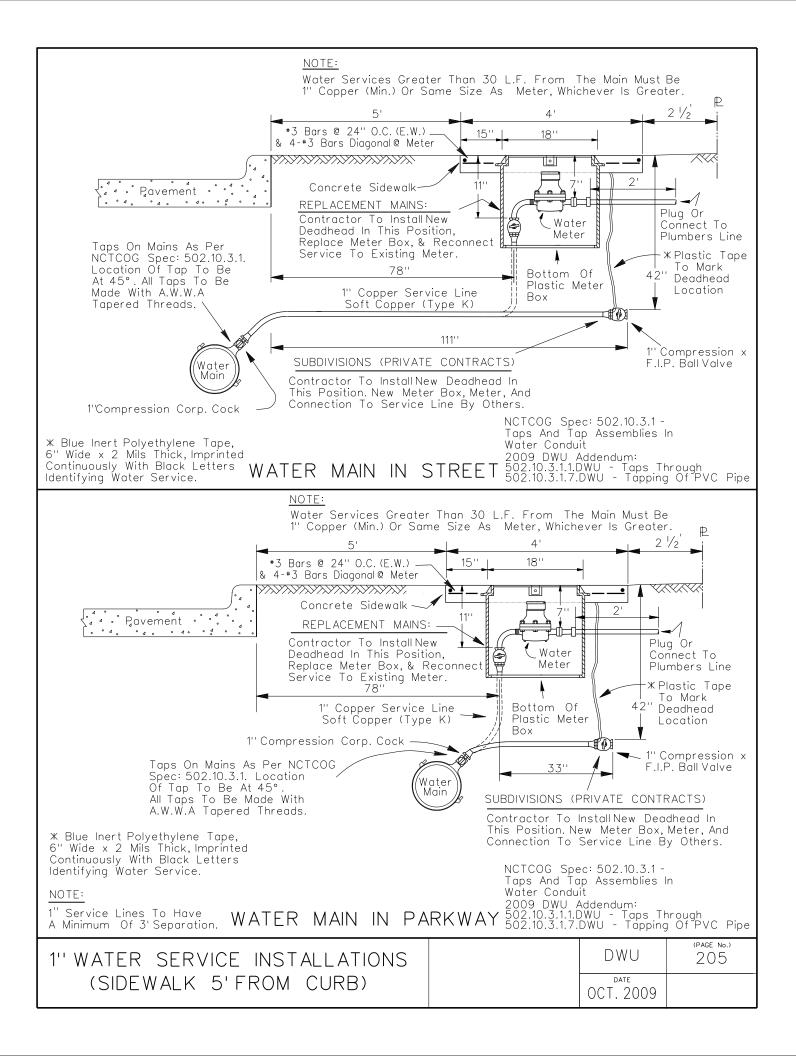
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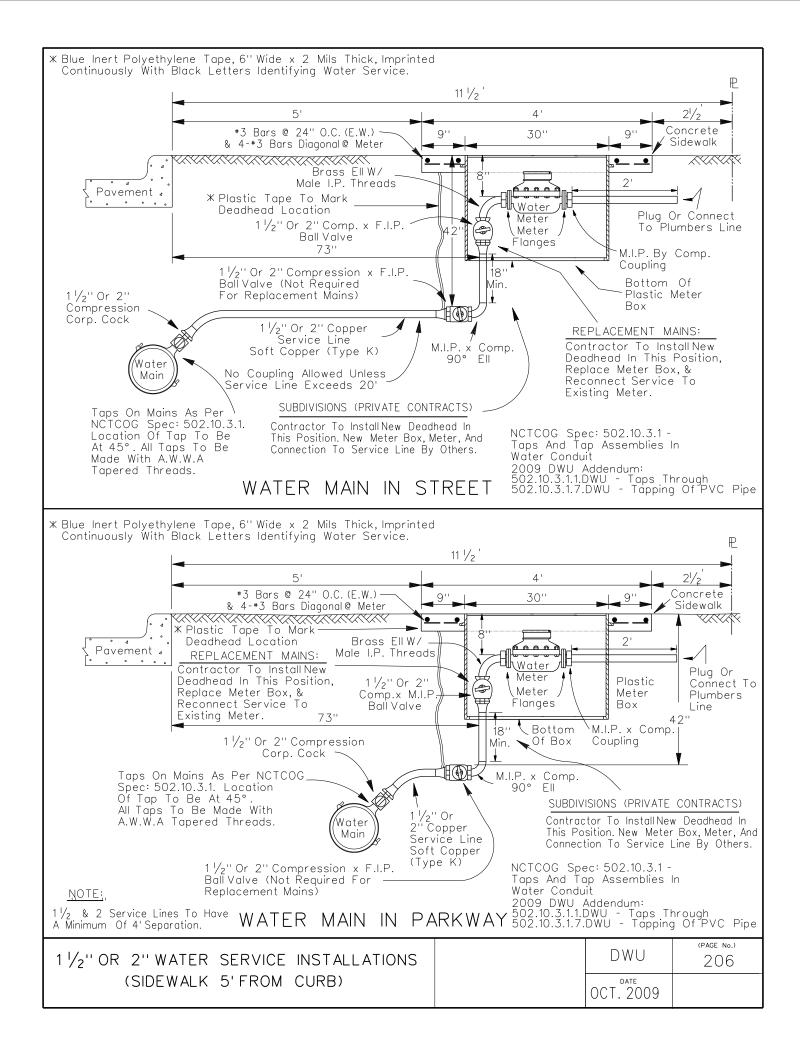


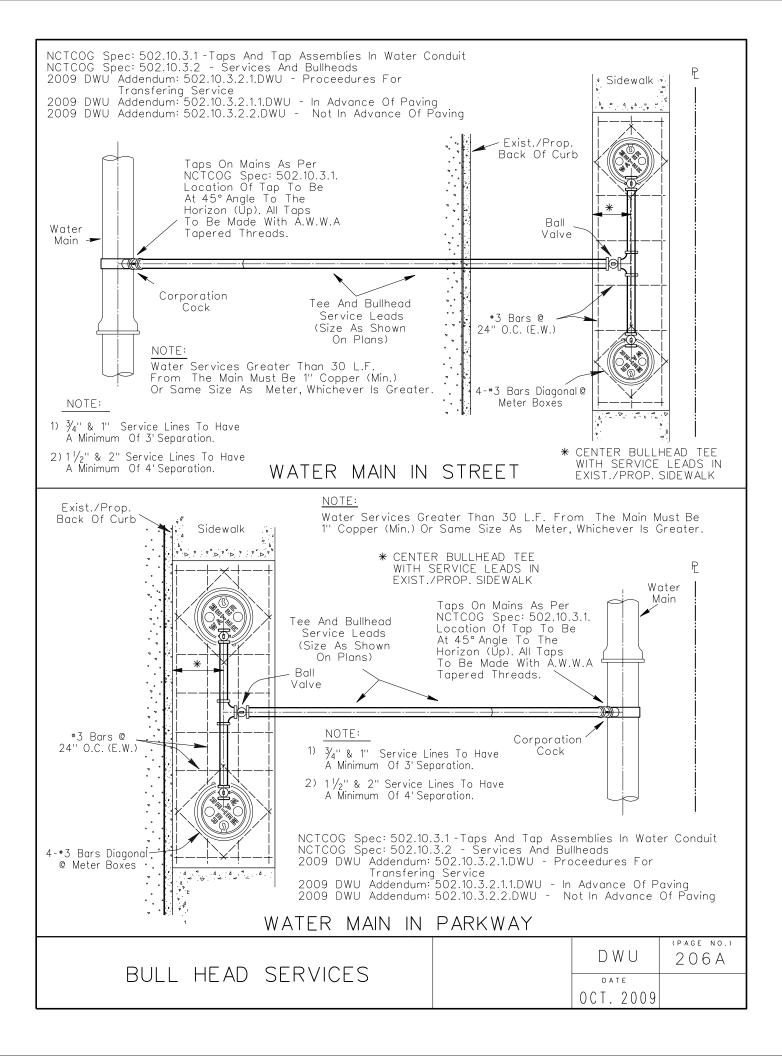


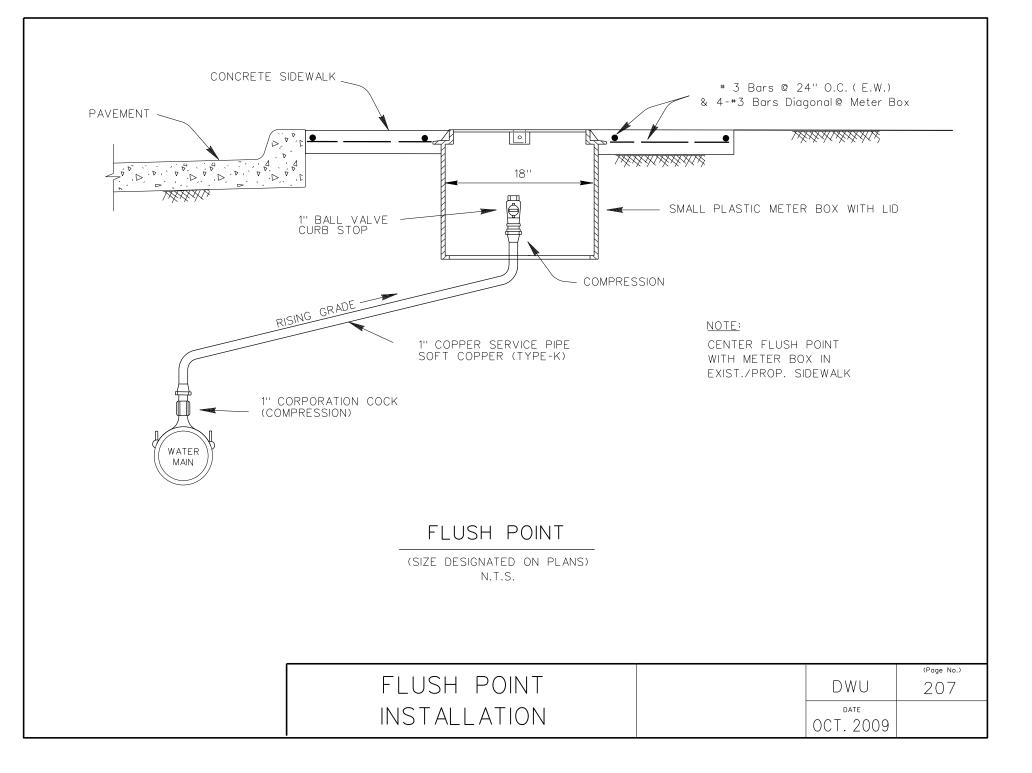


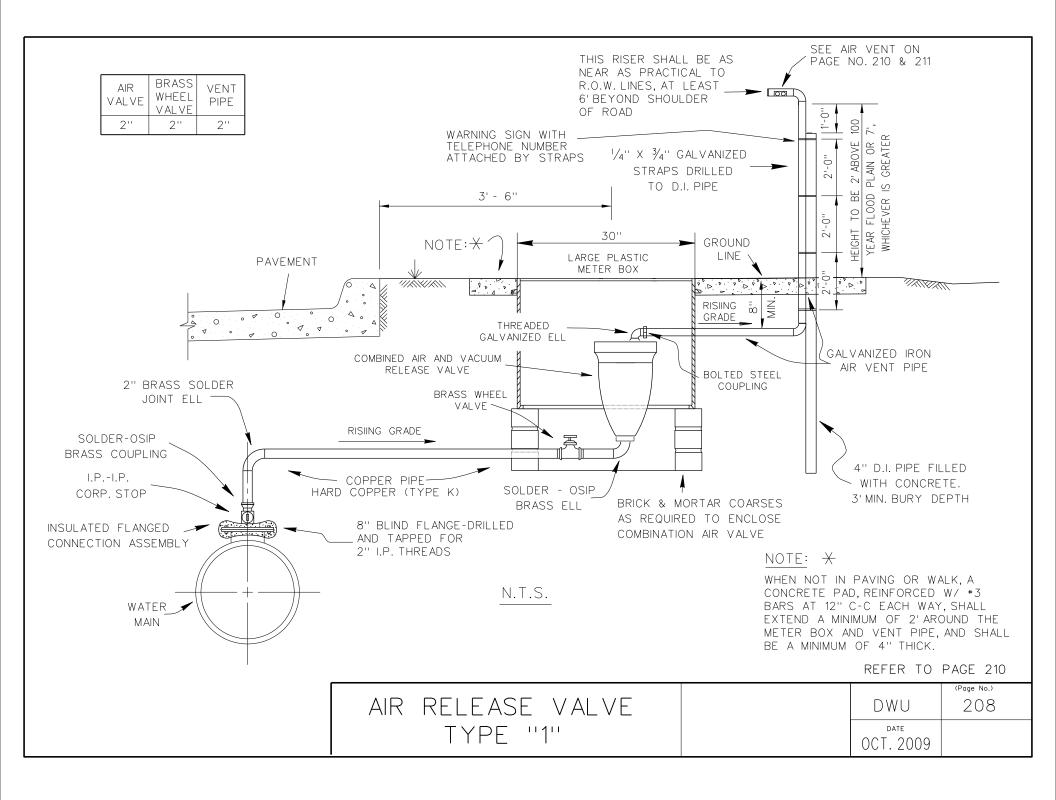


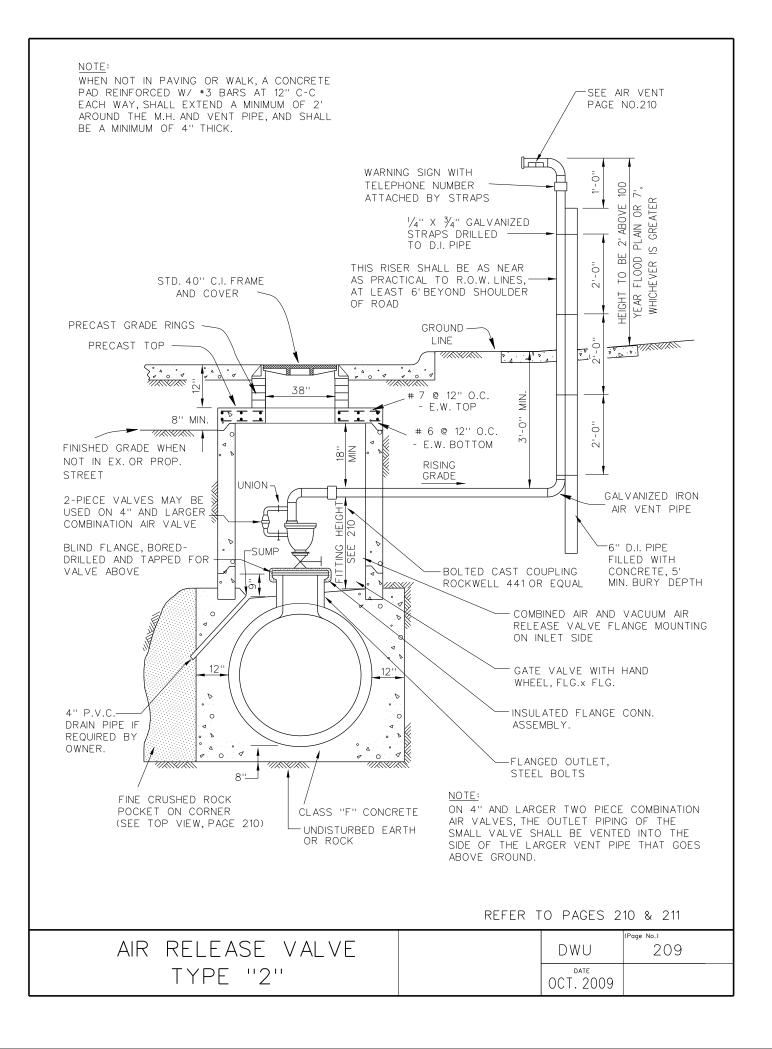


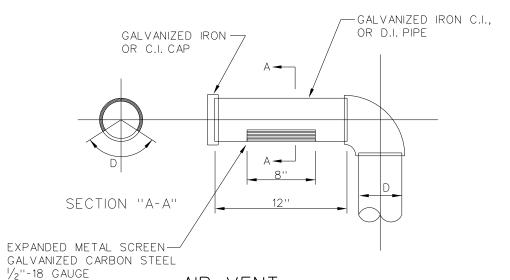








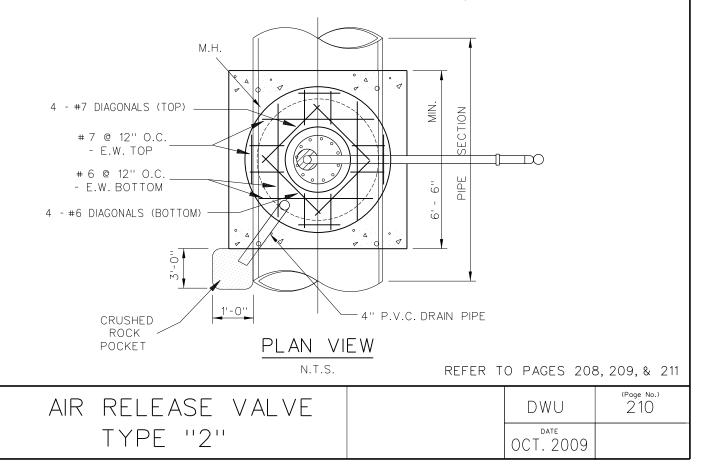




AIR VENT

N.T.S.

AIR VALVE	GATE VALVE	FLANGE OUTLET	MINIMUM FITTING HEIGHT	VENT PIPE DIAMETER	MANHOLE DIAMETER	VENT PIPE MATERIAL
2''	2''	8''	26''	2''	5'	GALVANIZED OR
3''	3''	18''	31''	3''	5'	PAINTED BLACK IRON
4 ''	4''	18''	38''	4''	5'	
6''	6''	18''	46''	6''	5'	CLASS 52
8''	8''	18''	53''	8''	6'	DUCTILE IRON
10''	10''	20''	62''	10''	6'	
12''	12''	24''	72''	12''	6'	



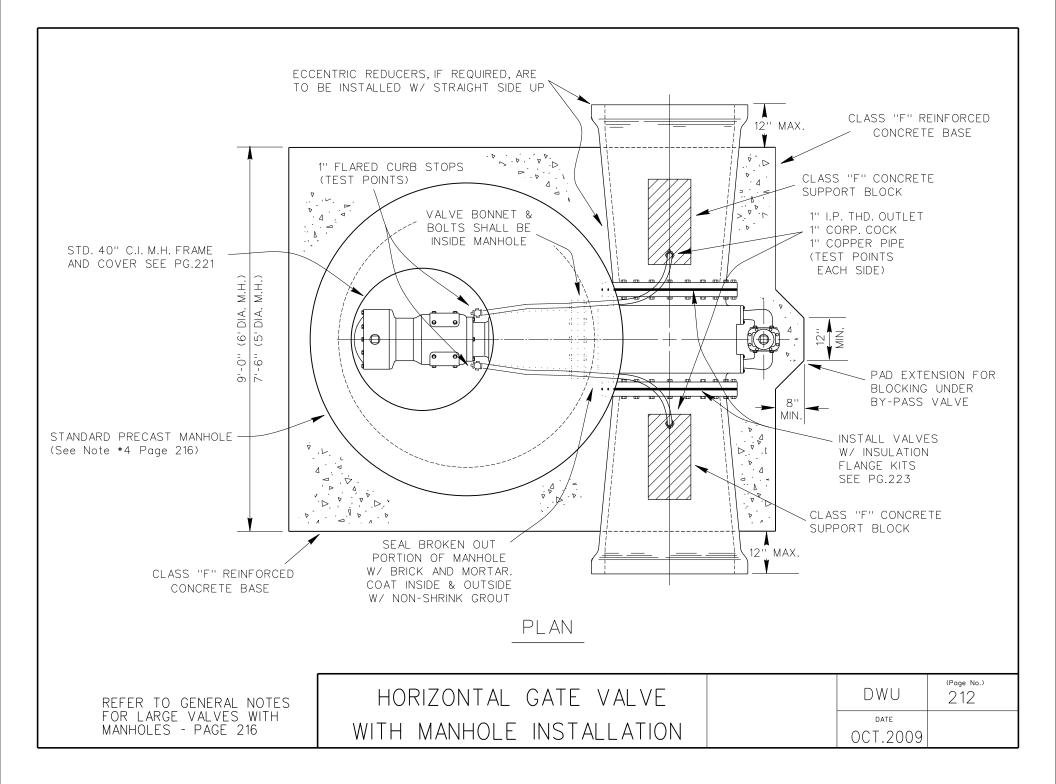
GENERAL NOTES

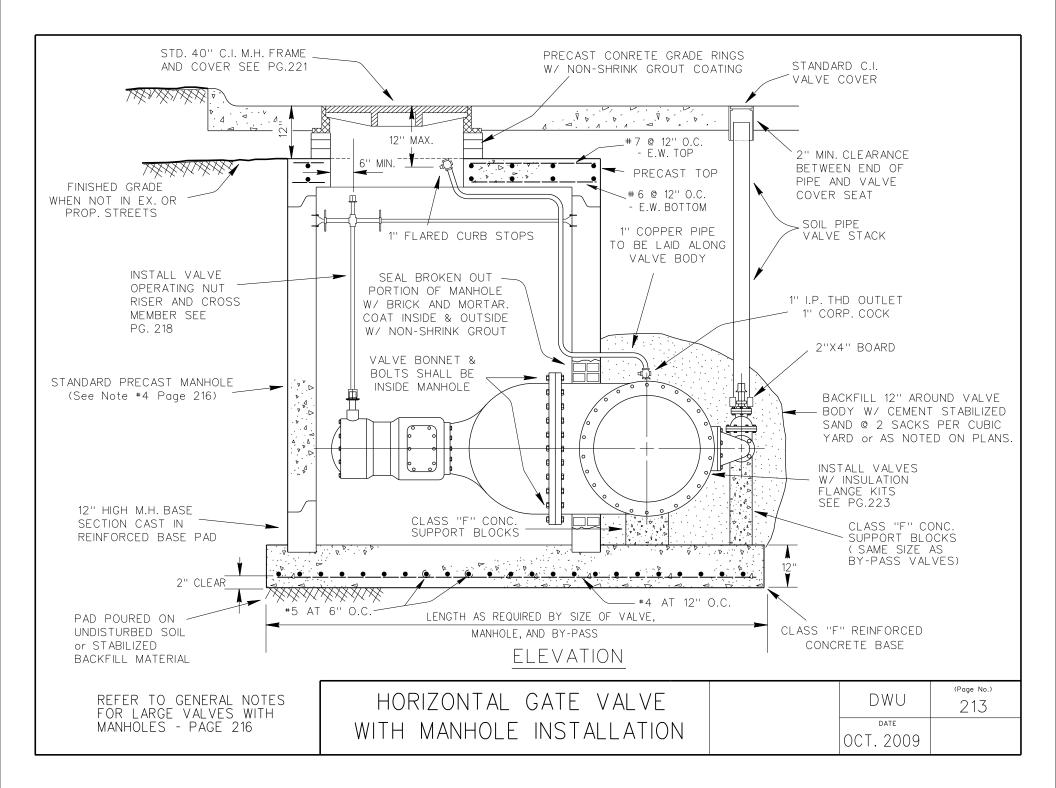
- 1. Manholes must be precast.
- Air vent pipes 4" and larger shall be Class 52 Ductile Iron Pipe with flange fittings with Rustoleum 7582 gray primer or equal in lieu of tar coating. Pipe shall be painted with Devguard 4308 or equal (SILVER COLOR) per manufacture's instructions prior to installation.
- 3. A Dallas Water Utilities warning sign shall be furnished by the City and installed by the Contractor.
- 4. Vent pipe must be extended a minimum of 2 feet above the water surface of the 100 year frequency flood (AS STATED ON DESIGN PLANS), or 7 feet above ground line, whichever is greater
- 5. The following table of dimensions govern the required depths of cover for the installation of Type 2 air valves within public rights-of-ways;
- 6. All underground portions of Ductile Iron Pipe will be encased in polywrap.

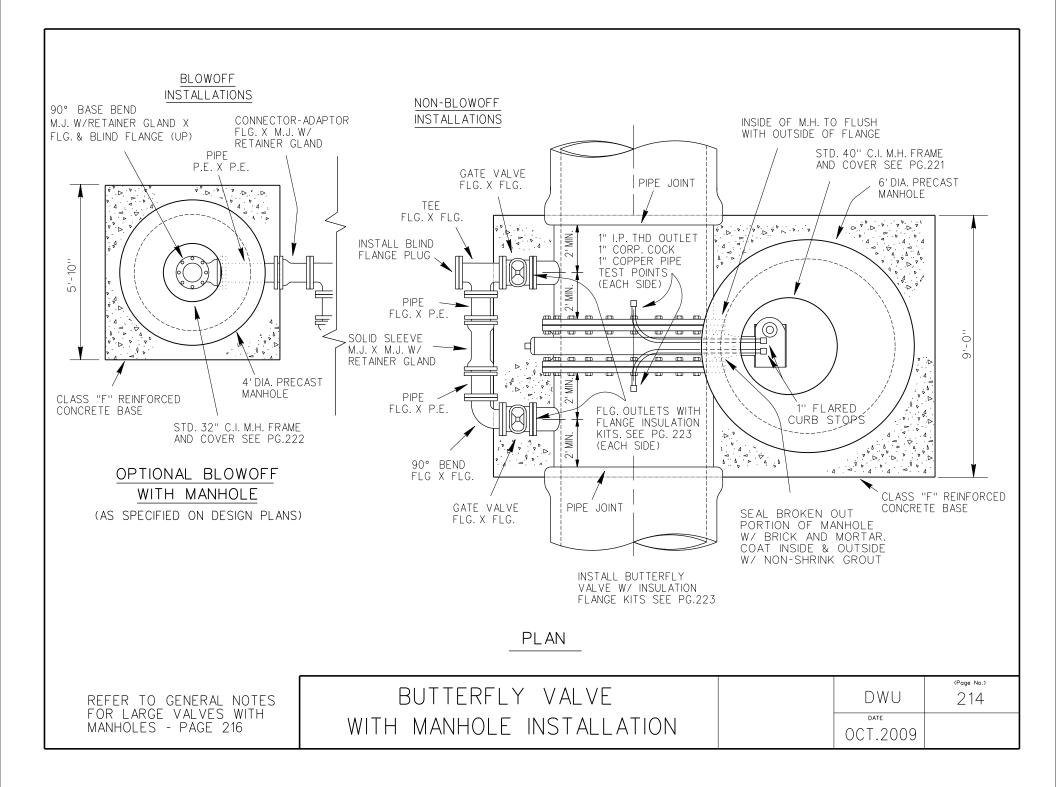
TABLE OF I	DIMENSIONS FOR DEPT	TH OF COVER
AIR VALVE SIZE	VALVE FITTING ASSEMBLY MIN. HEIGHT	MINIMUM REQUIERED DEPTH OF COVER
2''	26''	7.5'
3''	31''	7.8'
4''	38''	8.6'
6''	46''	9.3'
8''	53''	10.1'
10''	62''	10.8'
12''	72"	11.7'

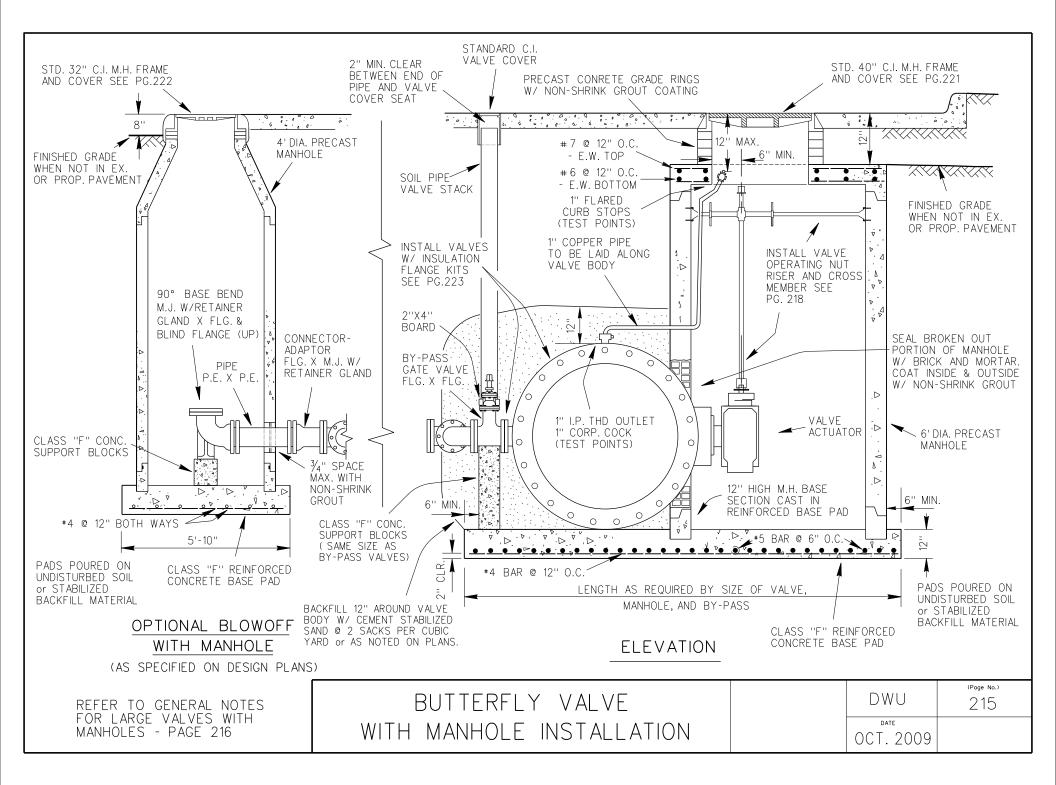
REFER TO PAGES 209 & 210

GENERAL NOTES	DWU	(Page No.) 211
TYPE 2 AIR VALVE	DATE OCT. 2009	



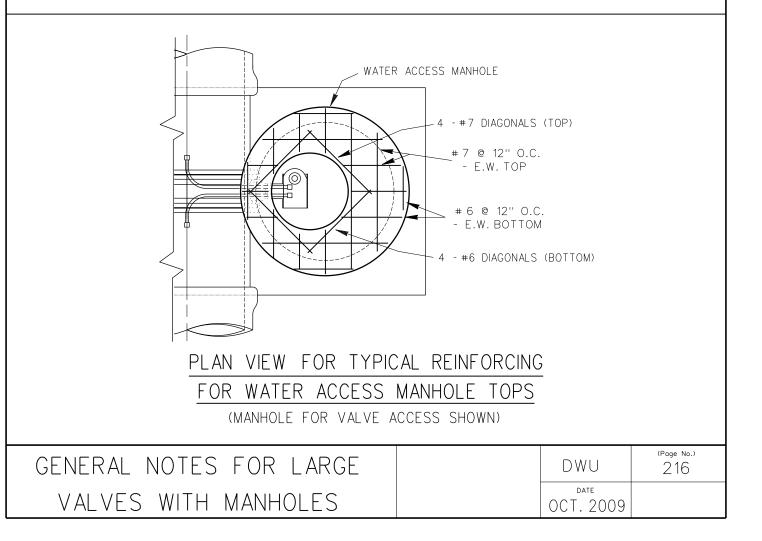


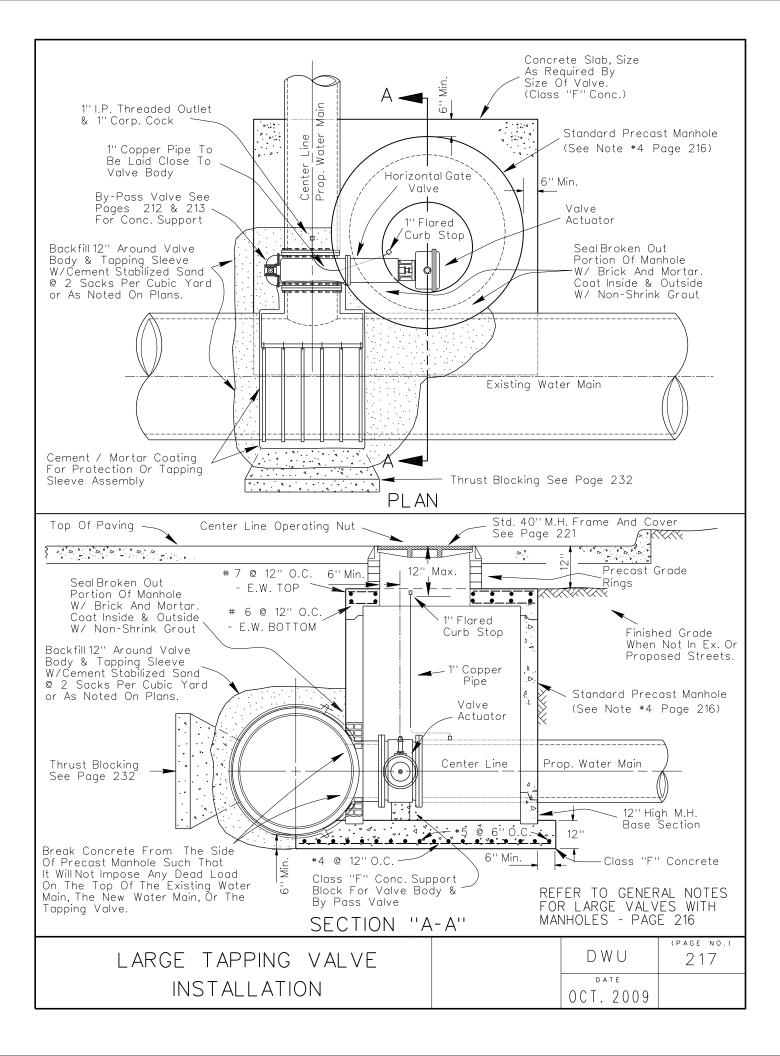


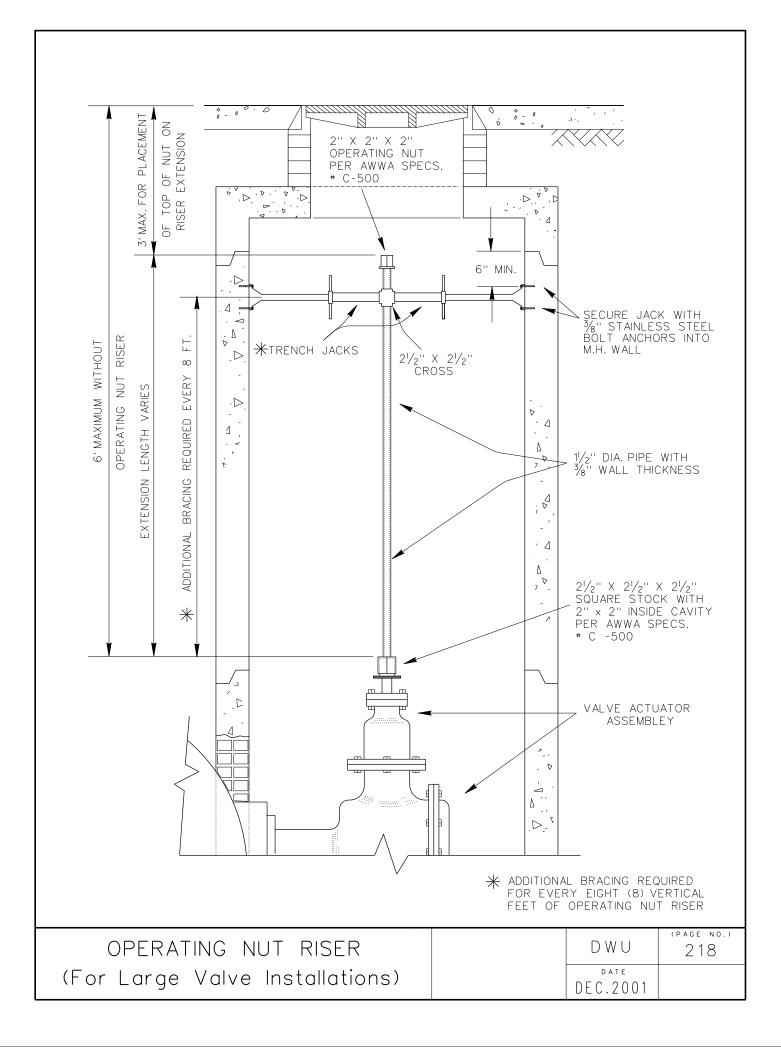


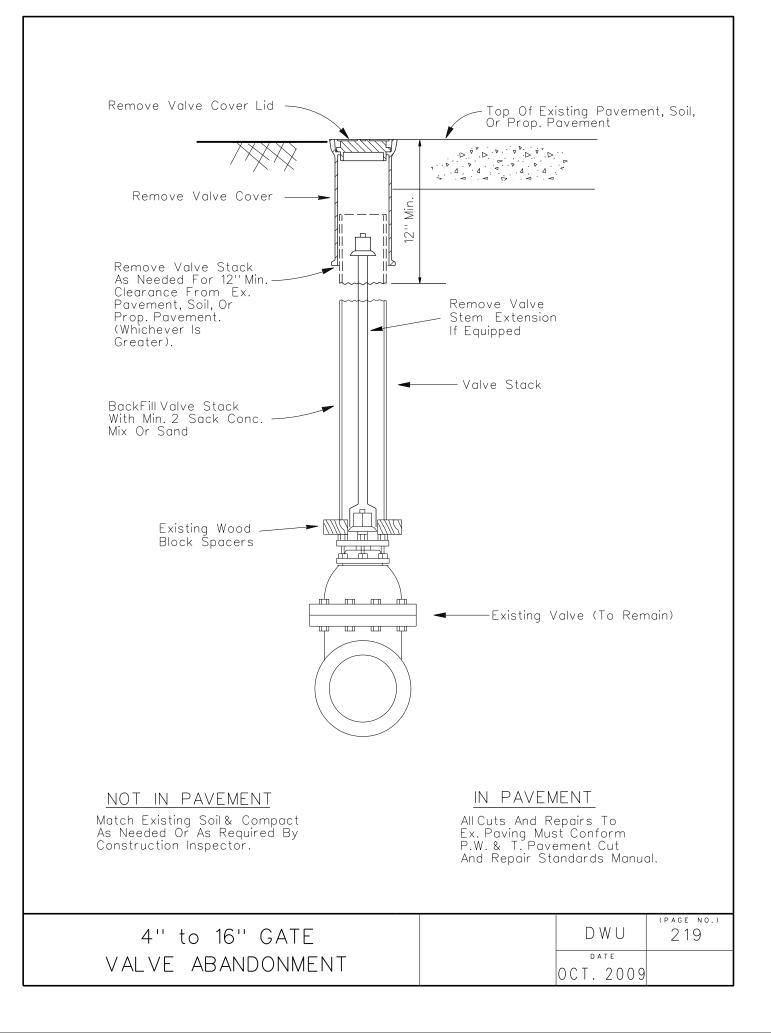
GENERAL NOTES

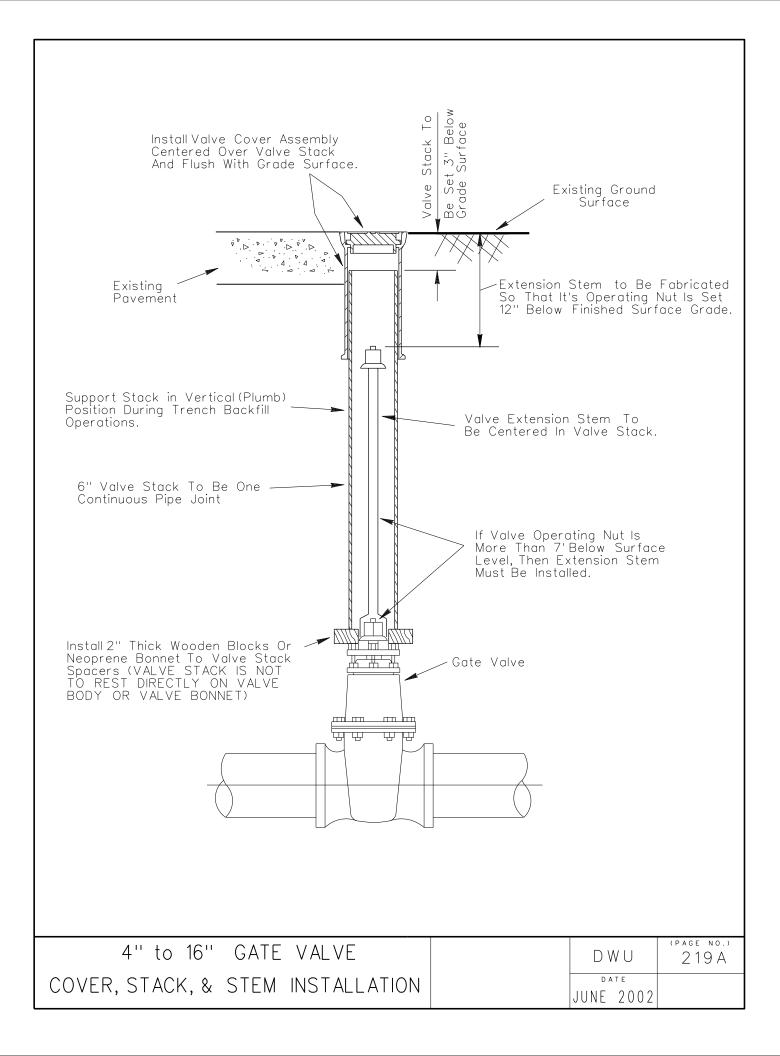
- 1. Precast grade rings shall be eliminated and the top of the manhole shall be placed at existing grade when the location is not in an existing or proposed street. For this case only, the standard 40" manhole frame and cover will be set in the manhole precast top.
- 2. In open country, a 4" thick concrete pad, reinforced with #3 bars on 12" centers each way shall extend a minimum of 2' around the manholes and bypass valve stack.
- 3. When a reducer is installed into a hub and valve, the exposed steel on the end of the reducer will be wrapped with wire mesh and a minimum of 1" mortar coating shall be applied.
- 4. Manholes for 30" and larger valves shall be 6' in diameter.

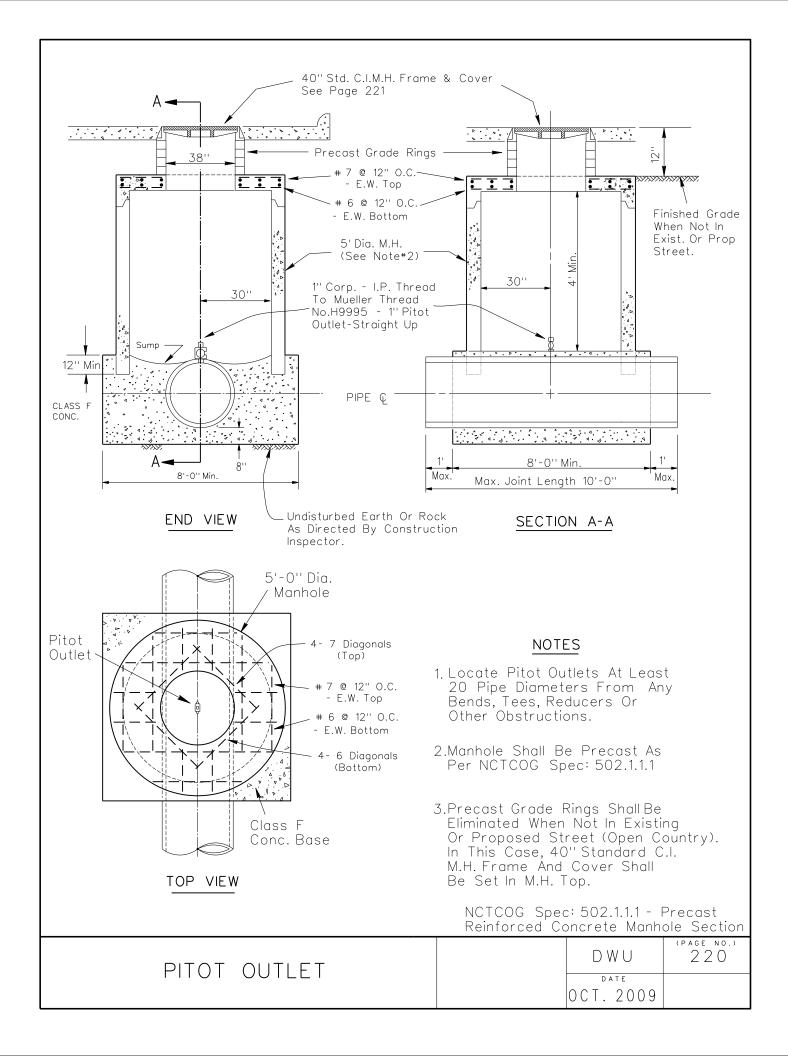


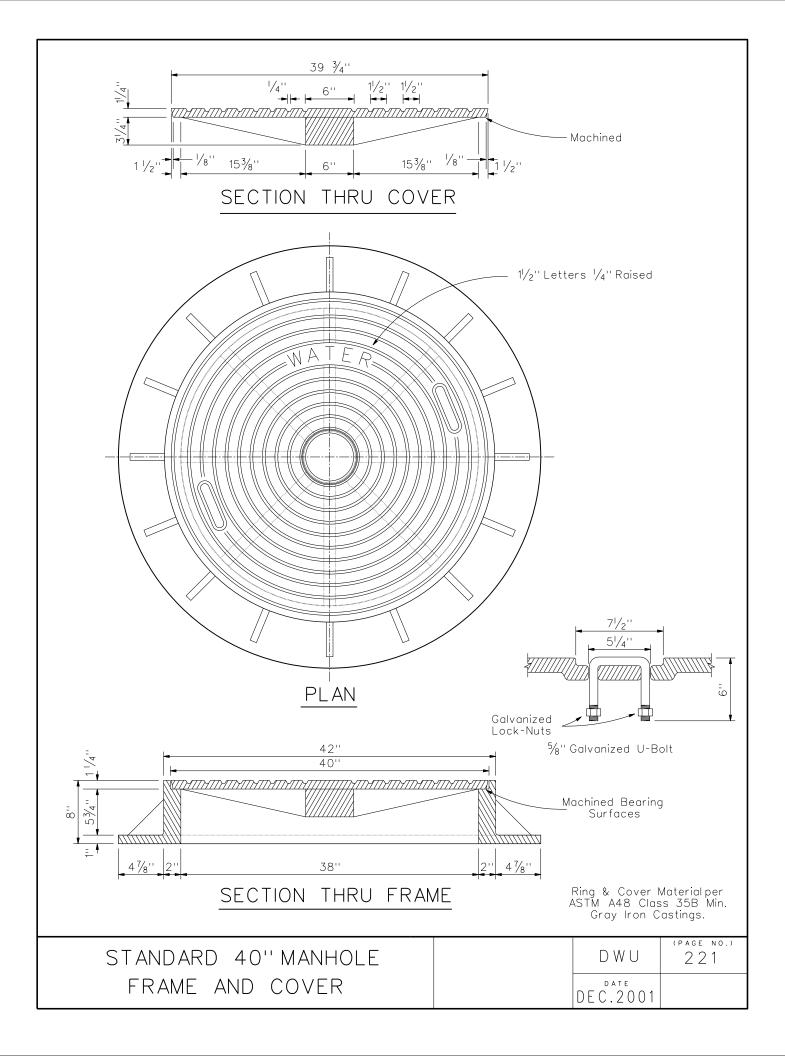


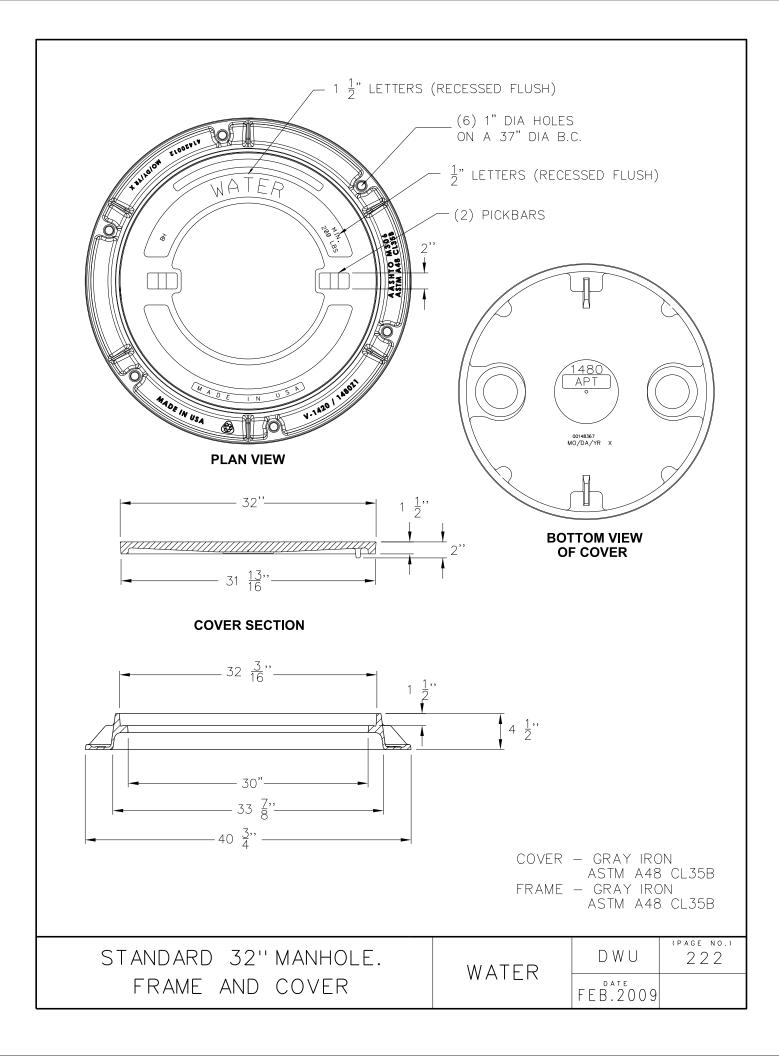


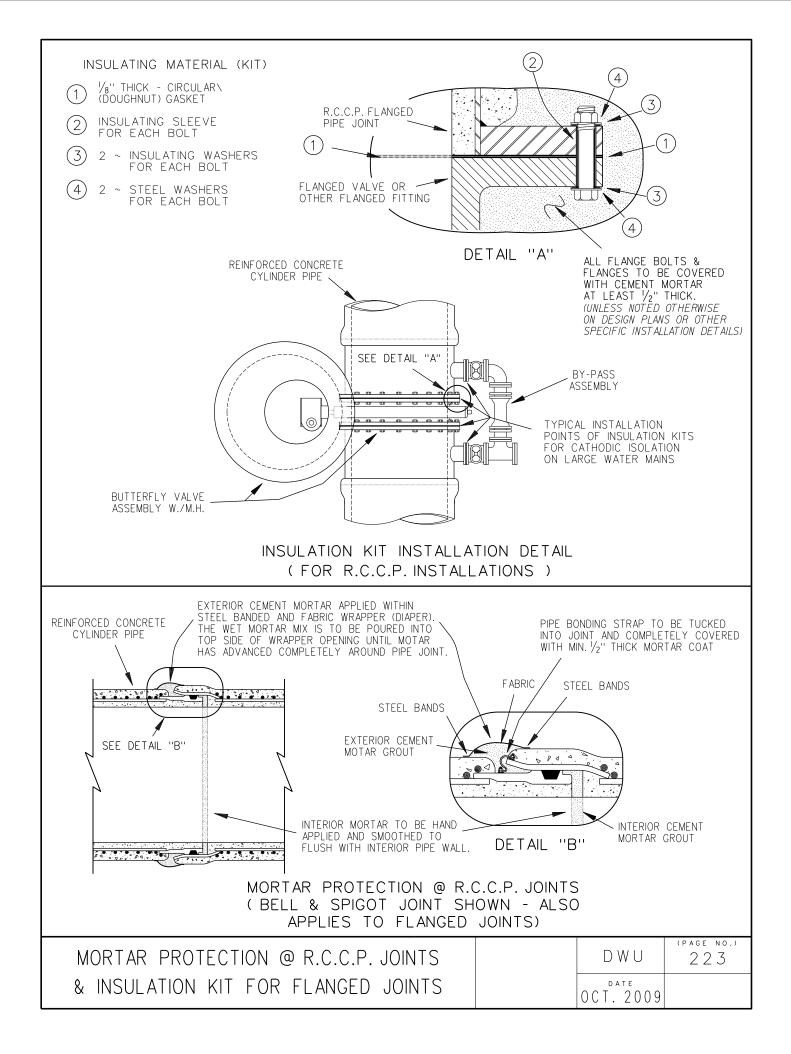


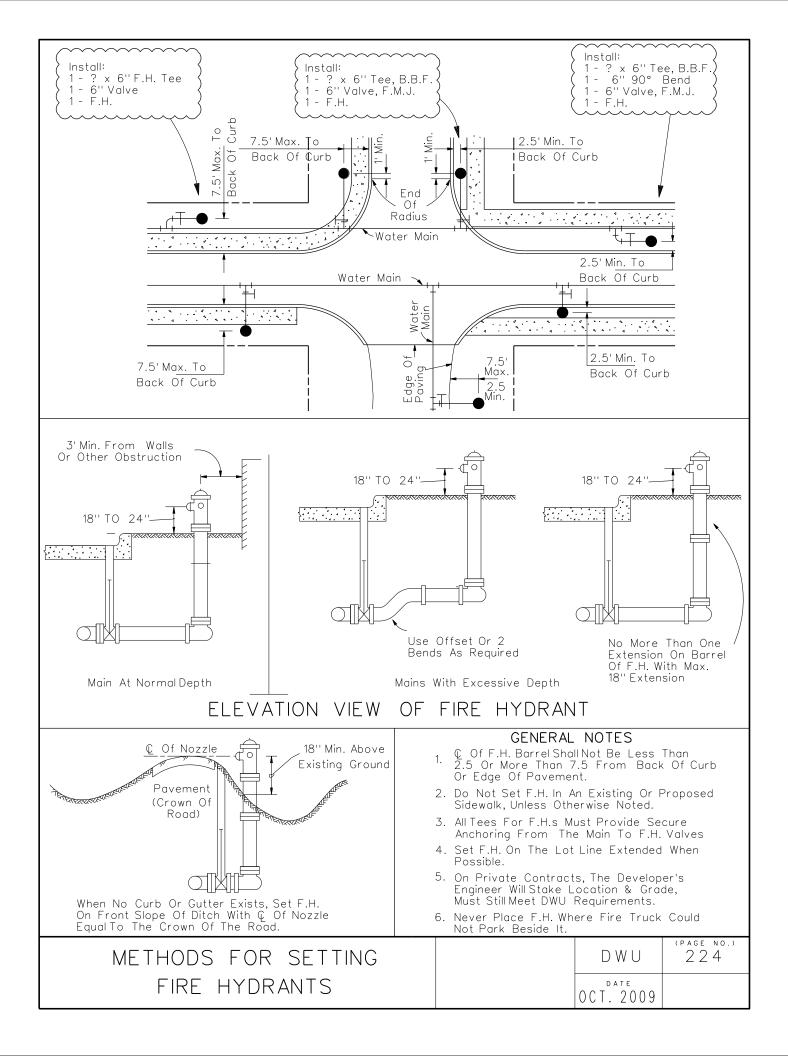


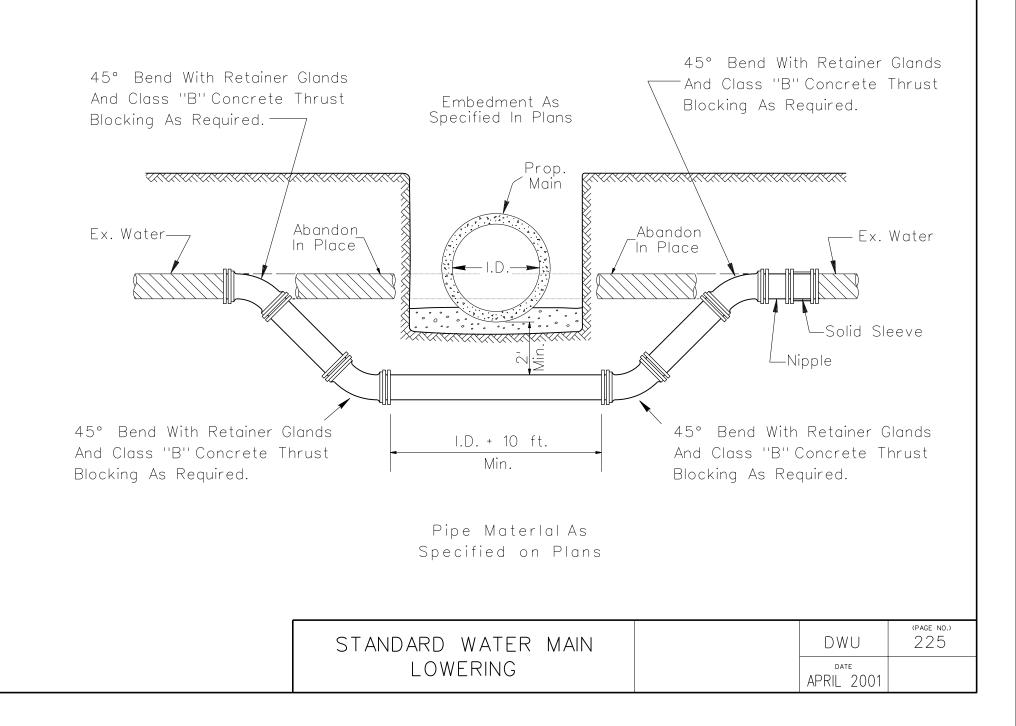


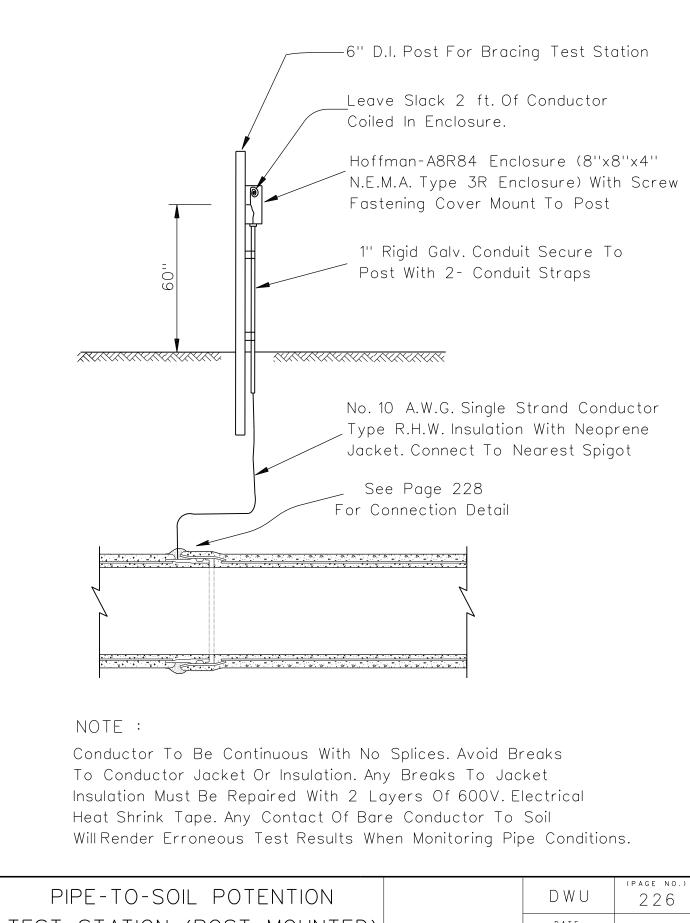






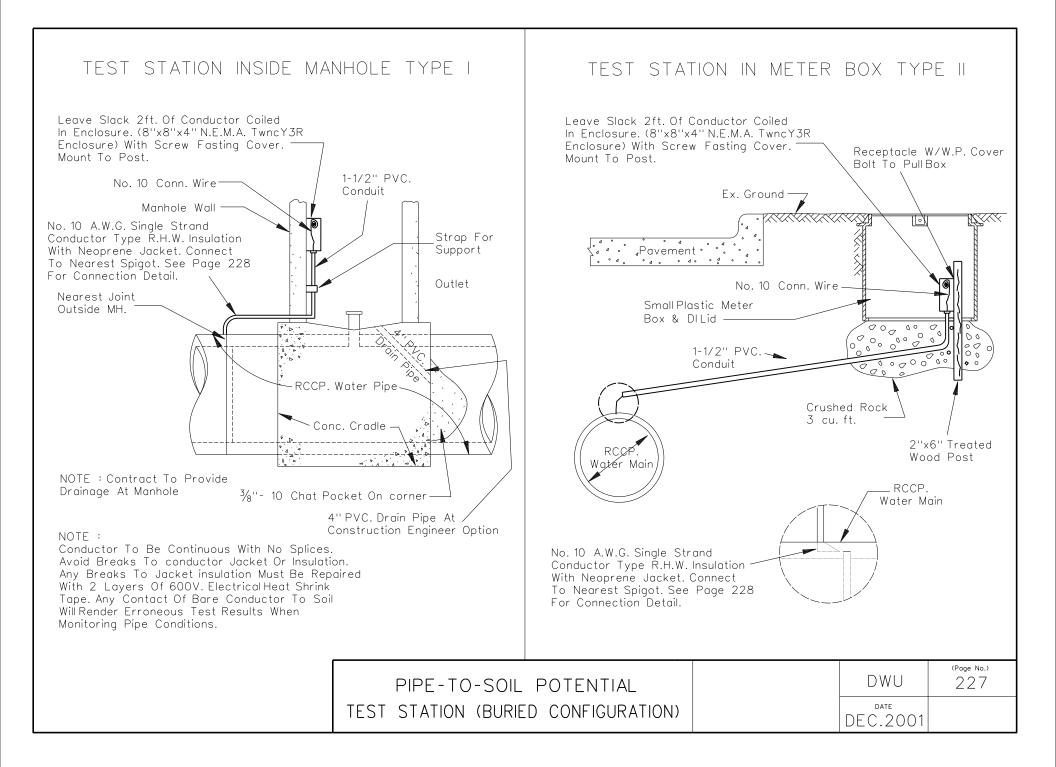


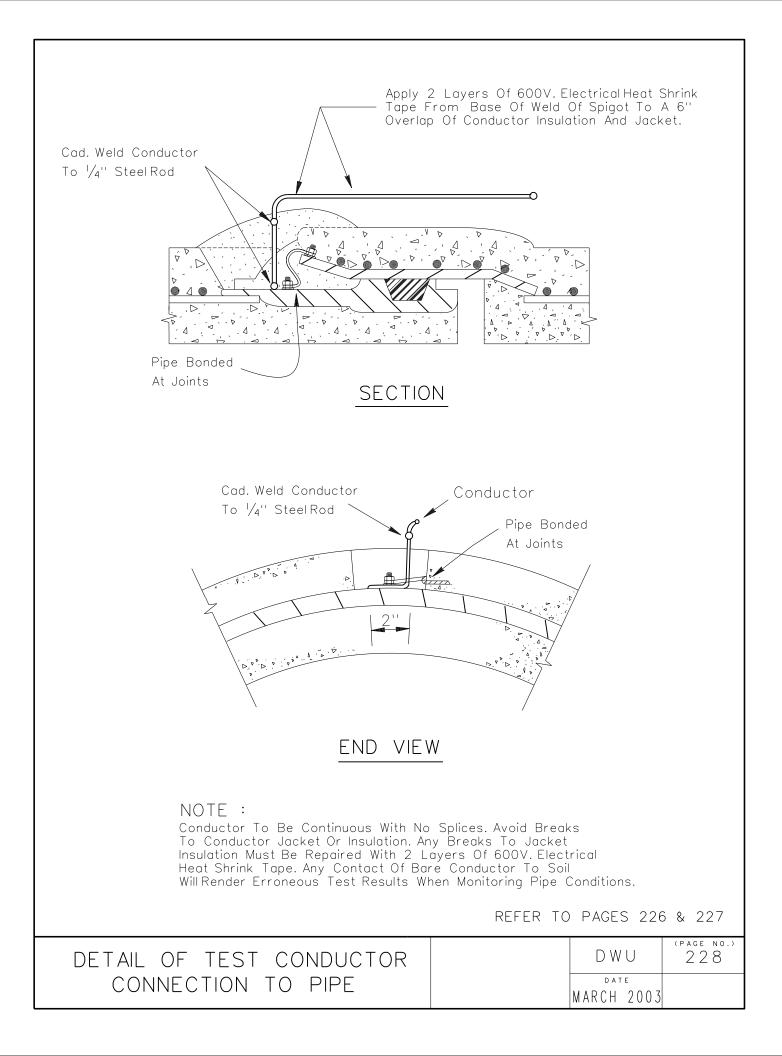


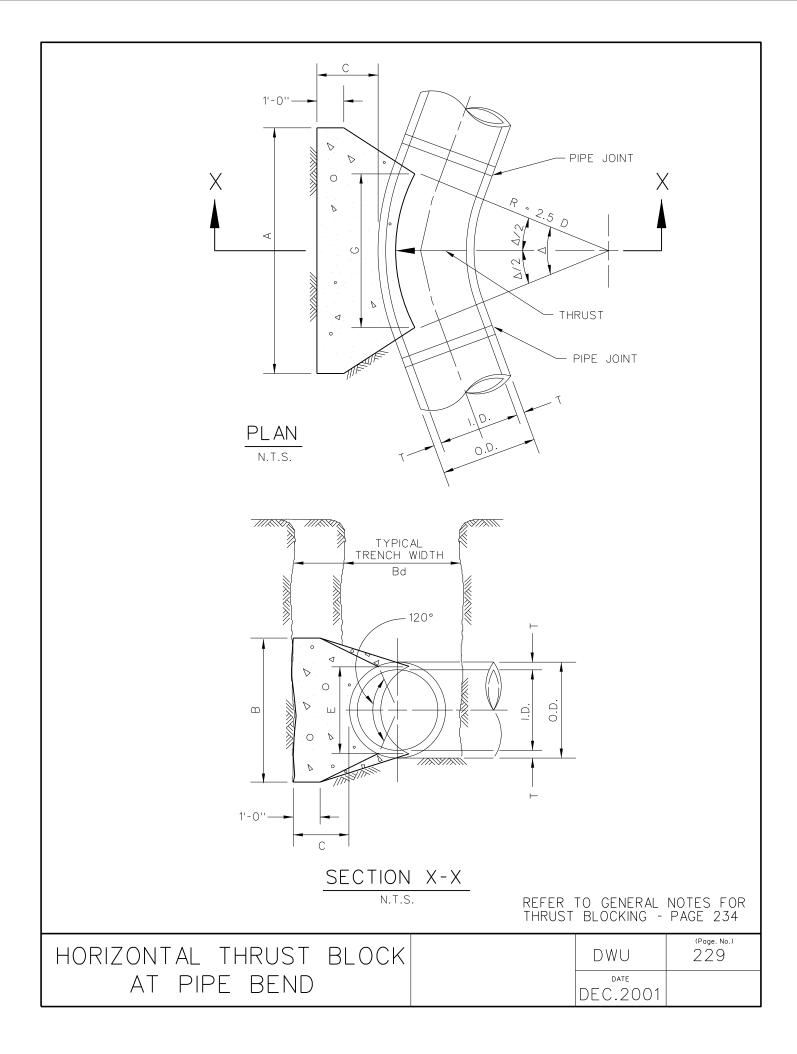


TEST STATION (POST MOUNTED)

DATE MARCH 2003







TABLES OF DIMENSIONS AND QUANTITIES

		C △ =	C ∆ ≥	
I.D.	Т	11.25°	22.50°	E
(IN.)	(IN.)	(FT.)	(FT.)	(FT.)
4,6,8	0.4	1.5	1.5	0.9
10,12	0.5	1.5	1.5	1.2
16,18	0.6	1.5	1.5	1.6
20	0.7	1.5	1.5	1.8
24	0.9	1.5	1.5	2.1
30	2.9	1.5	1.9	2.6
36	4.5	1.5	2.3	3.3
42	5.0	1.8	2.6	3.8
48	5.5	2.0	3.0	4.3
54	6.0	2.3	3.4	4.8
60	6.5	2.5	3.8	5.3
66	6.8	2.8	4.1	5.7
72	7.5	3.0	4.5	6.3
78	7.5	3.3	4.9	6.7
84	8.0	3.5	5.3	7.2
90	8.5	3.8	5.6	7.7
96	9.0	4.0	6.0	8.2

			Δ	= 11.2	:5°					Δ= 22.50°							
				EARTI	Η		ROCK			EARTH				ROCK			
I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4,6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1
10,12	0.6	2.2	1.5	1.5	0.1	1.0	1.5	0.1	10,12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1
16,18	0.8	5.0	2.0	2.5	0.3	1.5	2.0	0.2	16,18	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3
20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	0.3	20	1.8	12.3	3.5	3.5	0.7	2.0	3.0	0.4
24	1.1	8.9	3.0	3.5	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.5	0.5
30	1.4	10.4	3.0	3.5	0.6	2.0	3.5	0.4	30	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8
36	1.7	15.0	3.5	4.5	0.9	2.0	4.0	0.5	36	3.3	29.8	5.5	5.5	2.3	4.0	4.0	1.3
42	1.9	20.4	4.5	5.0	1.5	2.5	5.0	0.8	42	3.8	40.5	7.0	6.0	3.9	4.5	5.0	2.1
48	2.2	26.6	4.5	6.0	2.0	2.5	6.0	1.1	48	4.4	52.9	8.0	7.0	5.7	4.5	6.0	2.8
54	2.5	33.7	6.0	6.0	3.0	3.0	6.0	1.4	54	4.9	67.0	9.0	8.0	8.0	6.0	6.0	4.1
60	2.7	41.6	6.0	7.0	3.8	3.0	7.0	1.8	60	5.5	82.7	9.5	9.0	10.6	6.0	7.0	5.3
66	3.0	50.3	6.5	8.0	5.1	3.5	8.0	2.7	66	6.0	100.1	10.5	10.0	14.1	6.5	8.0	7.2
72	3.3	59.9	7.5	8.0	6.3	4.0	8.0	3.3	72	6.6	119.1	11.0	11.0	17.6	7.5	8.0	9.1
78	3.6	70.2	8.0	9.0	8.1	4.0	9.0	3.9	78	7.1	139.8	12.0	12.0	22.5	8.0	9.0	11.7
84	3.8	81.5	8.5	10.0	10.3	4.5	10.0	5.3	84	7.6	162.1	13.0	12.5	27.2	8.5	10.0	14.8
90	4.1	93.5	9.5	10.0	12.2	5.0	10.0	6.3	90	8.2	186.1	14.0	13.5	33.7	9.5	10.0	17.7
96	4.4	106.4	10.0	11.0	15.0	5.0	11.0	7.4	96	8.7	211.7	15.0	14.5	41.2	10.0	11.0	21.8

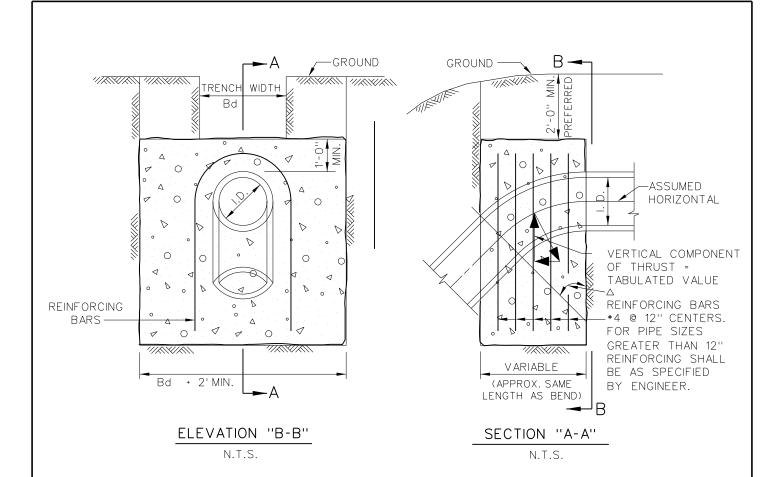
REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZONTAL THRUST BLOCK	DWU	J (Page No.) 230
AT PIPE BEND	DEC.2	2001

TABLES OF DIMENSIONS AND QUANTITIES

			Δ	= 30	0						۵	. = 45	0				
				EART	H		ROCK						EAR	ГН		ROCK	<u> </u>
I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	1.0	2.6	2.0	1.5	0.2	1.0	1.5	0.1	4,6,8	1.5	3.9	2.0	2.0	0.2	1.5	1.5	0.1
10,12	1.5	5.9	2.5	2.5	0.3	2.0	1.5	0.2	10,12	2.2	8.7	3.5	2.5	0.5	2.0	2.5	0.3
16,18	2.2	13.2	3.5	4.0	0.8	2.5	3.0	0.4	16,18	3.2	19.5	4.5	4.5	1.2	3.0	3.5	0.6
20	2.4	16.3	4.5	4.0	1.0	3.0	3.0	0.5	20	3.6	24.1	5.5	4.5	1.5	3.5	3.5	0.7
24	2.9	23.4	6.0	4.0	1.4	3.5	3.5	0.7	24	4.3	34.6	8.0	4.5	2.3	4.5	4.0	1.1
30	3.6	27.5	6.5	5.0	1.9	3.5	4.0	0.9	30	5.4	40.6	8.5	5.0	3.2	5.5	4.0	1.6
36	4.4	39.5	7.0	6.0	3.4	4.5	4.5	1.6	36	6.5	58.5	10.0	6.0	5.3	6.5	4.5	2.6
42	5.1	53.8	8.0	7.0	5.1	5.5	5.0	2.5	42	7.5	79.6	11.5	7.0	8.1	8.0	5.0	4.2
48	5.8	70.3	9.0	8.0	7.4	6.0	6.0	3.7	48	8.6	104.0	13.0	8.0	11.9	9.0	6.0	6.3
54	6.5	89.0	10.0	9.0	10.3	7.0	6.5	5.3	54	9.7	131.5	15.0	9.0	17.1	10.5	6.5	8.9
60	7.3	110.0	11.0	10.0	13.9	7.5	7.5	7.3	60	10.7	162.4	16.5	10.0	23.1	11.0	7.5	12.0
66	8.0	132.9	12.5	11.0	18.9	8.5	8.0	9.6	66	11.8	196.5	18.0	11.0	30.1	12.0	8.5	16.2
72	8.7	158.2	13.5	12.0	24.0	9.0	9.0	12.3	72	12.9	233.9	19.5	12.0	38.6	14.0	8.5	20.7
78	9.4	185.6	14.5	13.0	30.0	10.0	9.5	15.6	78	13.9	274.5	21.5	13.0	49.8	14.5	9.5	25.9
84	10.1	215.3	15.5	14.0	37.1	10.5	10.5	19.5	84	15.0	318.4	23.0	14.0	61.2	15.5	10.5	32.6
90	10.9	247.1	16.5	15.0	45.0	11.5	11.0	23.9	90	16.1	365.5	24.5	15.0	74.5	17.5	10.5	39.6
96	11.6	281.2	18.0	16.0	55.5	12.5	11.5	28.9	96	17.1	415.6	26.0	16.0	89.5	18.5	11.5	48.5
			Δ	= 67	.50°					Δ = 90°							
				EART	Н		ROCK]					ROCK	;		
I.D. (IN.)		THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.	B (FT.)	VOL. (C.Y.)
4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	4,6,8	2.7	7.1	5.0	1.5	0.4	2.0	2.0	0.2
10,12	3.1	12.6	5.5	2.5	0.8	3.5	2.0	0.4	10,12	4.0	16.0	6.5	2.5	1.0			0.5
16,18	4.7	28.3	7.5	4.0	1.9	5.5	3.0	0.9	16,18	6.0	36.0	9.0	4.0	2.4	4.5	4.0	1.0
20	5.2	34.9	9.0	4.0	2.3	5.5	3.5	1.2	20	6.6	44.4	10.0	4.5	3.1	6.0	4.0	1.5
24	6.2	50.3	11.5	4.5	3.5	6.5	4.0	1.6	24	7.9	64.0	14.5	4.5	5.0	8.0	4.0	2.1
30	7.8	58.9	12.0	5.0	4.8	7.5	4.0	2.2	30	9.9	75.0	15.0	5.0	6.7	10.0	4.0	3.3
36	9.4	84.9	14.5	6.0	8.2	9.5	4.5	3.8	36	11.9	108.0	18.0	6.0	11.4	12.0	4.5	5.3
42	10.9	115.5	17.0	7.0	12.8	11.0	5.5	6.3	42	13.9	147.0	21.0	7.0	17.8	14.0	5.5	8.7
48	12.5	150.9	19.0	8.0	18.4	13.0	6.0	9.2	48	15.9	192.0	24.0	8.0	26.2	16.0	6.0	12.4
54	14.0	191.0	21.5	9.0	26.0	15.0	6.5	12.9	54	17.9	243.0	27.0	9.0	36.9	18.0	7.0	18.1
60	15.6	235.8	24.0	10.0	35.6	16.0	7.5	17.6	60	19.9	299.8	30.0	10.0	50.3	20.0	7.5	24.0
66	17.1	285.3	26.0	11.0	46.0	18.0	8.0	23.0	66	21.8		33.0	11.0	66.2			32.5
72	18.7	339.5	28.5	12.0	57.8	19.0	9.0	28.4	72	23.8		36.0	12.0	85.6	24.0	9.0	41.0
78	20.2	398.5	31.0	13.0	75.7	21.0	9.5	37.4	78	25.7	506.7	39.0	13.0	108.2			53.2
84	21.8	462.1	33.5	14.0	94.7		10.5	46.5	84	27.7			14.0		28.0		64.8
90	23.3	530.5	35.5	15.0	114.4	24.5	11.0	58.2	90	29.0	674.6	45.0	15.0	164.9	30.0	11.5	81.2
96	24.9	603.6	38.0	16.0	138.9	25.5	12.0	70.0	96	31.6	767.5	48.0	16.0	199.0	32.0	12.0	95.1
																	ES FOF E 234
HORI		NTA		ΤH	RU:	ST	BI							DWL	J		^{age No.)} 231
	0	AT											D	date			

C C C C C C C C C C C C C C		
PLAN OF PLUG THRUST BLOC	CK	
PLAN OF TEE THRUST BLOCK		
N.T.S. I.D. THRUST C A VOL. A VOL. (IN.) (TONS) (FT.) (FT.) (C.Y.) (FT.) (C.Y.) 4,6,8 5.1 1.5 2.5 0.3 2.0 0.2 10,12 11.3 1.5 3.5 0.6 2.5 0.3 16,18 25.5 2.0 5.5 1.6 4.0 0.9 20 31.5 2.0 6.0 1.9 4.0 0.9 24 45.2 2.5 7.0 3.1 5.0 1.7 30 53.0 3.0 7.5 4.1 5.5 2.4 42 104.0 4.5 10.5 11.0 7.5 6.2 48 136.0 5.0 12.0 15.6 8.5 8.7 54 172.0 5.5 13.5 21.4 9.5 11.9 60 212.0 6.0 15.0 28.4 10.5.7 6.6 2		
90477.09.022.087.715.549.796543.09.523.5104.816.561.0		
	TO GENERAL BLOCKING -	PAGE 234
HORIZONTAL THRUST BLOCK	DWU	(Page No.) 232
AT TEES AND PLUGS	DEC.2001	



Δ	11.2	5°	22.5	50°	30	0	45	0	67.5	50°	90	0	- Δ
I.D. (IN.)	THRUST (TONS)	VOL. (C.Y.)	I.D. (IN.)										
4,6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4,6,8
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18
20	6.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.5	31.4	15.7	20
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30
36	14.9	7.5	29.2	14.6	38.2	19.1	54.0	27.0	70.5	35.3	76.4	38.2	36
42	20.3	10.1	39.8	19.9	52.0	26.0	73.5	36.7	96.0	48.0	104.0	52.0	42
48	26.5	13.2	51.9	26.0	67.9	33.9	96.0	48.0	126.0	62.7	136.0	67.9	48
54	33.5	16.8	65.7	32.9	85.9	42.9	122.0	60.7	159.0	79.4	172.0	85.9	54
60	41.4	20.7	81.2	40.6	106.0	53.0	150.0	75.0	196.0	98.0	212.0	106.0	60
66	50.1	25.0	98.2	49.1	128.0	64.2	182.0	90.7	237.0	119.0	257.0	128.0	66
72	59.6	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	153.0	72
78	69.9	35.0	137.0	68.6	179.0	90.0	254.0	127.0	331.0	166.0	358.0	179.0	78
84	81.1	40.5	159.0	79.5	208.0	104.0	294.0	147.0	384.0	192.0	416.0	208.0	84
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	169.0	441.0	221.0	477.0	239.0	90
96	106.0	53.0	208.0	104.0	272.0	136.0	384.0	192.0	502.0	251.0	543.0	272.0	96

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

VERTICAL THRUST BLOCK		DWU	(Page No.) 233
AT PIPE BEND	DI	DEC.2001	

GENERAL NOTES FOR ALL THRUST BLOCKS:

- 1. Concrete for blocking shall be CLASS "B".
- 2. All calculations are based on internal pressure of 200 P.S.I. for ductile iron and P.V.C., and 150 P.S.I. for concrete pipe.
- 3. Volumes of thrust blocks are net volumes of concrete to be furnished. The corresponding weight of the concrete (CLASS "B") is equal to or greater than the vertical component of the thrust on the vertical bend.
- 4. Wall thickness T (See Table Page 230) assumed for estimating purposes only.
- 5. Pour concrete for thrust blocks against undisturbed earth.
- 6. Dimensions may be varied as required by field conditions where and as directed by the inspector. The volume of concrete blocking shall not be less than shown in tables.
- 7. The calculations are based on bearing pressures equal to 1,000 lbs./s.f. in soil and 2,000 lbs./s.f. in rock.
- 8. Use polyethylene wrap between concrete blocking and bends, tees, and plugs to prevent the concrete from sticking to fittings.
- 9. Concrete shall not extend beyond joints.

THRUST BLOCK

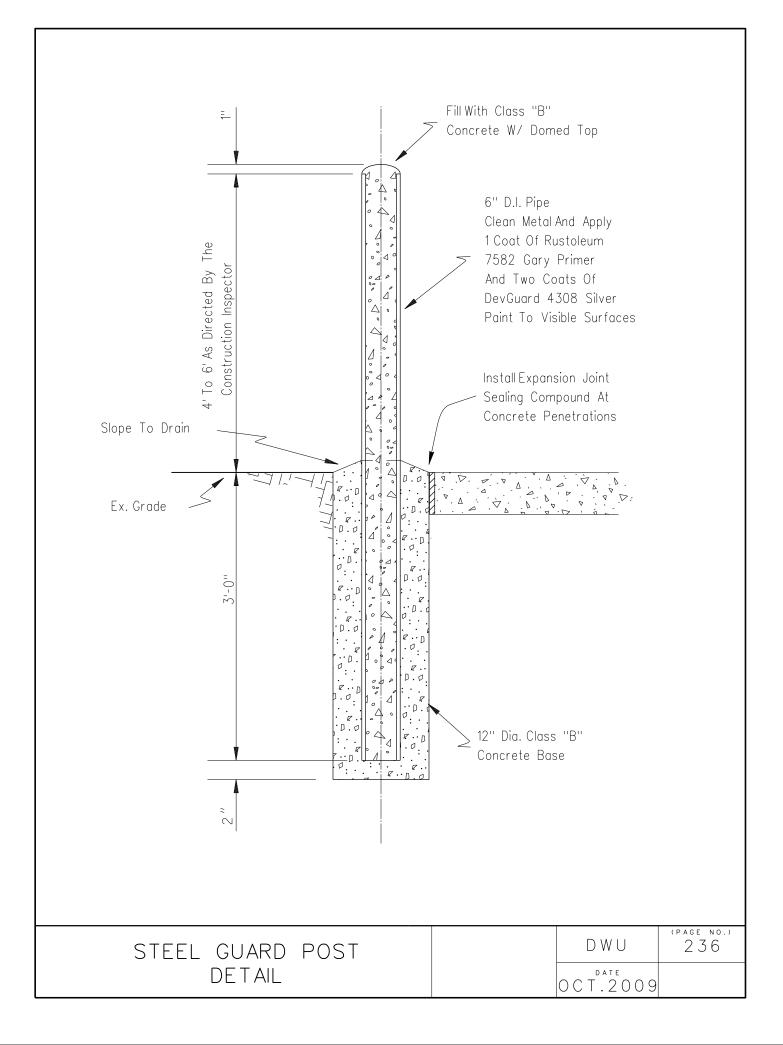
GENERAL NOTES

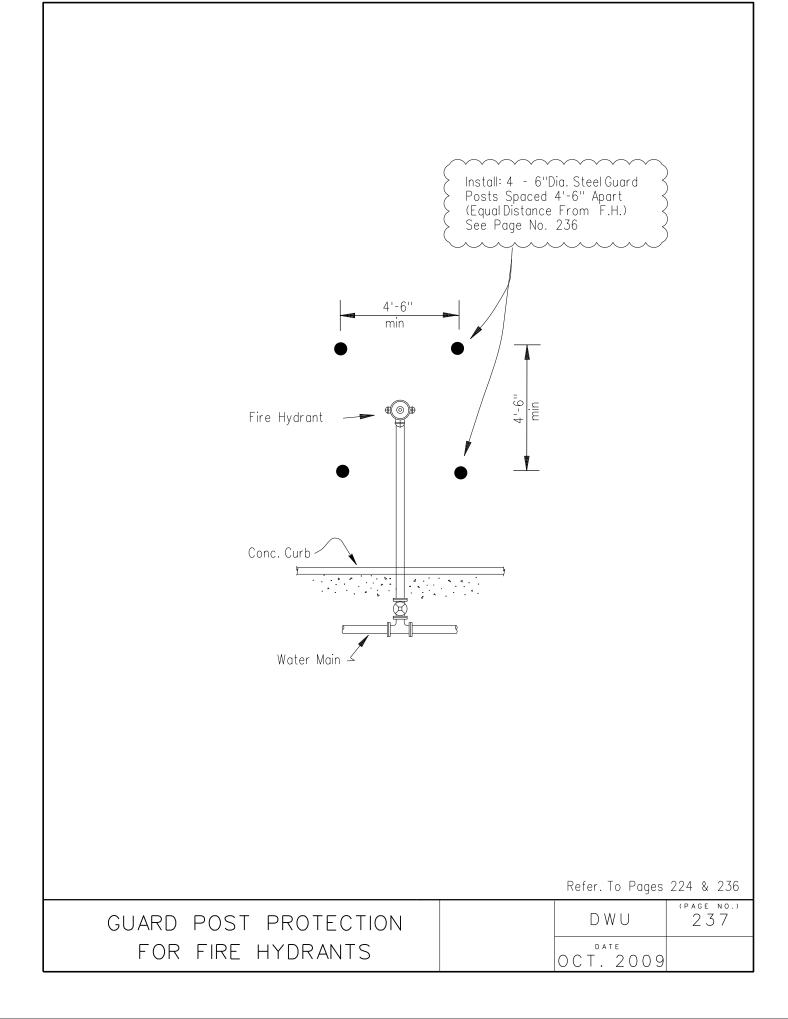
REFER TO PAGES: 229, 230, 231, 232, & 233

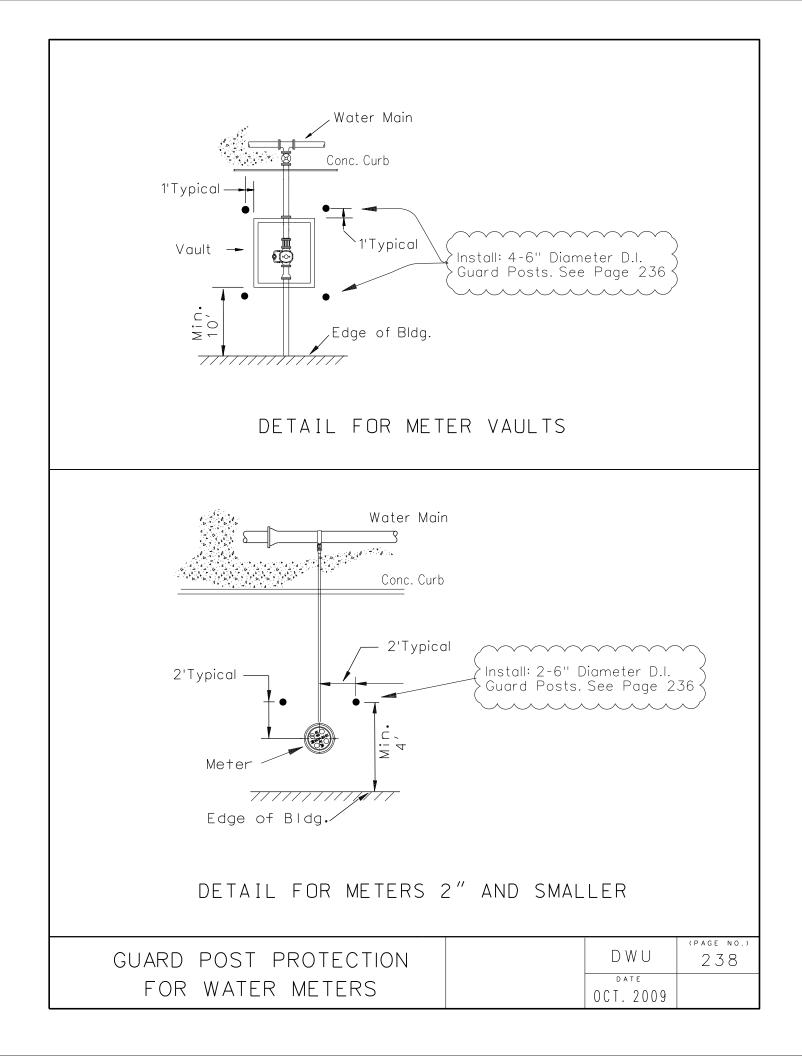
DWU	^(Page No.) 234
DATE	
OCT. 2009	

SIZE AND MATERIAL TYPE OF WATER MAINS		EDMENT EPTH IN		EMBEDMENT TYPE PER DEPTH IN ROCK				
OF WATER MAINS	0' - 8'	8'-16'	>16'	0' - 8'	8' -16'	>16'		
16" And Smaller Ductile Iron	D +	С	В	С	С	В		
18'' And Larger Ductile Iron	В	В	В	В	В	В		
16" And Smaller Pretensioned	С	С	В	С	С	В		
18" And Larger Pretensioned	В	В	В	В	В	В		
All Prestressed	С	С	В	С	С	В		
All Steel	B+	B+	B+	В	В	В		
All P.V.C. Water Pipe	C +	B+	B+	C +	B+	B+		

EMBEDMENT TYPES-	DW	U 235
SPECIFIED FOR WATER MAINS	OCT.2	009









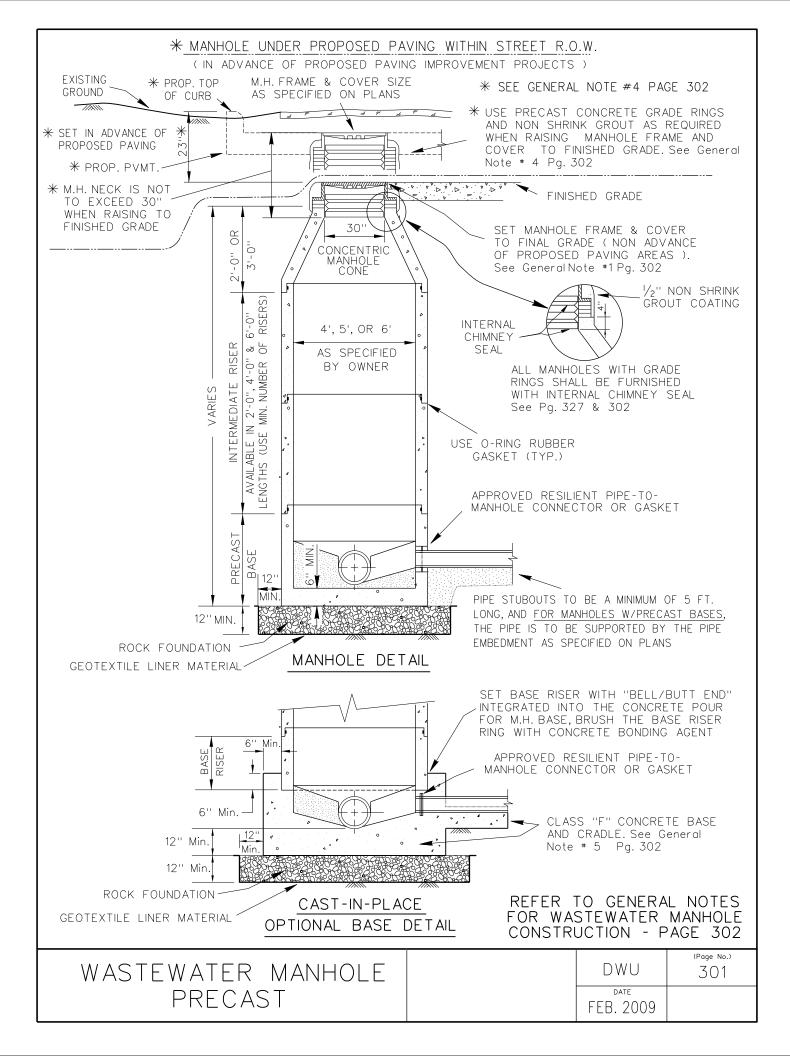
WASTEWATER MAIN Construction



City of Dallas Water Utilities Department

PART 3 WASTEWATER MAIN CONSTRUCTION

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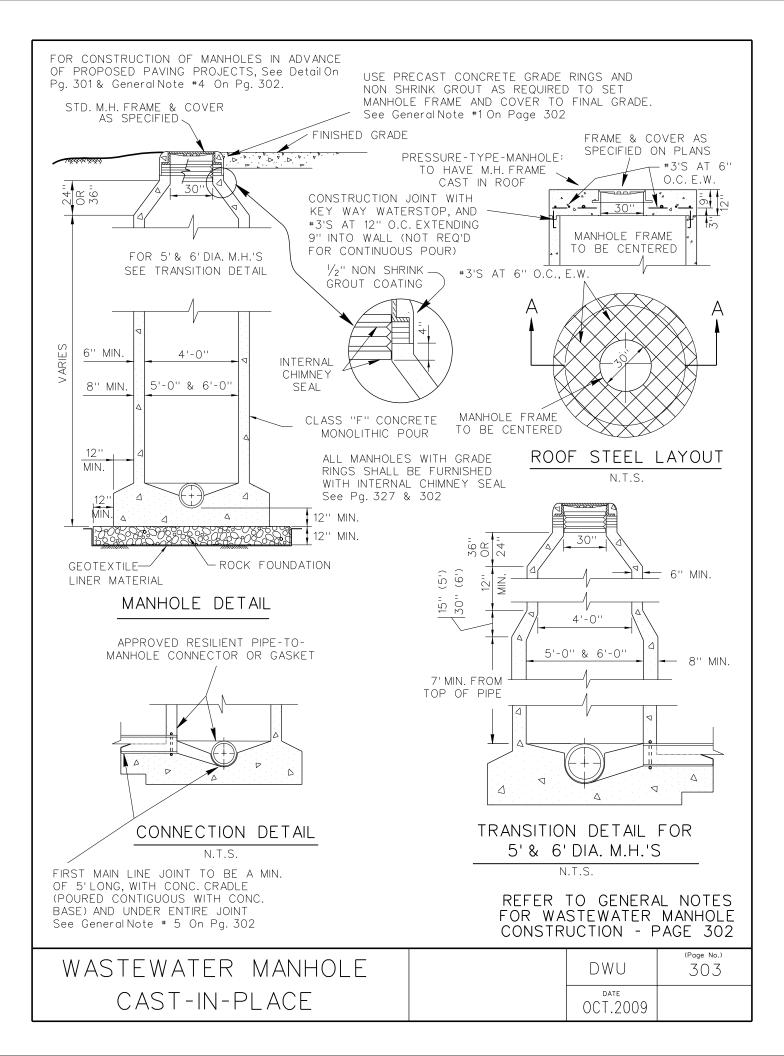


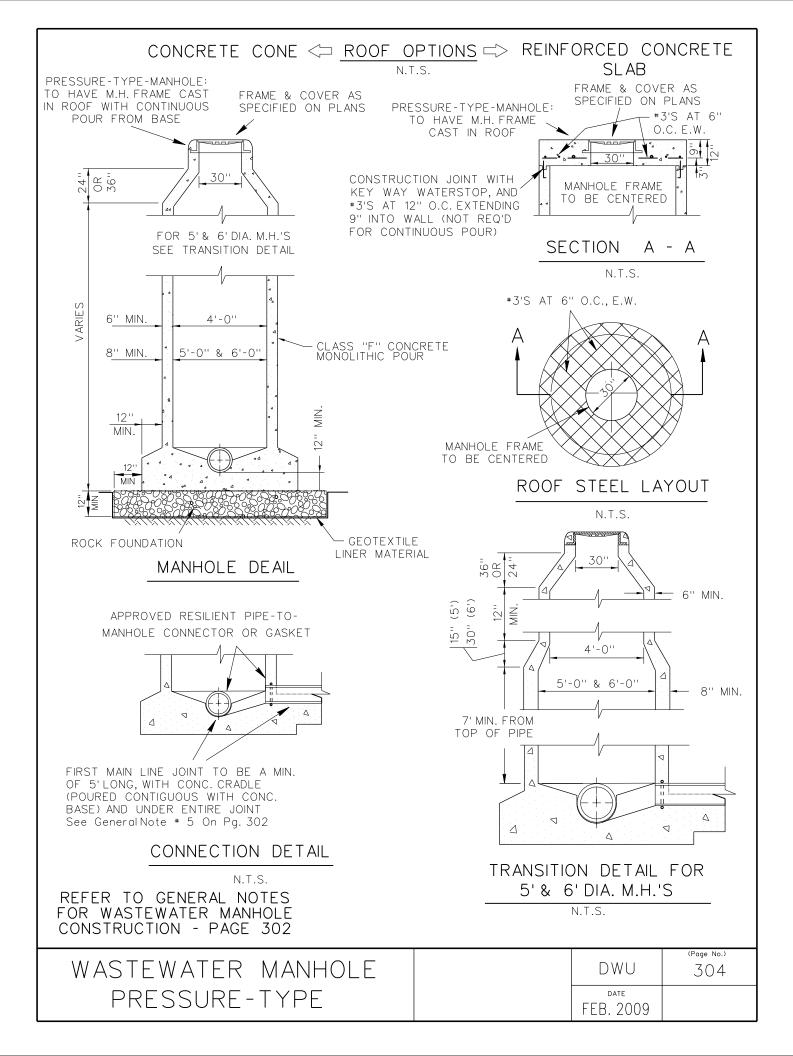
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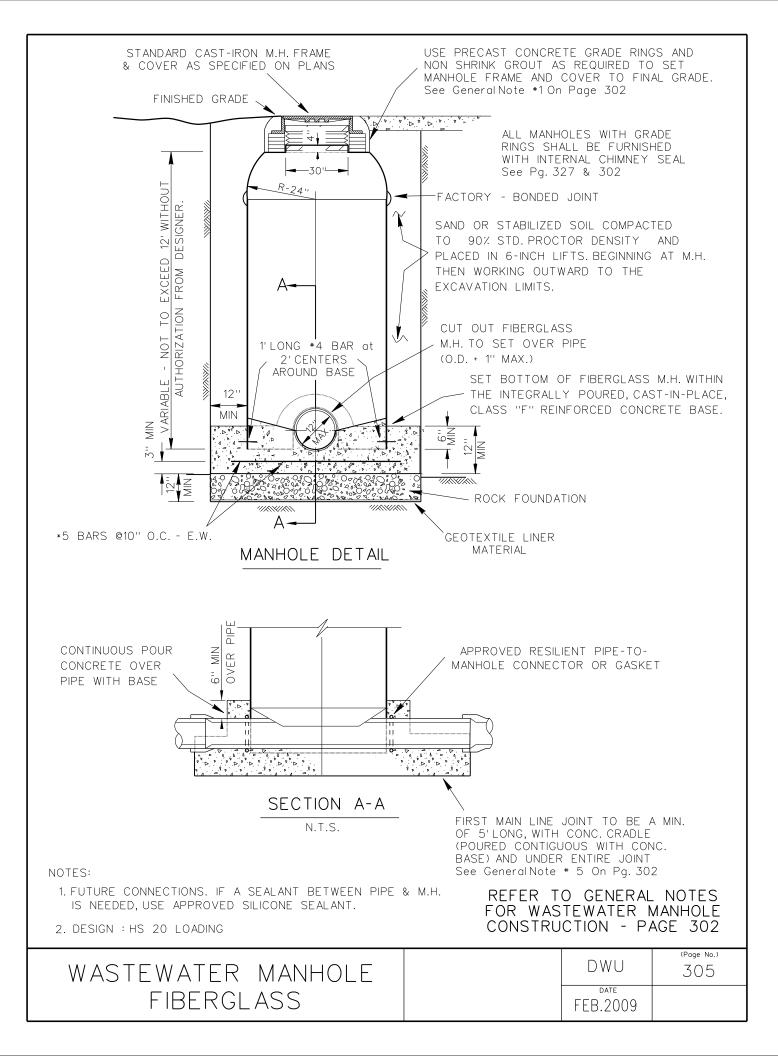
WASTEWATER MANHOLE CONSTRUCTION

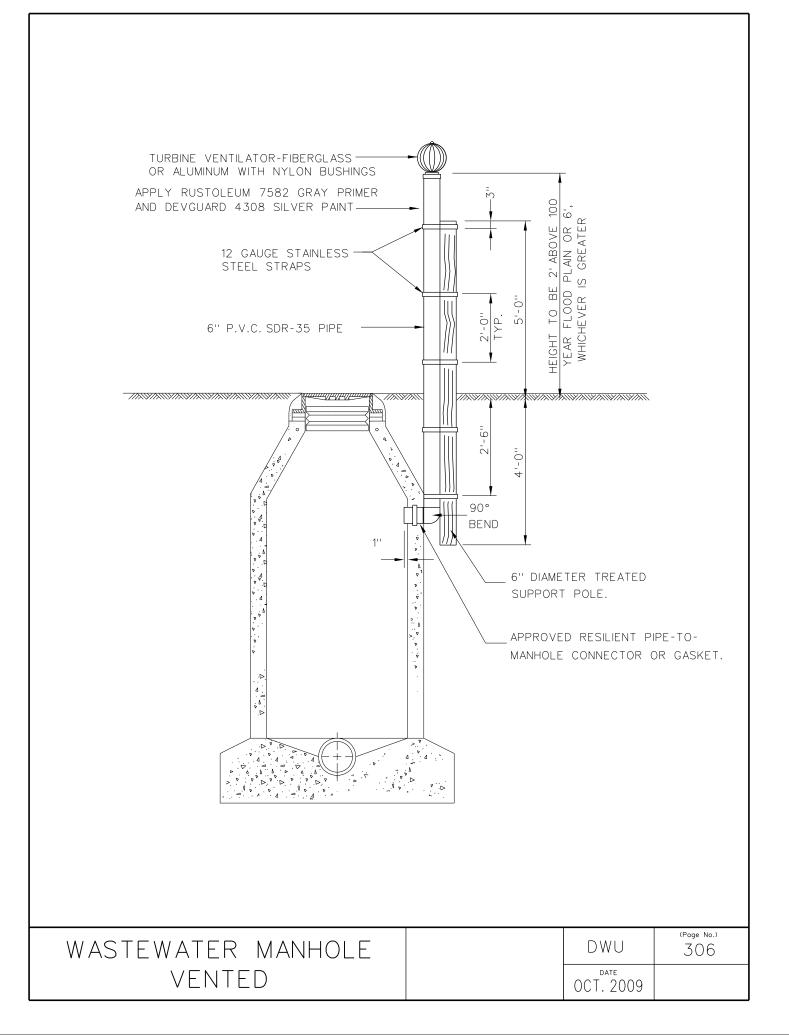
- All non-pressure type manholes are to be constructed with a minimum of 2 - precast concrete grade rings and with an internal chimney seal. The maximum allowable extension of manhole necks using grade rings is limited to 30". See typical drawing detail on page 327.
- 2) All manholes are to have inverts constructed as per details on pages 309 and 309A.
- 3) All wastewater main stubouts from manholes shall be a minimum of5 feet in length and terminated with a water tight stopper or cap.
- 4) Where new manholes are constructed in advance of proposed paving, the frame and cover shall be set 23" below the proposed top of curb, or flush with the existing ground, which ever is lower. Use precast concrete grade rings to raise M.H. frame and cover to final paving grade. (LIMITED TO 30" MAXIMUM MANHOLE NECK EXTENSION, AS MEASURED FROM THE TOP TAPER OF THE M.H. CONE TO M.H. LID). When M.H. neck extension exceeds 30", then the M.H. cone is to be removed and reset in such a manner as to reduce the number of grade rings required to reset M.H. frame and cover to final grade. See typical drawing detail on page 301.
- 5) For all manholes with cast in place bases, the first pipe joint must extend a minimum of 5 feet past the edge of manhole, with a concrete cradle poured integrally with the base, and under the entire pipe joint length.
- 6) All cast in place manholes are to be constucted with pipe to manhole connectors as per detail on page 310, or with a connector as approved by the DWU construction superintendent.
- 7) False manhole bottoms are required on all advance of paving projects. They shall be constructed, installed, and removed in accordance with details and instructions on page 311.

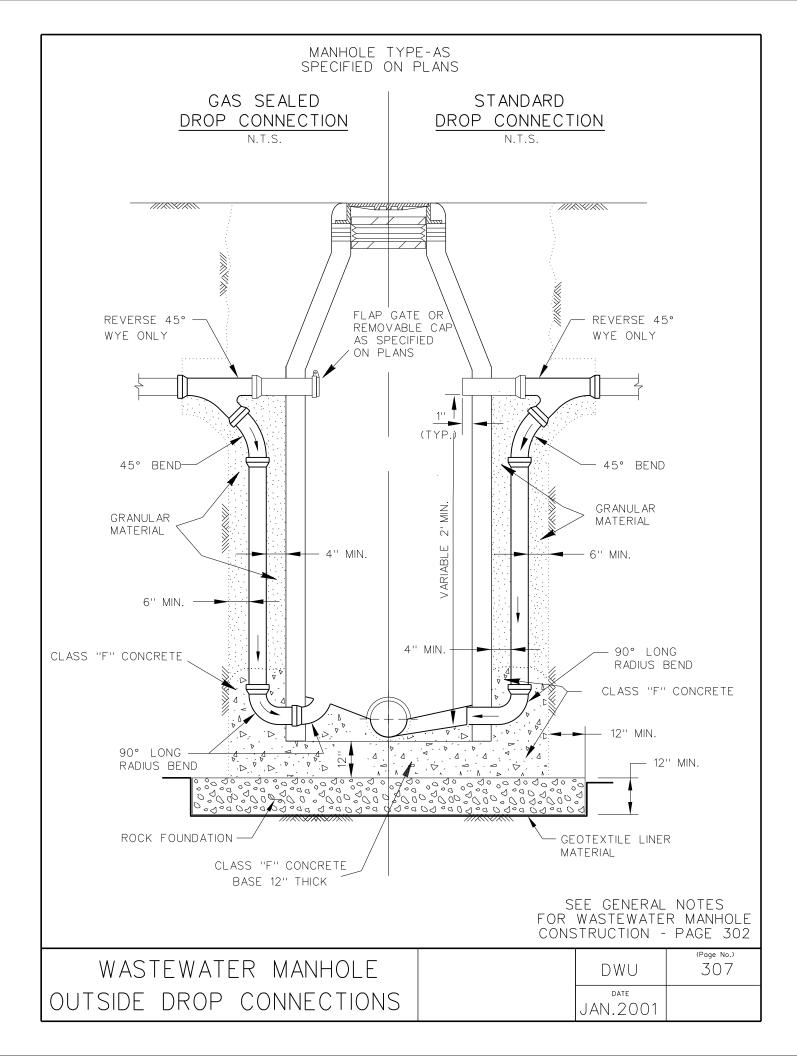
GENERAL NOTES FOR		DWU	^(Page No.) 302
WASTEWATER MANHOLES	М	JARCH 2003	

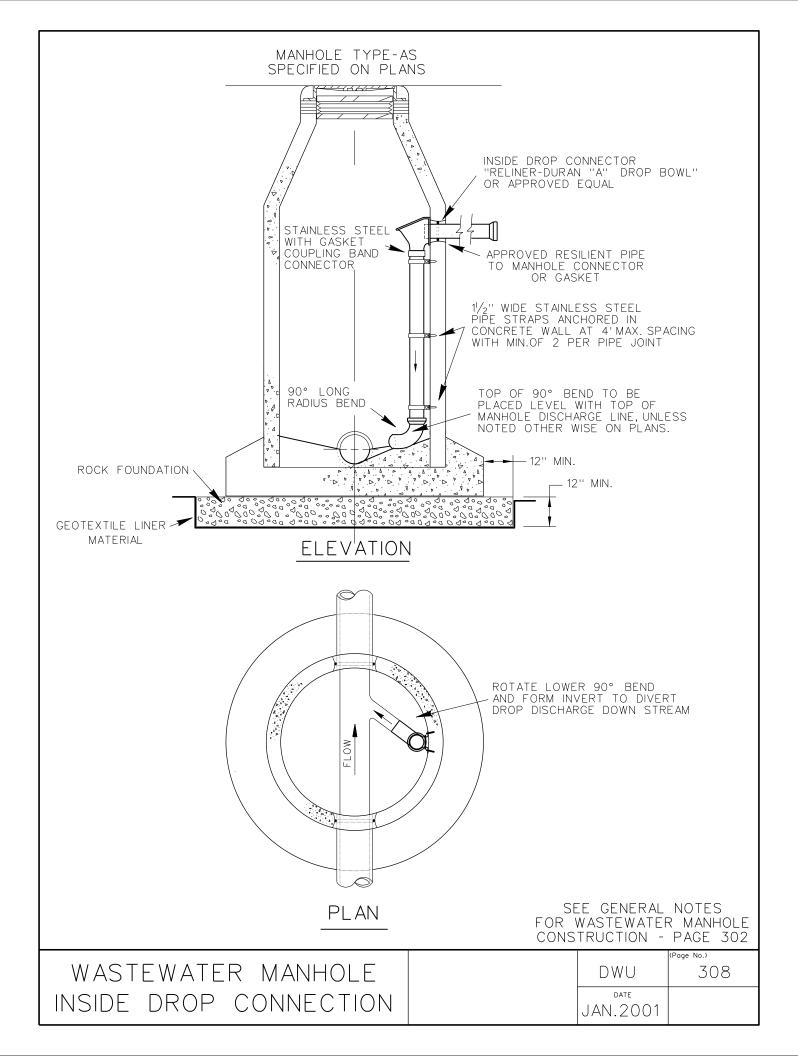


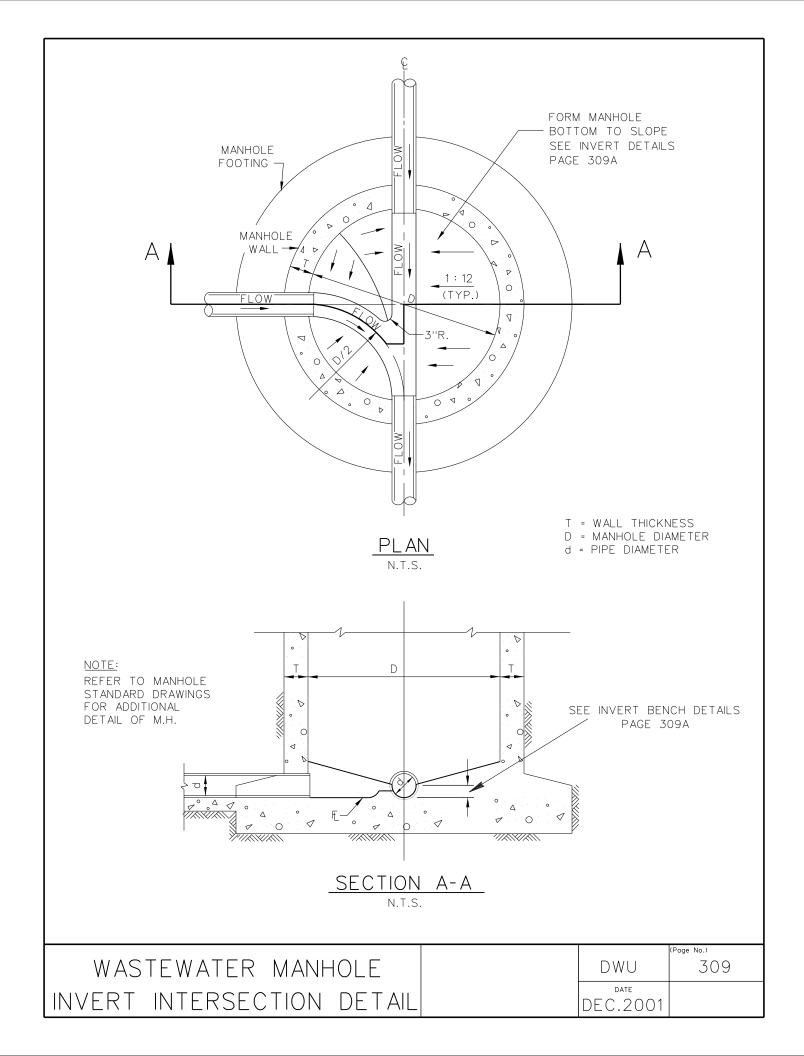


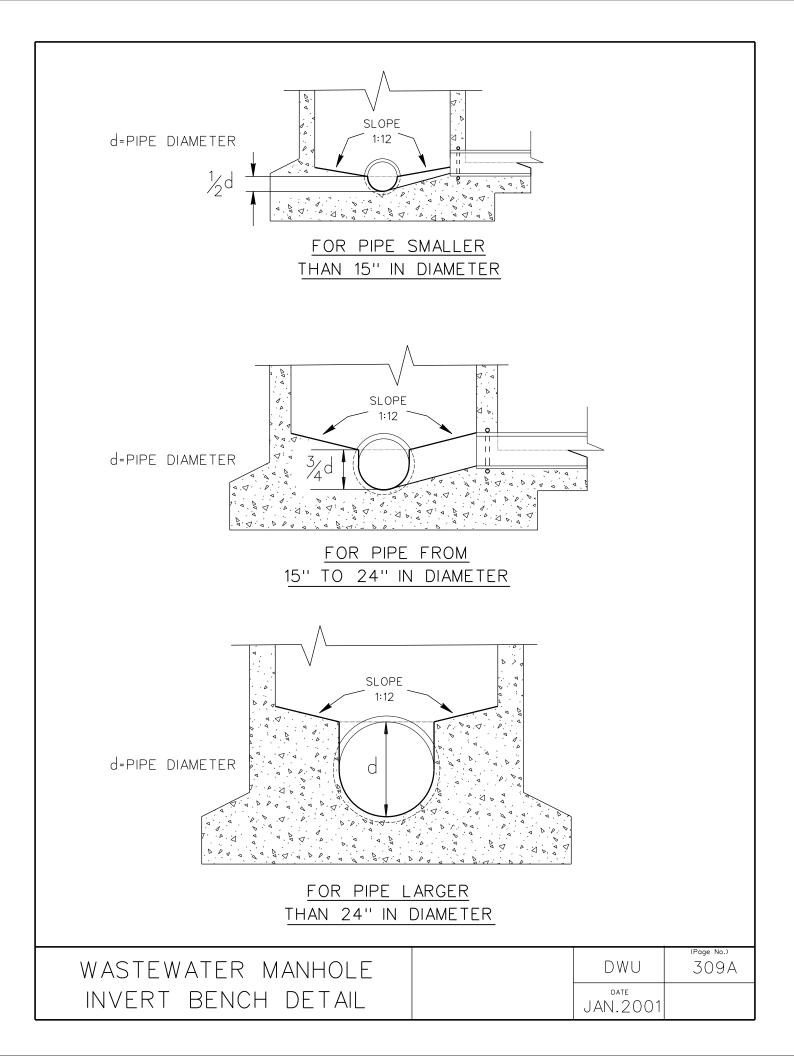


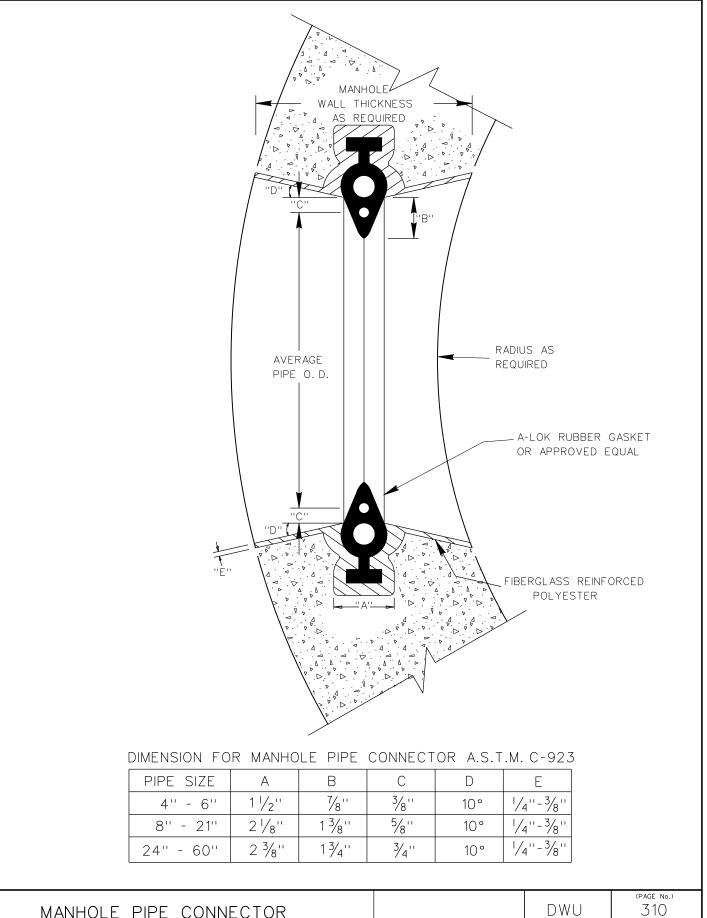












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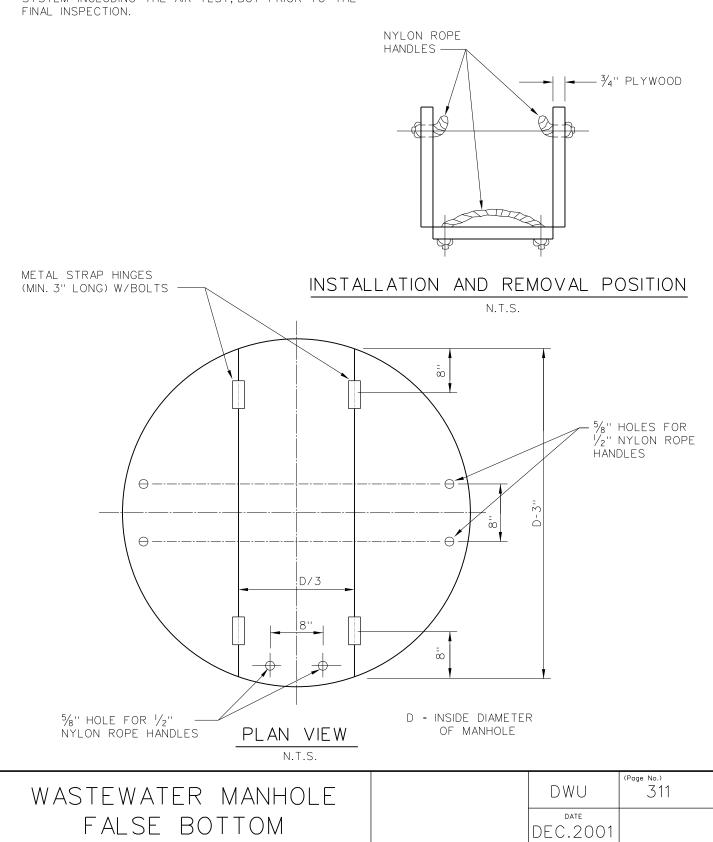
MA	ANHOLE	PIPE (INECTOR
(FOR	CAST-I	N-PLAC	Ε	MANHOLES)

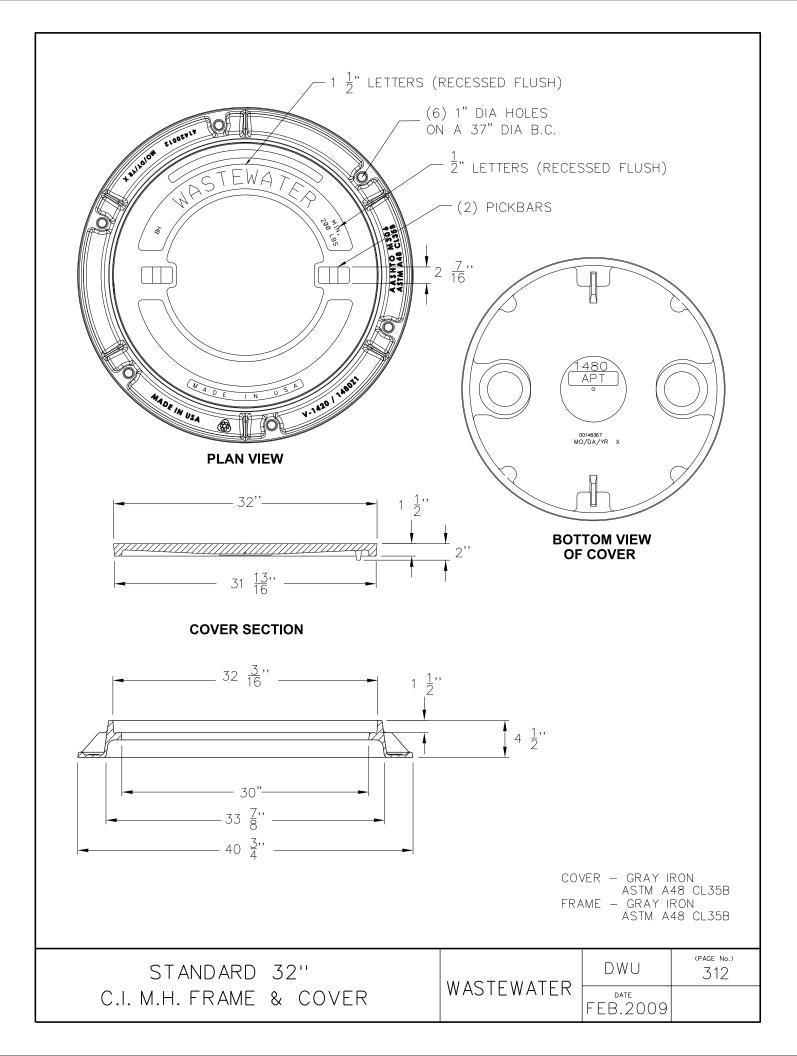
INSTALLATION

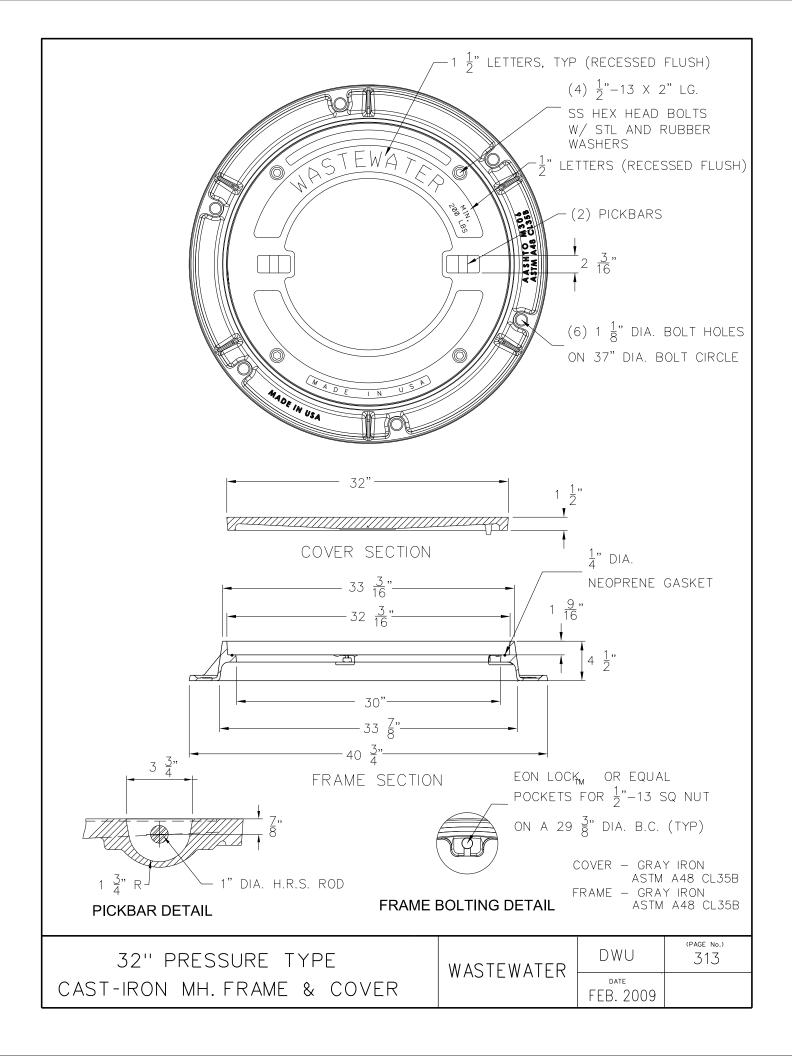
FALSE MANHOLE BOTTOM SHALL BE FURNISHED AND INSTALLED IN ALL MANHOLES CONSTRUCTED IN ADVANCE OF PAVING. THESE FALSE MANHOLE BOTTOMS WILL BE INSTALLED AT A TIME DIRECTED BY THE ENGINEER BUT WILL USUALLY BE AFTER ALL WORK IS COMPLETED ON THE WASTEWATER SYSTEM INCLUDING THE AIR TEST, BUT PRIOR TO THE FINAL INSPECTION.

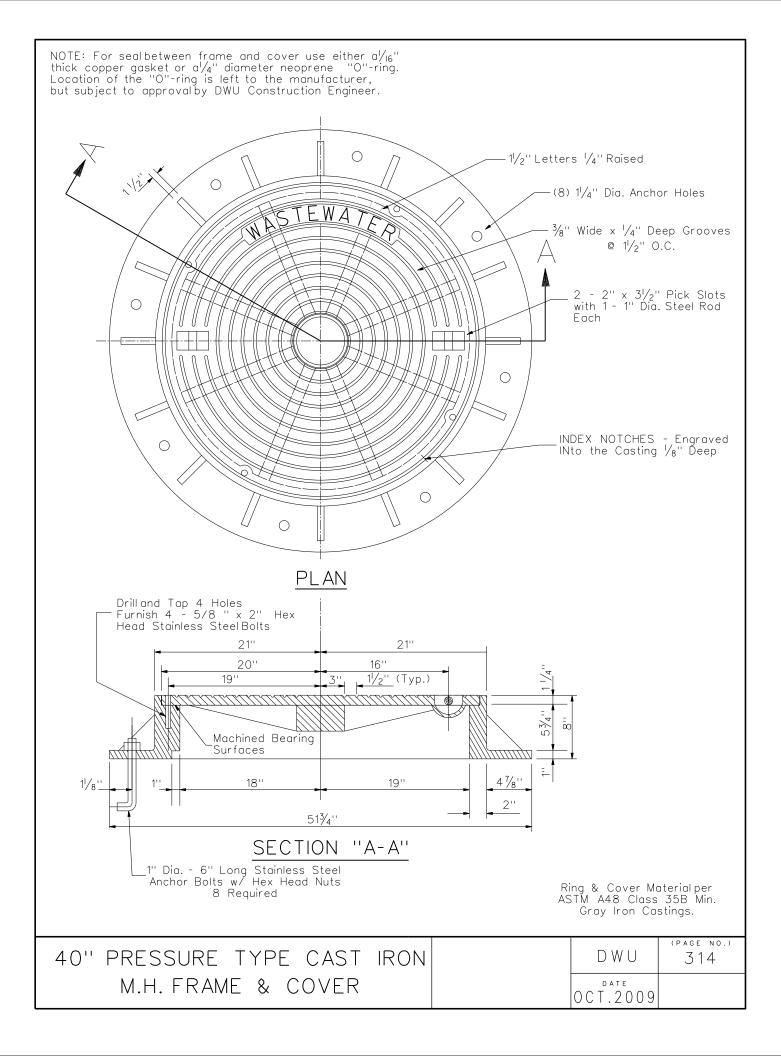
REMOVAL

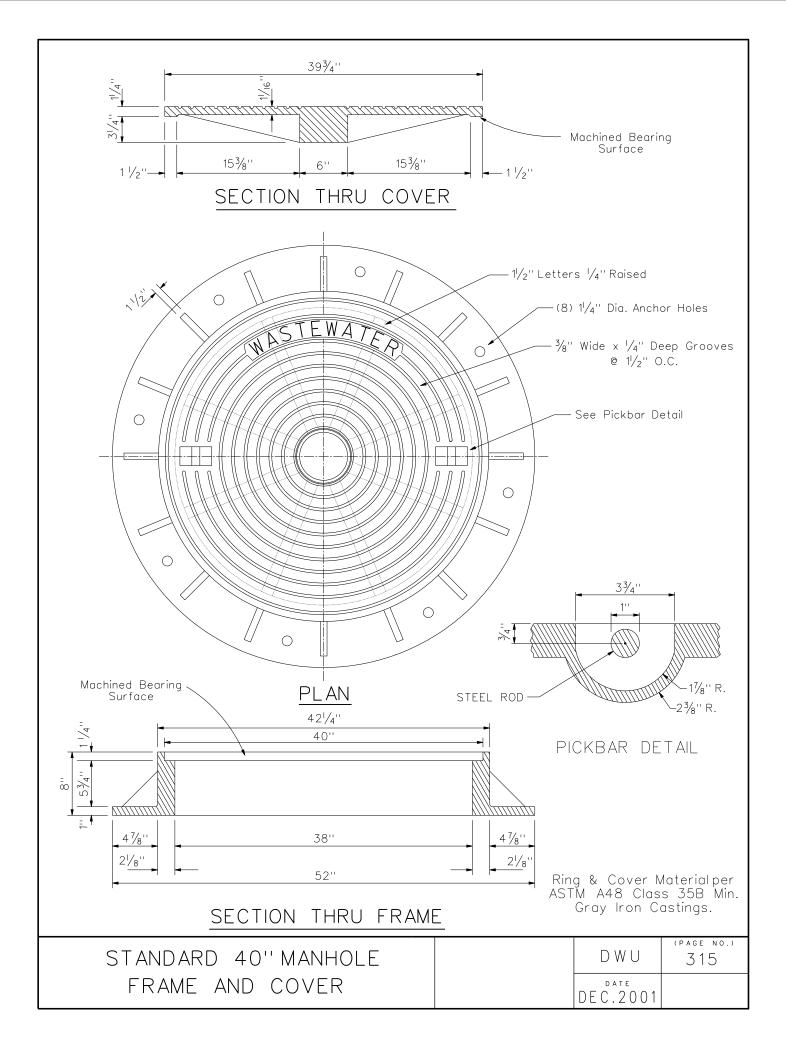
FALSE MANHOLE BOTTOM SHALL BE REMOVED AFTER THE FINAL APPURTENANCE ADJUSTMENT INSPECTION. THE PAVING CONTRACTOR AND OWNER'S REPRESENTATIVE WILL COORDINATE THE REMOVAL OF THE FALSE MANHOLE BOTTOMS.

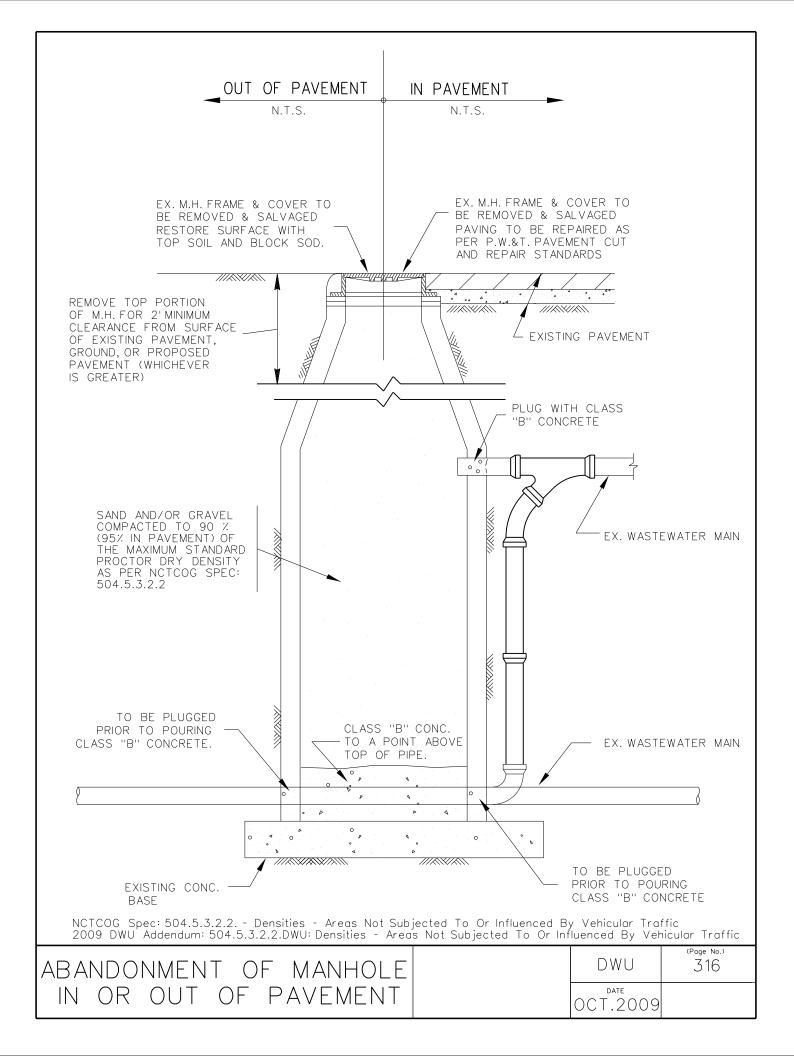


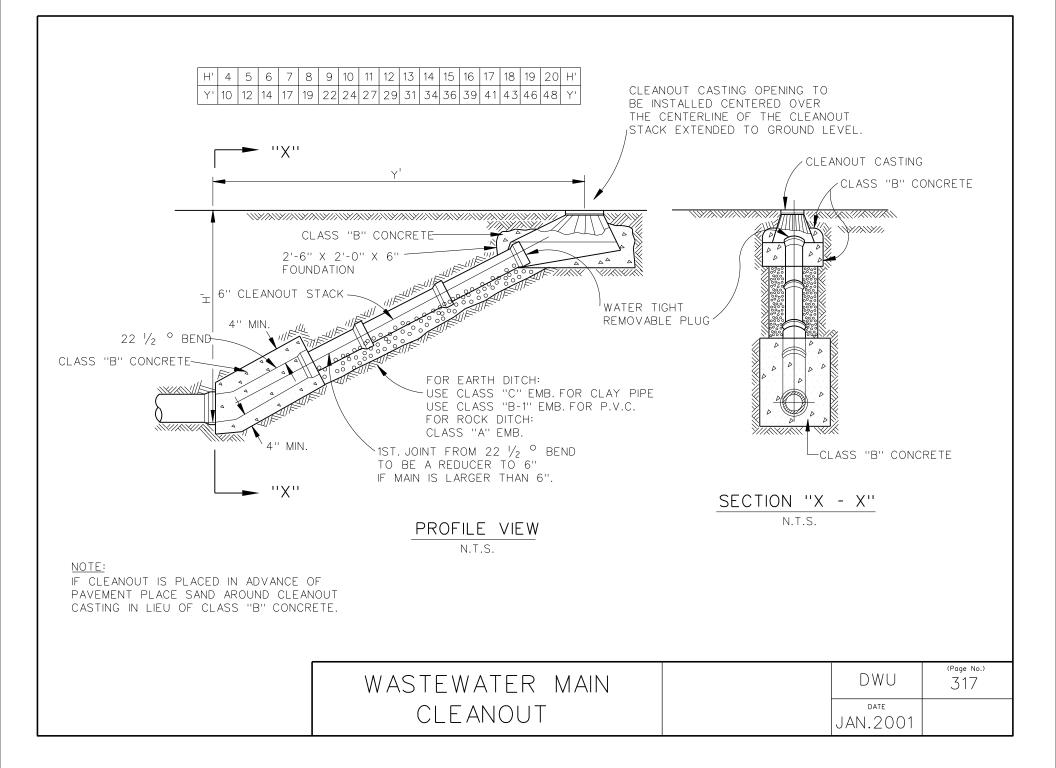


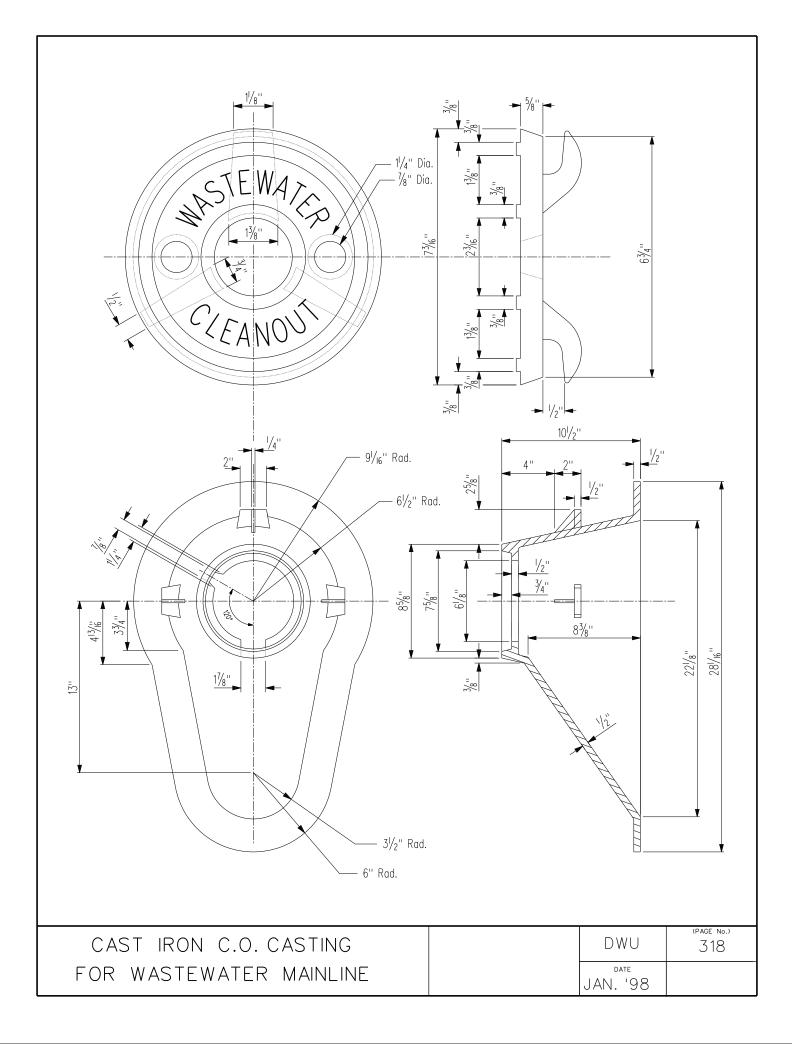


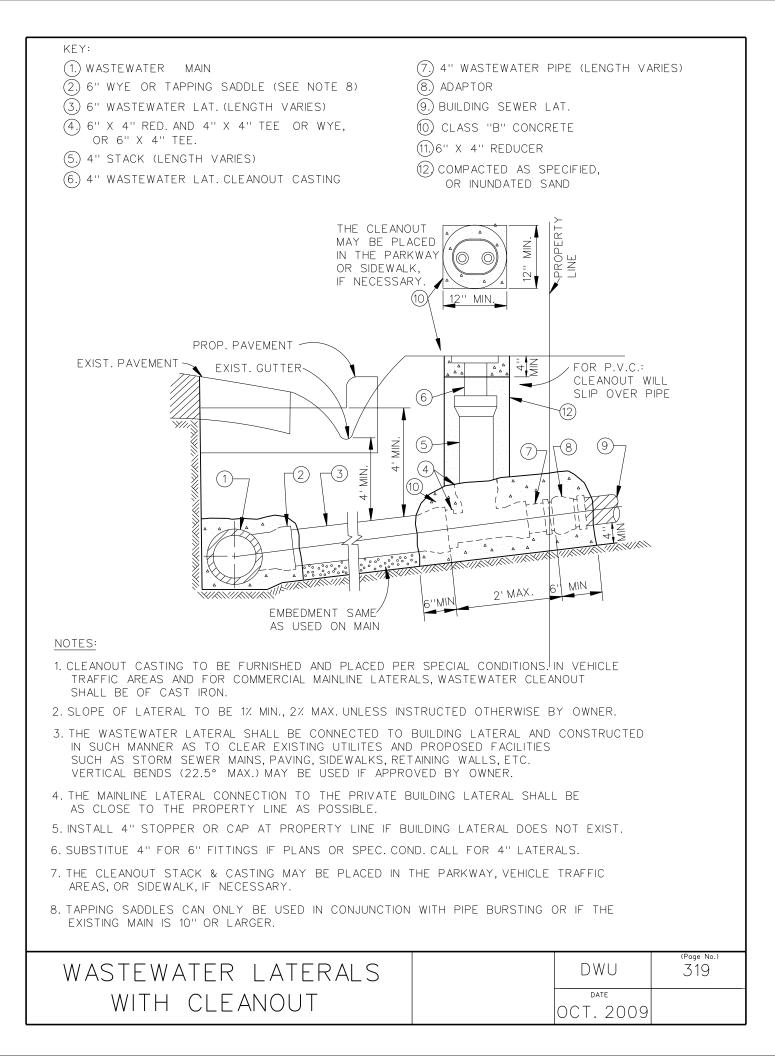


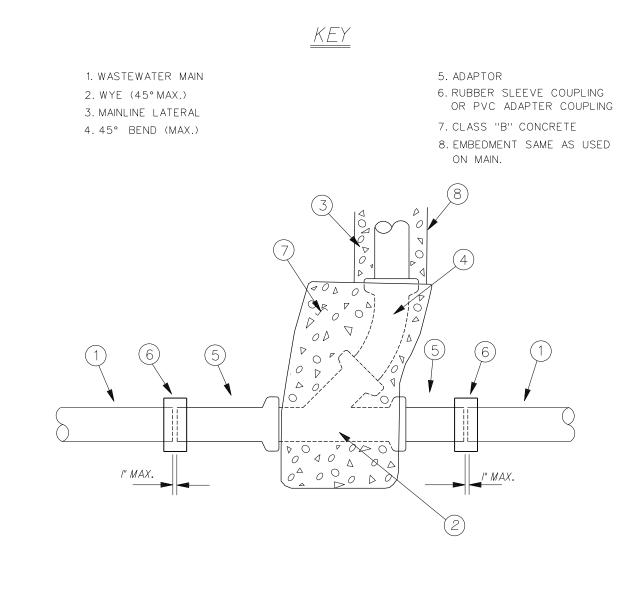










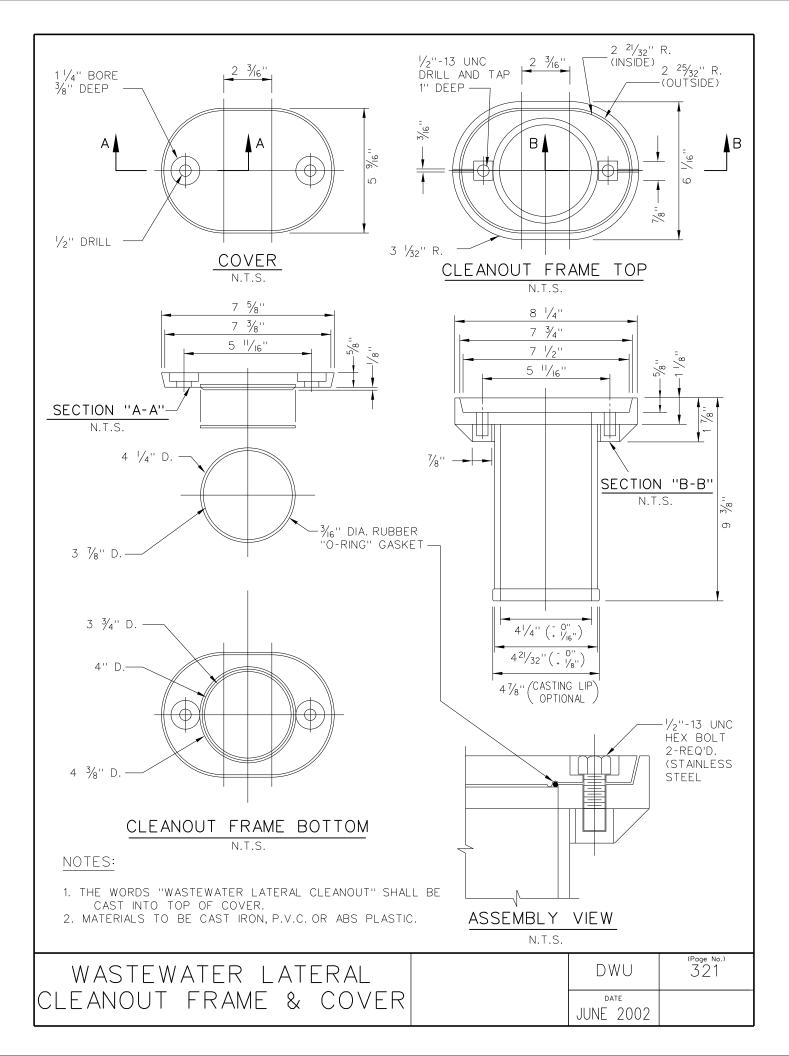


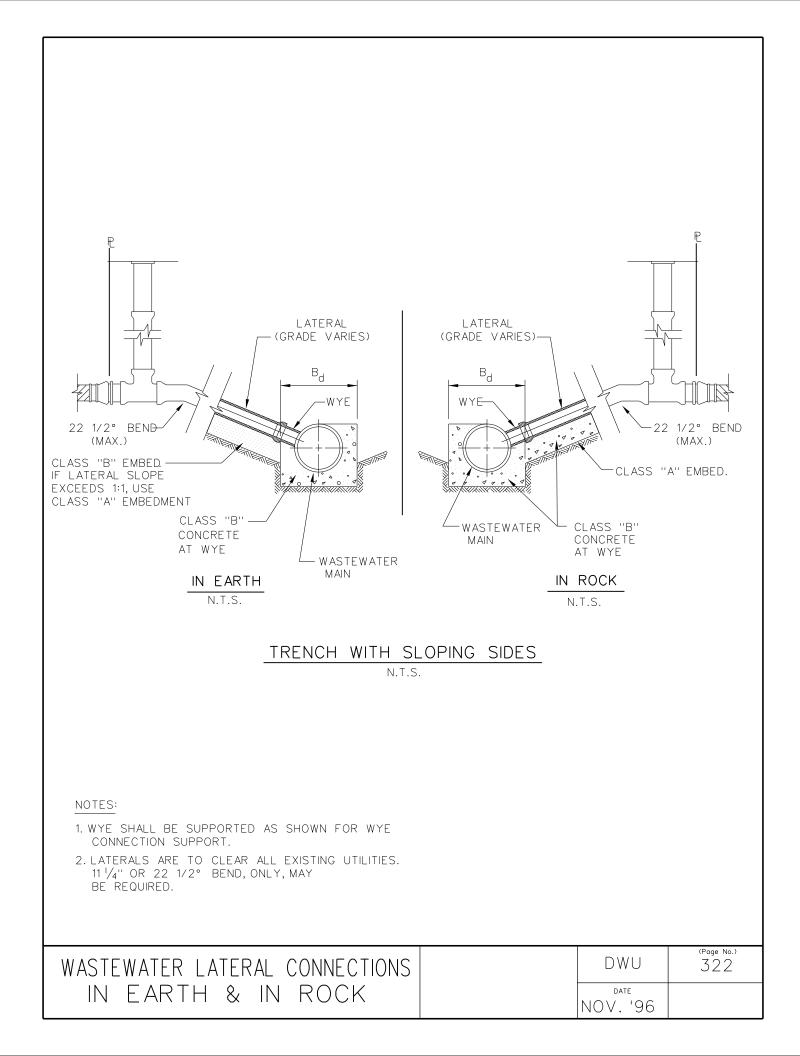
NOTES :

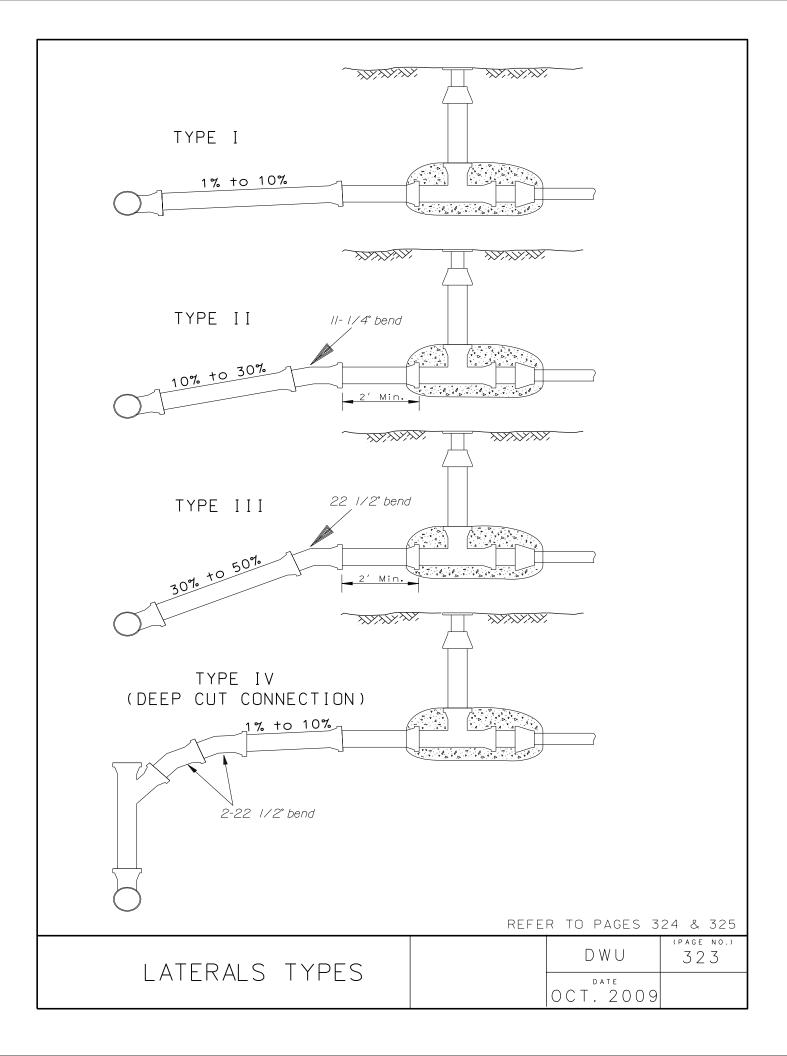
- A) THE WYE AND ADAPTORS INSTALLED SHALL BE OF THE SAME MATERIAL AS THE WASTEWATER MAINLINE.
- B) THE WYE AND ADAPTORS SHALL BE ASSEMBLED PRIOR TO INSTALLATION.
- C) CONNECTIONS TO THE EXISTING MAIN SHALL BE MADE USING A RUBBER SLEEVE COUPLING WITH STAINLESS STEEL BAND CLAMPS. THE CLAMPS SHALL BE TIGHTENED TO THE TORQUE RECOMMENDED BY THE MANUFACTURER.
- D) THE EMBEDMENT USED SHALL BE EQUAL TO THAT USED FOR THE MAINLINE SEWER.
- E) RUBBER SLEEVE COUPLINGS SHALL BE USED FOR CLAY TO CLAY OR CLAY TO CONCRETE CONNECTIONS ONLY.

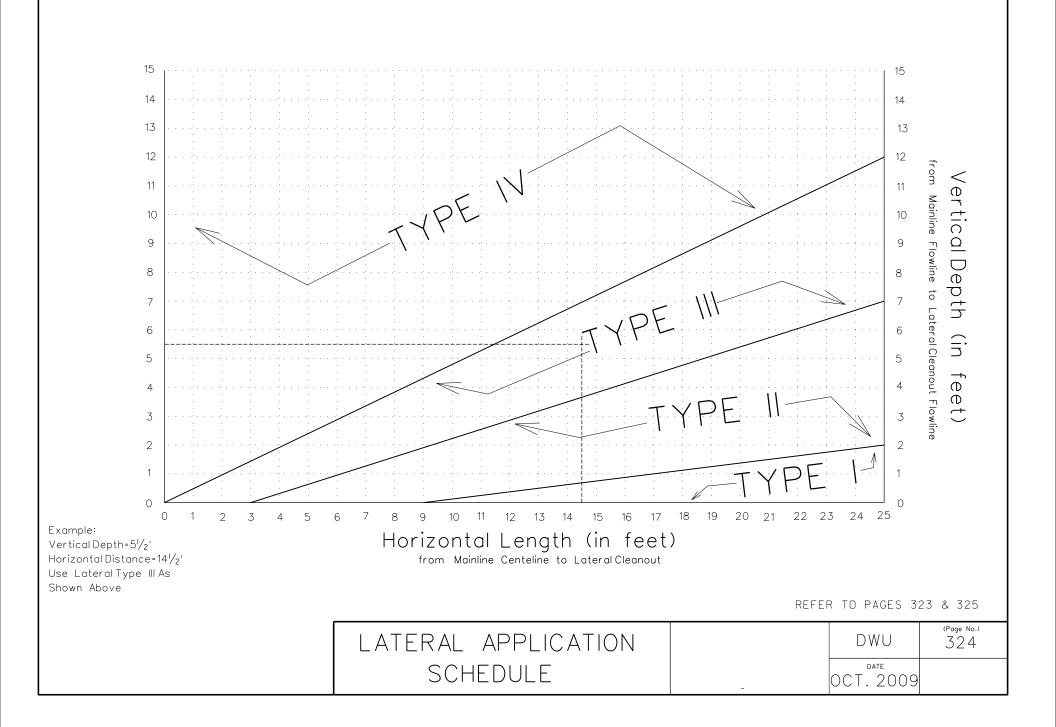
NOTE: THIS DETAIL SHALL NOT BE USED FOR THOSE CASES WHERE 150 PSI PVC IS REQUIRED BY T.C.E.Q.

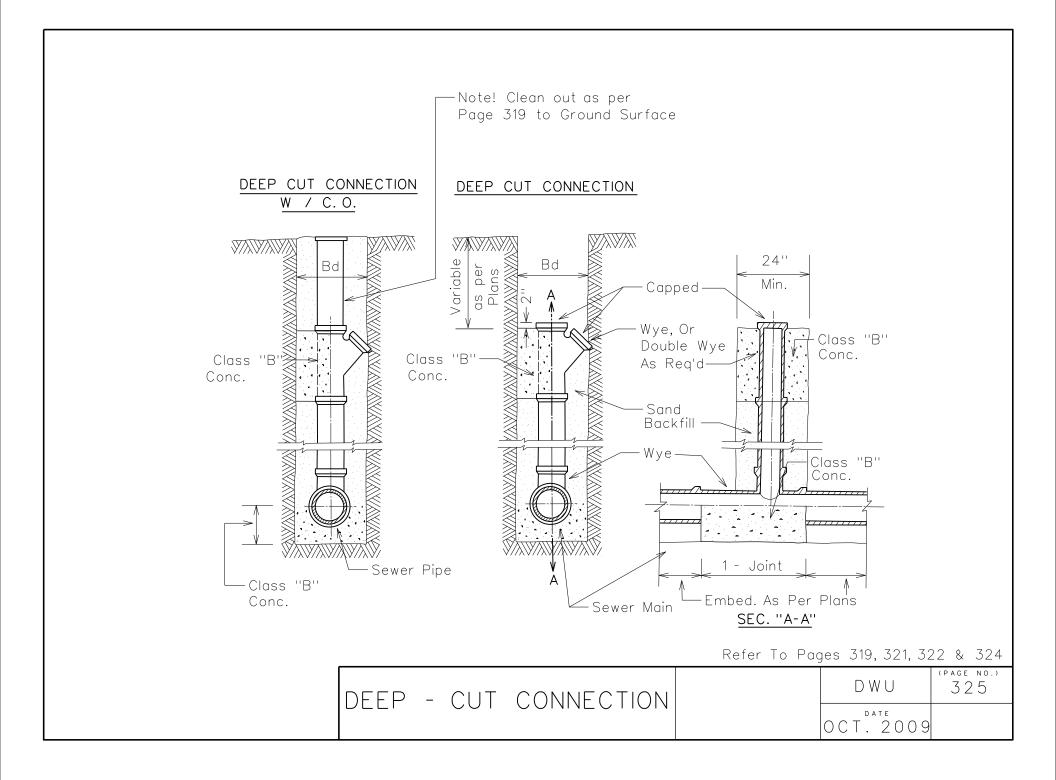
WASTEWATER LATERAL WYE	DWU	(PAGE No.) 320
CONNECTION TO THE EXISTING MAINLINE	oct. 2009	

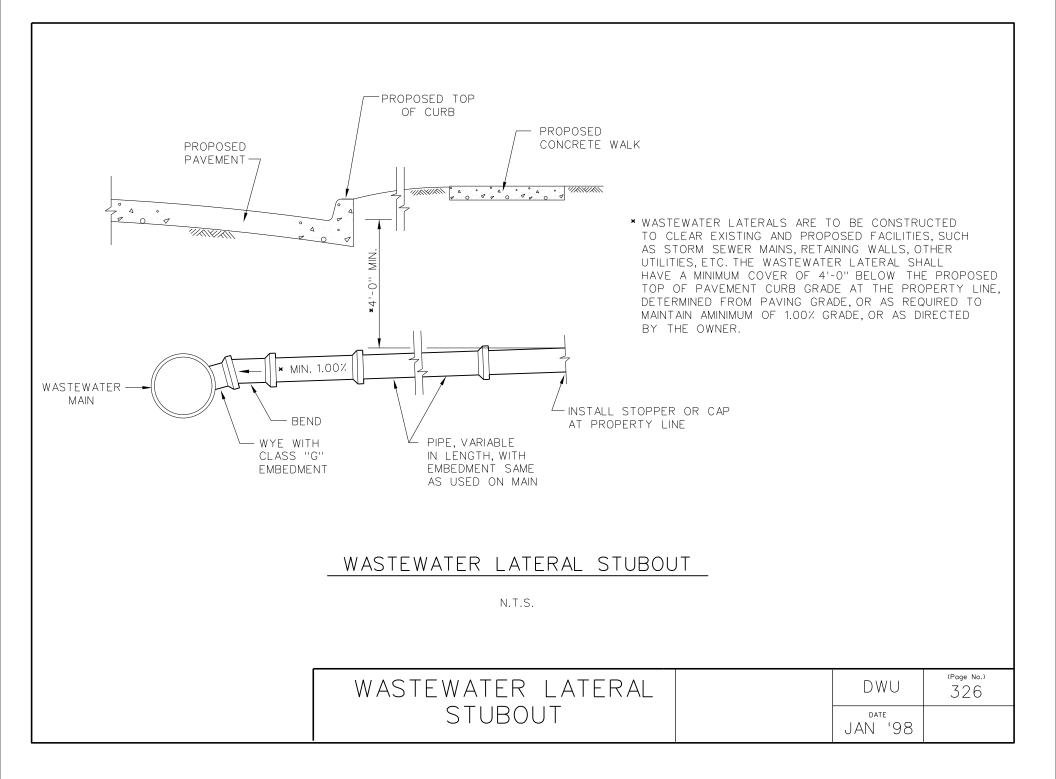


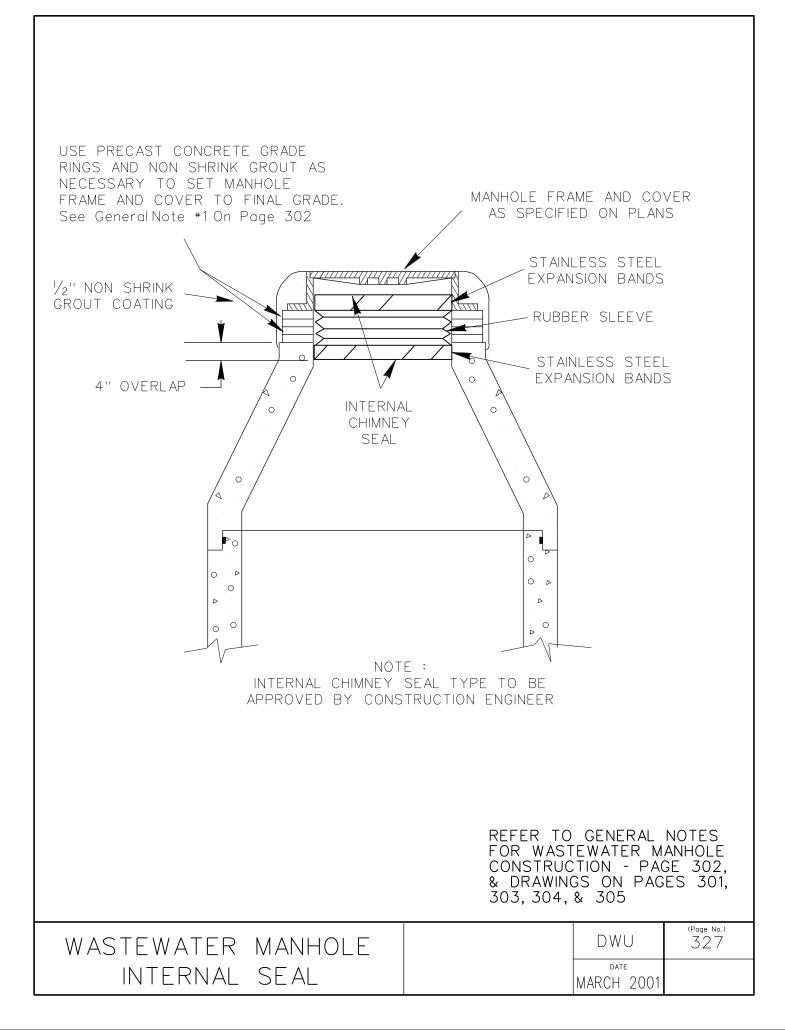


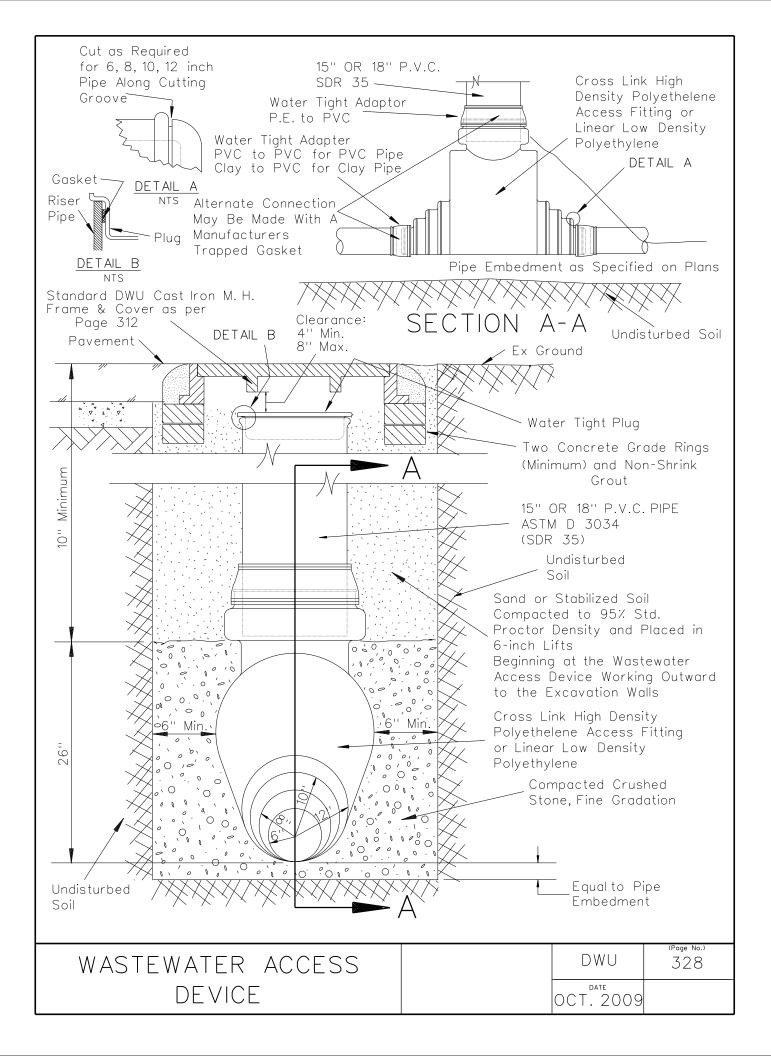


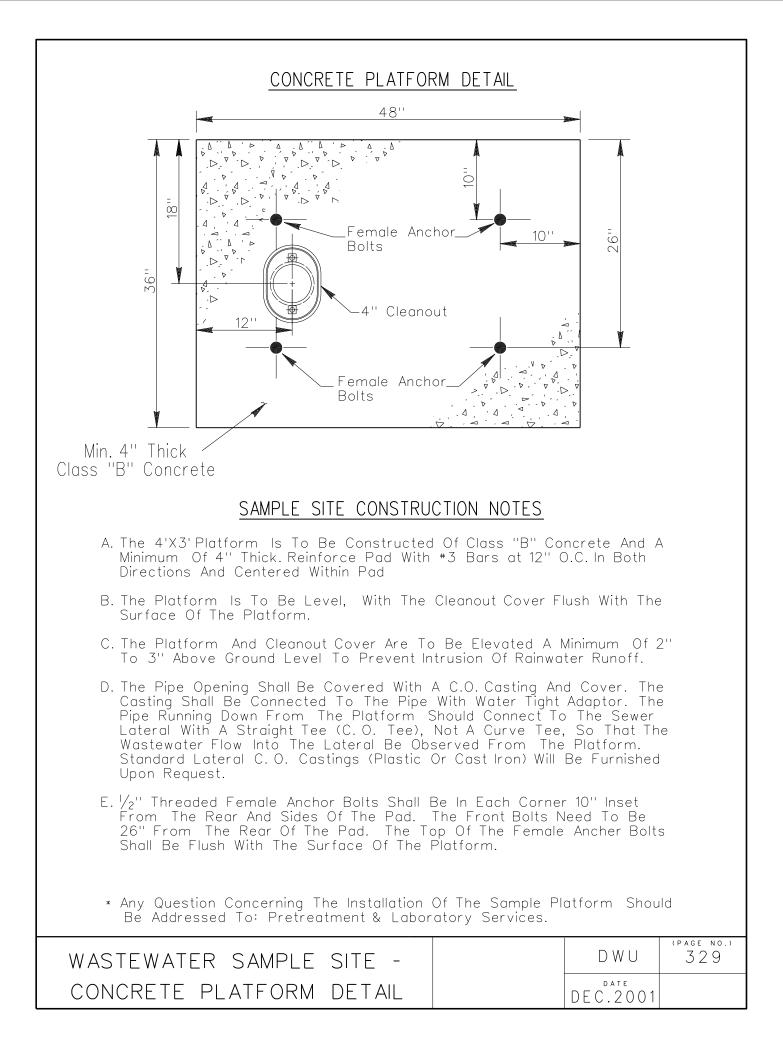














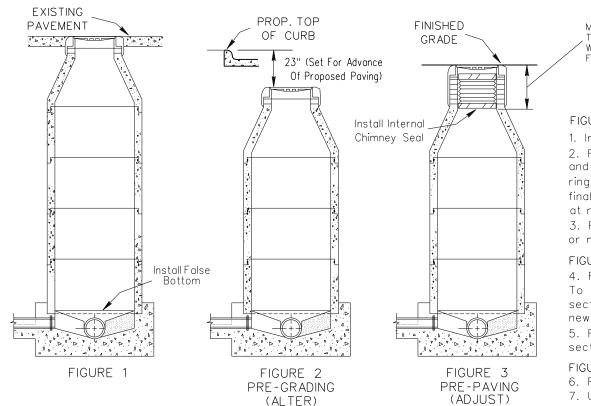
WATER & WASTEWATER ADJUSTMENTS



City of Dallas Water Utilities Department

PART 4 WATER AND WASTEWATER ADJUSTMENTS

TITLE	<u>Pg.</u>
Adjustment of Standard Precast Manhole	 401
Adjustment of Standard Cast-in-Place Manhole	 402
Adjustment of Fiberglass Manhole	 403
Adjustment of Valve Stack	 404
New Lateral Cleanout on Existing Lateral	 405
Adjustment of Existing Lateral	 406
Replace Existing Lateral Cleanout	 407
Replace Existing Lateral to Existing Mainline	 408
Meter Box Placement	 409
Alteration and Adjustment of Standard Mainline Cleanout	 410
Adjustment of Existing Water Service	 411
Adjustment of Type "S" Manhole	 412
Wastewater Main Under-Cut By Proposed Stormwater Main	 413
Encasement Protection For Wastewater Main	 414
Wastewater Main Passing Through Stormwater Main	 415
Wastewater Main Passing Thorough Stormwater Manhole	 416
Relocation of Pipe-To-Soil Potential Test Station	 417



NOTE: If the existing wastewater main is in cone section or if there is only one riser section, the entire manhole must be removed and a new manhole is to be installed. M.H. NECK IS NOT TO EXCEED 30'' WHEN RAISING TO FINISHED GRADE

FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.

2. Remove and salvage the existing ring and cover and remove the existing grade rings or brick. If the ring and/or cover are damaged at any time prior to final acceptance, it will be replaced by the contractor at no cost to the City.

3. Remove the cone section and remove or add one or more riser section as required.

FIGURE 2 PRE-GRADING (ALTER)

4. Reset the cone section on the existing manhole. To meet the required depth, one or more existing riser sections may have to be removed and replaced with new riser section(s) of a different height.

5. Reset the salvaged ring and cover on the cone section with concrete mortar.

FIGURE 3 PRE-PAVING (ADJUST)

6. Remove the salvaged ring and cover and mortar. 7. Use precast concrete grade rings and non-shrink grout to raise M.H. frame and cover to final paving grade. (LIMITED TO 30" MAX. MANHOLE NECK EXTENSION, AS MEASURED FROM THE TOP TAPER OF THE M.H. CONE TO M.H. LID). When M.H. neck extension exceeds 30", then the M.H. cone is to be removed and reset in such a manner as to reduce the number of grade rings required to reset M.H. frame and cover to final grade.

8. Set the salvaged ring and cover in place withnon-shrink grout. Install internal chimney seal. See pg. 327

 ${\bf 9}.$ Coat the entire outside of the neck with a waterproof bituminous coating.

10. The false bottom will be removed during the final inspection

ALTER & ADJUSTMENT OF	DWU	(Page No.) 401
STANDARD PRECAST MANHOLE	DATE OCT.2009	

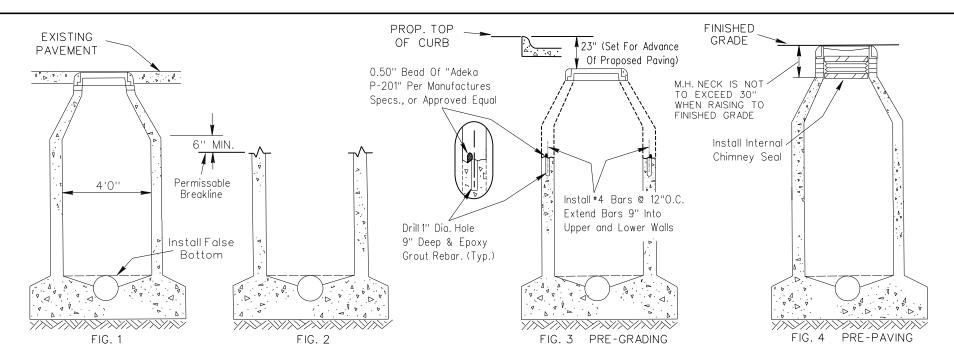


FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.

2. Remove and salvage the existing ring and cover and remove the existing grade rings or brick. If the ring and/or cover are damaged at any time prior to final acceptance, it will be replaced by the contractor at no cost to the City. FIGURE 2

3. Remove the existing manhole cone section to a minimum of 6" below the cone taper to M.H. Wall.

FIGURE 3 PRE-GRADING

4. Form and monolithically pour a new manhole extension with cone section. Use epoxy bonding agent. "Sikadur 32, HiMod" or approved equal, to bond new concrete to existing concrete. Coat entire outside of the new concrete with a waterproof bituminous coating. Set the salvaged ring and cover on top of new section with concrete mortar.

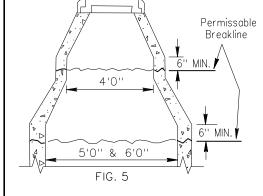
FIGURE 4 PRE-PAVING

5. Remove the salvaged ring and cover and mortar.

6. Use precast concrete grade rings to raise M.H. frame and cover to final paving grade. (LIMITED TO 30" MAX. MANHOLE NECK EXTENSION, AS MEASURED FROM THE TOP TAPER OF THE M.H. CONE TO M.H. LID). When M.H. neck extension exceeds 30", then the M.H. cone is to be removed and reset in such a manner as to reduce the number of grade rings required to reset M.H. frame and cover to final grade.

- 7. Set the salvaged ring and cover in place with non-shrink grout. Install internal chimney seal. See pg. 327
- 8. Coat the entire outside of the neck with a waterproof bituminous coating.
- 9. The false bottom will be removed during the final inspection.





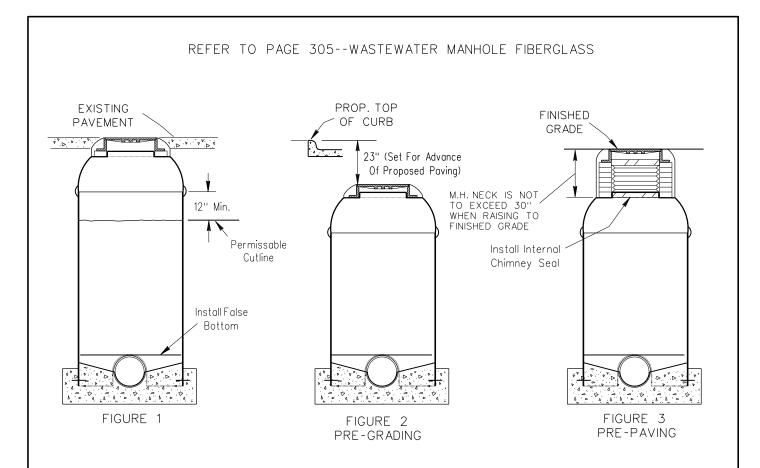


FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.

Remove and salvage the existing ring and cover and remove the existing grade rings or brick. If the ring and/or cover are damaged at any time prior to final acceptance, it will be replaced by the Contractor at no cost to City.
 Cut the existing manhole at a point no closer than 1' below the bottom of the cone section.

FIGURE 2 PRE-GRADING

4. Build up or remove a portion of the manhole to meet the required depth. A new riser section may be required if the manhole is to be raised. The salvaged cone section may be used if approved by the engineer. A manufacturer's repair kit approved by the engineer must be used to make the connection(s).

5. Backfill material must be sand or stabilized soil compacted to a minimum of 90% Std. Proctor Density and placed in 6" lifts beginning at the manhole and working outward to the excavation walls. 6. Reset the salvaged ring and cover on the cone section with concrete mortar.

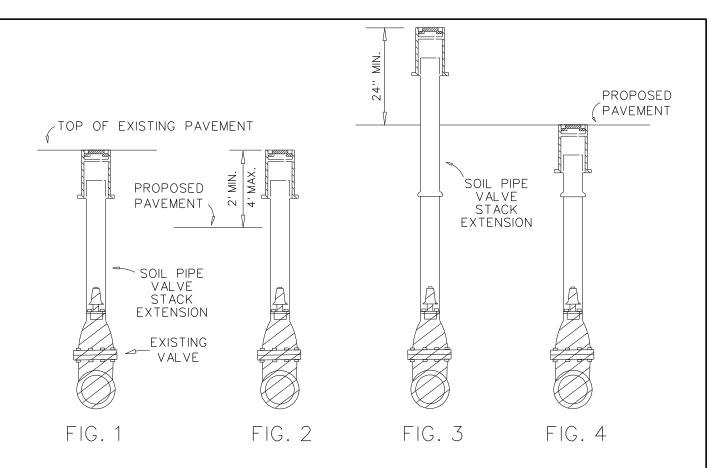
FIGURE 3 PRE-PAVING

7. Remove the salvaged ring and cover and mortar.

8. Use precast concrete grade rings and non-shrink grout to raise M.H. frame and cover to final paving grade. (LIMITED TO 30" MAX. MANHOLE NECK EXTENSION, AS MEASURED FROM THE TOP TAPER OF THE M.H. CONE TO M.H. LID). When M.H. neck extension exceeds 30", then the M.H. cone is to be removed and reset in such a manner as to reduce the number of grade rings required to reset M.H. frame and cover to final grade. 9. Set the salvaged ring and cover in place with non-shrink grout. Install internal chimney seal. See pg. 327 10. Coat the entire outside of the neck with a waterproof bituminous coating.

11. The false bottom will be removed during the final inspection.

ADJUSTMENT OF		DWU	(page no.) 403
FIBERGLASS MANHOLE	DE	^{вате} ЕС.2001	



NOTE: The valve cover must always be exposed so the valve can be operated at any time. Exceptions must be approved by the engineer in advance.

The existing valve cover and lid may be reused if not damaged during removal. If the valve cover and/or lid is damaged at any time prior to final acceptance, it will be replaced by the contractor at no cost to the City.

FIGURE 1 EXISTING VALVE STACK AND COVER

FIGURE 2 PRE-GRADING

 If the proposed paving is 2' to 4' below the top of the existing valve cover , the entire valve stack and cover may be left in place until final adjustment for paving.
 FIGURE 3 PRE-GRADING

2. If the proposed paving is less than 2' below the top of the existing valve cover, the valve stack must be extended.

3. The cover is removed and an extension of soil pipe only is installed on the existing valve stack. The valve stack and extension must be properly aligned so that the valve can be operated properly. The extension must be connected to the existing valve stack with a bell and rubber gasket.

FIGURE 4 PRE-PAVING

4. The valve stack or extension is cut to a point not more than 3" below the proposed top of paving.

5. The valve cover is installed over the valve stack or extension to the top of the paving grade.

ADJUSTMENT OF	DW	(PAGE NO.) 404
VALVE STACK		-

KEY:

WASTEWATER MAIN
 WYE OR TAPPING SADDLE

3. MAINLINE LATERAL

4. TEE

5. 4" STACK6. 4" WASTEWATER CLEANOUT CASTING (CAST IRON, P.V.C. OR ABS PLASTIC)(CAST IRON ONLY FOR COMMERCIAL LATERALS)

7. WATER TIGHT ADAPTOR

8. PRIVATE WASTEWATER LATERAL 9. CLASS "B" CONCRETE 10.COMPACTED AS SPECIFIED

9 FIGURE 1

FIGURE 1 EXISTING LATERAL WITHOUT CLEANOUT

1. The adaptor may not be encased in concrete. If it is not, the same adaptor may be used if it is in serviceable condition. If the adaptor is encased in concrete, the concrete and adaptor must be removed and replaced.

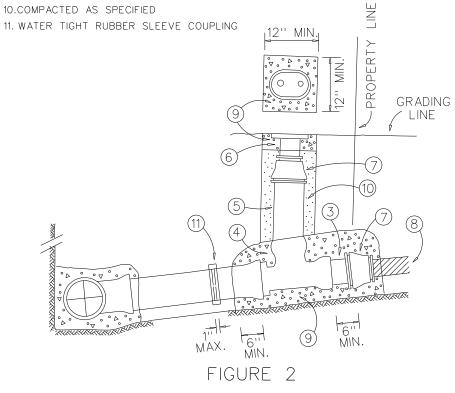
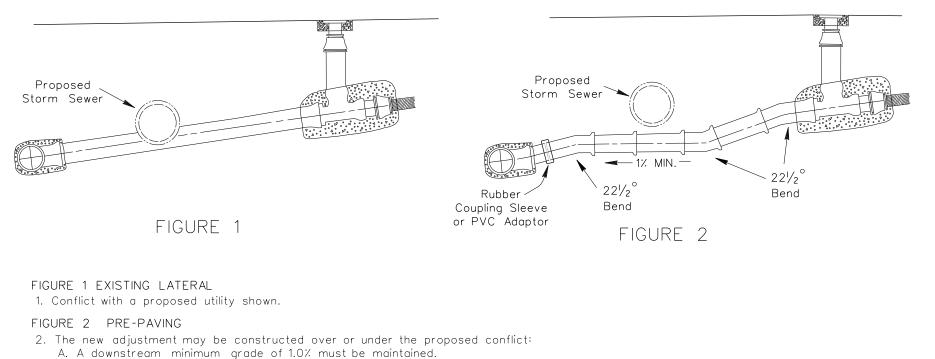


FIGURE 2 NEW CLEANOUT INSTALLED

2. Cut the existing lateral as shown and remove the existing lateral pipe to the private line.

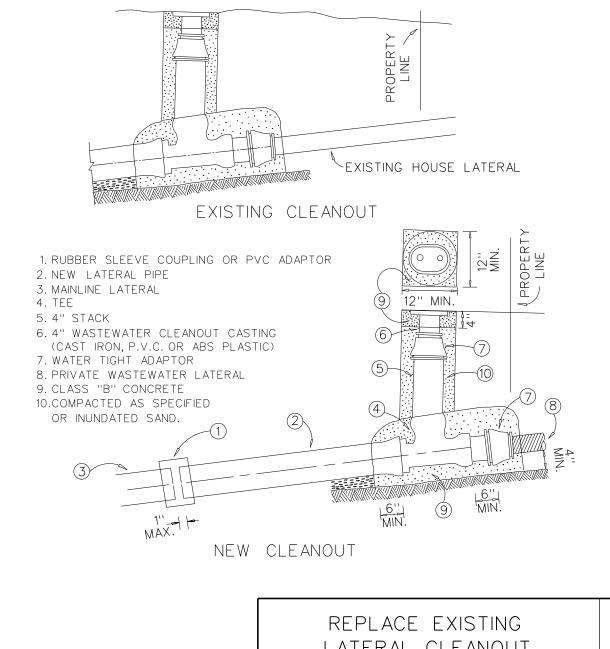
3. Install the new cleanout as shown. The new pipe and embedment shall be of the same type as the existing.

NEW LATERAL CLEANOUT	DWU	(Page No.) 405
ON EXISTING LATERAL	DEC.2001	



- B. Bends greater than $22 \frac{1}{2}$ degrees are NOT permitted.
- C. The new pipe and embedment must be of the same type as the existing.(Unless the lateral is concrete pipe, in which case clay pipe is to be used.)
- D. Connections between the existing lateralpipe and new lateralpipe may be made with a rubber sleeve coupling or PVC adaptor, which ever is appropriate.
- E. A minimum clearance between the outside of the new lateral pipe and the proposed conflict will be 6". If the clearance is less than 6", a steel pipe or D.I. pipe encasement will be required as shown on PAGE 414, ENCASEMENT PROTECTION FOR WASTEWATER MAINS.
- 3. The existing wye or tee connection to the existing main may have to be removed and reinstalled to meet the proposed new grade of the lateral. This work, if required, will be included at no additional cost to the City.

ĺ	ADJUSTMENT OF	DWU	(Page No.) 406
	EXISTING LATERAL	OCT.2009	



NOTES

- A) The new lateralpipe shall be the same type of pipe as the existing lateral. If the lateral is concrete, the entire lateral must be rebuilt.
- B) For commercial laterals, use cast iron cleanout castings only.
- C) The new cleanout shall be constructed as close to the property line as possible.
- D) NCTCOG Spec: 702.2.4 Quality Of Concrete
- E) The embedment will match the embedment on the existing lateral.

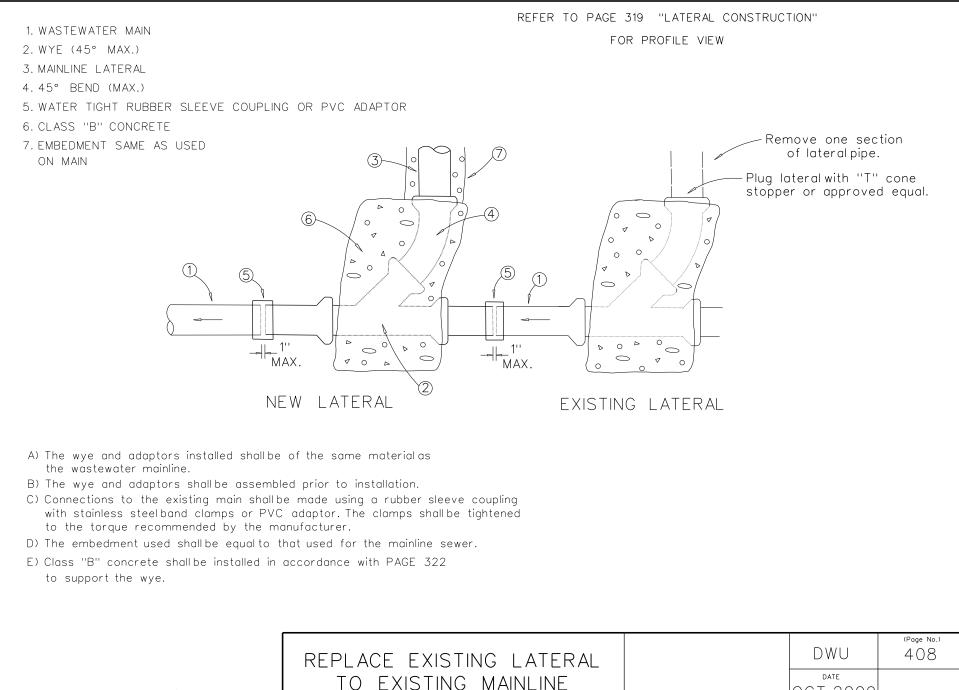
PROCEDURE

1. Remove existing cleanout and lateral to limits of existing concrete.

2. Salvage the cleanout casting and lid. If either is damaged, a new cleanout casting and/or lid will be furnished at no cost to the City.

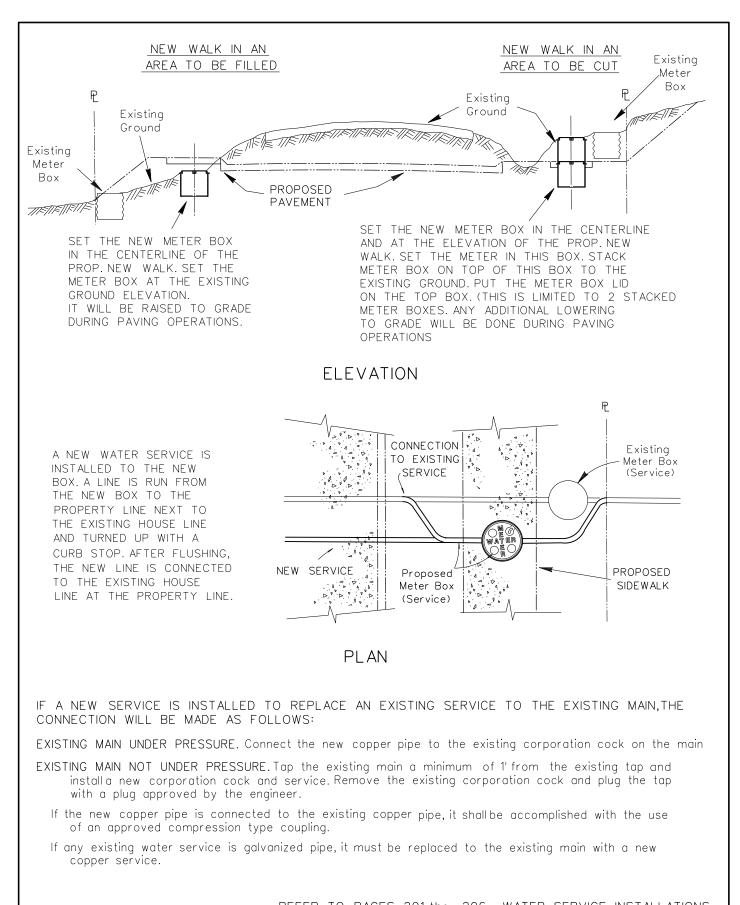
3. Install the lateral extension and cleanout as shown in the detail using all new materials. The salvaged cleanout casting and lid may be used if approved by the engineer.

REPLACE EXISTING	DWU	(Page No.) 407
LATERAL CLEANOUT	OCT.2009	



NCTCOG Spec: 702.2.4 - Quality Of Concrete

OCT.2009

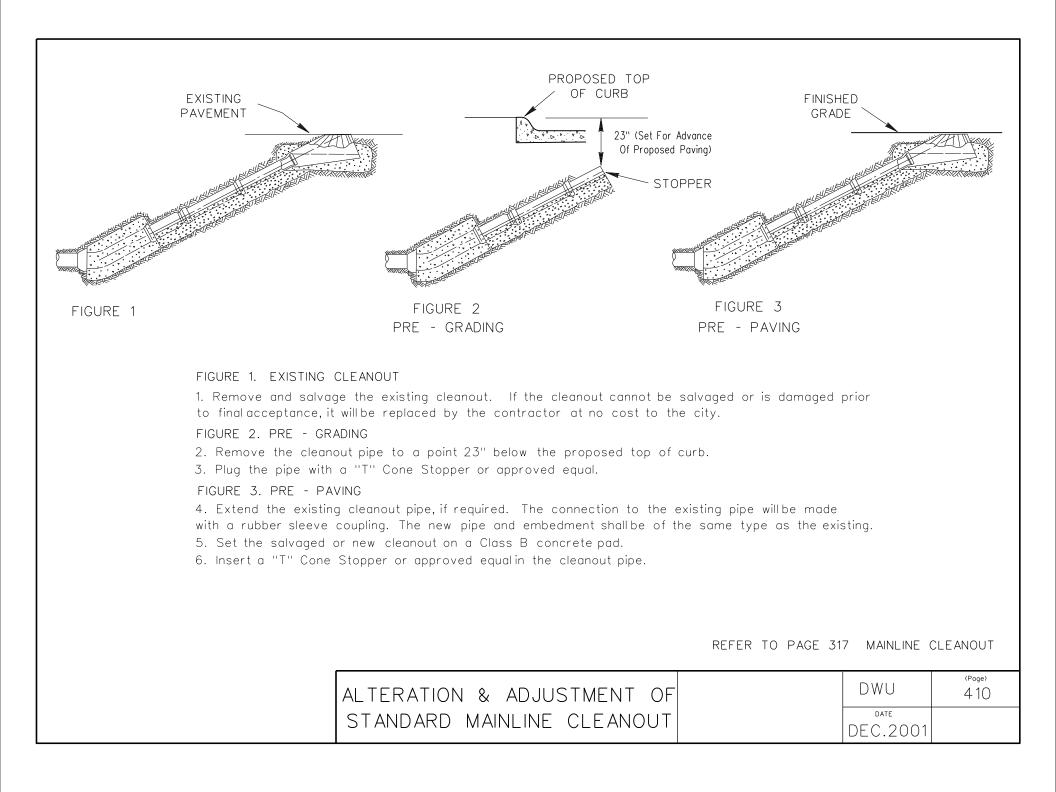


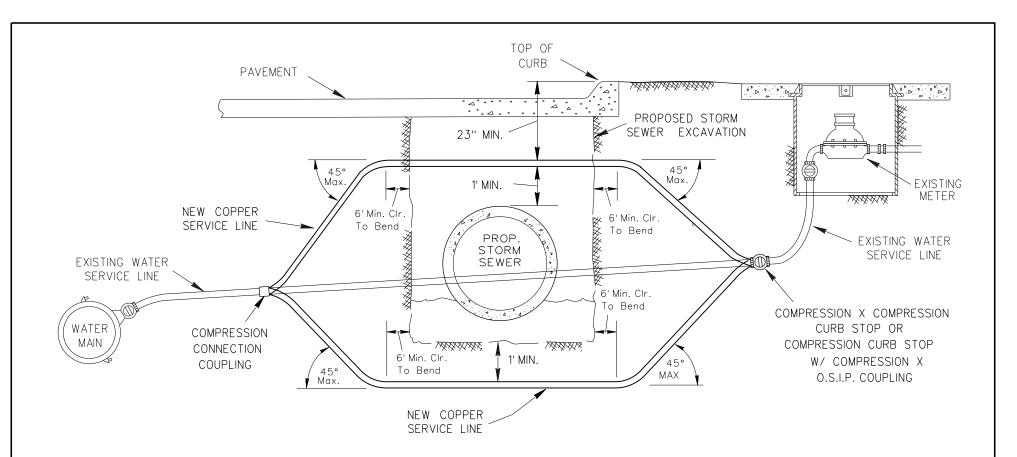
 REFER TO PAGES 201 thru 206
 WATER SERVICE INSTALLATIONS

 METER BOX REPLACEMENT
 DWU
 (PAGE NO..) 409

 DATE
 DATE

JUNE 2002





NOTES:

1. All materials must be new.

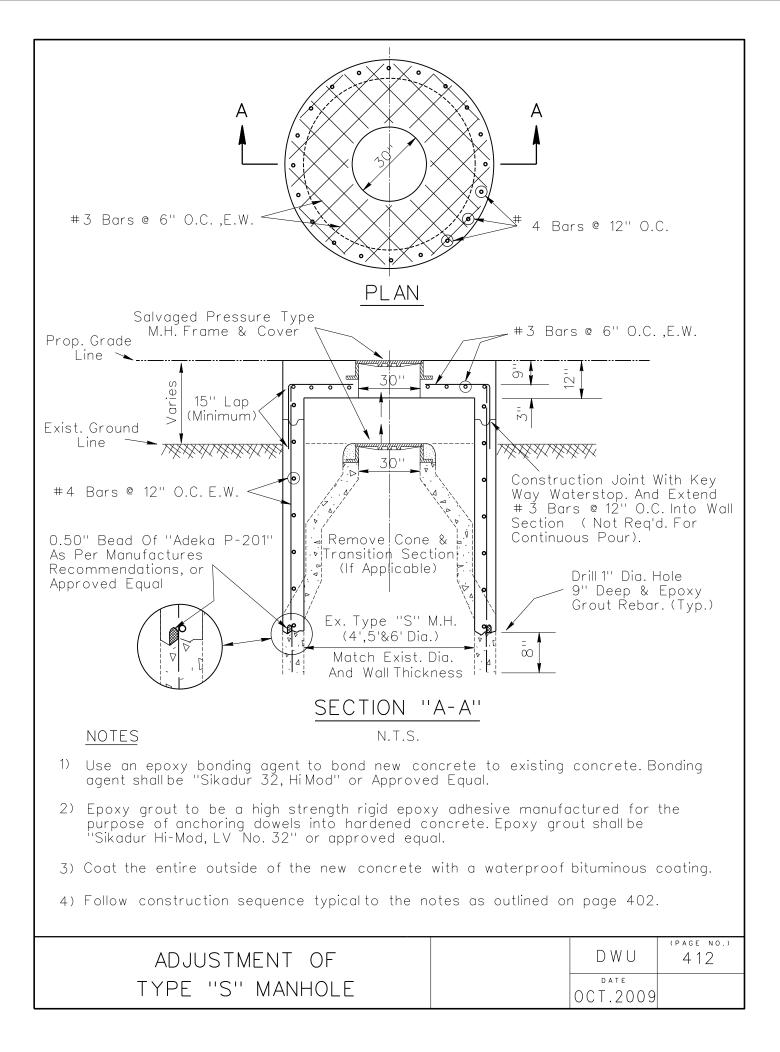
2. Install the new service with a minimum clearance of 1 foot below the excavation of the trench for the proposed storm sewer and a minimum of 1 foot clearance from the edge of the trench excavation when the service is installed laterally along the proposed storm sewer.

3. The minimum bending radius of the copper shall be 6 times the O.D. of the pipe.

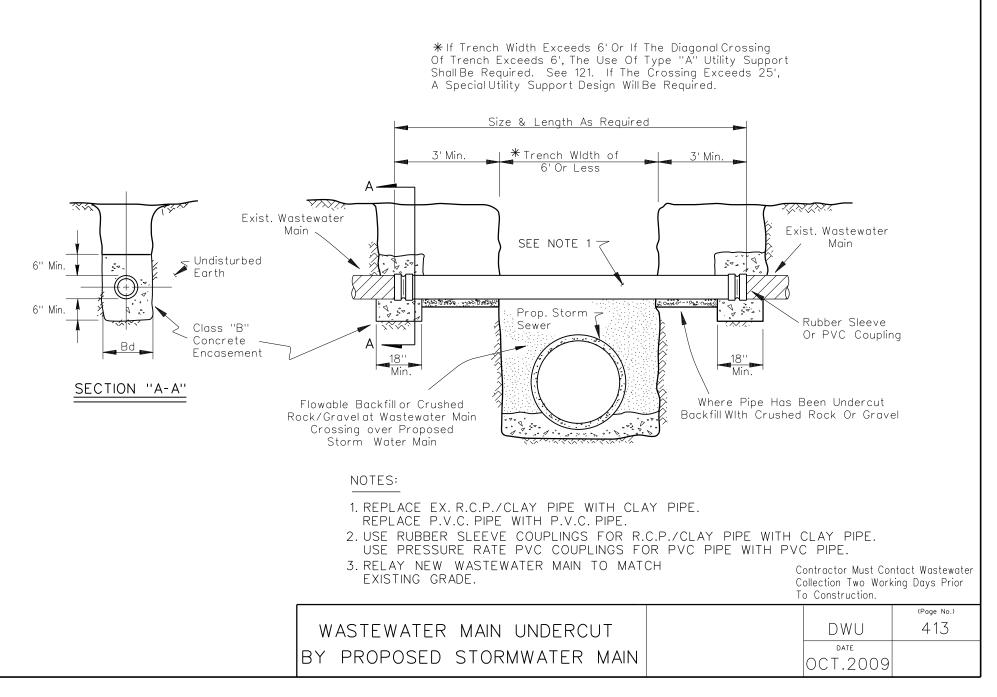
4. Adjustment of the proposed water service may be over the proposed storm sewer only if the minimum clearances are maintained, otherwise the service must be installed under the proposed storm sewer excavation.

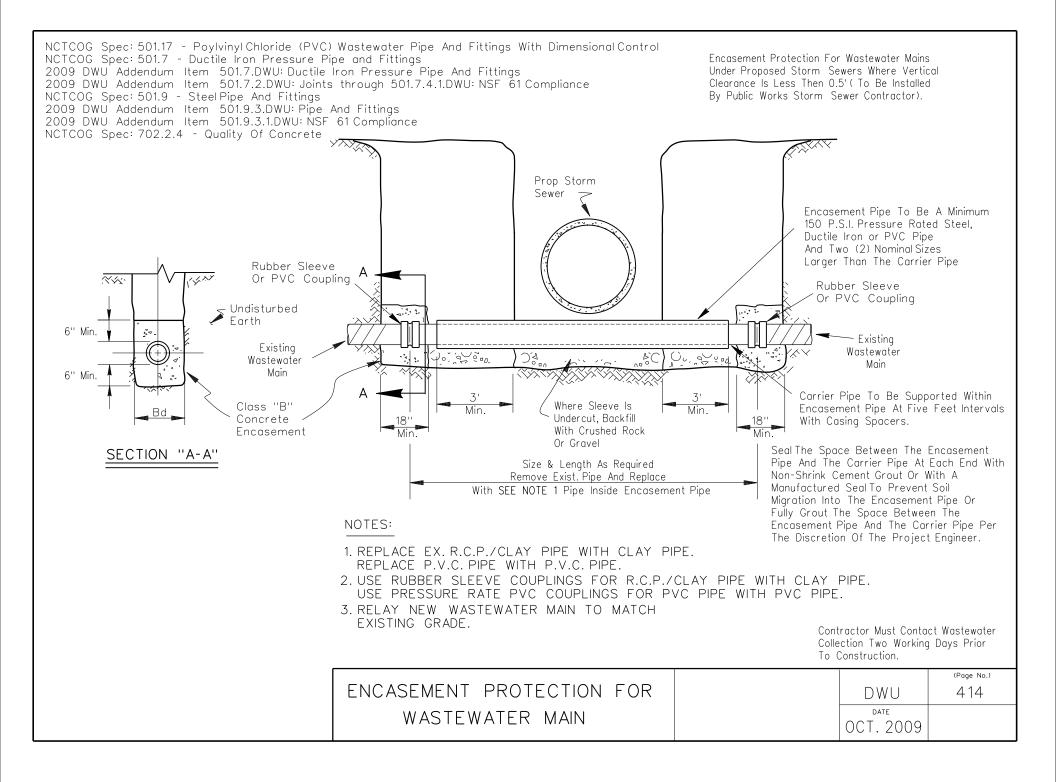
5. The bend angle is not to exceed 45° for any bend in a new copper service line.

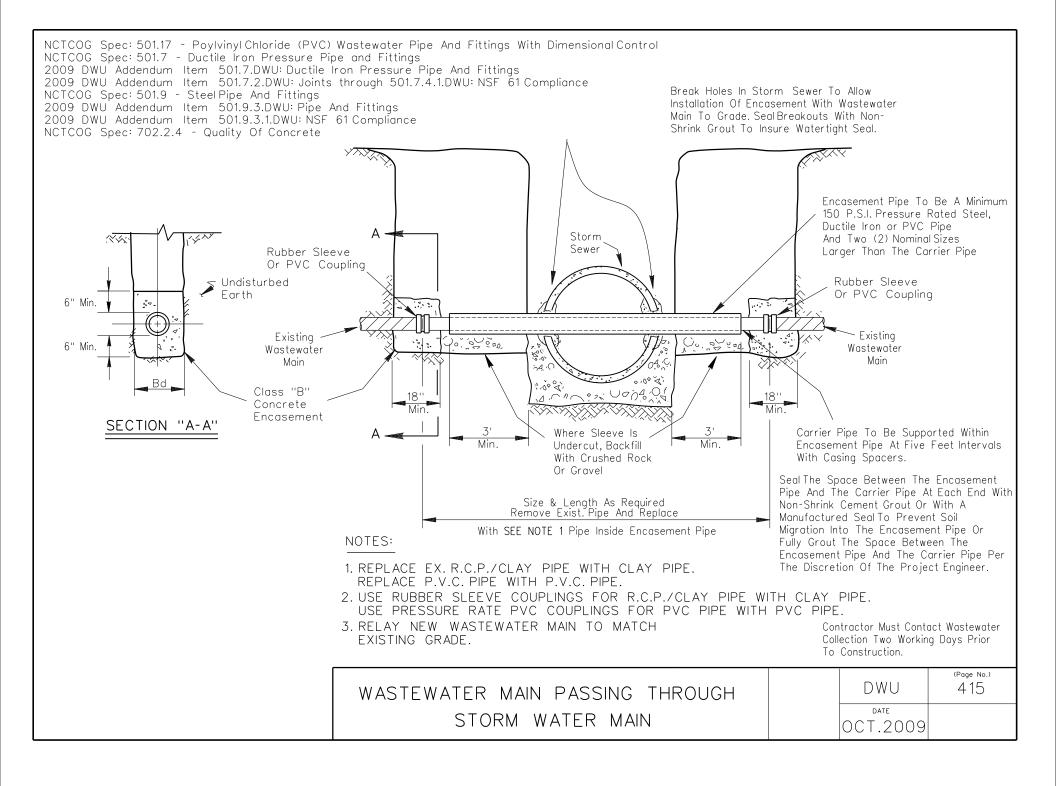
ADJUSTMENT OF		DWU	(Page) 4 11
EXISTING WATER SERVICE	(DATE DCT.2009	

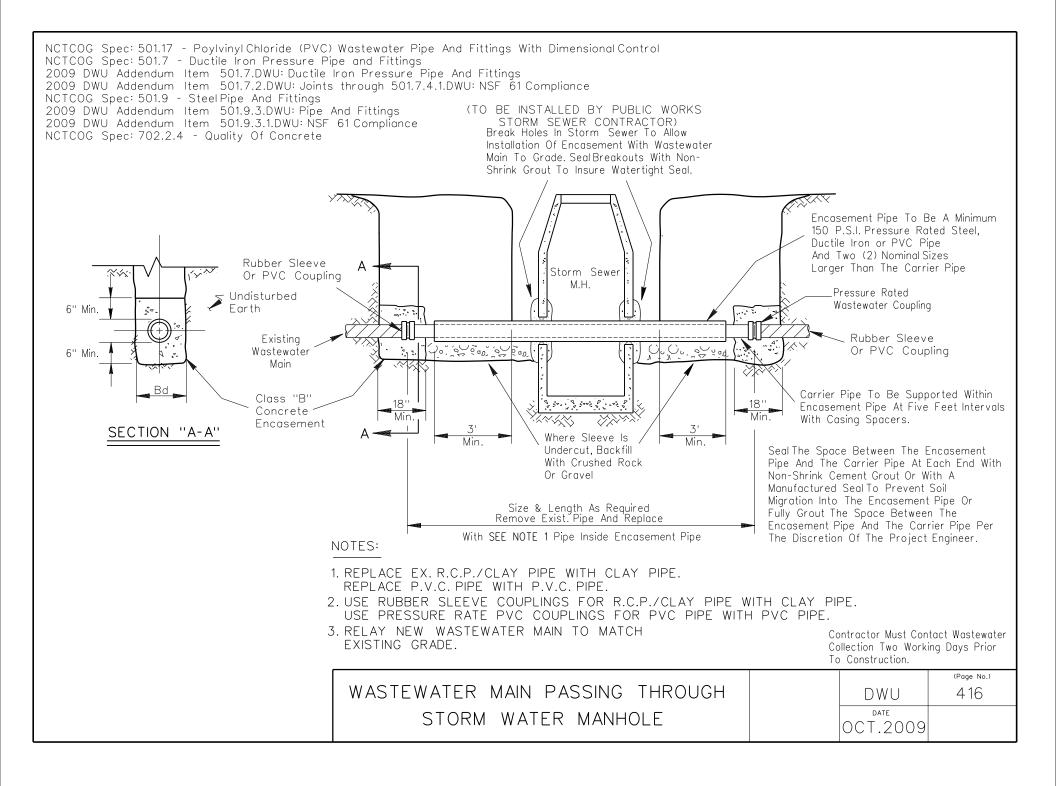


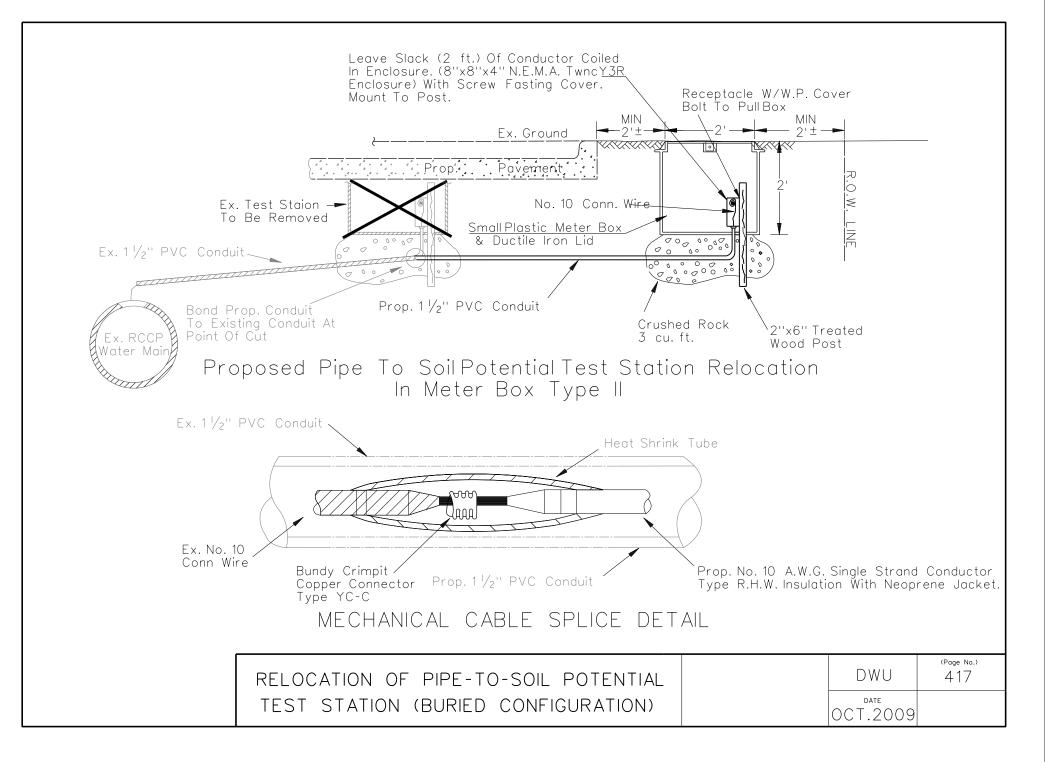
NCTCOG Spec: 501.17 - Polyvinyl Chloride (PVC) Wastewater Pipe And Fittings With Dimensional Control NCTCOG Spec: 702.2.4 - Quality Of Concrete













4" AND LARGER WATER SERVICE INSTALLATIONS



City of Dallas Water Utilities Department

PART 5 LARGE WATER SERVICE INSTALLATIONS

TITLE	<u>Pg.</u>
Large Water Services (4" and Larger) Descriptions and Typical Uses	 501
Large Sevice Installation Details and Plan Views	 502
Minimum Easement Sizes for Meter Installation	 502A
Large Service Installation DetailElevation View	 503
Large Service Installation DetailsPrecast Vaults (F.M. & D.C. Type)	 504
Large Service Installation DetailsPrecast Vaults (10" or Larger Meter Size)	 505
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8" Combined Service with 6" Meter	 509
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4" Domestic Service with 3" Meter	 513
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4" Closed Fireline Service with 4" Detector Check Device	 517
6" Closed Fireline Service with 6" Detector Check Device	 518
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10" Closed Fireline Service with 10" Detector Check Device	 521
Suspended Vault Installation Detail Description And General Notes	 522
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Suspended Vault Installation DetailsElevation View	 524
Typical Suspended Vault Detail - Meter Perpendicular to Main	 525
Typical Suspended Vault Detail - Meter Parallel to Main	 526

GENERAL DESCRIPTION OF LARGE WATER SERVICES

- 1) A Closed Fireline Service -
 - A) Definition A system with automatic sprinklers only, regularly inspected and supervised by an insurance agency.
 - B) Metering Monitored with a detector check device.
- 2) Combined Water Service (Domestic and Fire)
 - A) Definition Fire protection and domestic water through a single water service and meter.
 - B) Metering Metered with Underwriter approved "FM" full flow meter or turbine meter with U.L. approved strainer.

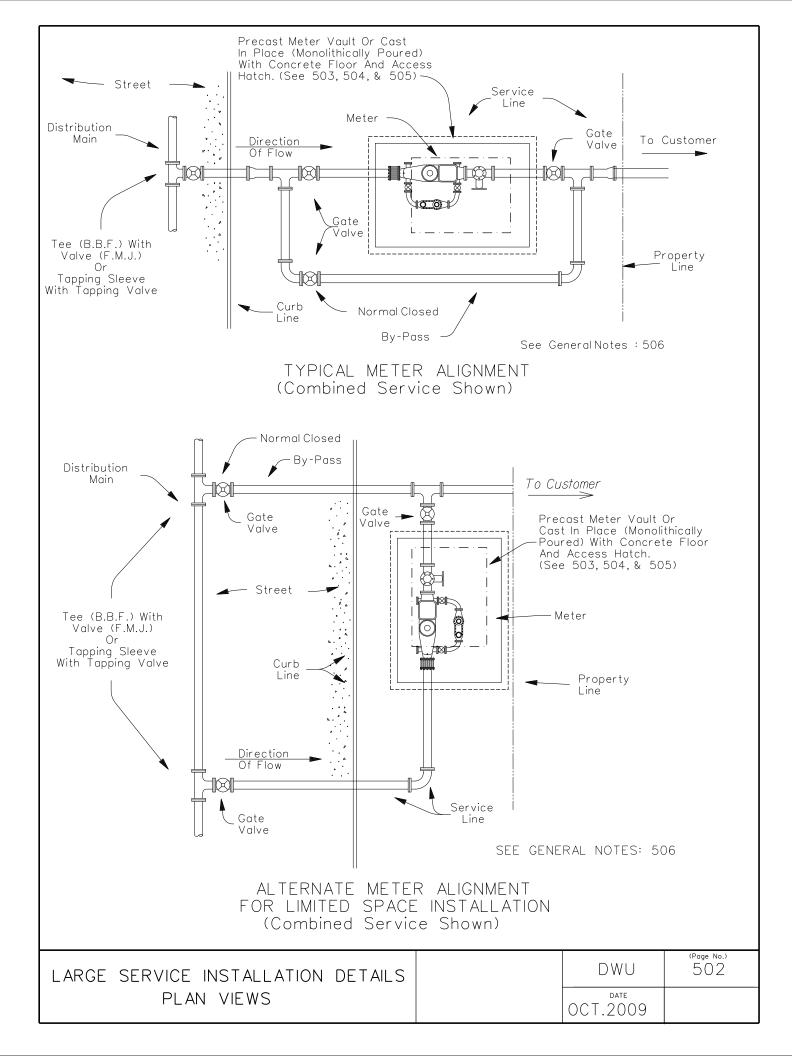
3) Domestic Water Service

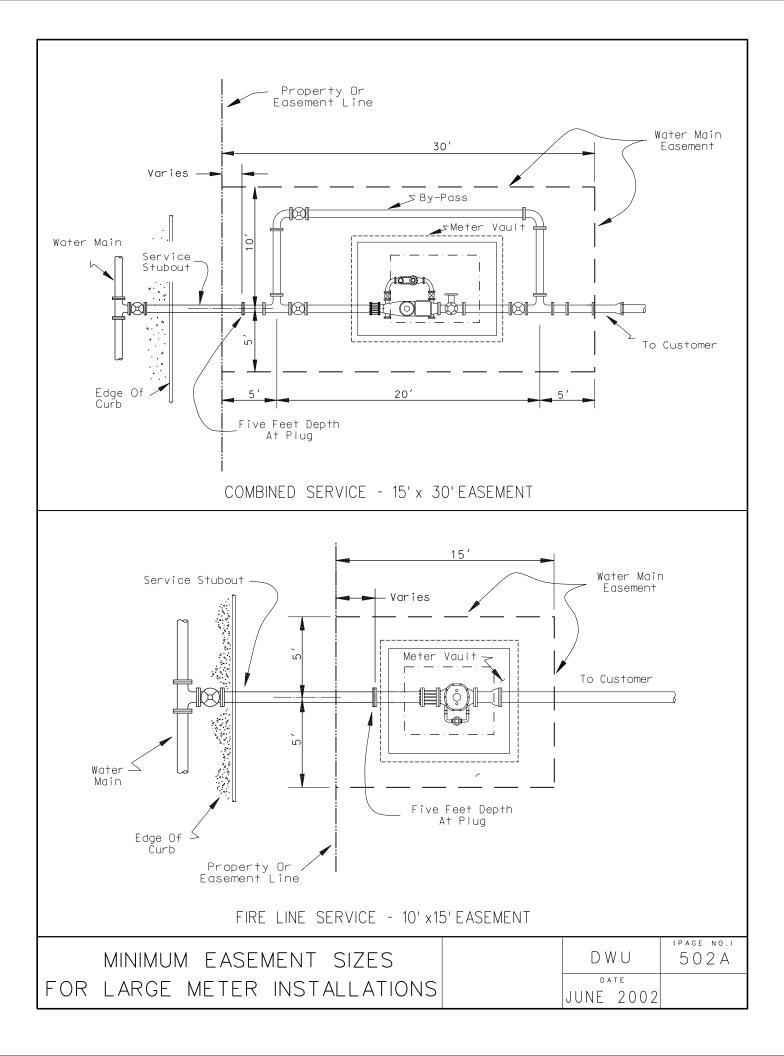
- A) Definition Domestic water through a single water service and meter.
- B) Metering Metered with C.T. meter or turbine meter with domestic type strainer.

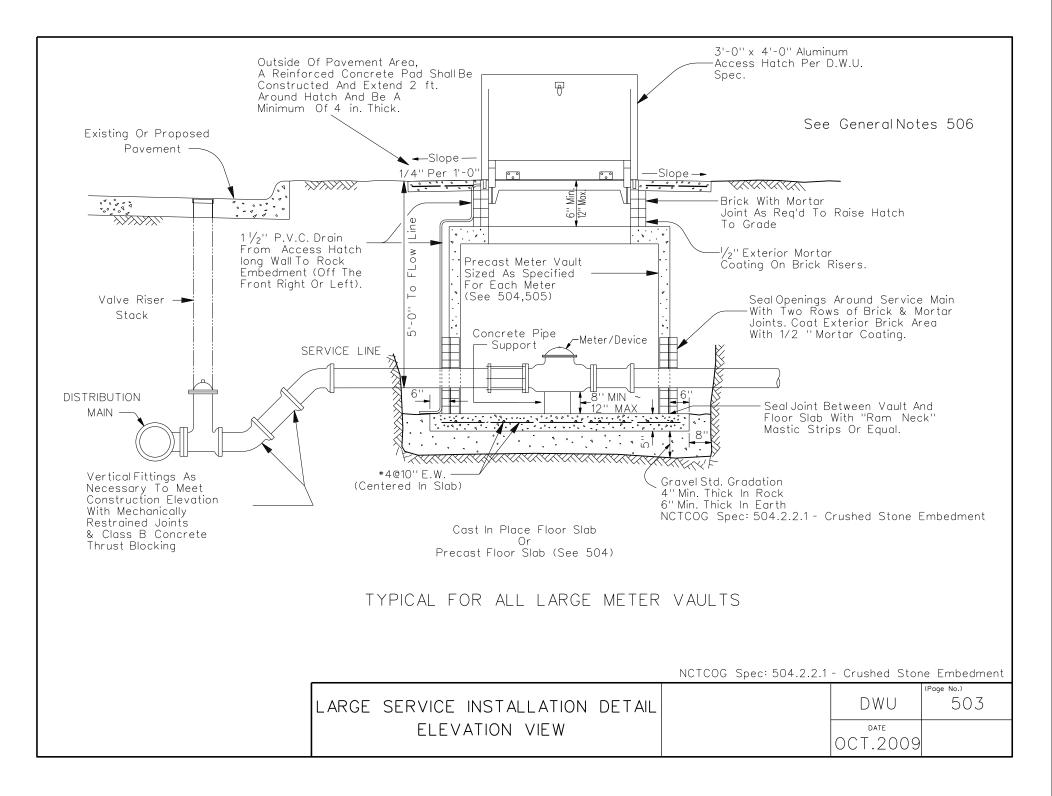
4) Irrigation Water Service

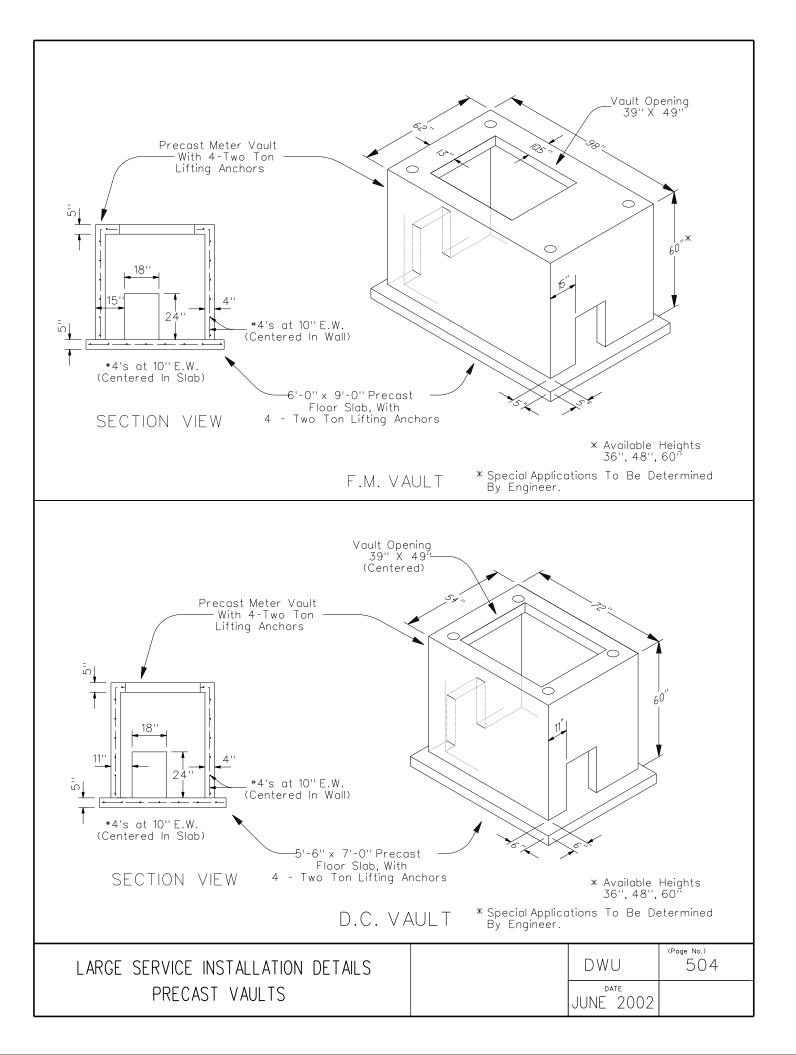
- A) Definition Same as domestic water through a single water service and meter without a bypass and for irrigation purpose only.
- B) Metering Metered with C.T. meter or turbine meter with domestic type strainer.

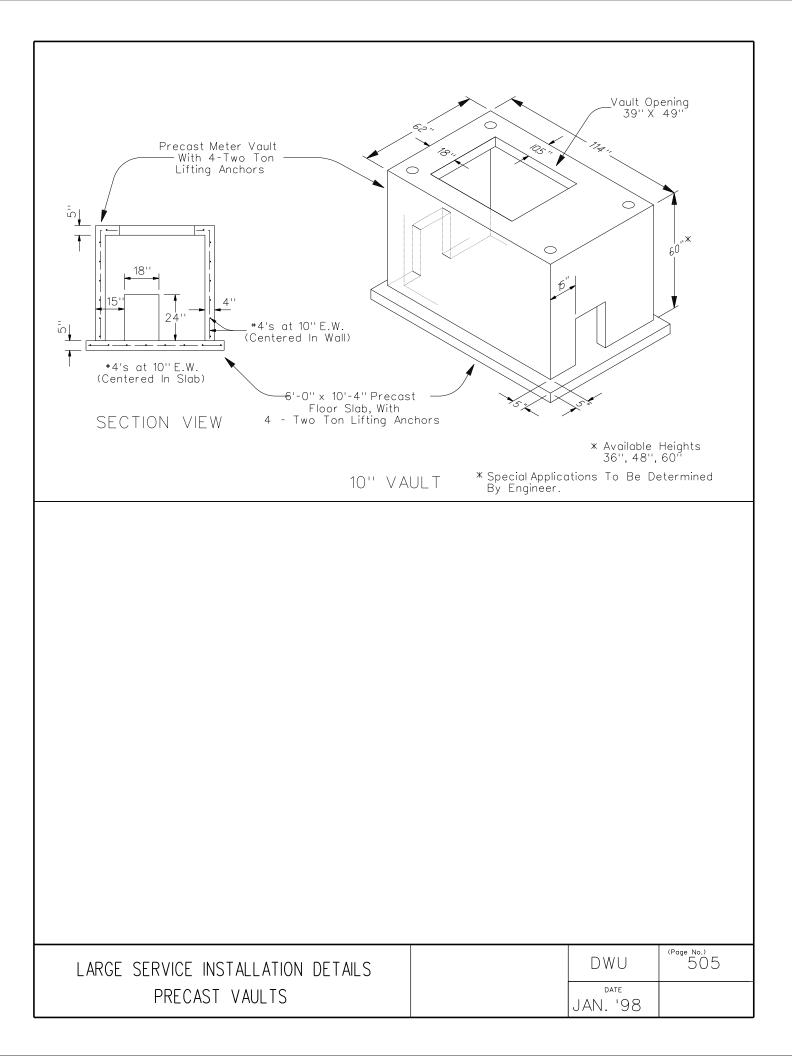
LARGE WATER SERVICES (4'' & LARGER)	DWU	(Page No.) 501
DESCRIPTIONS AND TYPICAL USES	OCT.2009	











<u>GENERAL NOTES FOR</u> MATERIAL AND CONSTRUCTION METHODS

1.) All materials including tapping sleeves, tapping valves, valves, pipe, associated fittings and construction methods shall conform to the most current version of NCTCOG specifications, DWU Addendum to that specification, this manual and the latest addition of the approved materials list.

NOTE:

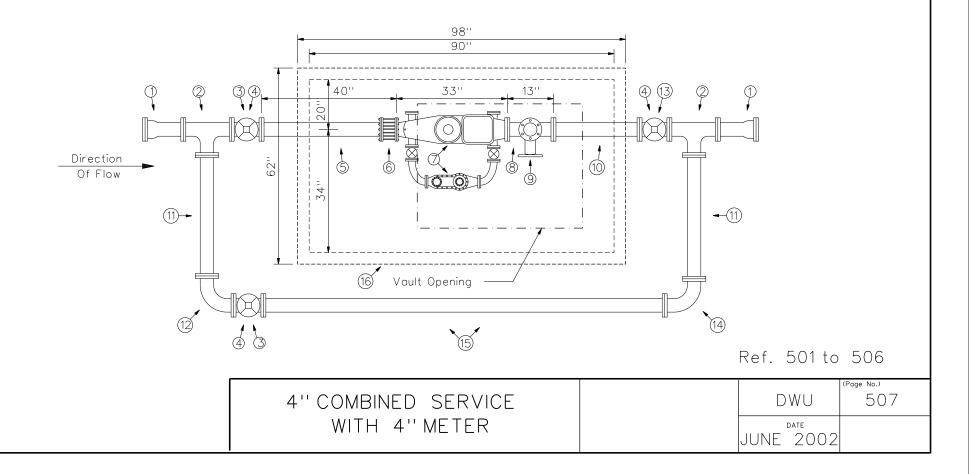
- A.) Only fullbody gray or ductile iron fittings and glands willbe permitted for large water service installation. In no case will compact fittings be allowed
- B.) All connections including valves and fittings shall be restrained joints. No threaded rod will be allowed. Along with restrained joints, thrust blocking will be required.

C.) All pipe must be either Ductile Iron (Class 52) or PVC C900 (DR-14).

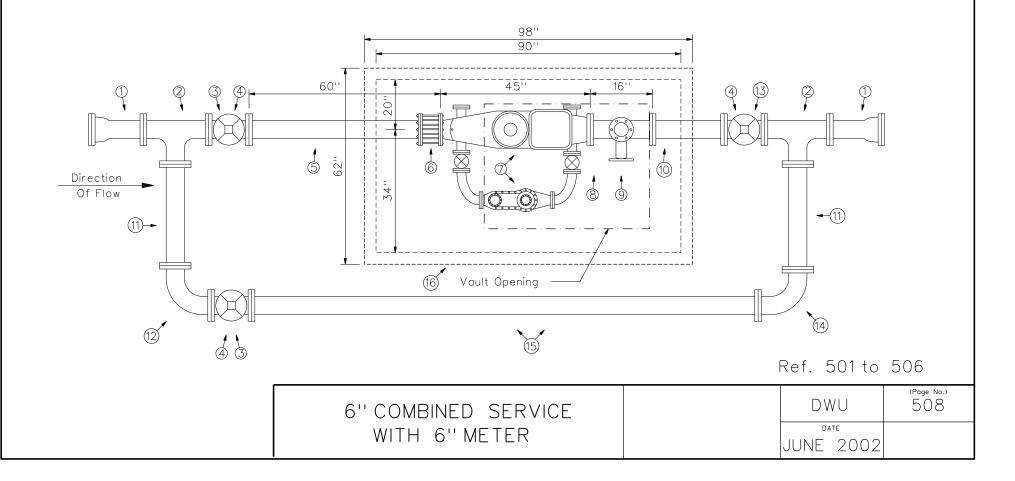
- 2.) All precast vaults and precast floors used in the installation of large water services will meet DWU specifications and must be on the approved materials list.
- 3.) Cast in place concrete shall be class "F" concrete, except for concrete used for thrust blocking, which shall be class "B" concrete.
- 4.) The 3' x 4' aluminum access hatch cover shall meet DWU specifications and must be on the approved material list. (Currently supplied by DWU and may be purchased for use on DWU facilities only.)

		(Page No.)
LARGE SERVICE INSTALLATION DETAILS	DWU	506
GENERAL NOTES	DATE	
OLIVE NOTES	OCT.2009	

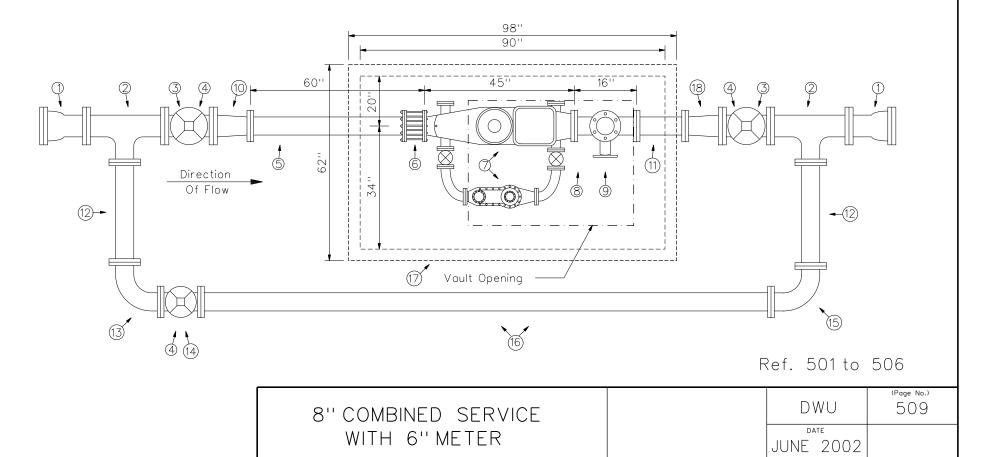
Material List		Material List			
Part No.	Quantity	Description	Part No.	Quantity	Description
() (2) (3) (4) (5) (6) (7) (8) (9)	2 Ea. 2 Ea. 2 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	 4" x 8" Nipple M.J. x F. 4" x 4". Tee F. x F. 4" Gate Valve F. x M.J. Valve Stack Riser Cover & Lid 4" x 40" Pipe S. x S. 4" Flanged Coupling Adaptor 4" Meter As Specified (Type F.M. Shown) 4" x 4" Tee F. x F. (test Point) 4" Gate Valve F. x F. (Test Point) 	9E99496	1 Ea. 2 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	4" x 24" Nipple F. x F. 4" x 36" Nipple F. x F. 4" 90° Bend F. x F. 4" Gate Valve F. x F. 4" 90° Bend M.J. x F. 4" Pipe Precast F.M. Vault F.M. Vault Floor (Not Shown) Access Hatch (Not Shown)



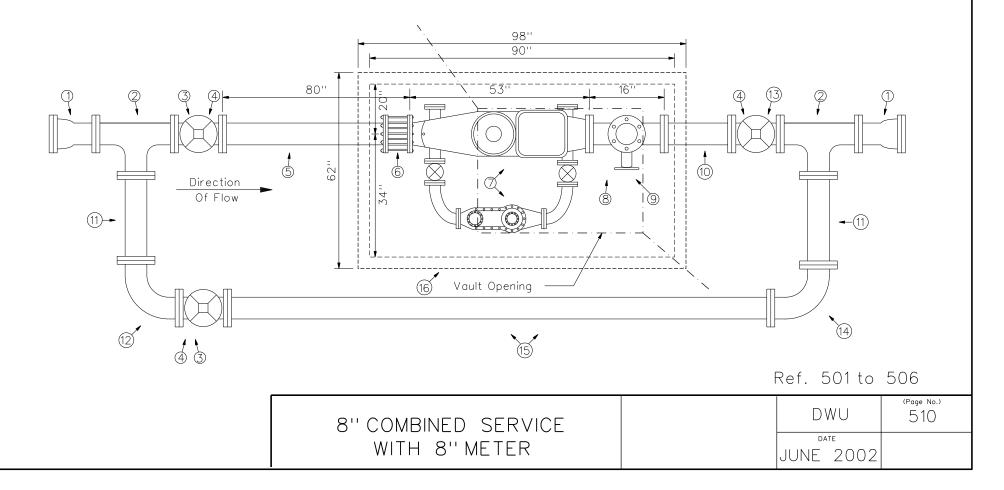
	Material List		Material List		
Part No.	Quantity	Description	Part No.	Quantity	Description
() (2) (3) (4) (5) (6) (7) (8) (9)	2 Ea. 2 Ea. 2 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	6" x 8" Nipple M.J. x F. 6" x 6" Tee F. x F. 6" Gate Valve F. x M.J. Valve Stack Riser Cover & Lid 6" x 60" Pipe S. x S. 6" Flanged Coupling Adaptor 6" Meter As Specified (Type F.M. Shown) 6" x 4" Tee F. x F. (test Point) 4" Gate Valve F. x F. (Test Point)	(D)(D)(D)(D)(D)(D)(D)(D)(D)(D)(D)(D)(D)(1 Ea. 2 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	6" x 24" Nipple F. x F. 6" x 36" Nipple F. x F. 6" 90° Bend F. x F. 6" Gate Valve F. x F. 6" 90° Bend M.J. x F. 6" Pipe Precast F.M. Vault F.M. Vault Floor (Not Shown) Access Hatch (Not Shown)



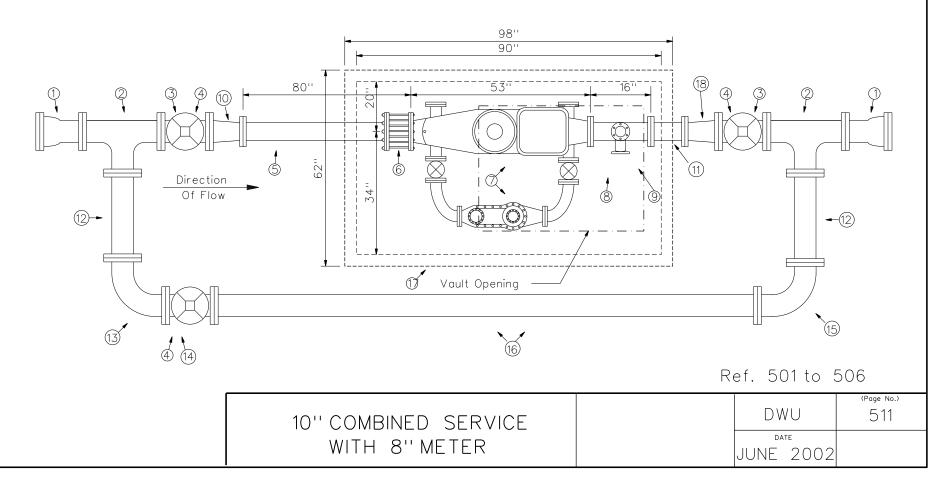
	Material List			Material List		
Part No.	Quantity	Description	Par	t No.	Quantity	Description
1 0 0 0 0 0 0 0 0 0 0 0 0 0	2 Ea. 2 Ea. 2 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	8" x 8" Nipple M.J. x F. 8" x 6" Tee F. x F. 8" Gate Valve F. x F. Valve Stack Riser Cover & Lid 6" x 60" Pipe S. x S. 6" Flanged Coupling Adaptor 6" Meter As Specified (Type F.M. Shown) 6" x 4" Tee F. x F. (Test Point) 4" Gate Valve F. x F. (Test Point)		11 12 13 14 15 16 17	1 Ea. 2 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	6" x 12" Nipple F. x F. 6" x 36" Nipple F. x F. 6" 90° Bend F. x F. 6" Gate Valve F. x M.J. 6" 90° Bend M.J. x F. 6" Pipe Precast F.M. Vault F.M. Vault Floor (Not Shown) Access Hatch (Not Shown)



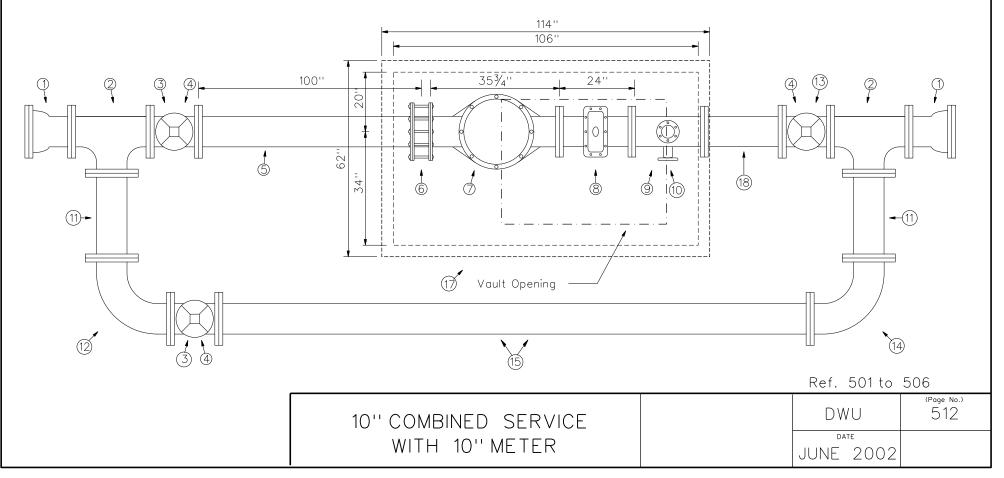
	Material List			Material List		
Part No.	Quantity	Description	Part No.	Quantity	Description	
() () () () () () () () () () () () () (2 Ea. 2 Ea. 2 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	8" x 8" Nipple M.J. x F. 8" x 8" Tee F. x F. 8" Gate Valve F. x M.J. Valve Stack Riser Cover & Lid 8" x 80" Pipe S. x S. 8" Flanged Coupling Adaptor 8" Meter As Specified (Type F.M. Shown) 8" x 4" Tee F. x F. (Test Point) 4" Gate Valve F. x F. (Test Point)	9999999	1 Ea. 2 Ea. 1 Eo. 1 Eo. 1 Eo. 1 Eo. 1 Eo. 1 Eo. 1 Eo.	8" x 24" Nipple F. x F. 8" x 36" Nipple F. x F. 8" C.I. 90° Bend F. x F. 8" Gate Valve F. x F. 8" 90° Bend M.J. x F. 8" Pipe Precast F.M. Vault F.M. Vault Floor (Not Shown) Access Hatch (Not Shown)	



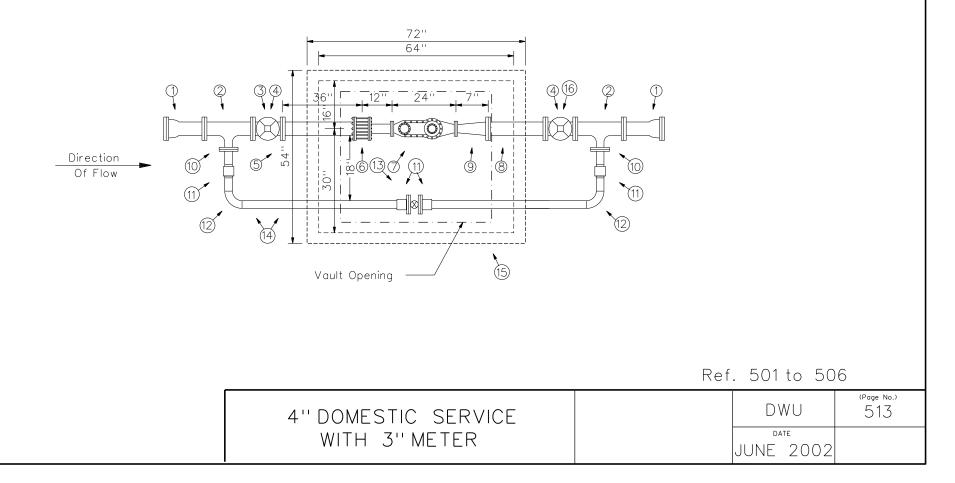
	Material List			Material List		
Part No. Qu	uantity	Description	Part No.	Quantity	Description	
1 2 3 4 5 6 7 8	2 Ea. 2 Ea. 2 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	10" x 8" Nipple M.J. x F. 10" x 8" Tee F. x F. 10" Gate Valve F. x F. Valve Stack Riser Cover & Lid 8" x 80" Pipe S. x S. 8" Flanged Coupling Adaptor 8" Meter As Specified (Type F.M. Shown) 8" x 4" Tee F. x F. (Test Point) 4" Gate Valve F. x F. (Test Point) 10" x 8" Reducer F. x M. J.	11 12 13 14 15 (6) 7 18	1 Ea. 2 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	8" x 12" Nipple F. x F. 8" x 36" Nipple F. x F. 8" 90° Bend F. x F. 8" Gate Valve F. x M.J. 8" 90° Bend M.J. x F. 8" Pipe Precast F.M. Vault F.M. Vault Floor (Not Shown) Access Hatch (Not Shown) 10" x 8" Reducer F. x F.	



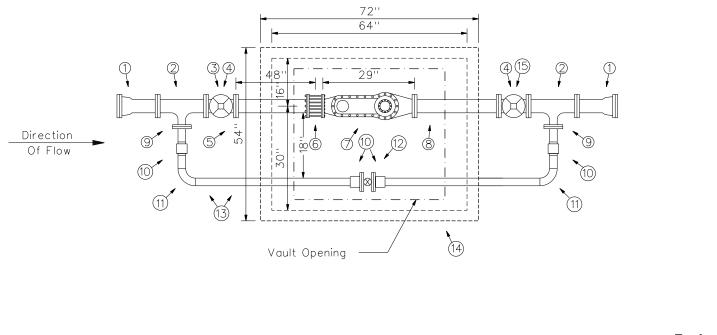
	Material List			Material List		
Part No.	Quantity	Description	Part No.	Quantity	Description	
() () () () () () () () () () () () () (2 Ea. 2 Ea. 2 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	 10" x 8" Nipple M.J. x F. 10" x 10" Tee F. x F. 10" Gate Valve F. x M.J. Valve Stack Riser Cover & Lid 10" x 100" Pipe S. x S. 10" Flanged Coupling Adaptor 10" U.L. Approved Strainer (For Turbine) 10" Meter As Specified (Type F.M. Shown) 10" x 4" Tee F. x F. (Test Point) 4" Gate Valve F. x F. (Test Point) 	(T)(T)(T)(T)(T)(T)(T)(T)(T)(T)(T)(T)(T)(1 Ea. 2 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	10" x 24" Nipple F. x F. 10" x 36" Nipple F. x F. 10" 90° Bend F. x F. 10" Gate Valve F. x F. 10" 90° Bend M.J. x F. 10" Pipe Precast F.M. Vault F.M. Vault Floor (Not Shown) Access Hatch (Not Shown)	



	MaterialList			MaterialList		
Part No.	Quantity	Description	Part No.	Quantity	Description	
() () () () () () () () () () () () () (2 Ea. 2 Ea. 1 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	4" x 8" Nipple M.J. x F. 4" x 2" Tee F. x F. 4" Gate Valve F. x M.J. Valve Stack Riser Cover & Lid 4" x 36" Pipe S. x S. 4" X 3" Reducing Flanged Coupling Adaptor 3" Meter As Specified (Type C.T. Shown) 4" x 24" Nipple F. x F. 4" x 3" Reducer F. x F.	(D)	2 Ea. 4 Ea. 2 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	2" Companion Flange 2" Comp X OSIP Adaptor 2" Comp 90 Deg. Ell 2" Ball Valve 2" Copper Pipe Precast D.C. Vault D.C. Vault Floor (Not Shown) Access Hatch (Not Shown) 4" Gate Valve F. x F.	



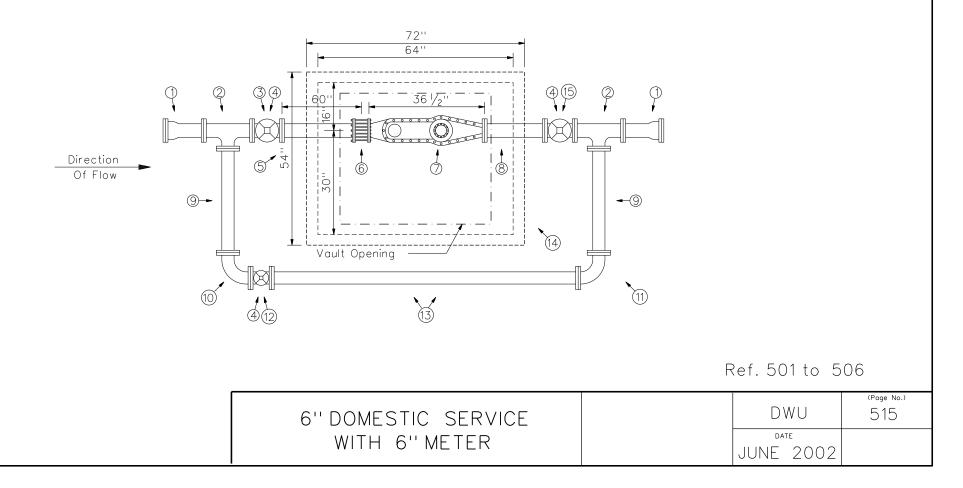
	Material List			Material List		
Part No.	Quantity	Description	Part No.	Quantity	Description	
() () () () () () () () () () () () () (2 Ea. 2 Ea. 1 Ea. 2 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	4" x 8" Nipple M.J. x F. 4" x 2" Tee F. x F. 4" Gate Valve F. x M.J. Valve Stack Riser Cover & Lid 4" x 36" Pipe S. x S. 4" Flanged Coupling Adapter 4" Meter As Specified (Type C.T. Shown) 4" x 36" Pipe F. x F.	9 (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	2 Ea. 4 Ea. 2 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	2" Companion Flange 2" Comp X OSIP Adaptor 2" Comp 90 Deg. Ell 2" Ball Valve 2" Copper Pipe Precast D.C. Vault D.C. Vault Floor (Not Shown) Access Hatch (Not Shown) 4" Gate Valve F. x F.	



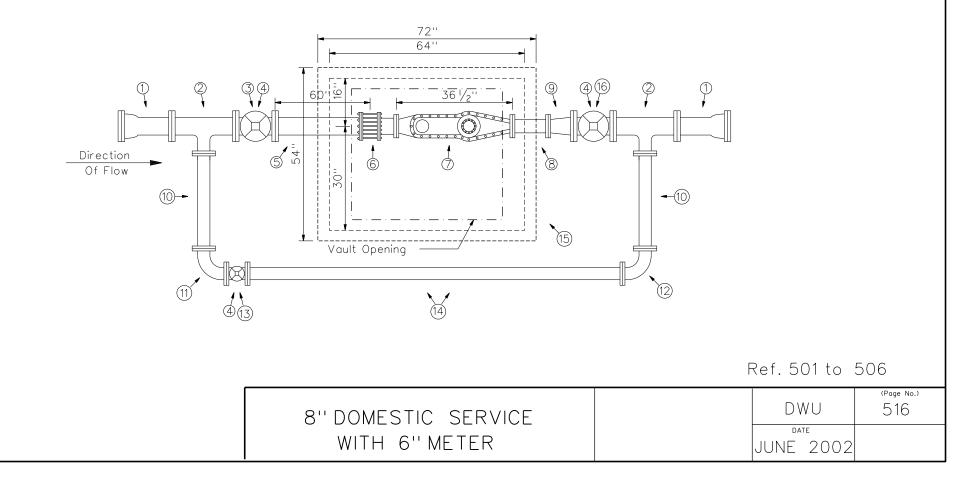
Ref. 501 to 506

4" DOMESTIC SERVICE	DWU	^(Page No.) 514
WITH 4" METER	JUNE 2002	

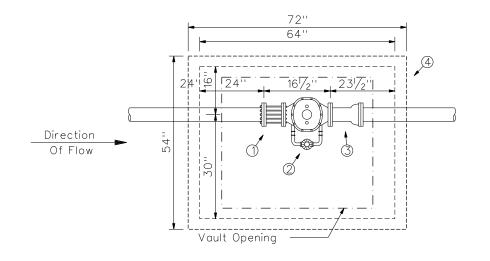
	Material List			MaterialList		
Part No.	Quantity	Description	Part No.	Quantity	Description	
() () () () () () () () () () () () () (2 Ea. 2 Ea. 1 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	6" x 8" Nipple M.J. x F. 6" x 4" Tee F. x F. 6" Gate Valve F. x M.J. Valve Stack Riser Cover & Lid 6" x 24" Pipe S. x S. 6" Flanged Coupling Adapter 6" Meter As Specified (Type C.T. Shown) 6" x 24" Pipe F. x F.		2 Ea. 1Ea. 1Ea. 1Ea. 1Ea. 1Ea. 1Ea. 1Ea.	4" x 36" Nipple F. x F. 4" 90 Deg. Bend F.x F. 4" 90 Deg. Bend M.J. x F. 4" Gate Valve F. x M.J. 4" Pipe Precast D.C. Vault D.C. Vault Floor (Not Shown) Access Hatch (Not Shown) 4" Gate Valve F. x F.	



	Material List			Material List			
Part No.	Quantity	Description	Part No.	Quantity	Description		
() () () () () () () () () () () () () (2 Ea. 2 Ea. 1 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	8" x 8" Nipple M.J. x F. 8" x 4" Tee F. x F. 8" Gate Valve F. x M.J. Valve Stack Riser Cover & Lid 8" x 24" Pipe S. x S. 8" x 6" Reducing Flanged Coupling Adaptor 6" Meter As Specified (Type C.T. Shown) 6" x 24" Pipe F. x F. 8" x 6" Reducer F. x F.	(D)	2 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	4" x 36" Nipple F. x F. 4" 90 Deg. Bend F.x F. 4" 90 Deg. Bend M.J. x F. 4" Gate Valve F. x M.J. 4" Pipe Precast D.C. Vault D.C. Vault Floor (Not Shown) Access Hatch (Not Shown) 8" Gate Valve F. x F.		



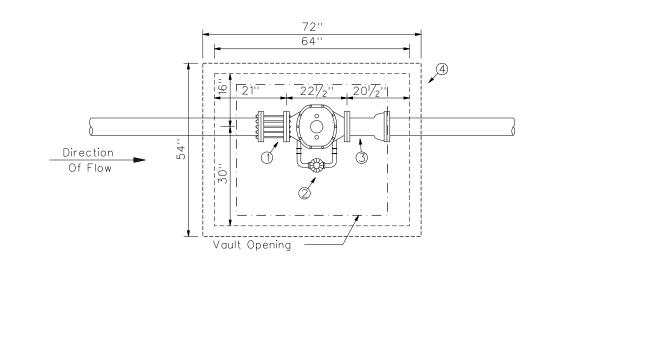
	Material List				
Part No.	Quantity	Description			
(1) (2) (3) (4)	1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	4" Flanged Coupling Adaptor 4" Detector Check Device W/ By-Pass Meter 4" × 8" Nipple M.J. × F. Precast D.C. Vault D.C. Vault Floor (Not Shown) Access Hatch (Not Shown)			



Ref. 501 to 506

4'' CLOSED	FIRELINE SERVICE	DWU	^(Page No.) 517
WITH 4" DETE	CTOR CHECK DEVICE	date JUNE 2002	

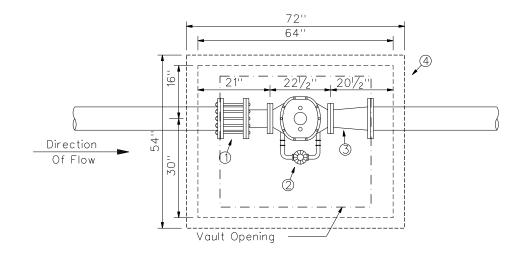
	Material List				
Part No.	Quantity	Description			
(1) (2) (3) (4)	1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	6" Flanged Coupling Adaptor 6"Detector Check Device W/ By-Pass Meter 6" x 8" Nipple M.J. x F. Precast D.C. Vault D.C. Vault Floor (Not Shown) Access Hatch (Not Shown)			



Ref. 501 to 506

6" CLOSED FIRELINE SERVICE		DWU	(Poge No.) 518
WITH 6" DETECTOR CHECK DEVICE	JUN	NE 2002	

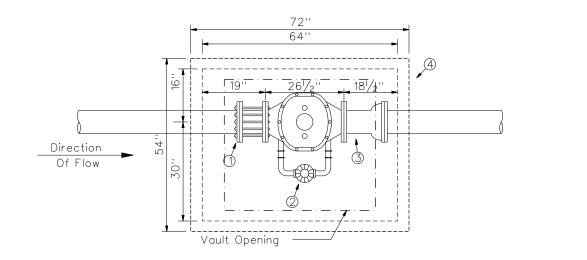
	MaterialList				
Part No.	Quantity	Description			
(1) (2) (3) (4)	1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	8" X 6" Flanged Coupling Adaptor 6"Detector Check Device W/ By-Pass Meter 8" X 6" Reducer M.J. X F. Precast D.C. Vault D.C. Vault Floor (Not Shown) Access Hatch (Not Shown)			



Ref. 501 to 506

8" CLOSED FIRELINE SERVICE	DWU	(Page No.) 519
WITH 6" DETECTOR CHECK DEVICE	june 2002	

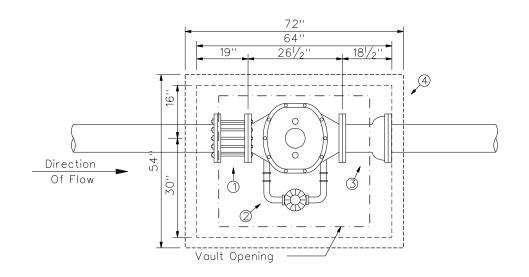
	Material List				
Part No.	Quantity	Description			
(1) ② ③ ④	1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	8'' Flanged Coupling Adaptor 8'' Detector Check Device W/ By-Pass Meter 8'' X 8'' Nipple M.J. X F. Precast D.C. Vault D.C. Vault Floor (Not Shown) Access Hatch (Not Shown)			



Ref. 501 to 506

8" CLOSED FIRELINE SERVICE	DWU	^(Page No.) 520
WITH 8" DETECTOR CHECK DEVICE	JUNE 2002	

	MaterialList				
Part No.	Quantity	Description			
(1) (2) (3) (4)	1 E a. 1 E a. 1 E a. 1 E a. 1 E a. 1 E a.	10'' Flanged Coupling Adaptor 10'' Detector Check Device W/ By-Pass Meter 10'' X 8'' Nipple M.J. X F. Precast D.C. Vault D.C. Vault Floor (Not Shown) Access Hatch (Not Shown)			



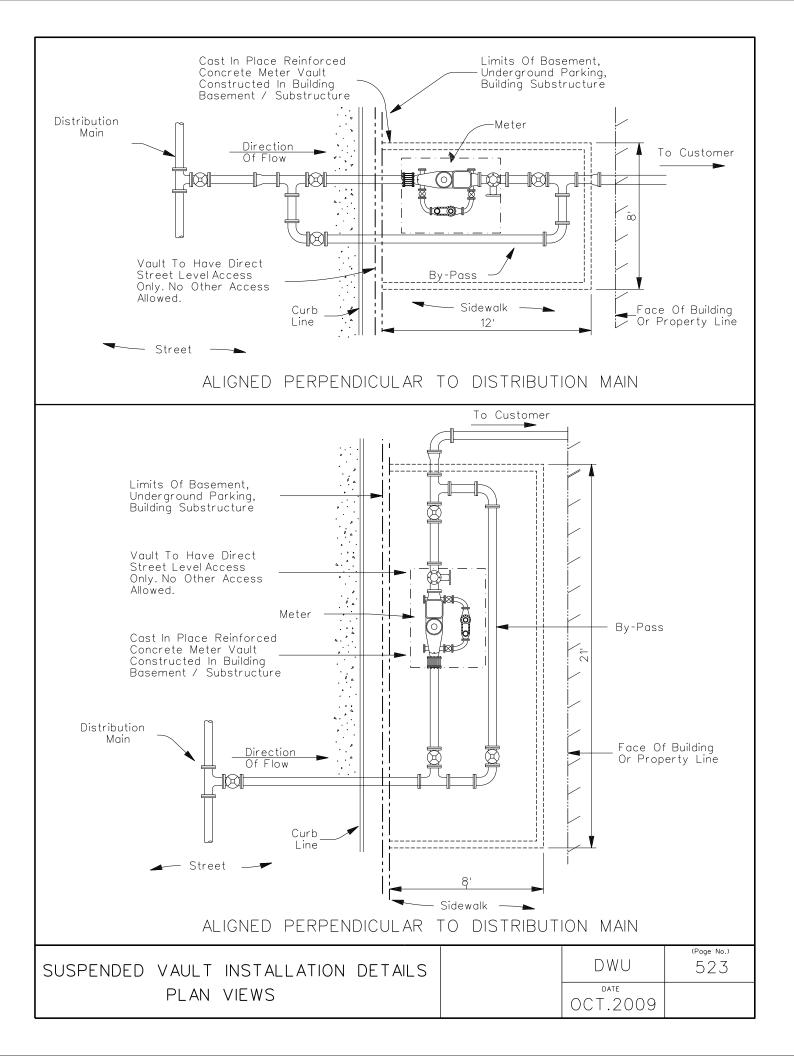
Ref. 501 to 506

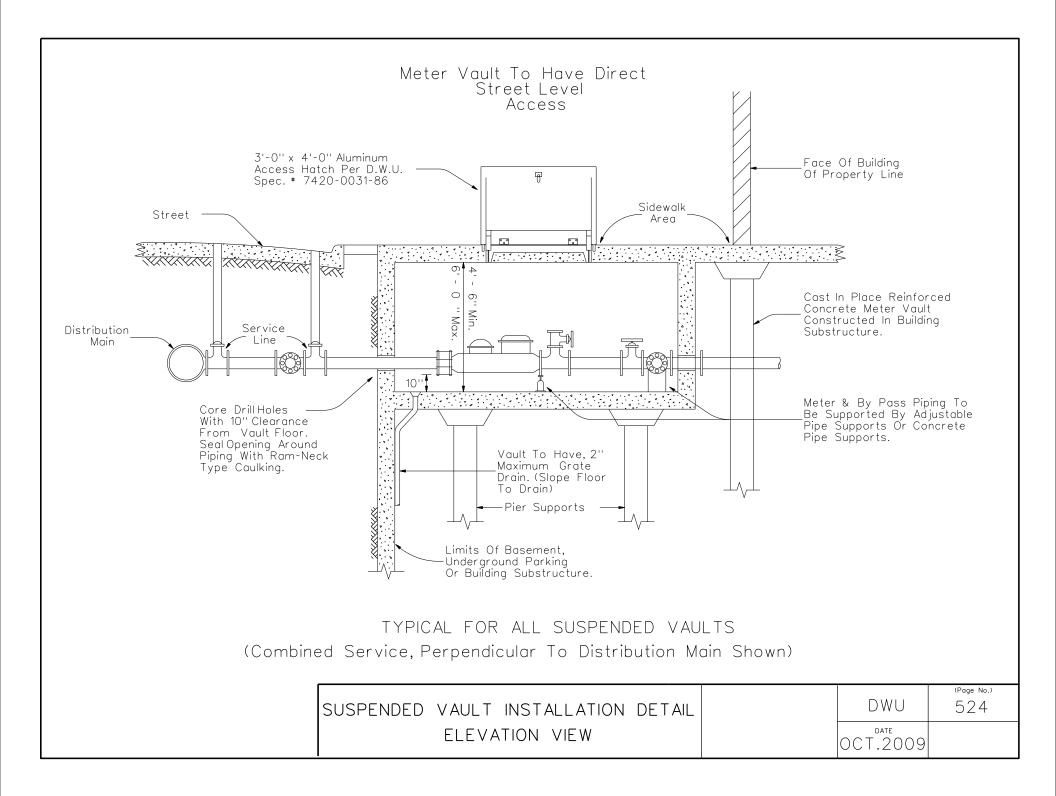
10" CLOSED FIRELINE SERVICE	DWU	^(Page No.) 521
WITH 10" DETECTOR CHECK DEVICE	JUNE 2002	

<u>GENERAL DESCRIPTIONS AND NOTES</u> FOR SUSPENDED VAULT INSTALLATION

- 1.) Suspended Vault Installation refers to the design and construction methods required to install a large water service within the basement or substructure of a building. This design and construction method is occasionally required in the Central Business District or in other commercial areas where the basements or substructure of the buildings extend into the right-of-way creating conditions that are too congested for conventional vault construction. The suspended vault installation method is compatible with all large water services.
- 2.) The design of the cast-in-place reinforced concrete vault piping configuration and vault support system for the suspended vault installation is to be performed and sealed by a registered Professional Engineer at the expense of the Contractor or Developer. All plans are to be approved by Dallas Water Utilities.
- 3.) Refer to "General Notes" Page No. 506 for additional information on large water service installations.

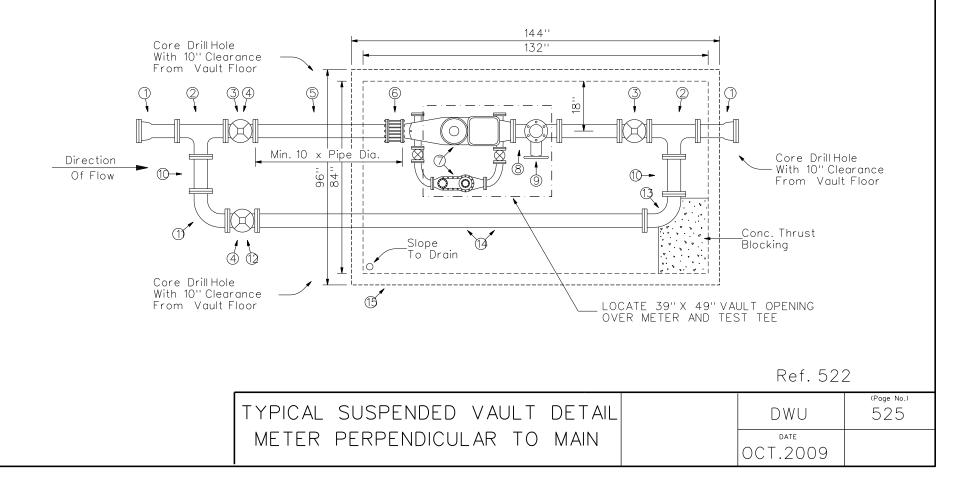
SUSPENDED VAULT INSTALLATION DETAIL	DWU	(Page No.) 522
DESCRIPTION AND GENERAL NOTES	OCT.2009	





	MaterialList			Material List		
Part No.	Quantity	Description	Part No.	Quantity	Description	
() (2) (3) (4) (5) (6) (7) (8)	2 Ea. 2 Ea. 2 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	 ?" x 12" C.I. Nipple M.J. x F. ?" x ?" C.I. Tee F. x F. ?" Gate Valve F. x F. Valve Stack Riser Cover & Lid ?" x ?" C.I. Nipple F. x S. ?" Flanged Coupling Adaptor ?" Meter As Specified (Type F.M. Shown) ?" x 4" C.I. Tee F. x F. (Test Point) 		1 Ea. 3 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea. 1 Ea.	4" Gate Valve F. x F. (Test Point) 4" x 24" C.I. Nipple F. x F. ?" C.I. 90° Bend F. x F. ?" Gate Valve F. x M.J. ?" C.I. 90° Bend M.J. x F. ?" D.I. Pipe, Class 52, Approx. 10' Cast In Place Concrete Vault Access Hatch (Not Shown)	

?" = Size As Specified



Material List			Material List		
Part No.	Quantity	Description	Part No.	Quantity	Description
1	2 Ea.	?" x 12" C.I. Nipple M.J. x F.	9	1 Ea.	?" x 24" C.I. Nipple F. x F.
2	2 Ea.	?"x 6"C.I. Tee F. x F.	10	3 Ea.	?" C.I. 90° Bend F. x F.
3	2 Ea.	?"Gate Valve F.x F.		1 Ea.	?"Gate Valve F. x M.J.
4	3 Ea.	?'' x ?'' C.I. Nipple F. x S.	12	1 Ea.	?"C.I. 90° Bend M.J. x F.
5	1 E a.	?'' Flanged Coupling Adaptor	13	1 E a.	?" D.I. Pipe, Class 52, Approx. 10
6	1 Ea.	?" Meter As Specified (Type F.M. Shown)	14	1 Ea.	Cast In Place Concrete Vault
\bigcirc	1 E a.	?" x 4" C.I. Tee F. x F. (Test Point)		1 Ea.	Access Hatch (Not Shown)
8	1 E a.	4" Gate Valve F. x F. (Test Point)			

?" = Size As Specified

Direction Core Drill Hole With 10'' Clearance From Vault Floor Of Flow 252" 240'' Varies 4 Ŷ 18'' Min. -10-10-Ξ _1_ Min. 10 x Pipe Dia. Core Drill Hole With 10'' Clearance Conc. 96'' 84'' Thrust -9 9-From Vault Floor Blocking 10 12 Conc. Thrust Blocking Slope 🔪 To Drain ÌÍ.Í 14 LOCATE 39" X 49" VAULT OPENING OVER METER AND TEST TEE Ref. 522 (Page No.) DWU 526 TYPICAL SUSPENDED VAULT DETAIL METER PARALLEL TO MAIN DATE OCT.2009