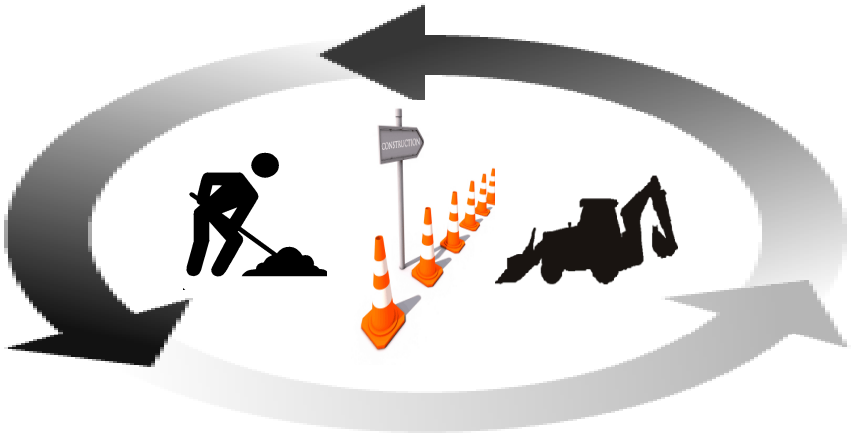
dallas water utilities
city of dallas

STANDARD DRAWINGS FOR WATER & WASTEWATER CONSTRUCTION



October 2012

PREFACE

The intent of this manual is to provide guidelines for the standard appurtenances of water and wastewater mains owned and operated by Dallas Water Utilities (DWU). This manual replaces the third edition of "Standard Drawings for Water and Wastewater Construction" by DWU dated February, 2009. The chronological list of events in developing this manual is summarized as follows:

JAN, 1984 FIRST EDITION: Standard drawings are compiled into the first edition of the manual.

MAY, 1998 SECOND EDITION: The 1984 manual is revised and retitled. This edition includes revisions made in 1985, 1986, 1989 and 1991.

FEB. 2009 THIRD EDITION: The 1998 manual is revised to accommodate new construction standards required by 30 TAC §217. This edition includes minor revisions made in 2003.

OCT. 2010 FOURTH EDITION: The 2009 manual is revised to accommodate new construction standards required by Public Works Construction Standards for North Central Texas by North Central Council of Governments (NCTCOG), October 2004. This edition includes minor revisions made in 2009 and 2010.

OCTOBER 2011: The 2011 manual includes minor revisions made in 2011. Henceforth, this edition and all subsequent editions will be designated by the year of publication.

OCTOBER 2012: The 2012 manual includes three new AMI Standard Drawings, a Project Construction Sign Technical Specifications, two new Flush Point drawings, and several revisions of some of the existing Standard Drawings.

This edition of "Standard Drawings for Water and Wastewater Construction" is written by Engineering Services, Dallas Water Utilities. Any questions or suggestions regarding to this manual should be forwarded to Engineering Services, Dallas Water Utilities.

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PART 1 - COMMON FOR WATER & WASTEWATER CONSTRUCTION

By Other Than Open Cut (Non-T.x.D.O.T. - Non Railroad)	---	101
Highway Crossing - All Wastewater Mains & for Water Mains 12" and Under in Diameter.	---	102
Highway Crossing - For Water Mains Over 12" Diameter	---	103
Highway Crossing - Encasement Pipe, Gauge, Class, & Cover (12” to 72” Dia.)	---	104
Highway Crossing - Encasement Pipe, Gauge, Class, & Cover (78” to 138” Dia.)	---	105
Highway Crossing - T.x.D.O.T. Requirements (1of 2)	---	106
Highway Crossing - T.x.D.O.T. Requirements (2of 2)	---	107
Tunnel Approaches--With Casing Spacers	---	108
Carrier Pipe Support--Tunnel	---	109
Hold - Down - Jack Fabrication Detail	---	109A
Embedment Detail for Non-Pressure Rated Wastewater Mains Below Water Mains	---	110
Encasement Detail for Non-Pressure Rated Wastewater Mains Above Water Mains	---	111
Encasement Detail for Proposed Water Mains Below Wastewater Mains	---	111A
Trench Width -- Calculations For “Bd”	---	112
Embedment--Class "A" and Class "A-1"	---	113
Embedment--Class "B", Class "B+", and Class "B-1"	---	114
Embedment--Class "B-2", Class "B-3", and Class "B-4"	---	115
Embedment--Class "C", Class "C+", and Class "C-1"	---	116
Embedment--Class "C-2" and Class "D+"	---	117
Embedment--Class "G" and Class "G-1"	---	118
Embedment--Class "B-1a", Class "B-2a", and Class "B-5"	---	119
Contaminated Soil Clay Cut-Off Dam	---	119A
Embedment--Class "E-1” & “E-2” Landfill	---	119B
Embedment--Class "E3” High Chemical of Concern Zone	---	119C
Stabilized Backfill & Rip-Rap Detail For Embankment Slope Protection	---	120
Type “A” Utility Support	---	121
Project Construction Sign Technical Specifications	---	122

PART 2 - WATER MAIN CONSTRUCTION

3/4" Water Service Installations (Sidewalk Adjacent to Curb)	---	201
1" Water Service Installations (Sidewalk Adjacent to Curb)	---	202
1 ½" or 2" Water Service Installations (Sidewalk Adjacent to Curb)	---	203
3/4" Water Service Installations (Sidewalk 5' from Curb)	---	204
1" Water Service Installations (Sidewalk 5' from Curb)	---	205
1 ½" or 2" Water Service Installations (Sidewalk 5' from Curb)	---	206
Bull Head Water Services	---	206A
Installation Requirements For AMI Meter	---	206B
AMI Meter Installation Details For 2” Or Smaller Meters	---	206C

AMI Meter Installation Details For 3” And Larger Meters	---	206D
Manual Flush Point Installation	---	207
Automatic Flush Point	---	207A
Automatic Flush Point Location	---	207B
Temporary Flush Point With Sample Point Installation	---	207C
Air Release Valve--Type 1	---	208
Air Release Valve--Type 2 (Elevation)	---	209
Air Release Valve--Type 2 (Details)	---	210
General Notes--Type 2 Air Valve	---	211
Horizontal Gate Valve With Manhole Installation (Plan)	---	212
Horizontal Gate Valve With Manhole Installation (Elevation)	---	213
Butterfly Valve With Manhole Installation (Plan)	---	214
Butterfly Valve With Manhole Installation (Elevation)	---	215
Large Main Blow-Off	---	215A
General Notes For Large Valves With Manholes	---	216
Large Tapping Valve Installation	--	217
Operating Nut Riser (For Large Valve Installations)	---	218
4" to 16" Gate Valve Abandonment	---	219
4" to 16" Gate Valve Cover, Stack, & Stem Installation	---	219A
Pitot Outlet	---	220
Standard 40" Manhole Frame and Cover (Water)	---	221
Standard 32" Manhole Frame and Cover (Water)	---	222
Mortar Protection and Insulation Kit for Flange Joints	---	223
Methods for Setting Fire Hydrants	---	224
Standard Water Main Lowering	---	225
Pipe-to-Soil Potential Test Station (Post Mounted)	---	226
Pipe-to-Soil Potential Test Station (Buried Configuration)	---	227
Detail of Test Conductor Connection to Pipe	---	228
Horizontal Thrust Block Diagram	---	229
Horizontal Thrust Block Dimensions & Quantities For 11 ¼ & 22 ½ Degree Bends	---	230
Horizontal Thrust Block Dimensions & Quantities For 30 to 90 Degree Bends	---	231
Horizontal Thrust Block at Tees and Plugs	---	232
Vertical Thrust Block at Pipe Bend	---	233
Thrust Block General Notes	---	234
Embedment Types - Specified For Water Mains	---	235
Steel Guard Post Detail	---	236
Guard Post Protection For Fire Hydrants	---	237
Guard Post Protection For Water Meters	---	238

PART 3 - WASTEWATER MAIN CONSTRUCTION

Wastewater Manhole--Precast	---	301
General Notes For Wastewater Manholes	---	302
Wastewater Manhole--Cast-in-Place	---	303
Wastewater Manhole--Pressure Type	---	304
Wastewater Manhole--Fiberglass	---	305
Wastewater Manhole--Vented	---	306
Wastewater Manhole--Outside Drop Connections	---	307
Wastewater Manhole--Inside Drop Connections	---	308
Wastewater Manhole--Invert Intersection Details	---	309
Wastewater Manhole--Invert Bench Details	---	309A
Manhole Pipe Connector--For Cast-in-Place Manholes	---	310
Wastewater Manhole--False Bottom	---	311
32" Standard Cast Iron Manhole Frame and Cover	---	312
24" Standard Cast Iron Manhole Frame and Cover (Not For New Construction)	---	312A
32" Pressure Type Cast Iron Manhole Frame and Cover	---	313
24" Pressure Type Cast Iron Manhole Frame and Cover (Not For New Construction)	---	313A
40" Pressure Type Cast Iron Manhole Frame and Cover	---	314
40" Standard Cast Iron Manhole Frame and Cover	---	315
Abandonment of Manhole In or Out of Pavement	---	316
Wastewater Main Cleanout	---	317
Cast-Iron Clean Out Casting For Wastewater Mainline	---	318
Wastewater Laterals With	---	319
Wastewater Lateral Wye Connection to the Existing Mainline	---	320
Wastewater Lateral Cleanout Frame and Cover	---	321
Wastewater Lateral Connections in Earth and in Rock	---	322
Laterals Types	---	323
Lateral Application Schedule	---	324
Deep-Cut Connection	---	325
Wastewater Lateral Stubout in Advance of Paving	---	326
Wastewater Manhole with Internal Chimney Seal	---	327
Wastewater Access Device	---	328
Wastewater Sample Site – Concrete Platform Detail	---	329
Single PRV Assembly	---	239
Dual PRV Assembly (Option 1)	---	240
Dual PRV Assembly (Option 2)	---	241
PRV Vault Elevation & Sectional Plan	---	242
PRV Details	---	243
PRV General Notes	---	244

PRV General Notes	---	245
Single PRV Assembly	---	239

PART 4 - WATER AND WASTEWATER ADJUSTMENTS

Alter & 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

PART 5 - LARGE WATER SERVICE INSTALLATIONS

Large Water Services (4" and Larger) Descriptions and Typical Uses	---	501
Large Service Installation Details and Plan Views	---	502
Minimum Easement Sizes for Meter Installation	---	502A
Large Service Installation Detail--Elevation View	---	503
Large Service Installation Details--Precast Vaults (F.M. & D.C. Type)	---	504
Large Service Installation Details--Precast Vaults (10” or Larger Meter Size)	---	505
Large Service Installation Details--General Notes	---	506
4" Combined Service with 4" Meter	---	507
6"Combined Service with 6" Meter	---	508
8" Combined Service with 6" Meter	---	509

8" Combined Service with 8" Meter	---	510
10" Combined Service with 8" Meter	---	511
10" Combined Service with 10" Meter	---	512
4" Domestic Service with 3" Meter	---	513
4" Domestic Service with 4" Meter	---	514
6" Domestic Service with 6" Meter	---	515
8" Domestic Service with 6" Meter	---	516
4" Closed Fireline Service with 4" Detector Check Device	---	517
6" Closed Fireline Service with 6" Detector Check Device	---	518
8" Closed Fireline Service with 6" Detector Check Device	---	519
8" Closed Fireline Service with 8" Detector Check Device	---	520
10" Closed Fireline Service with 10" Detector Check Device	---	521
Suspended Vault Installation Detail Description And General Notes	---	522
Suspended Vault Installation Details--Plan View	---	523
Suspended Vault Installation Details--Elevation View	---	524
Typical Suspended Vault Detail - Meter Perpendicular to Main	---	525
Typical Suspended Vault Detail - Meter Parallel to Main	---	526

PART 1
COMMON FOR WATER & WASTEWATER CONSTRUCTION

TITLE		Pg.
By Other Than Open Cut (Non-T.x.D.O.T. - Non Railroad)	---	101
Highway Crossing - All Wastewater Mains & for Water Mains 12" and Under in Diameter.	---	102
Highway Crossing - For Water Mains Over 12" Diameter	---	103
Highway Crossing - Encasement Pipe, Gauge, Class, & Cover (12” to 72” Dia.)	---	104
Highway Crossing - Encasement Pipe, Gauge, Class, & Cover (78” to 138” Dia.)	---	105
Highway Crossing - T.x.D.O.T. Requirements (1of 2)	---	106
Highway Crossing - T.x.D.O.T. Requirements (2of 2)	---	107
Tunnel Approaches--With Casing Spacers	---	108
Carrier Pipe Support--Tunnel	---	109
Hold - Down - Jack Fabrication Detail	---	109A
Embedment Detail for Non-Pressure Rated Wastewater Mains Below Water Mains	---	110
Encasement Detail for Non-Pressure Rated Wastewater Mains Above Water Mains	---	111
Encasement Detail for Proposed Water Mains Below Wastewater Mains	---	111A
Trench Width -- Calculations For “Bd”	---	112
Embedment--Class "A" and Class "A-1"	---	113
Embedment--Class "B", Class "B+", and Class "B-1"	---	114
Embedment--Class "B-2", Class "B-3", and Class "B-4"	---	115
Embedment--Class "C", Class "C+", and Class "C-1"	---	116
Embedment--Class "C-2" and Class "D+"	---	117
Embedment--Class "G" and Class "G-1"	---	118
Embedment--Class "B-1a", Class "B-2a", and Class "B-5"	---	119
Contaminated Soil Clay Cut-Off Dam	---	119A
Embedment--Class "E-1” & “E-2” Landfill	---	119B
Embedment--Class "E3” High Chemical of Concern Zone	---	119C
Stabilized Backfill & Rip-Rap Detail For Embankment Slope Protection	---	120
Type “A” Utility Support	---	121
Project Construction Sign Technical Specifications	---	122

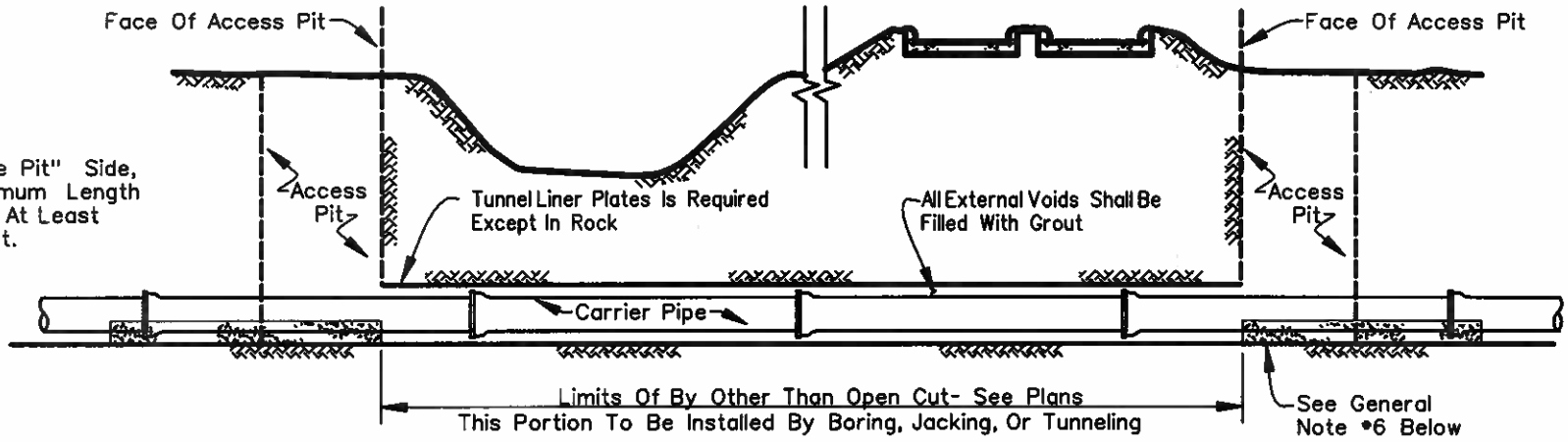
PART 1

(Series 100)

COMMON FOR WATER & WASTEWATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department

BY OTHER THAN OPEN CUT-FOR WATER MAINS & WASTEWATER MAINS
(NON Tx.D.O.T. - NON RAILROAD)



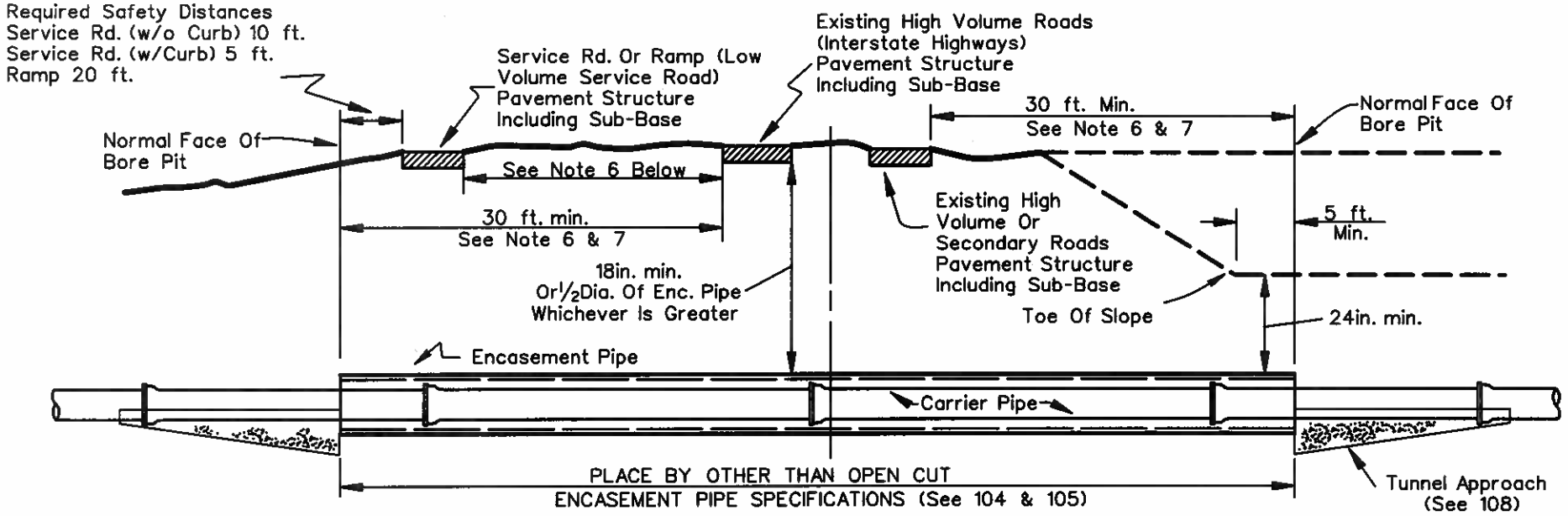
GENERAL NOTES

1. By Other Than Open Cut Construction Methods Are To Conform NCTCOG Specifications Item 503.3 Methods Of Jacking, Boring, Or Tunneling & 2010 City of Dallas Addendum To NCTCOG Specs. (Unless Otherwise Noted)
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/Tunnel Liner (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 Will 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 Tunneling
2010 DWU Addendum 503.3.3.1. - General

BY OTHER THAN OPEN CUT (Non-Tx.D.O.T. & Non-Railroad)		DWU	(Page No.) 101
		DATE OCT. 2011	

TYPICAL FOR HIGHWAY CROSSING FOR ALL WASTEWATER MAINS & FOR WATER MAINS 12 in. & UNDER IN DIAMETER



GENERAL NOTES

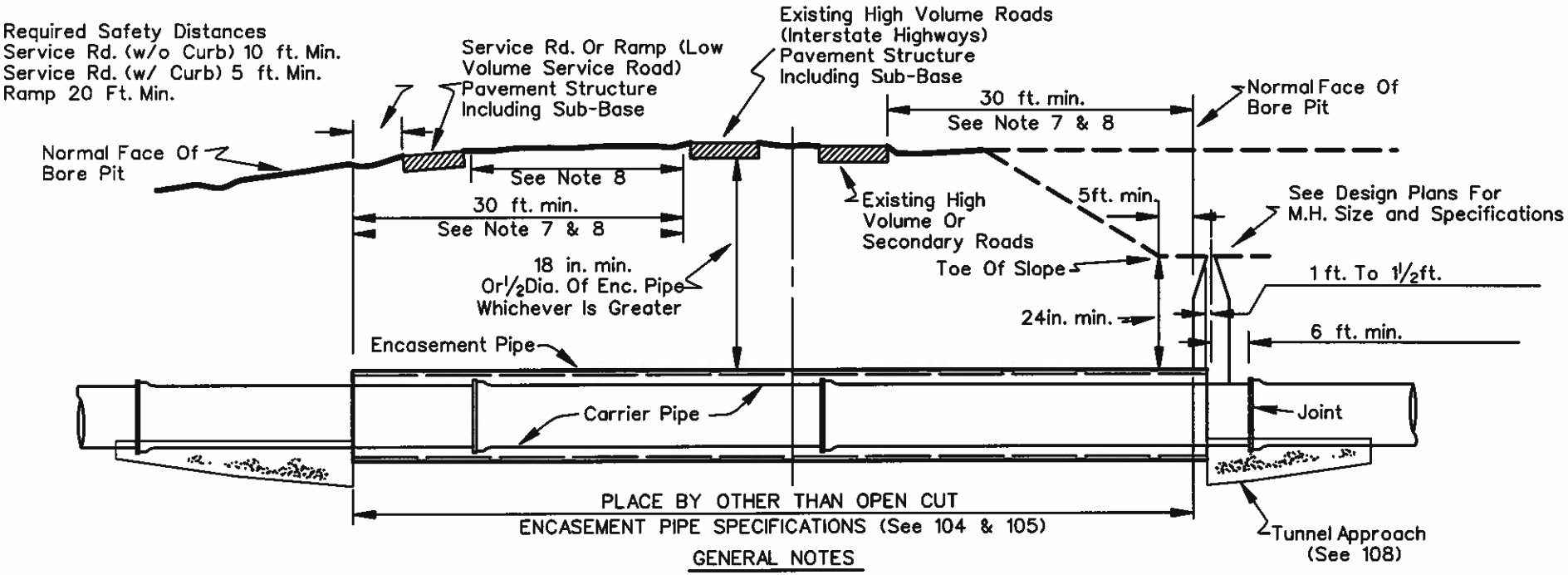
1. Carrier Pipe To Be Made Up Outside The Encasement Pipe And Pushed Through With The Bell Of The Pipe Resting On The Encasement Pipe Or A Class "B" Concrete Cradle Where Applicable.
2. Carrier Pipe Shall Be Supported On A Continuous Class "B" Concrete Cradle, Within Corrugated Metal And Flange Liner 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.
9. In Tunnel Sections, Voids Between Encasement Pipe And Carrier Pipe Shall Be Filled With 1:7 Grout Including 5%-40% Air Entrainment By Pressure Injection.

NCTCOG Spec: 509.2 - State Highway Crossing
NCTCOG Spec:702.2.4 - Quality Of Concrete

REFER TO PAGES: 103 104 105 106 107 108 109

HIGHWAY CROSSING FOR ALL WASTEWATER MAINS & FOR WATER MAINS 12" & UNDER IN DIAMETER.		DWU	(Page No.) 102
		DATE OCT. 2011	

TYPICAL FOR HIGHWAY CROSSING FOR WATER MAINS OVER 12in. (30.5cm.) DIAMETER



GENERAL NOTES

1. There Shall Be A Minimum Of Two Hold-Down Jacks or Pipe Spacers Per Carrier Pipe Joint, See 109. Additionally, Grout Shall Be Applied To All Voids Between The Carrier Pipe And Encasement Pipe.
2. In Tunnel Sections, Voids Between Earth Or Rock & Enc. Pipe Shall Be Filled With 1:7 Grout Including 5% Air Entrainment By Pressure Injection.
3. Carrier Pipe Shall Be Supported On A Continuous Class "B" Concrete Cradle, Within Corrugated Metal And Flange Liner Encasements.
4. Construct Tapered Concrete Tunnel Approach At Each End Of Enc. Pipe. See Detail On 108.
5. 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.
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 Greater Than 15 Inches (I.D.), The Submittal Must Be Sealed By A Professional Engineer Registered Within The State Of Texas.
9. In Tunnel Sections, Voids Between Encasement Pipe And Carrier Pipe Shall Be Filled With 1:7 Grout Including 5%-40% Air Entrainment By Pressure Injection.

REFER TO PAGES:
102, 104, 105, 106, 107, 108 & 109

NCTCOG Spec: 509.2 - State Highway Crossing
NCTCOG Spec: 702.2.4 - Quality Of Concrete

HIGHWAY CROSSING FOR WATER MAINS OVER 12" DIAMETER		DWU	(Page No.) 103
		DATE OCT. 2011	

ENC. PIPE I.D.	2 FLNG. LINER H-20-L.L.		4 FLNG. LINER H-20-L.L.		CORRUGATED METAL		COUPLING BAND		R.C. CULVERT PIPE					STEEL PIPE	
	Gauge	Max. Cov.	Gauge	Max. Cov.	Gauge	Max. Cov.	Min. Width	Gauge	Class	Wall	For Open-Cut Maximum Cover Ft. (M) Embedment			Wall Thick.	Max. Cov.
in.	Ga.	Ft.	Ga.	Ft.	Ga.	Ft.	In.	Ga.			Class "C"	Class "B"	Class "A"	In.	Ft.
12"	NOT AVAILABLE		NOT AVAILABLE		NOT ALLOWED IN TXDOT DISTRICT 18 OR CITY OF DALLAS		NOT ALLOWED IN TXDOT DISTRICT 18 OR CITY OF DALLAS				NOT ALLOWED IN TXDOT DISTRICT 18 OR CITY OF DALLAS			3/16"	∞
15"														1/4"	∞
18"														1/4"	∞
21"														5/16"	∞
24"														3/8"	∞
27"														7/16"	∞
30"														7/16"	∞
36"														1/2"	∞
42"														1/2"	∞
48"	14	∞	12	∞											
54"	14	∞	12	∞											
60"	14	∞	12	∞											
66"	14	∞	12	∞											
72"	14	∞	12	∞											
	ALT. "B"													ALT. "D"	

NOTE:
∞ Infinity

HIGHWAY CROSSING ENCASEMENT PIPE, GAUGE, CLASS, COVER

DWU

(Page No.) 104

DATE OCT. 2009

ENC. PIPE I.D.	2 FLNG. LINER H-20-L.L.		4 FLNG. LINER H-20-L.L.		CORRUGATED METAL		COUPLING BAND		R.C. CULVERT PIPE					STEEL PIPE	
	Gauge	Max. Cov.	Gauge	Max. Cov.	Gauge	Max. Cov.	Min. Width	Gauge	Class	Wall	For Open-Cut Maximum Cover Ft. (M) Embedment			Wall Thick.	Max. Cov.
in.	Ga.	Ft.	Ga.	Ft.	Ga.	Ft.	In.	Ga.			Class "C"	Class "B"	Class "A"	In.	Ft.
78"	12	∞	12	∞	NOT ALLOWED IN TX.D.O.T. DISTRICT 18 OR CITY OF DALLAS		NOT ALLOWED IN TX.D.O.T. DISTRICT 18 OR CITY OF DALLAS				NOT ALLOWED IN TX.D.O.T. DISTRICT 18 OR CITY OF DALLAS				
84"	12	∞	12	∞											
90"	10	∞	10	∞											
96"	10	∞	10	∞											
102"	10	∞	10	∞											
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'											
	ALT. "B"													ALT. "D"	

NOTE:
∞ Infinity

HIGHWAY CROSSING ENCASEMENT PIPE, GAUGE, CLASS, COVER

DWU

(Page No.) 105

DATE OCT. 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

STATE HIGHWAY CROSSINGS
Continued

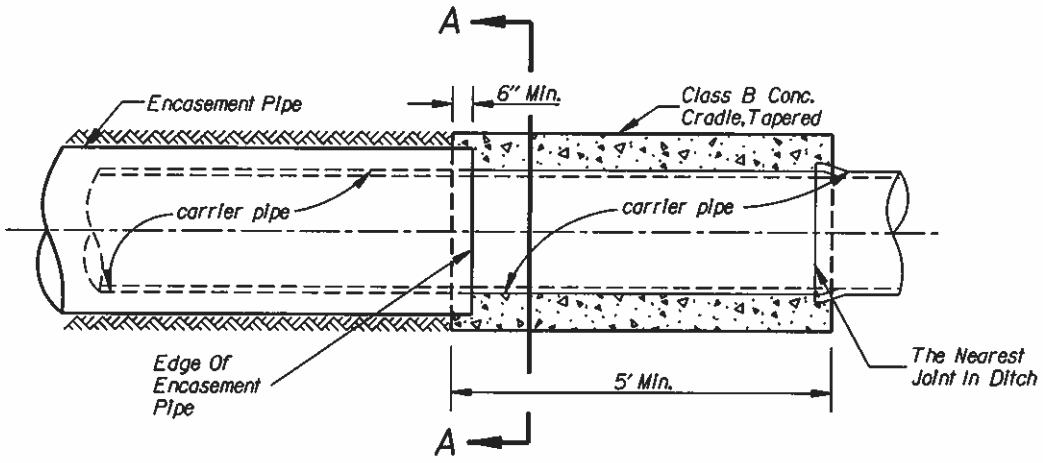
Depth of Cover

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.

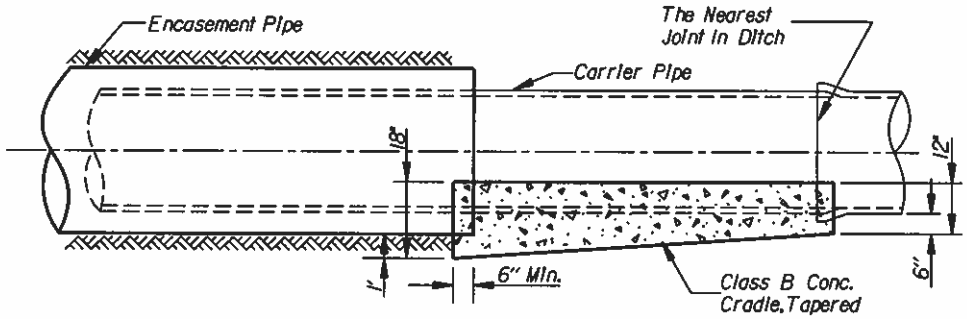
Open Cutting Of Pavement

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".

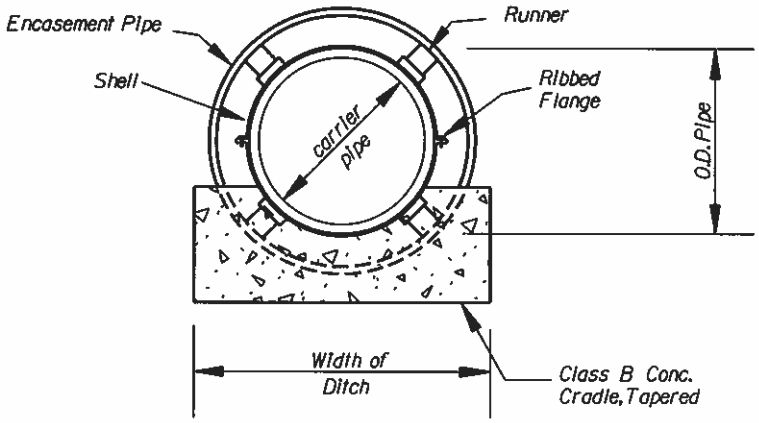
See 102, 103, 104, 105, 106



PLAN VIEW

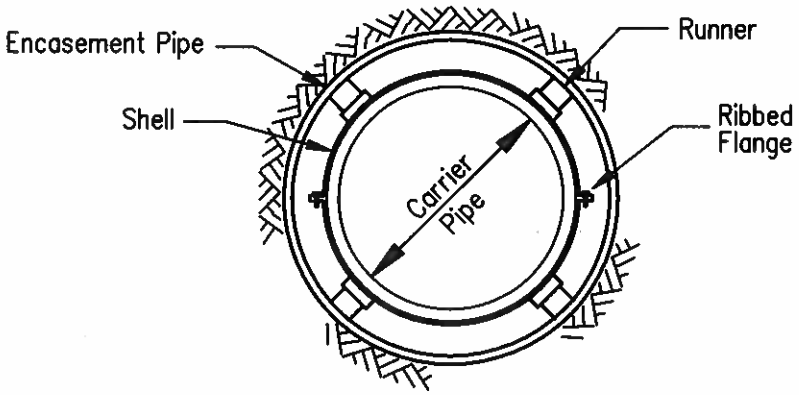


PROFILE VIEW

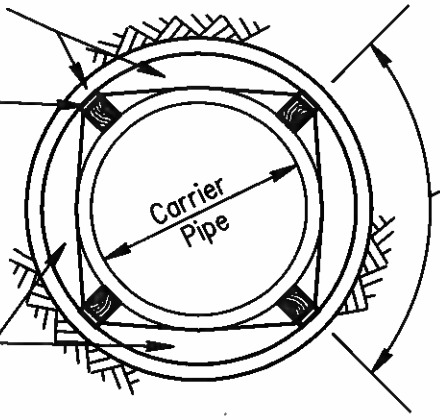


SECTION A-A

TUNNEL APPROACHES WITH CASING SPACERS		DWU	(PAGE No.) 108
		DATE OCT. 2009	



CASING SPACERS



Wooden Skids Strapped To Carrier Pipe With Steel Straps or Heavy Wire

Notch Skids To Facilitate Strapping Operation And To Prevent Strap Or Wire Movement

Skids To Run Length Of Pipe (With Exception Of Bell And Spigot Areas)

Fill All Voids Between Carrier Pipe And Encasement Pipe With Grout.

Evenly Space Skids

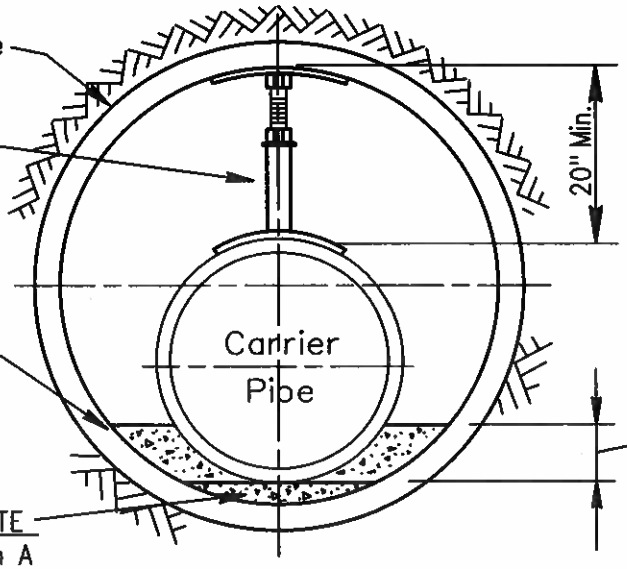
4 Skids For 12" Or Less Carrier Pipes

6 Skids For Carrier Pipes Larger Than 12"

Skids Shall Be Evenly Spaced Around Carrier Pipe

Skids Shall Be Trimmed And Shimmed As Necessary To Maintain Grade On Wastewater Mains.

WOODEN SKIDS



Hold-Down-Jacks Minimum 2 Per Pipe Joint (See Fabrication Detail Pg.109A)

FOR STEEL ENCASEMENT PIPE

Carrier Pipe Is to Rest On Bottom Of Encasement Pipe

Concrete Cradle

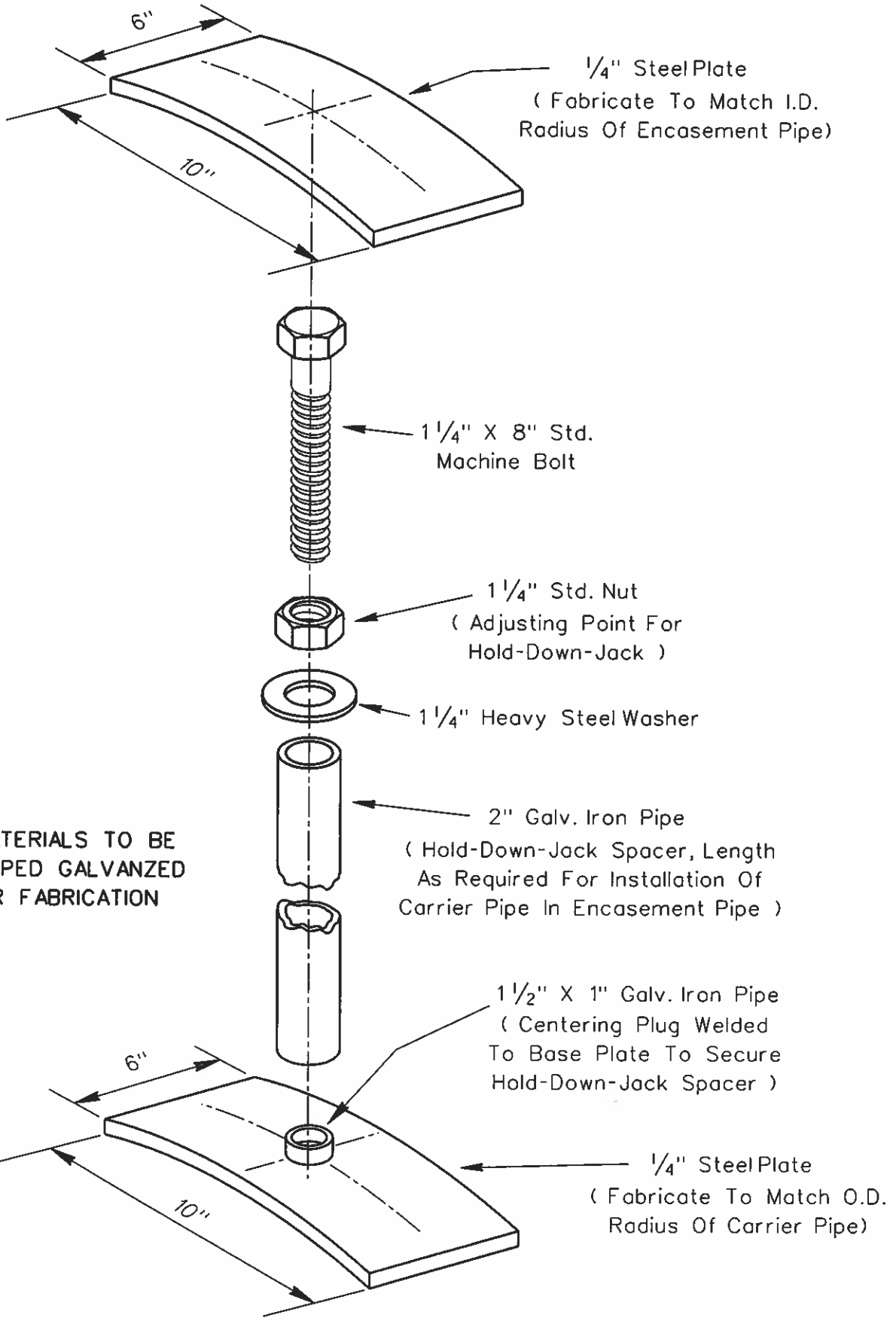
FOR FLANGED LINER PLATE

Carrier Pipe Is To Rest On A 6" Thick Concrete Pad.

HOLD-DOWN-JACK

Hold-Down-Jacks To Be Used On Water Mains ONLY

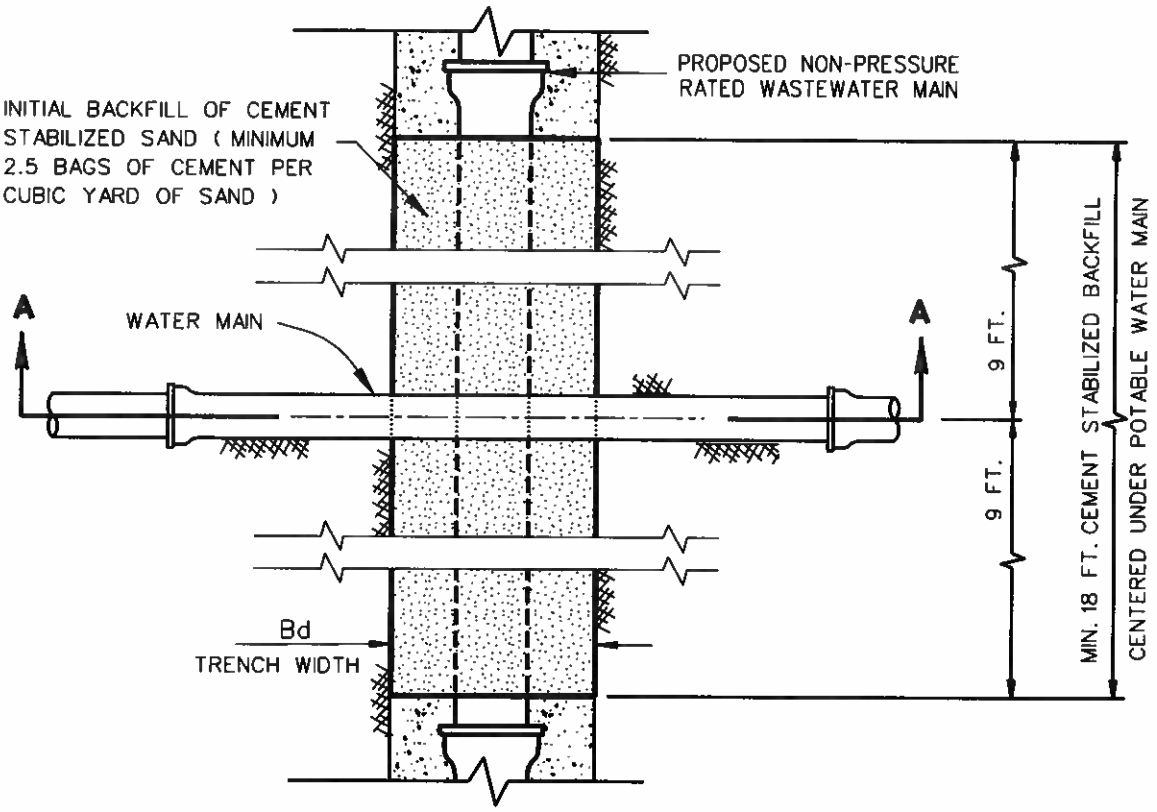
CARRIER PIPE SUPPORT (TUNNEL)		DWU	(PAGE No.) 109
		DATE OCT. 2011	



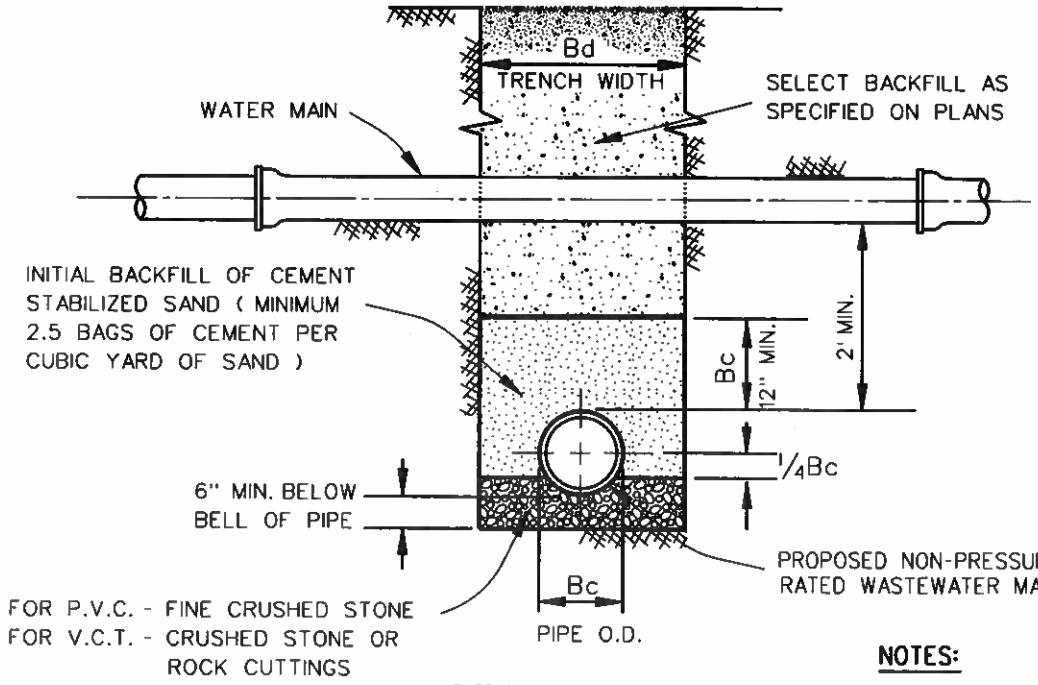
ALL MATERIALS TO BE
HOT DIPPED GALVANZED
AFTER FABRICATION

HOLD-DOWN-JACK FABRICATION DETAIL

DWU		(PAGE No.) 109A
DATE DEC.2001		



SECTIONAL PLAN VIEW

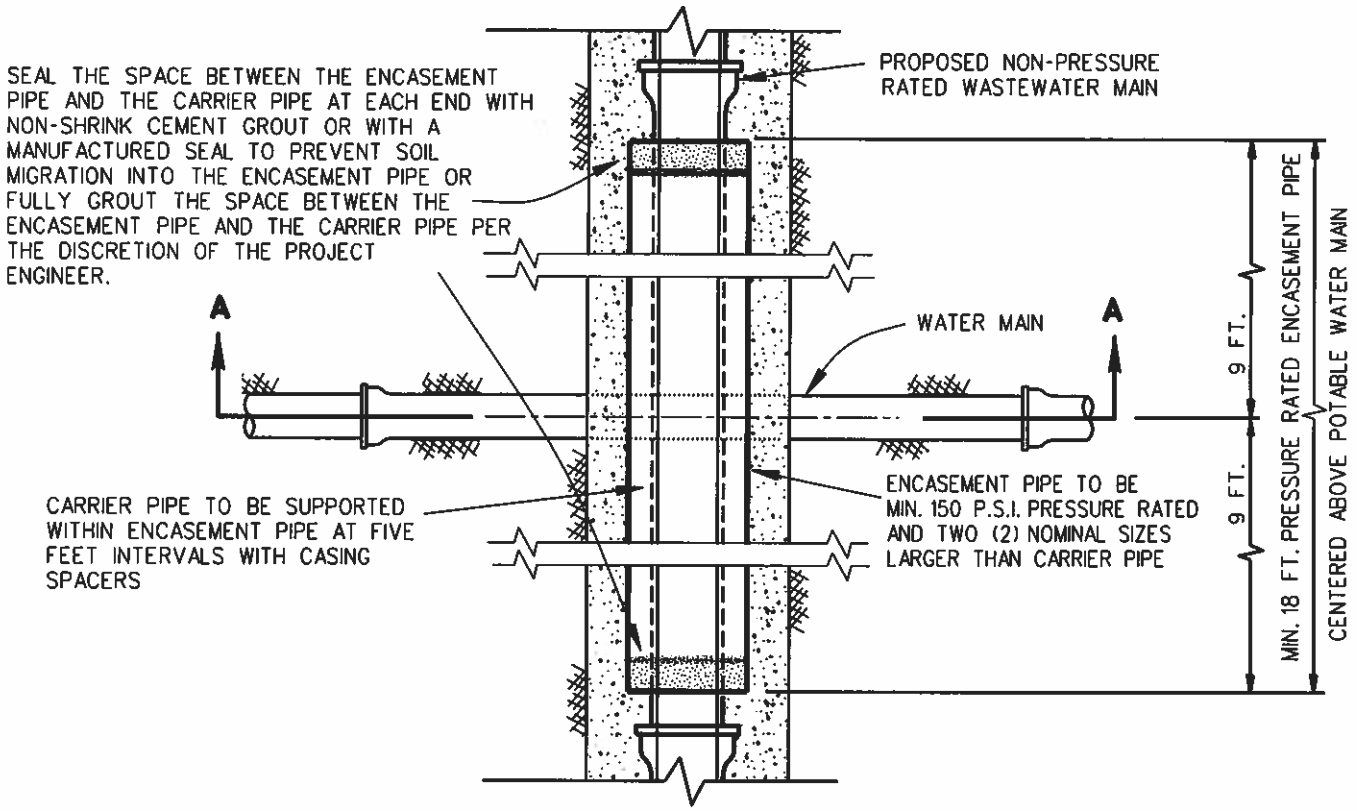


SECTION A-A

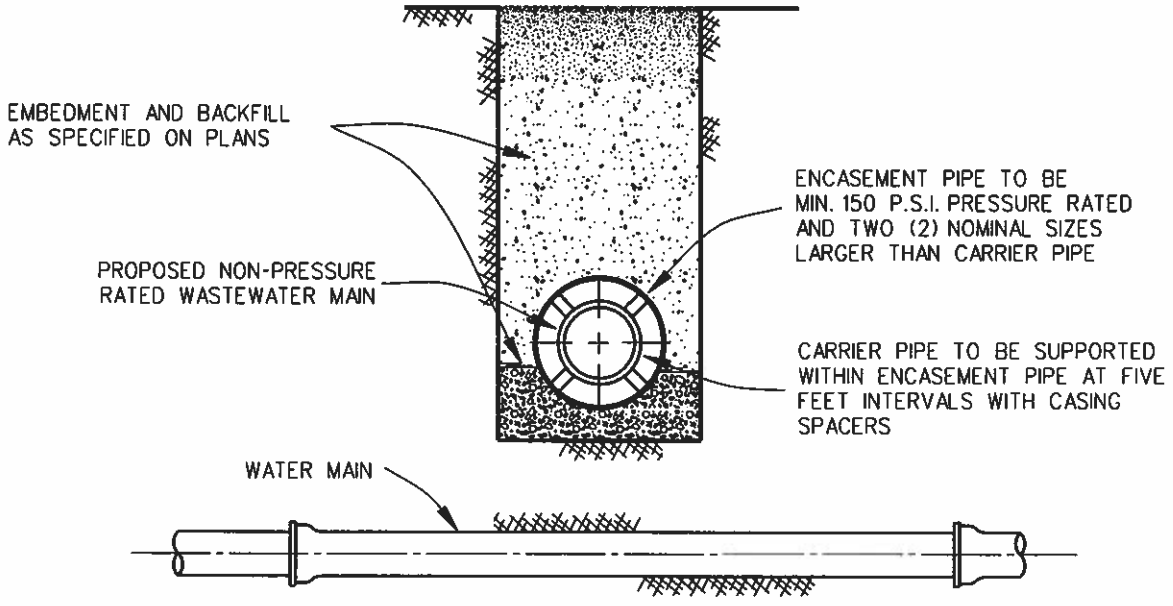
NOTES:

1. Bc = Outside Diameter Of Pipe
2. Bd = Trench Width (See Pg.112 for Calculation Of "Bd")

EMBEDMENT DETAIL FOR NON-PRESSURE RATED WASTEWATER MAINS BELOW WATER MAINS		DWU	(PAGE No.) 110
		DATE OCT. 2009	

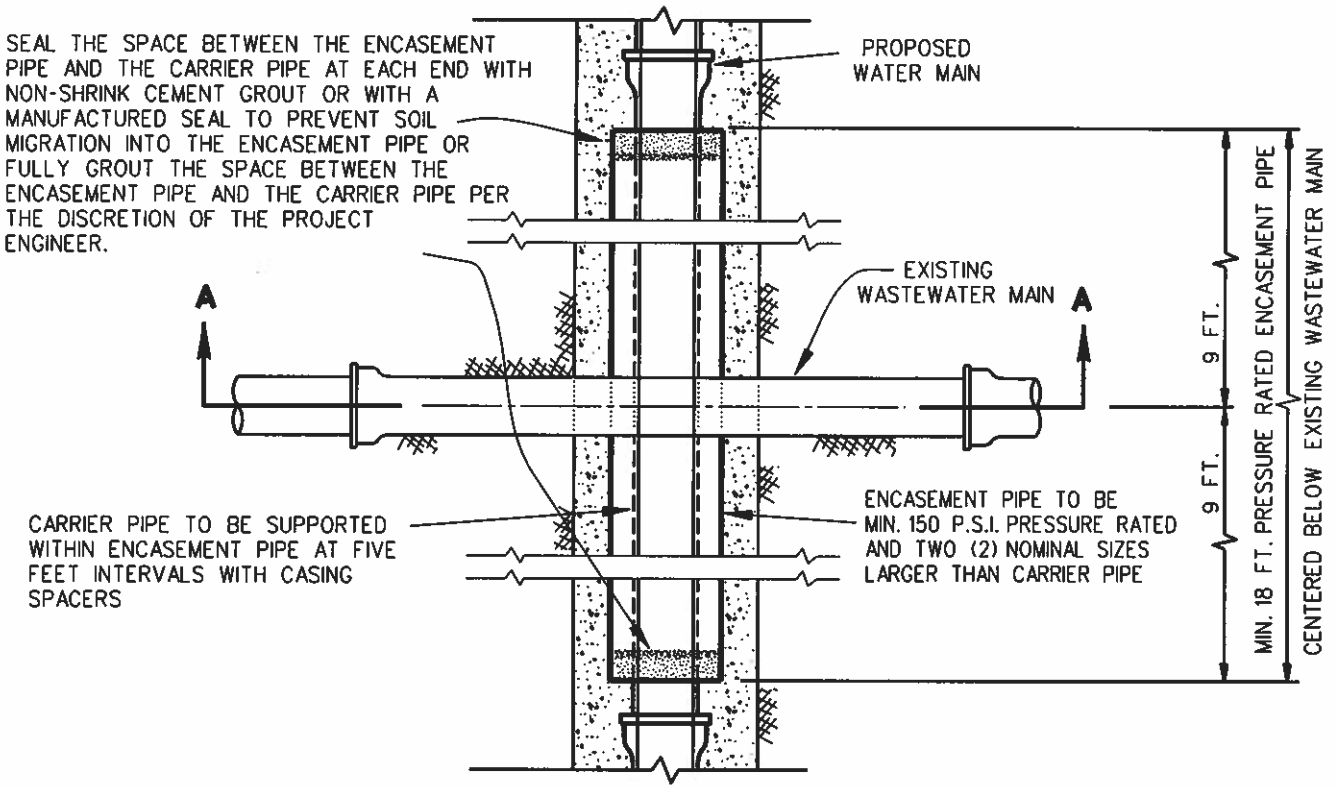


SECTIONAL PLAN VIEW

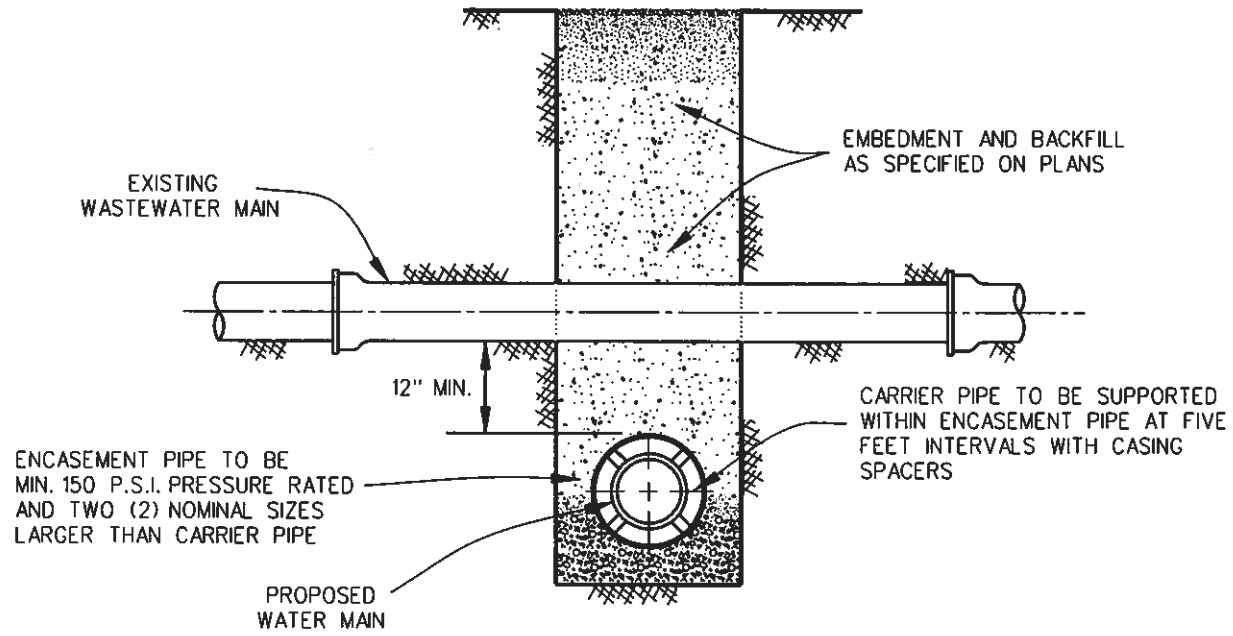


SECTION A-A

ENCASEMENT DETAIL FOR NON-PRESSURE RATED WASTEWATER MAINS ABOVE WATER MAINS		DWU	(Page No.) 111
		DATE OCT. 2009	



SECTIONAL PLAN VIEW



SECTION A-A

ENCASEMENT DETAIL FOR PROPOSED WATER MAINS BELOW WASTEWATER MAINS		DWU	(Page No.) 111A
		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

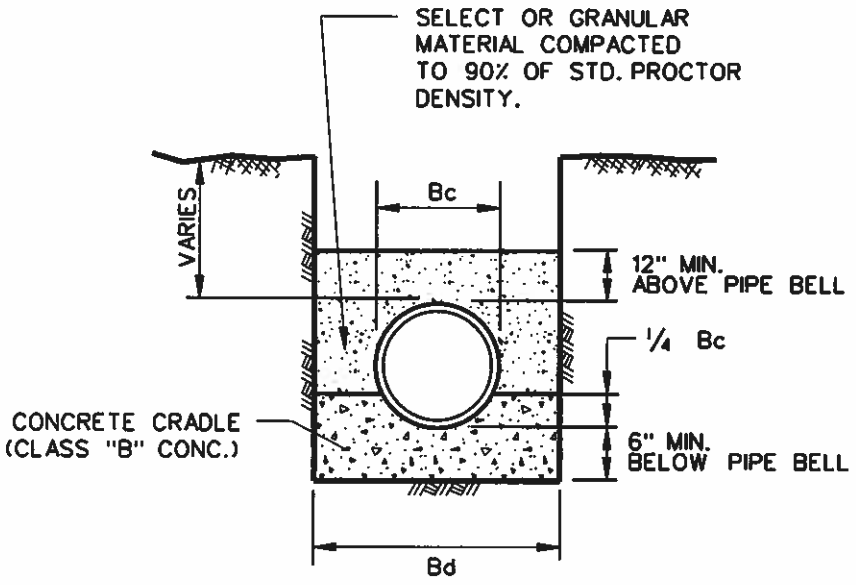
For Pipe Diameters Greater Than 24" to 72" :

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

For Pipe Diameters Greater Than 72" :

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

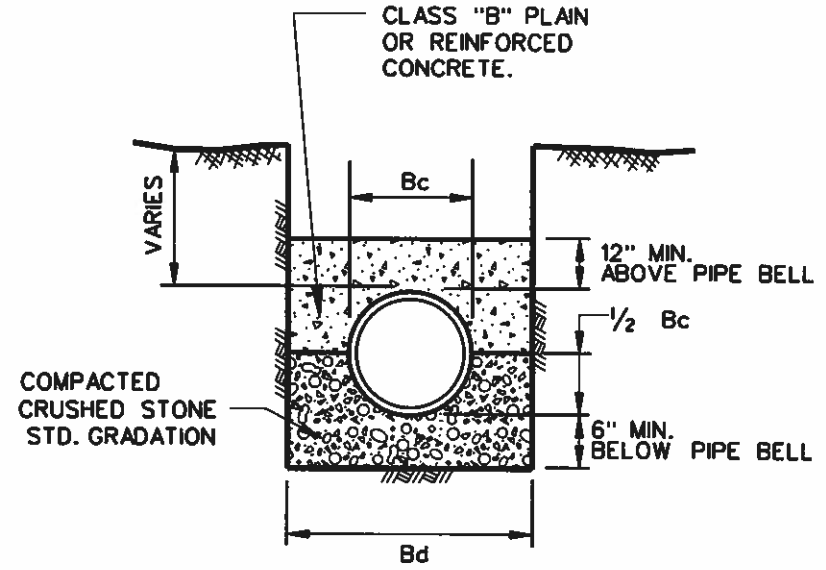
(REFER TO PAGES 113 THRU 119 FOR USAGE OF "Bd")



CLASS "A"

CLASS "B" CONCRETE CRADLE
PLAIN CONC. LF 2.8
REINF. CONC. LF 3.4 P=0.4%

N.T.S.



CLASS "A-1"

CLASS "B" CONCRETE CAP
PLAIN CONC. LF 2.8
REINF. CONC. LF 3.4 P=0.4%
REINF. CONC. LF 4.8 P=1.0%

N.T.S.

NOTES:

1. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
2. FREE-FALL OF CONCRETE NOT TO EXCEED 5 FT. MAXIMUM.
3. P = Rho FOR STEEL %
4. Bc = OUTSIDE DIAMETER OF PIPE
5. Bd = TRENCH WIDTH
6. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

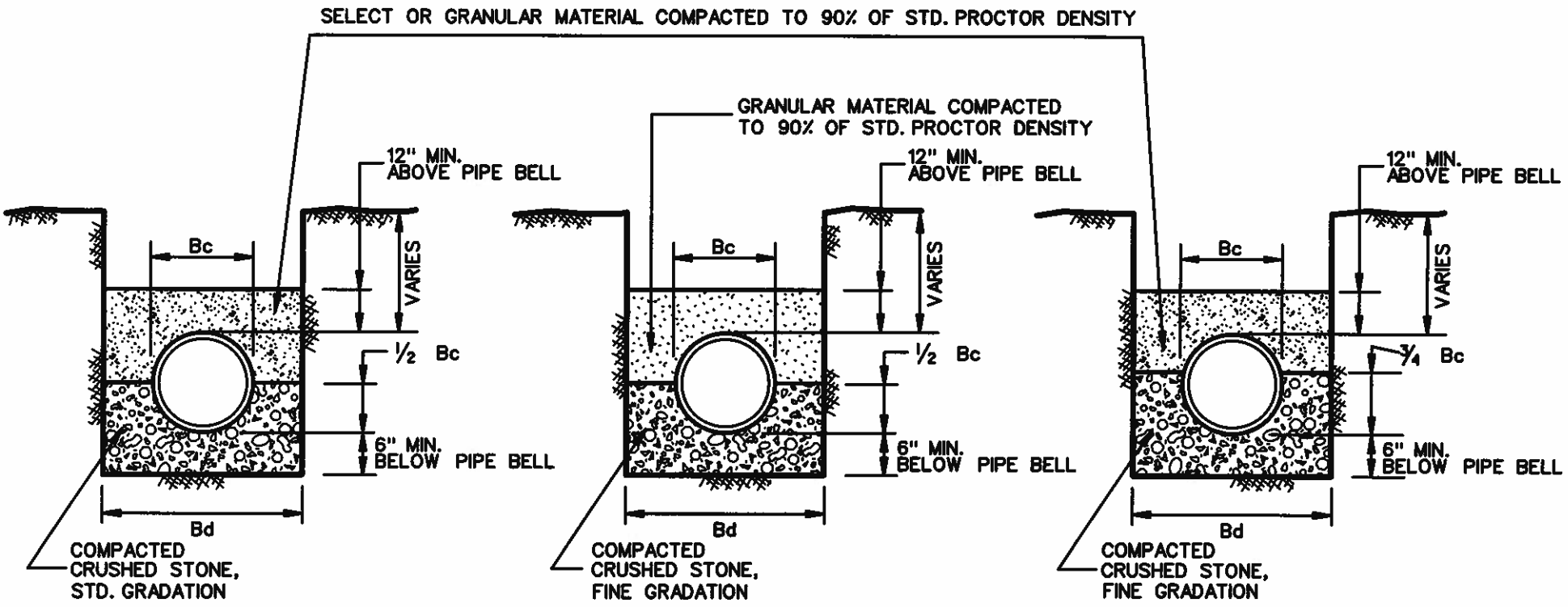
(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "A" & "A-1"

DWU

DATE
JAN. 2010

(PAGE NO.)
113



CLASS "B"

N.T.S.

L.F. = 1.9
E' = 700

CLASS "B+"

N.T.S.

BEDDING ANGLE 150°
L.F. = 1.9
E' = 700

CLASS "B-1"

N.T.S.

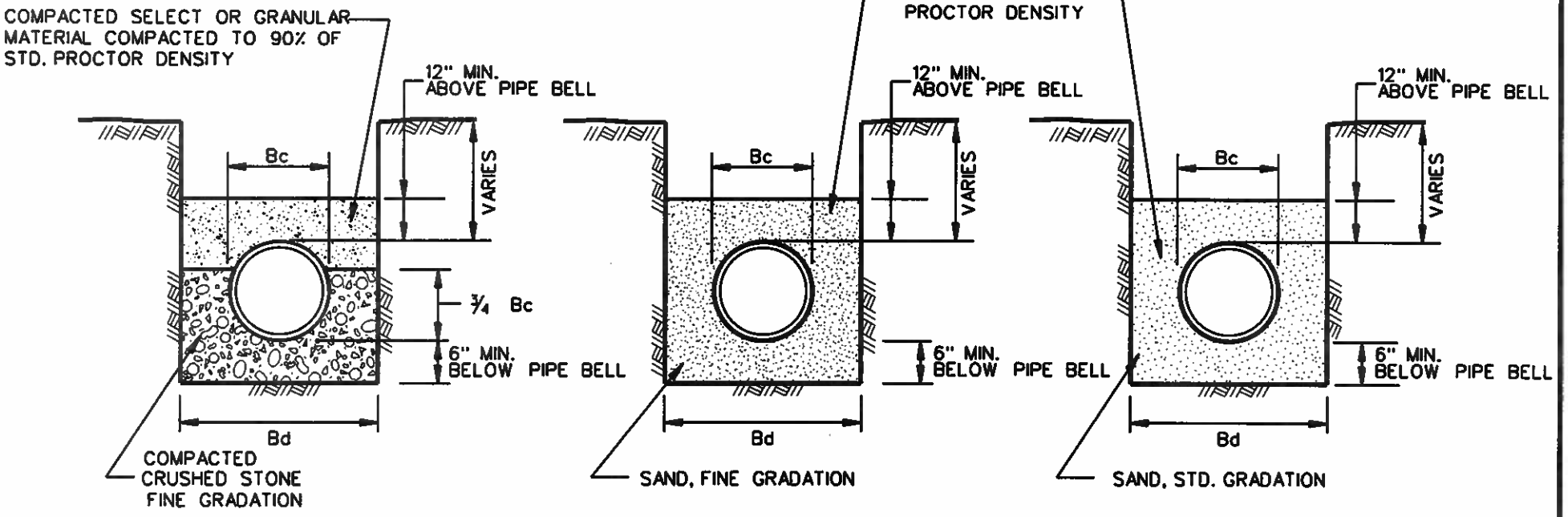
NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
4. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "B", "B+", & "B-1"

		DWU	(PAGE NO.) 114
		DATE OCT. 2011	



CLASS "B-2"

N.T.S.

CLASS "B-3"

N.T.S.

CLASS "B-4"

N.T.S.

NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

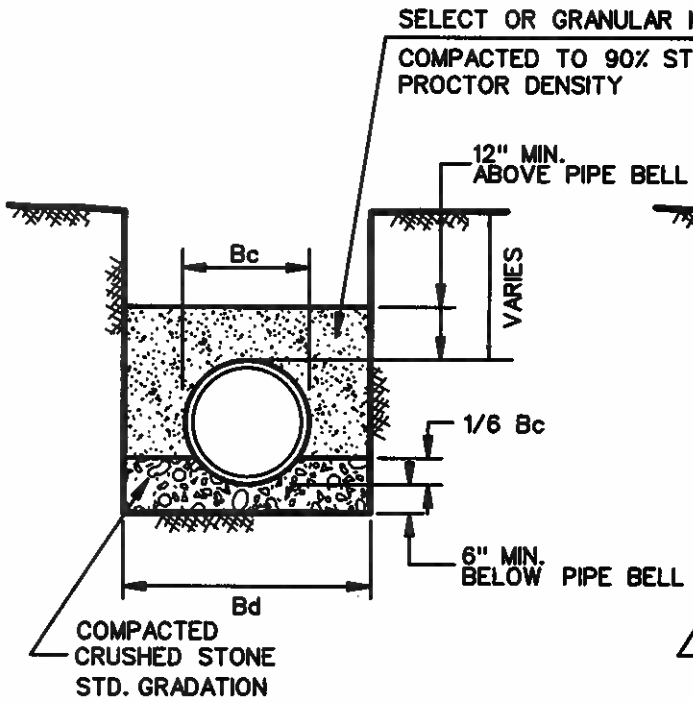
(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "B-2","B-3", & "B-4"

DWU

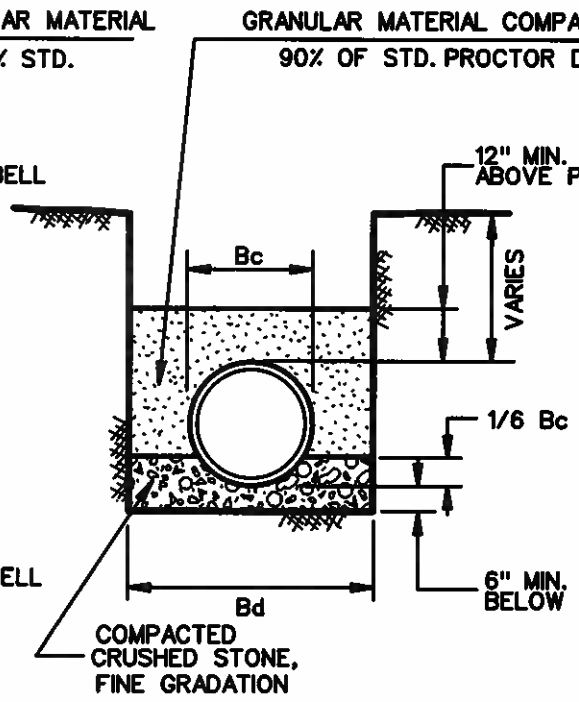
(PAGE NO.) 115

DATE JAN. 2010



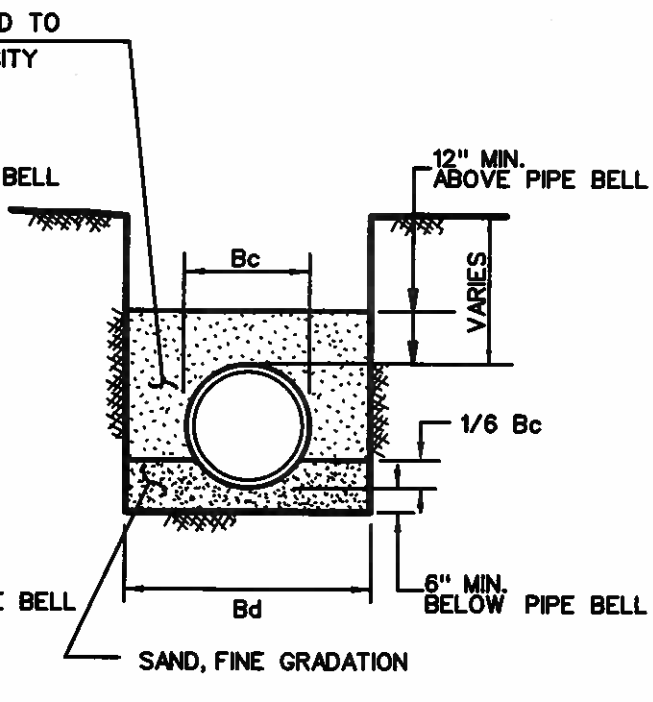
CLASS "C"

N.T.S.
BEDDING ANGLE 75°
L.F. = 1.5
E' = 300



CLASS "C+"

N.T.S.
BEDDING ANGLE 75°
L.F. = 1.5
E' = 300



CLASS "C-1"

N.T.S.

NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
4. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

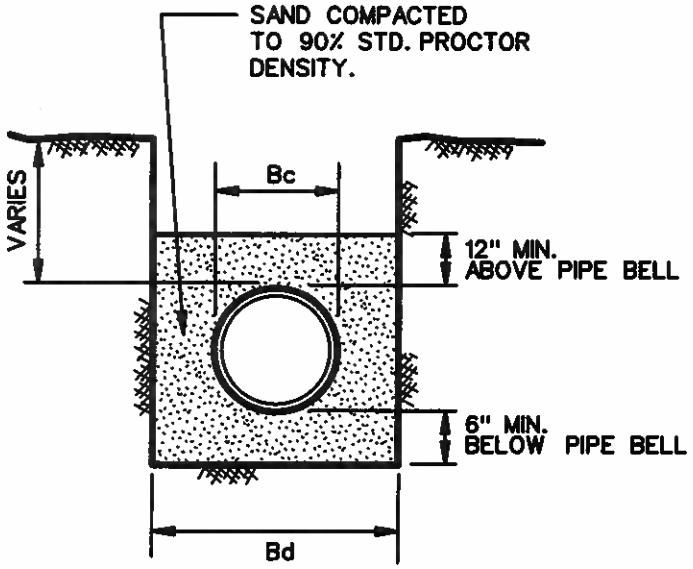
(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "C", "C+", & "C-1"

DWU

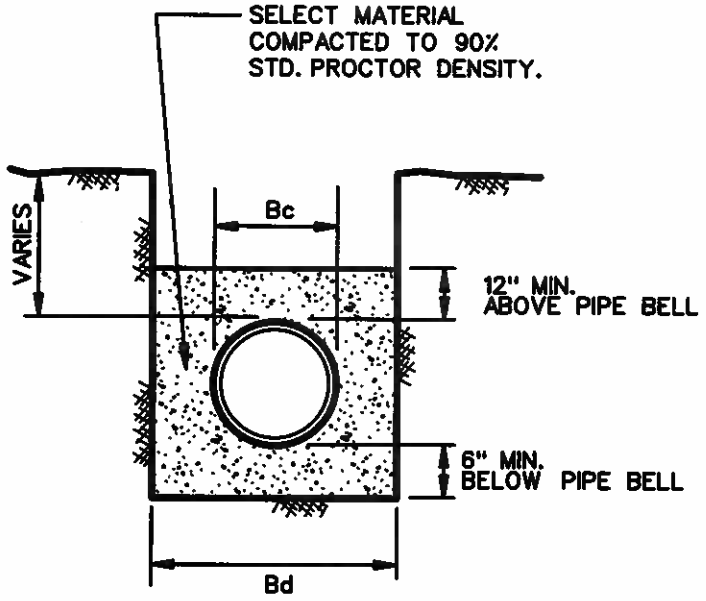
(PAGE NO.) 116

DATE OCT. 2011



CLASS "C-2"

N.T.S.



CLASS "D+"

N.T.S.

BEDDING ANGLE 30°
L.F. = 1.3
E' = 200

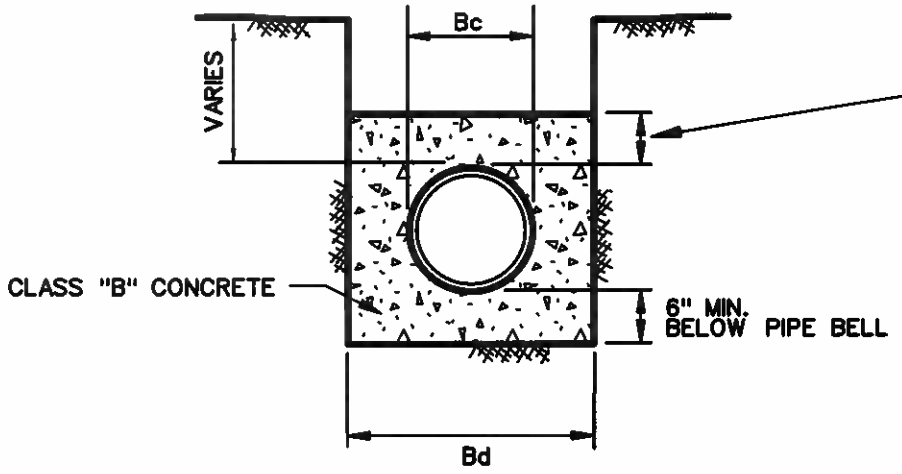
NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. LF. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
4. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "C-2" & "D+"

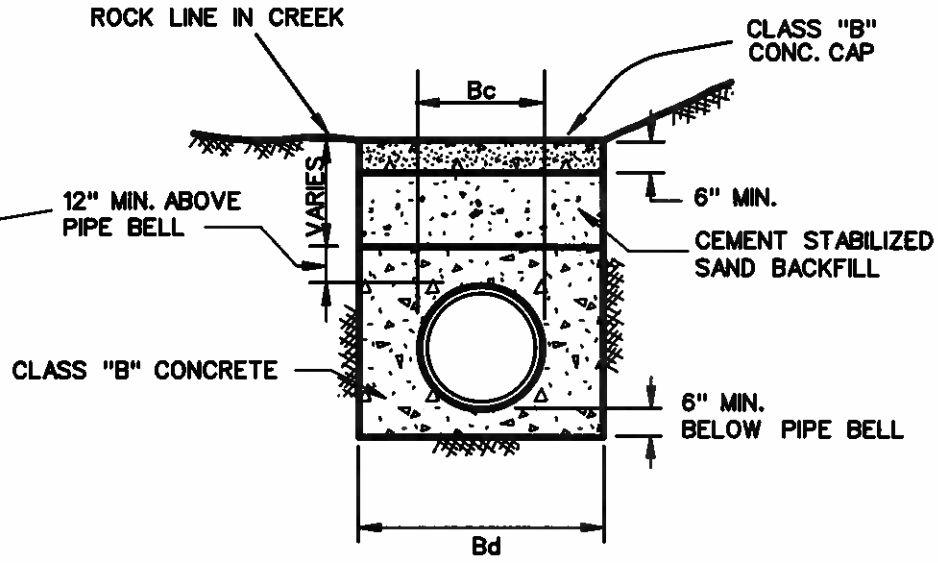
DWU		(PAGE NO.) 117
DATE OCT. 2011		



CLASS "G"

N.T.S.

L.F. = 4.2



CLASS "G-1"

(FOR ROCK DITCHES IN CREEKS)

N.T.S.

L.F.-4.2

NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. L.F. = LOAD FACTOR TO BE USED TO DETERMINE 3 EDGE BEARING BASED ON TYPE OF EMBEDMENT.
4. FREE-FALL OF CONCRETE NOT TO EXCEED 5 FT. MAXIMUM.
5. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

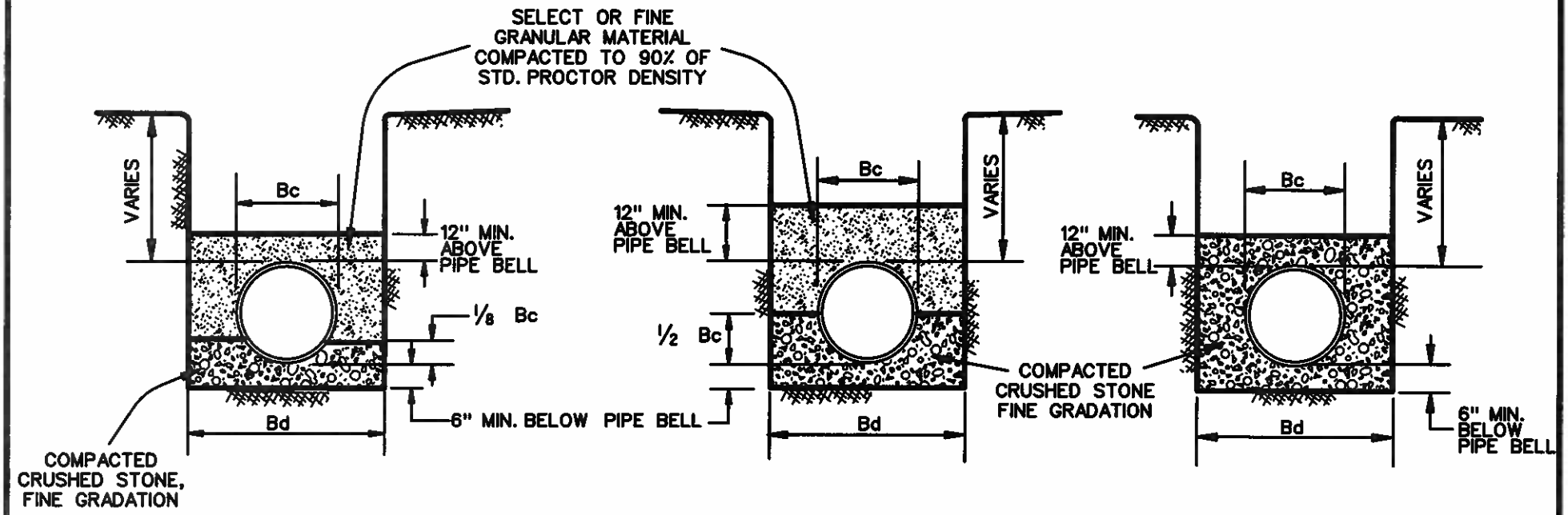
(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

EMBEDMENT
CLASS "G" & "G-1"

DWU

(PAGE NO.) 118

DATE OCT. 2011



CLASS "B-1a"

CLASS " B-2a "

CLASS " B-5 "

NOTES:

1. Bc = OUTSIDE DIAMETER OF PIPE
2. Bd = TRENCH WIDTH
3. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

(REFER TO PAGE 112 FOR CALCULATION OF "Bd")

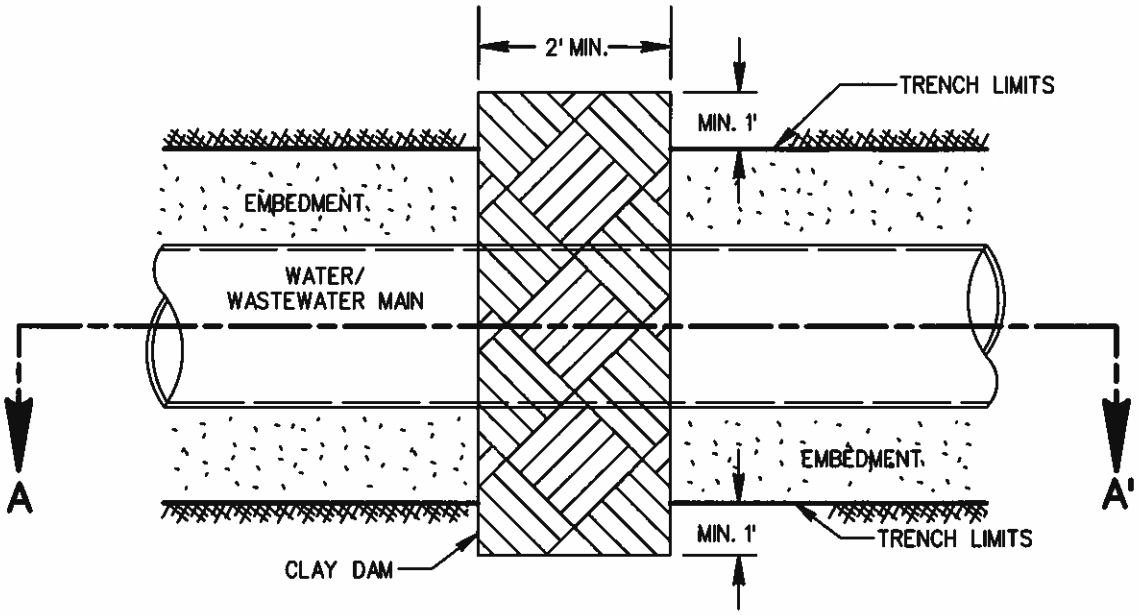
EMBEDMENT CLASS"B-1a","B-2a"&"B-5"

DWU

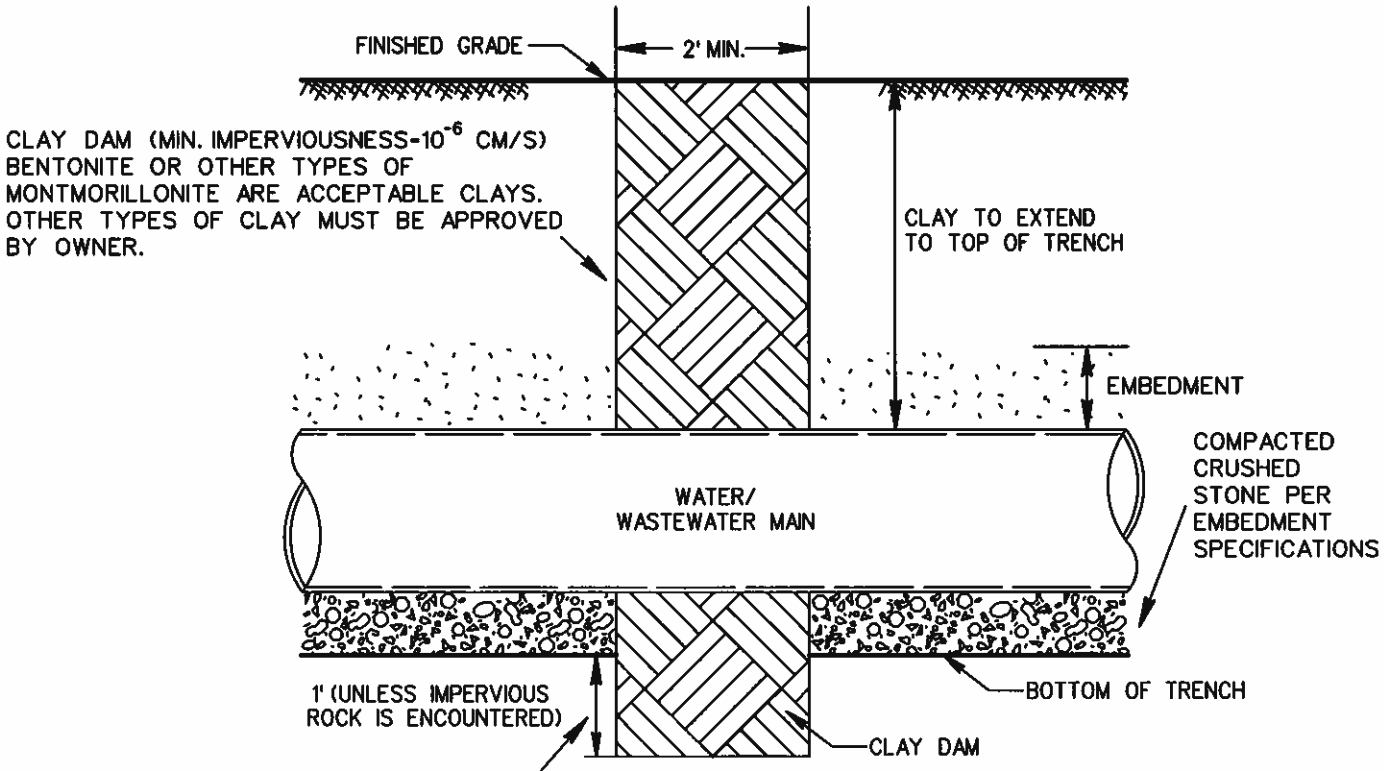
(PAGE NO.) 119

DATE OCT. 2011

CLAY DAMS SHALL BE PLACED AT CONTAMINATION PLUME LIMITS TO PREVENT CONTAMINANT CONVEYANCE THROUGH UTILITY TRENCH. PLACEMENT AND LOCATION OF DAMS ARE SUBJECT TO DWU APPROVAL.



CLAY DAM PLAN VIEW

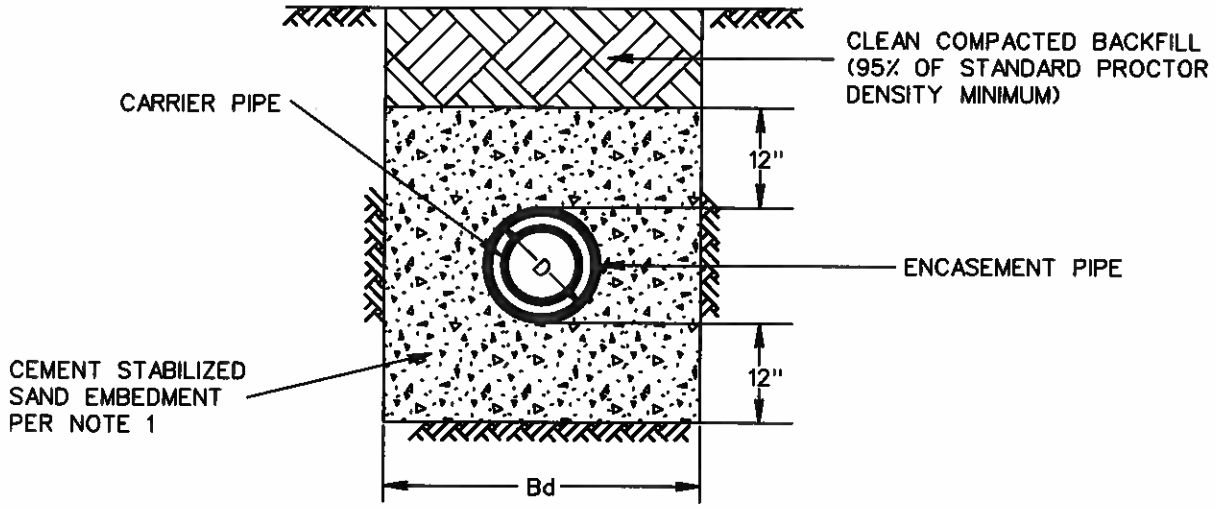


SECTION A-A'

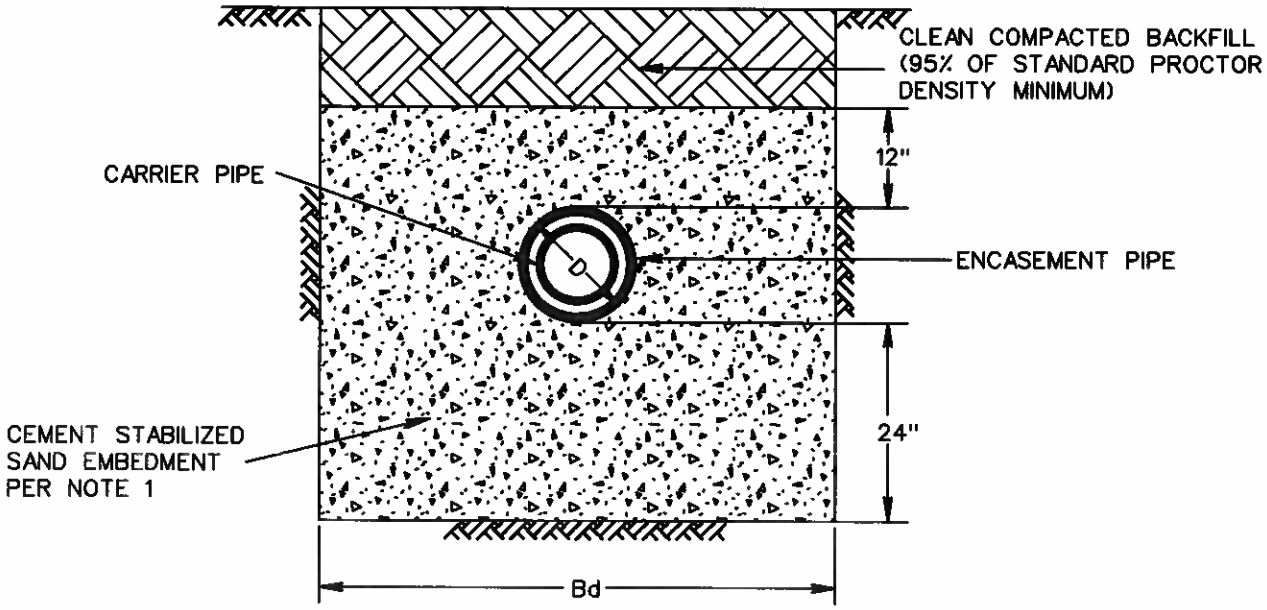
(IF ROCK IS WEATHERED, FISSURED OR WILL TRANSPORT WATER, EXTRA DEPTH MAY BE REQUIRED)

REFER TO PAGES 112, 113, 114, 115, 116, 117, 118 & 119

CONTAMINATED SOIL CLAY CUT-OFF DAM		DWU	119A
		OCT. 2011	



TRENCH E-1 (CLEAN ZONE)
CEMENT STABILIZED SAND EMBEDMENT



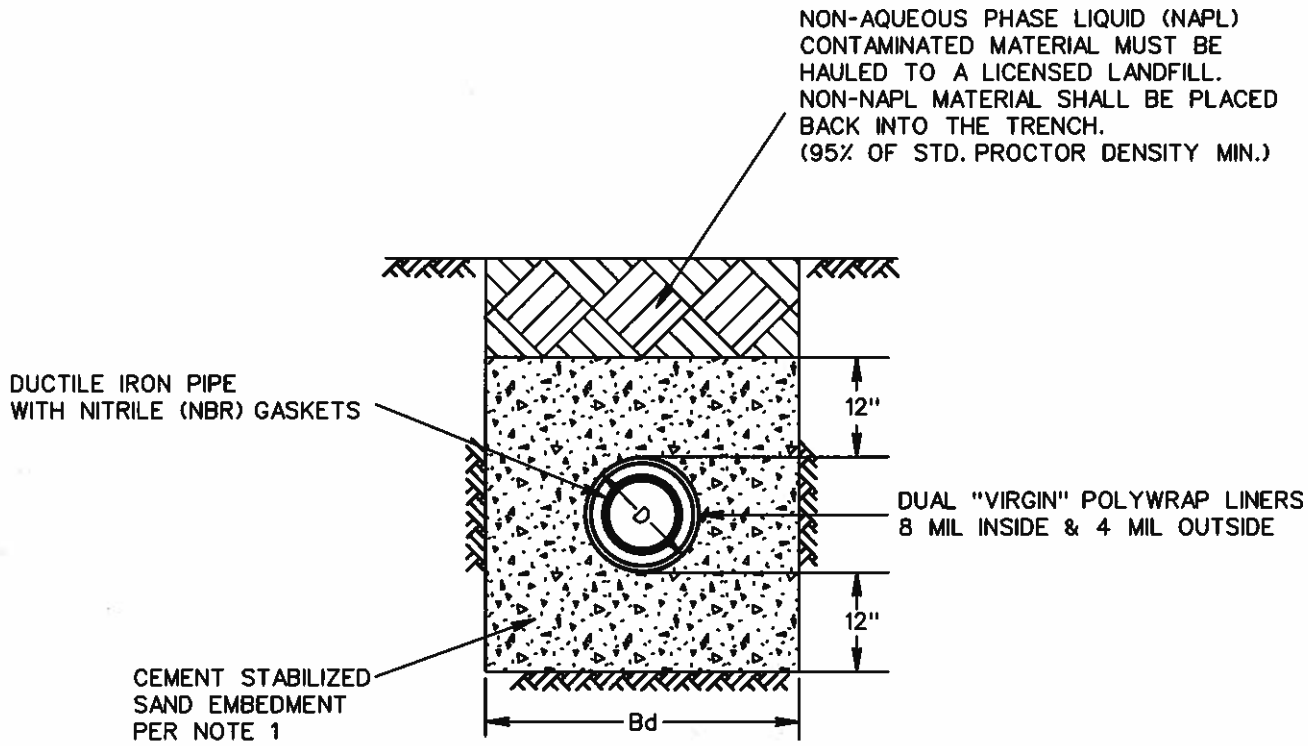
TRENCH E-2 (TRASH ZONE)
CEMENT STABILIZED SAND EMBEDMENT

DIMENSIONS NOTES:
1. D = Inside DiameterOf Containment Pipe
2. Bd = Trench Width Per Standard Drawing 112

Note 1: Cement stabilized sand shall have a minimum of 12% cement per cubic yard of cement stabilized sand mixture, based on loose dry weight volume (at least 3 bags of cement per cubic yard of mixture).

REFER TO PAGE 112

EMBEDMENT CLASS "E-1" & "E-2" LANDFILL		DWU	119B
		OCT. 2011	

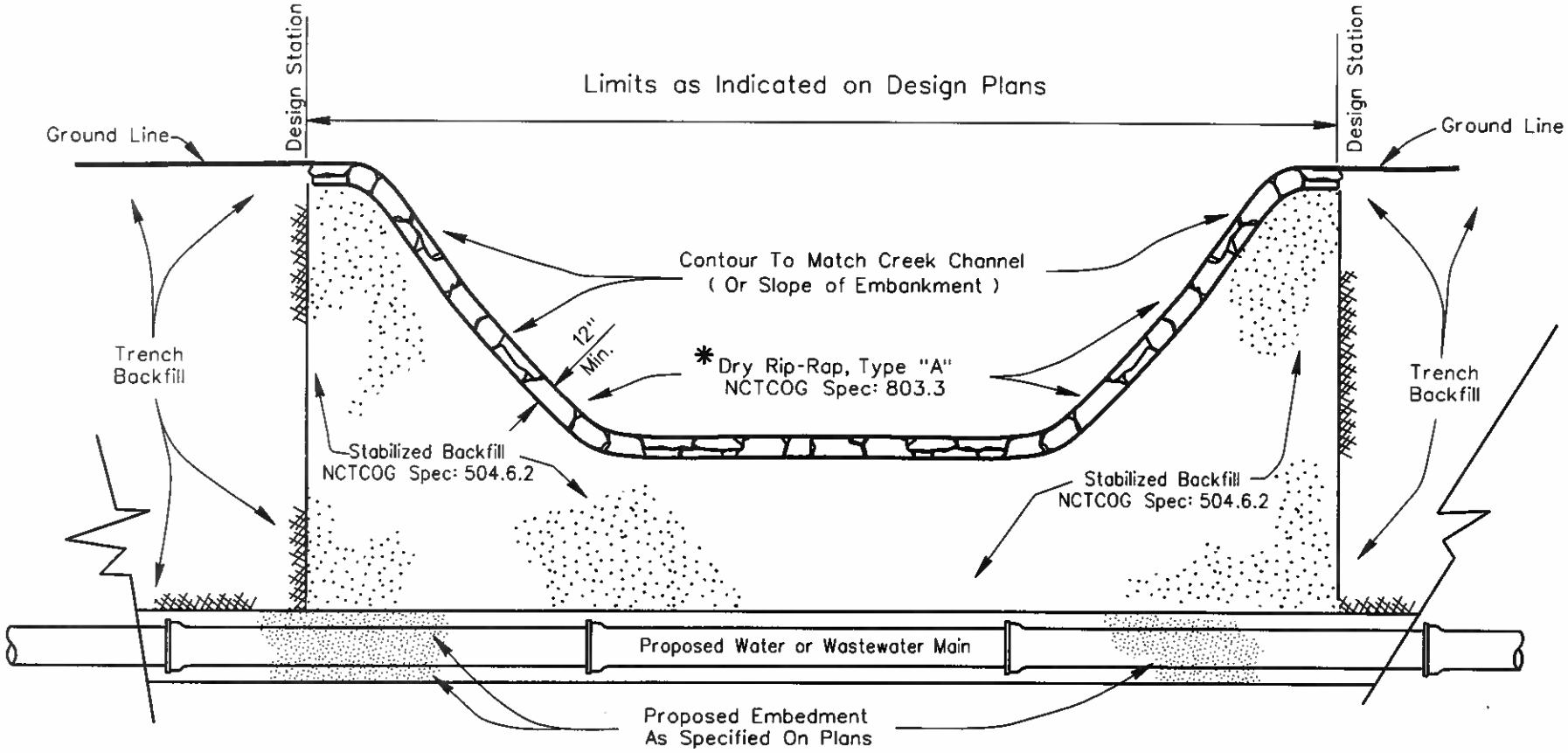


TRENCH E-3
"HIGH" CHEMICAL OF CONCERN ZONE

Note 1: Cement stabilized sand shall have a minimum of 12% cement per cubic yard of cement stabilized sand mixture, based on loose dry weight volume (at least 3.0 bags of cement per cubic yard of mixture). Minimum final permeability to be 10^{-6} cm/s.

EMBEDMENT CLASS "E-3" HIGH CHEMICAL OF CONCERN ZONE		DWU	119C
		OCT. 2011	

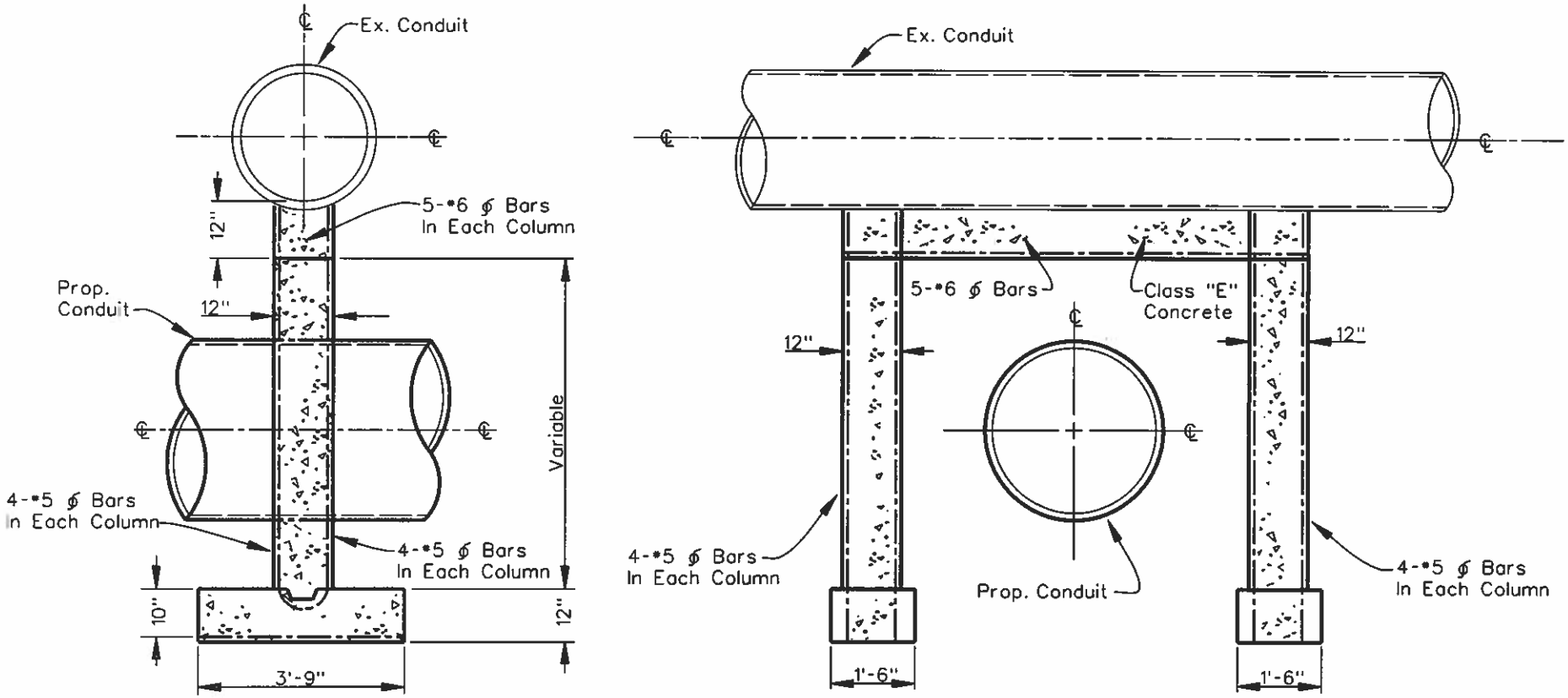
DETAIL SHOWN FOR CREEK CROSSING
(TYPICAL FOR EMBANKMENT SLOPE PROTECTION)



* OPTION
Dry Rip-Rap As Indicated on Design Plans.
Dry Rip-Rap to Span Disturbed Trench
Width Area Plus 1 Ft. on Each Side.

NCTCOG Spec: 803.3 - Riprap
NCTCOG Spec: 504.6.2 - Stabilized Backfill
2010 DWU Addendum: 803.3.4.DWU - Measurement And Payments

STABILIZED BACKFILL & RIP-RAP DETAIL FOR EMBANKMENT SLOPE PROTECTION		DWU	(Page No.) 120
		DATE OCT. 2010	



NOTES:

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 - Steel Reinforcement
2009 DWU Addendum: Item 702.DWU - Concrete Structures

TYPE "A"
UTILITY SUPPORT

	(Page No.)
DWU	121
DATE OCT. 2009	

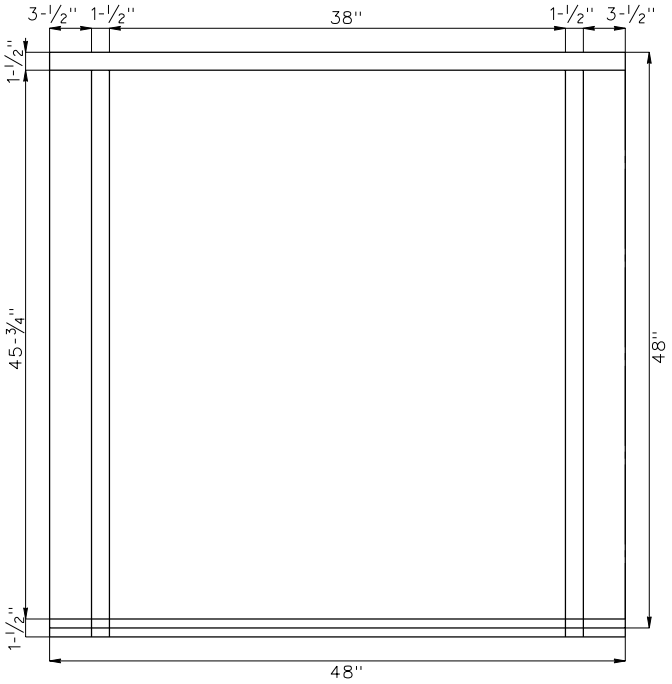
PROJECT CONSTRUCTION SIGN

NOT TO SCALE

PROJECT SIGN TECHNICAL SPECIFICATIONS

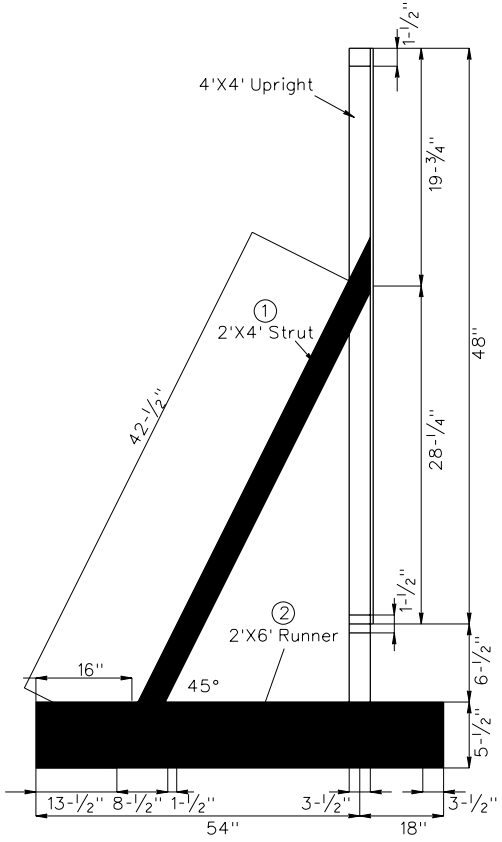
1) BOARD - 1/2" PRE-FINISHED (WHITE) SIGN GRADE, MDO PLYWOOD ("SIGN READY" FORMICA FINISH)
2) DALLAS SYMBOL AND THE DALLAS PLAN SYMBOL -LEFT-HAND SECTION OF SIGN
   1. Shaded Area - Painted With Bulletin Color Type, Sign Grade Enamel. Sign Color Per Department As Shown Below:
      a) Public Works And Transportation Department - Pantone 1945 (3M Burgundy), 4010106 Carmine, Or Approved Equal
      b) Dallas Water Utilities Department - Pantone 286 (3M Royal Blue), 4010152 Light Blue, Or Approved Equal
      c) Parks Department - Pantone 5753 (3M Moss Green), 4010144 Medium Green, Or Approved Equal
      d) Equipment And Building Services Department - Pantone 1595 (3M Burnt Orange), 4010124 Orange, Or Approved Equal
   2. Shaded Area Lettering
      a) White Paint (101-L Polar White) On Colored Background
3) PROJECT INFORMATION - RIGHT-HAND SECTION OF SIGN
   1. Vinyl Lettering (Used On Multi-Segment Projects. Specified On Purchase Order)
      a. Background Color - White
      b. Lettering - Black Vinyl
   2. Painted Lettering (Used On Facility Projects. Specified on Purchase Order)
      a. Background Color - White
      b. Lettering - Black Paint (199-L Black)
4) STRIPES AND BORDERS - BLACK REFLECTIVE VINYL APPROX. 1/2" WIDE
5) LETTERING TYPE - ARIAL BLACK, SIZES AS SPECIFIED ON THIS DRAWING SPECIFICATION
6) FRAME TO BE PAINTED WHITE
7) LUMBER - TREATED

PROJECT SIGN FRAME



NOT TO SCALE

Notes:
1) All Dimensions Are In Inches.
2) All Materials Exterior Grade, Pressure Treated Pine, Two By Four (2"x4") Dimensional Lumber.
3) 16P Nails Acceptable For Butt Connections.
4) Use 1/2" Galvanized Coated Bolts, Washers And Nuts For Side Connections.
5) Screw Front Panels To Frame Using #8 1-3/4" Galvanized Screws 2 Ft. OC.



SIDE

NOT TO SCALE

Note: Contractor Shall Provide Items ① & ②

PROJECT CONSTRUCTION SIGN TECHNICAL SPECIFICATIONS

DWU

DATE
OCT. 2012

(Page No.)
122

PART 2

(Series 200)

WATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department

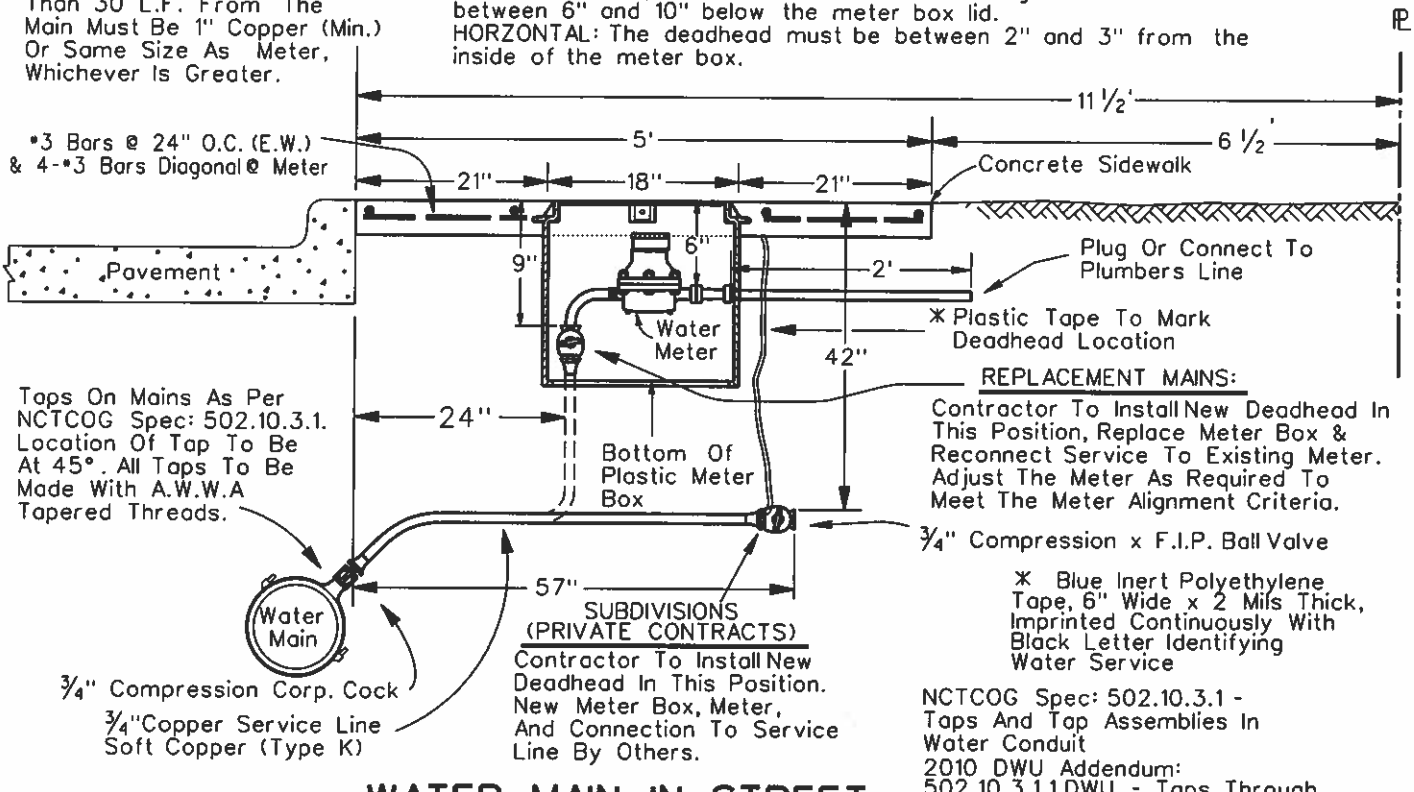
PART 2
WATER MAIN CONSTRUCTION

TITLE		Pg.
3/4" Water Service Installations (Sidewalk Adjacent to Curb)	---	201
1" Water Service Installations (Sidewalk Adjacent to Curb)	---	202
1 ½" or 2" Water Service Installations (Sidewalk Adjacent to Curb)	---	203
3/4" Water Service Installations (Sidewalk 5' from Curb)	---	204
1" Water Service Installations (Sidewalk 5' from Curb)	---	205
1 ½" or 2" Water Service Installations (Sidewalk 5' from Curb)	---	206
Bull Head Water Services	---	206A
Installation Requirements For AMI Meter	---	206B
AMI Meter Installation Details For 2" Or Smaller Meters	---	206C
AMI Meter Installation Details For 3" And Larger Meters	---	206D
Manual Flush Point Installation	---	207
Automatic Flush Point		207A
Automatic Flush Point Location	---	207B
Temporary Flush Point With Sample Point Installation	---	207C
Air Release Valve--Type 1	---	208
Air Release Valve--Type 2 (Elevation)	---	209
Air Release Valve--Type 2 (Details)	---	210
General Notes--Type 2 Air Valve	---	211
Horizontal Gate Valve With Manhole Installation (Plan)	---	212
Horizontal Gate Valve With Manhole Installation (Elevation)	---	213
Butterfly Valve With Manhole Installation (Plan)	---	214
Butterfly Valve With Manhole Installation (Elevation)	---	215
Large Main Blow-Off	---	215A
General Notes For Large Valves With Manholes	---	216
Large Tapping Valve Installation	--	217
Operating Nut Riser (For Large Valve Installations)	---	218
4" to 16" Gate Valve Abandonment	---	219
4" to 16" Gate Valve Cover, Stack, & Stem Installation	---	219A
Pitot Outlet	---	220
Standard 40" Manhole Frame and Cover (Water)	---	221
Standard 32" Manhole Frame and Cover (Water)	---	222
Mortar Protection and Insulation Kit for Flange Joints	---	223
Methods for Setting Fire Hydrants	---	224
Standard Water Main Lowering	---	225
Pipe-to-Soil Potential Test Station (Post Mounted)	---	226
Pipe-to-Soil Potential Test Station (Buried Configuration)	---	227
Detail of Test Conductor Connection to Pipe	---	228
Horizontal Thrust Block Diagram	---	229
Horizontal Thrust Block Dimensions & Quantities For 11 ¼ & 22 ½ Degree Bends	---	230
Horizontal Thrust Block Dimensions & Quantities For 30 to 90 Degree Bends	---	231
Horizontal Thrust Block at Tees and Plugs	---	232
Vertical Thrust Block at Pipe Bend	---	233

Thrust Block General Notes	---	234
Embedment Types - Specified For Water Mains	---	235
Steel Guard Post Detail	---	236
Guard Post Protection For Fire Hydrants	---	237
Guard Post Protection For Water Meters	---	238
Single PRV Assembly	---	239
Dual PRV Assembly (Option 1)	---	240
Dual PRV Assembly (Option 2)	---	241
PRV Vault Elevation & Sectional Plan	---	242
PRV Details	---	243
PRV General Notes	---	244
PRV General Notes	---	245

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.

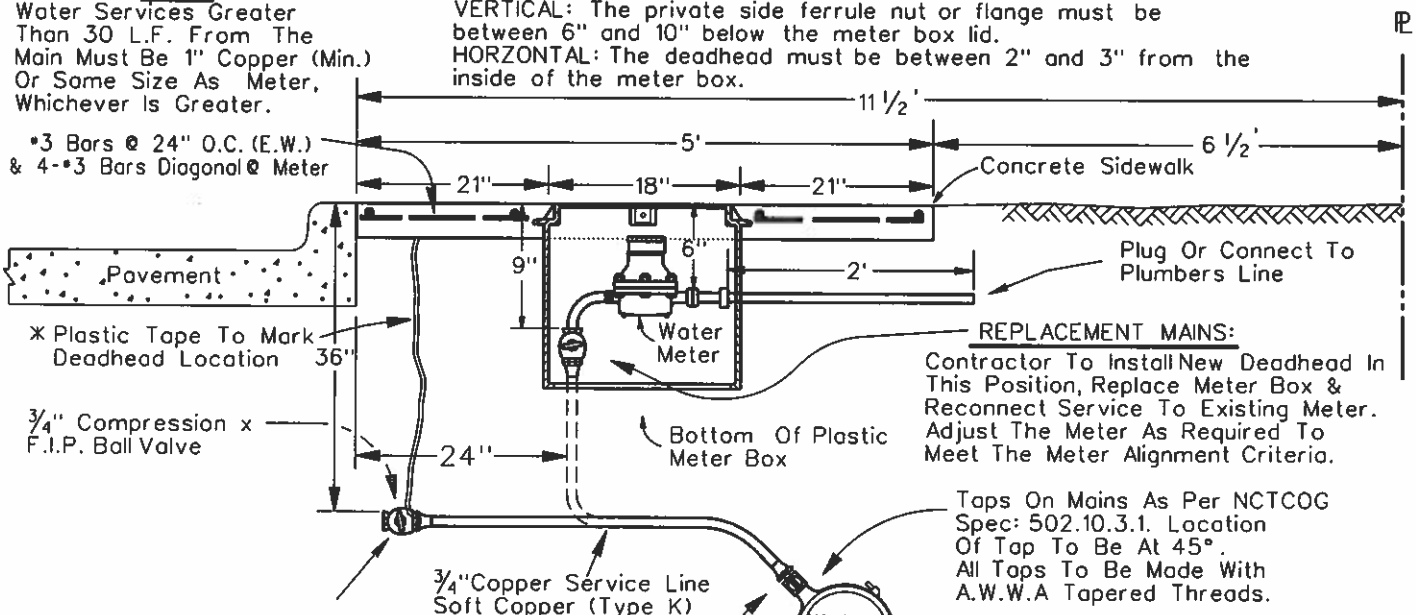


NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

WATER MAIN IN STREET

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letter Identifying Water Service

NOTE:
¾" Service Lines To Have A Minimum Of 3' Separation.

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

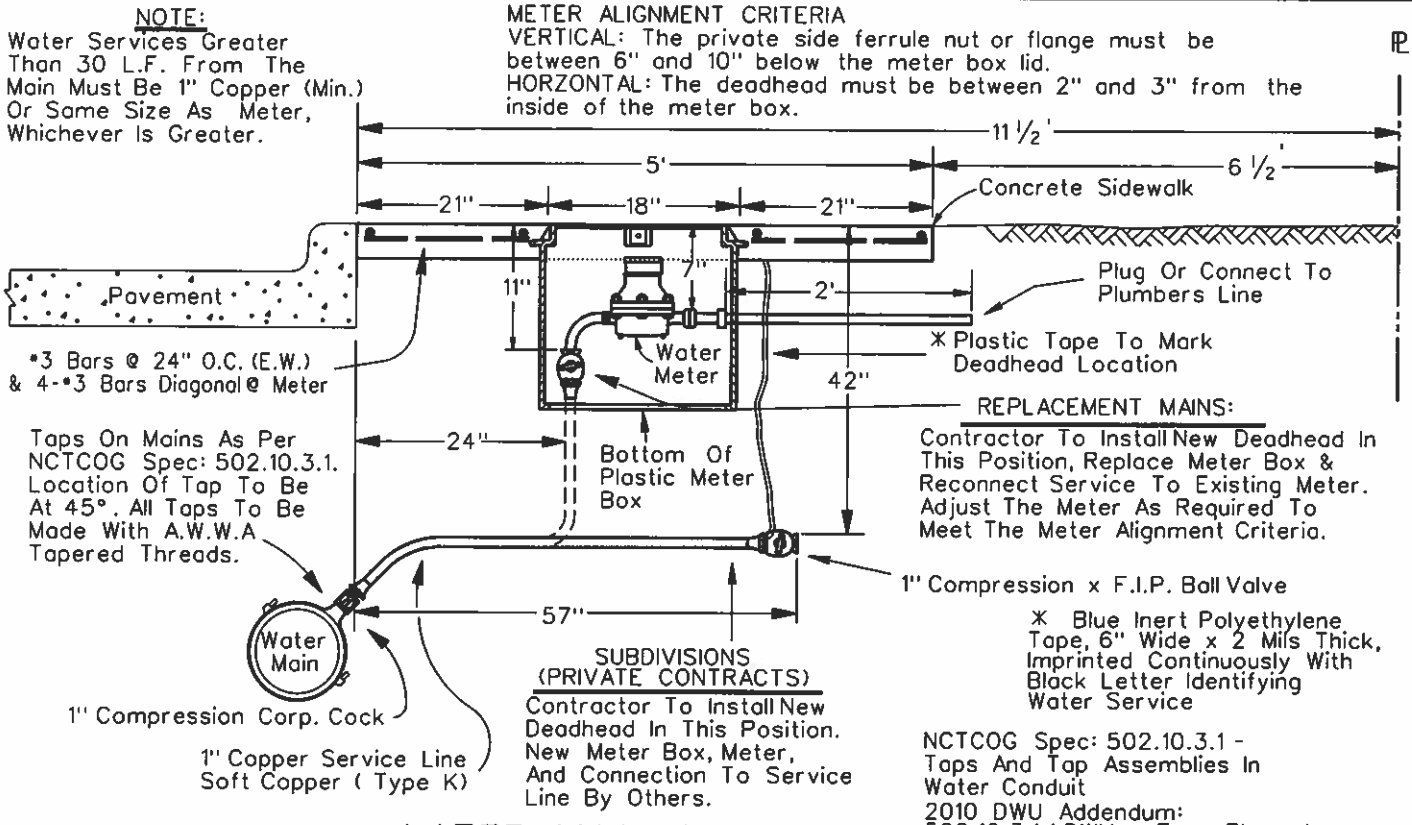
WATER MAIN IN PARKWAY

¾" WATER SERVICE INSTALLATIONS (SIDEWALK ADJACENT TO CURB)

	DWU	(PAGE No.) 201
	DATE OCT. 2010	

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

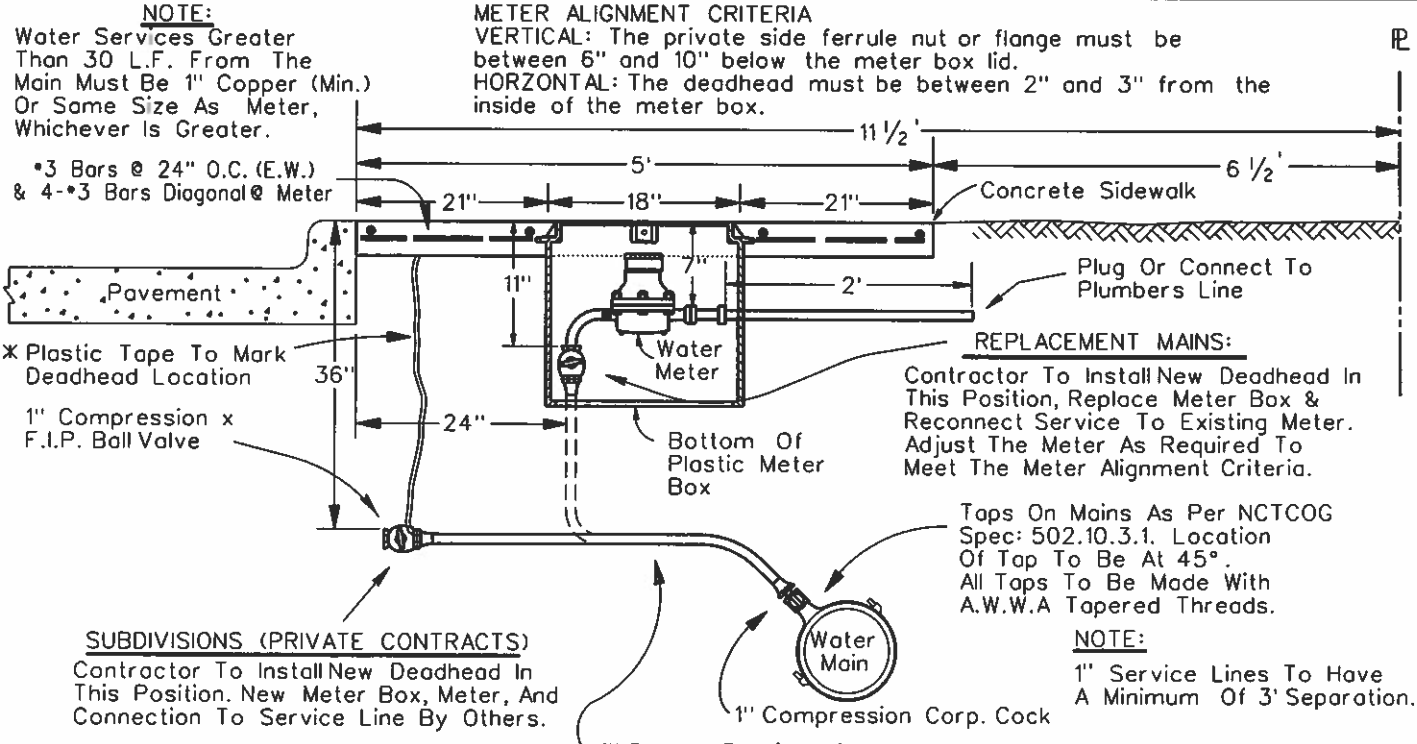
* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letter Identifying Water Service

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

WATER MAIN IN STREET

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



REPLACEMENT MAINS:
Contractor To Install New Deadhead In This Position, Replace Meter Box & Reconnect Service To Existing Meter. Adjust The Meter As Required To Meet The Meter Alignment Criteria.

SUBDIVISIONS (PRIVATE CONTRACTS)
Contractor To Install New Deadhead In This Position. New Meter Box, Meter, And Connection To Service Line By Others.

NOTE:
1" Service Lines To Have A Minimum Of 3' Separation.

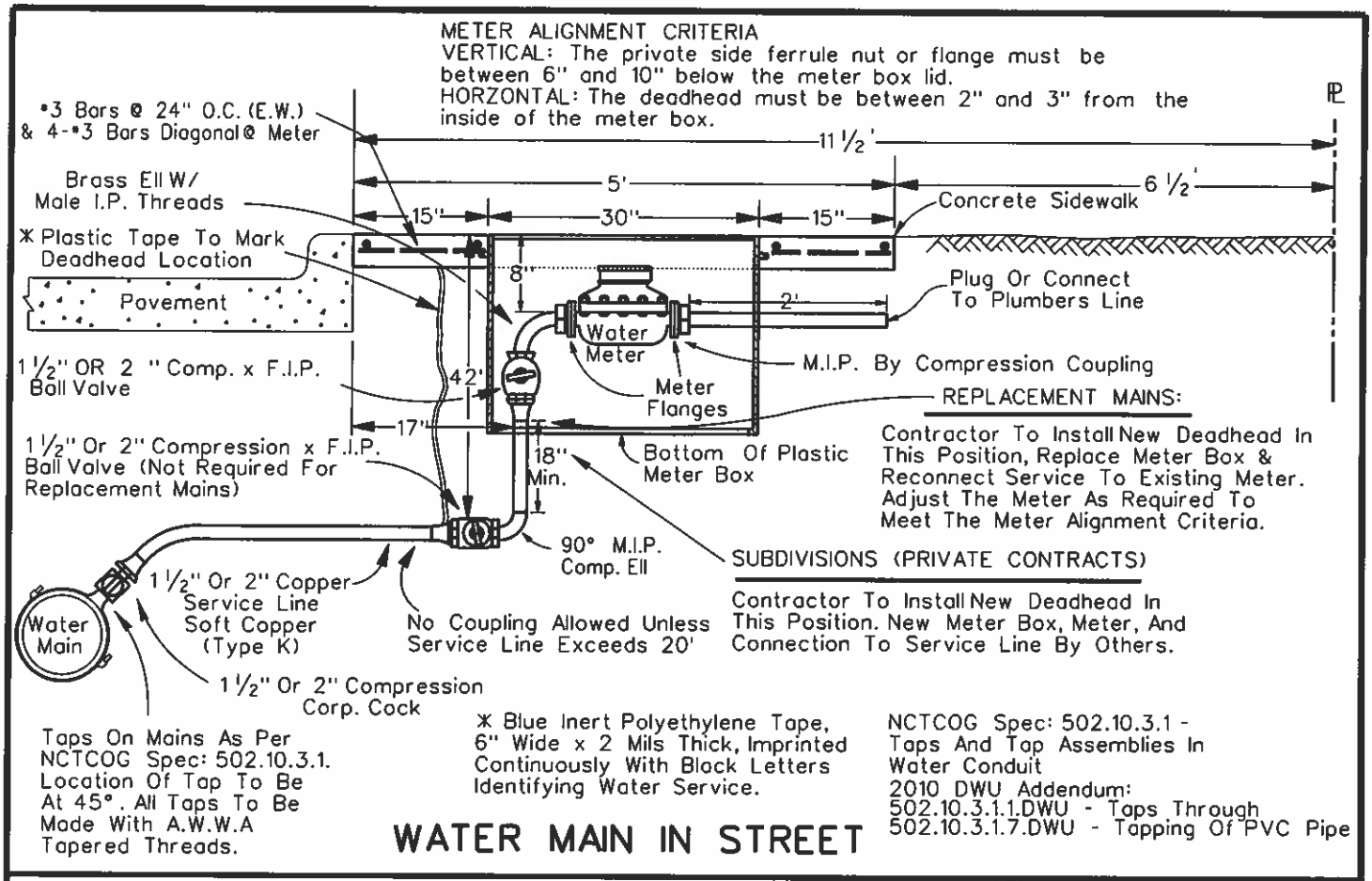
* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letter Identifying Water Service

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

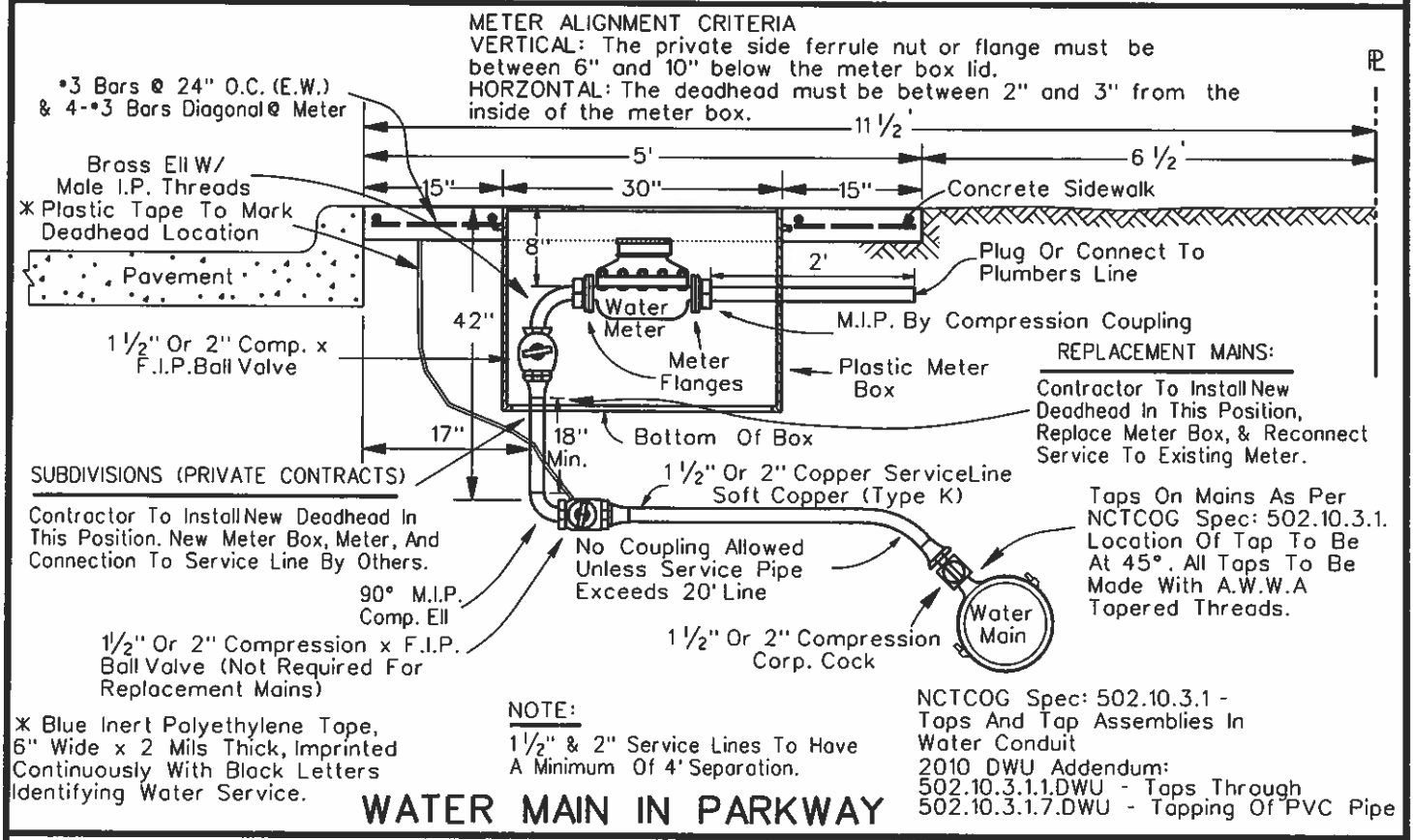
WATER MAIN IN PARKWAY

1" WATER SERVICE INSTALLATIONS (SIDEWALK ADJACENT TO CURB)

	DWU	(PAGE No.) 202
	DATE OCT. 2010	



WATER MAIN IN STREET

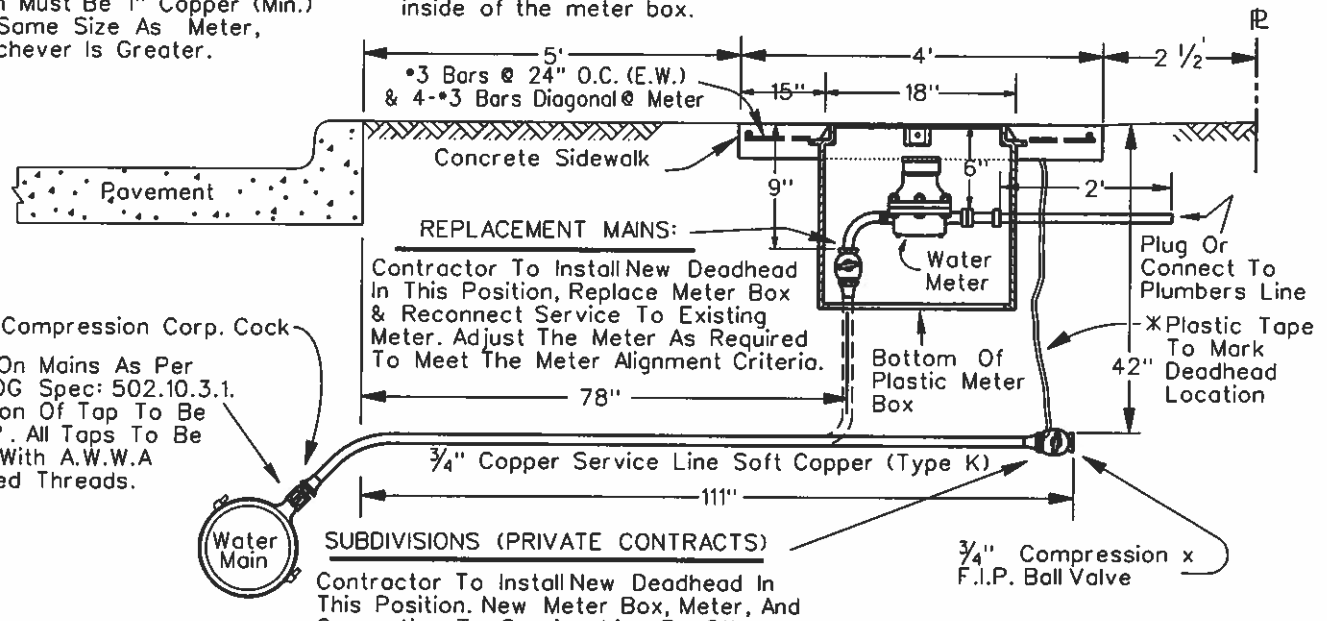


WATER MAIN IN PARKWAY

1 1/2" OR 2" WATER SERVICE INSTALLATION (SIDEWALK ADJACENT TO CURB)		DWU	(PAGE No.) 203
		DATE OCT. 2010	

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



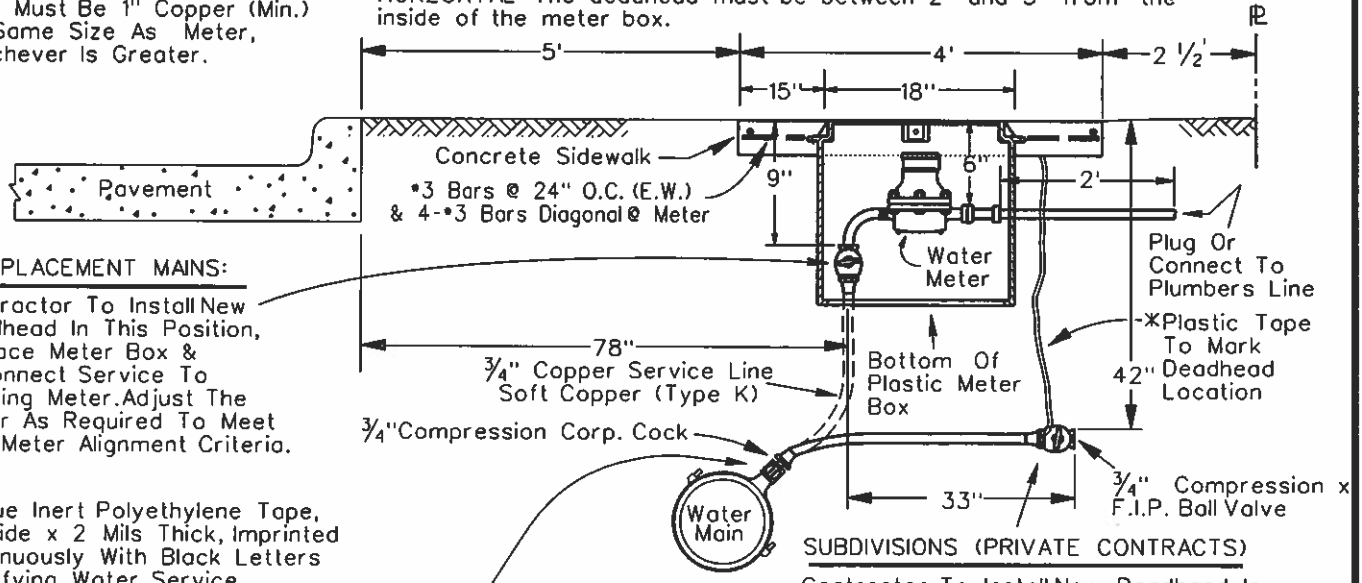
* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

WATER MAIN IN STREET

NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

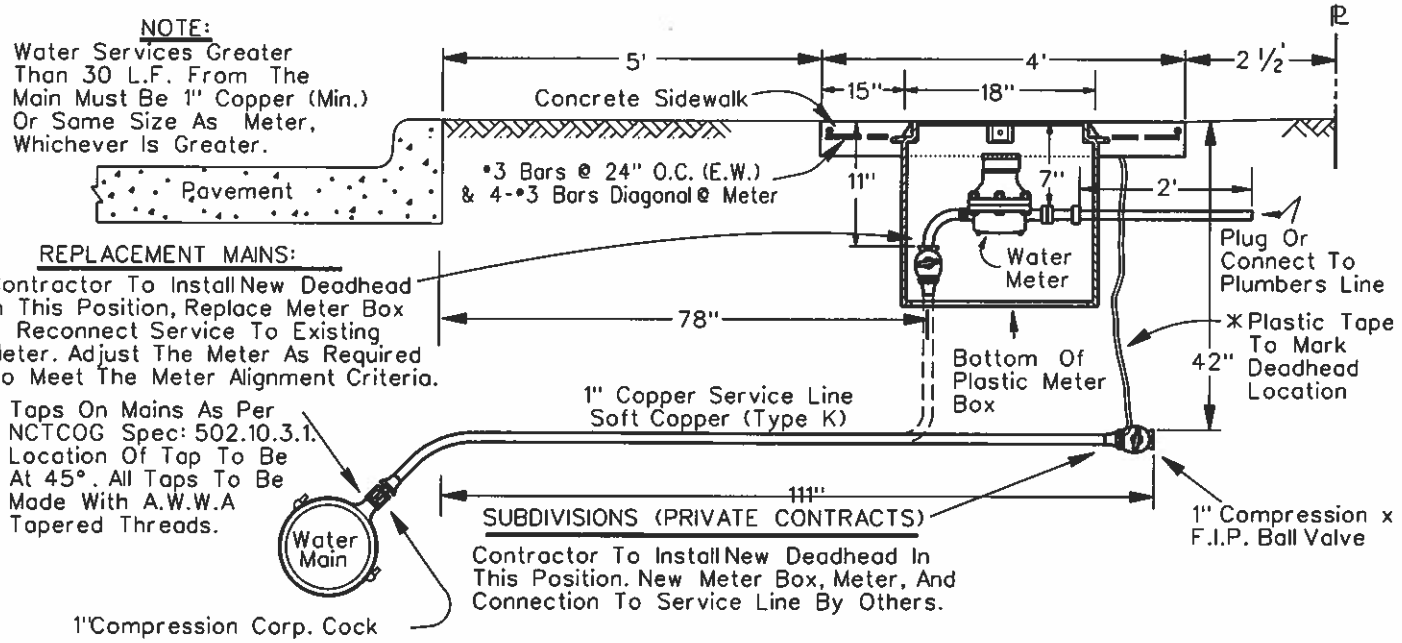
WATER MAIN IN PARKWAY

NOTE:
¾" Service Lines To Have A Minimum Of 3' Separation.

¾" WATER SERVICE INSTALLATIONS (SIDEWALK 5' FROM CURB)

DWU		(PAGE No.) 204
DATE OCT. 2010		

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.

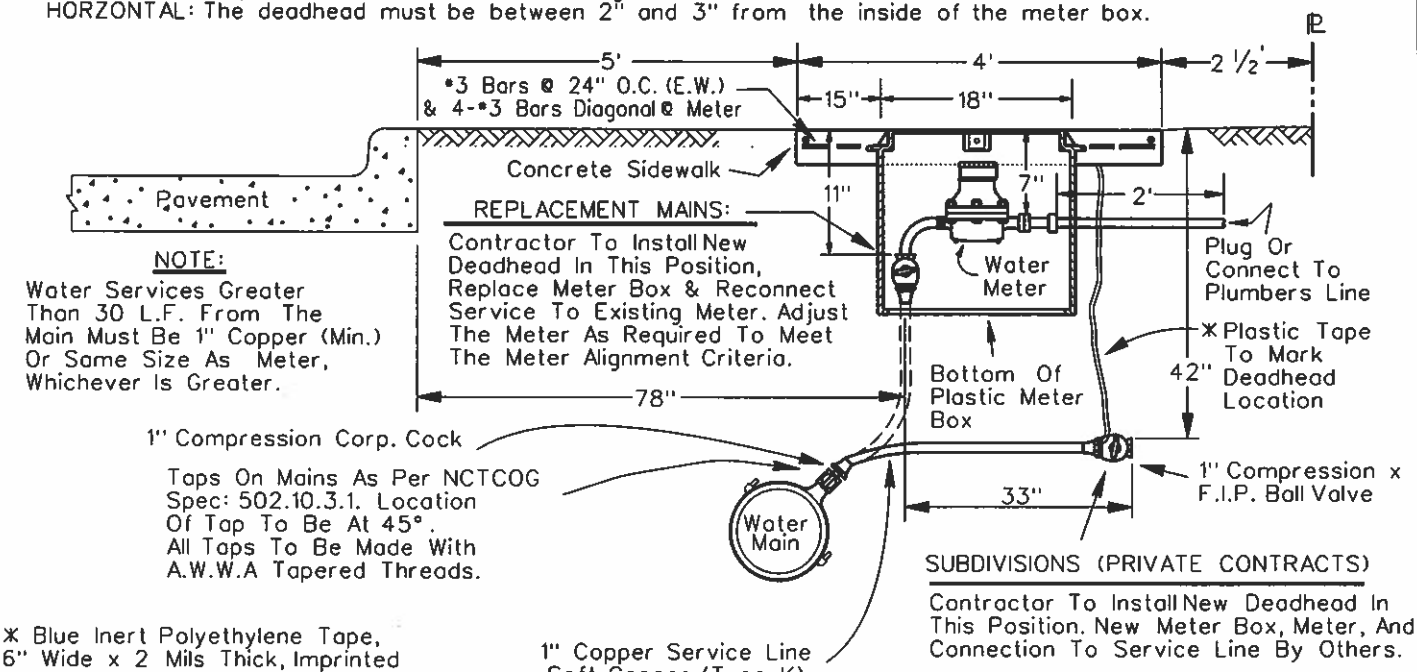


* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

WATER MAIN IN STREET

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



* Blue Inert Polyethylene Tape, 6" Wide x 2 Mils Thick, Imprinted Continuously With Black Letters Identifying Water Service.

NOTE:
1" Service Lines To Have A Minimum Of 3' Separation.

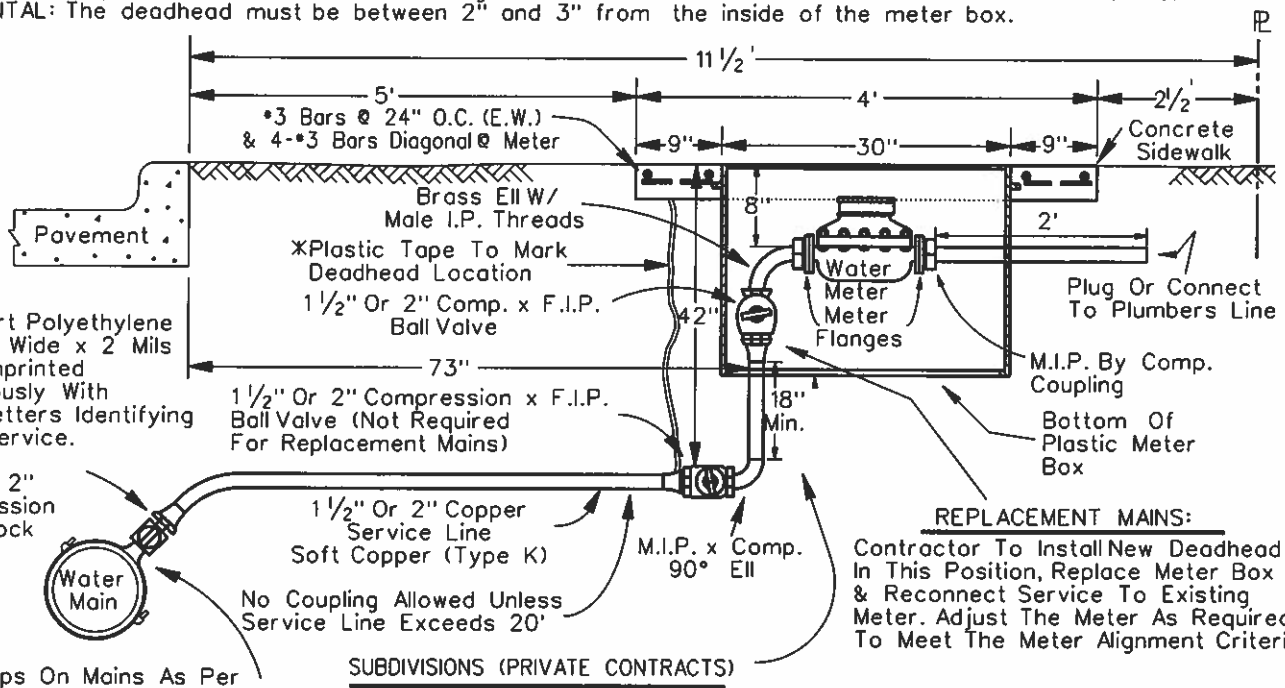
WATER MAIN IN PARKWAY

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

1" WATER SERVICE INSTALLATIONS (SIDEWALK 5' FROM CURB)

	DWU	(PAGE No.) 205
	DATE OCT. 2010	

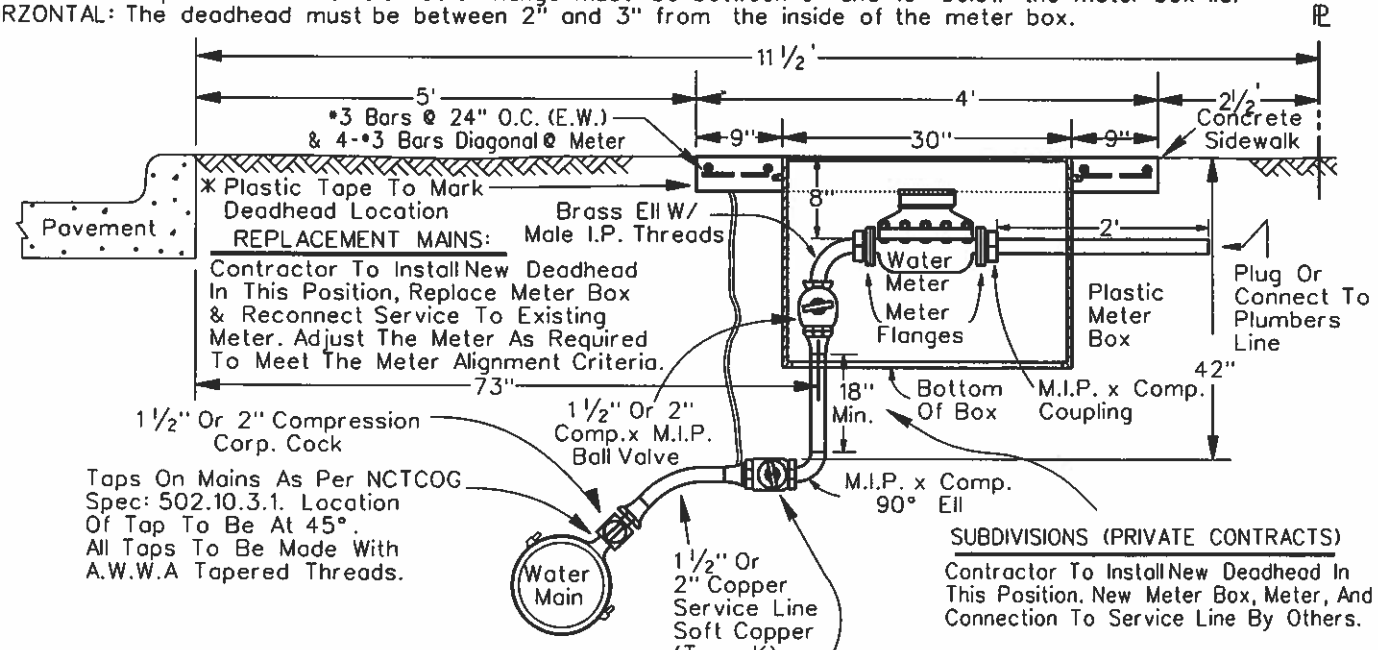
METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



WATER MAIN IN STREET

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

METER ALIGNMENT CRITERIA
VERTICAL: The private side ferrule nut or flange must be between 6" and 10" below the meter box lid.
HORZONTAL: The deadhead must be between 2" and 3" from the inside of the meter box.



NOTE:
1 1/2 & 2 Service Lines To Have A Minimum Of 4' Separation.

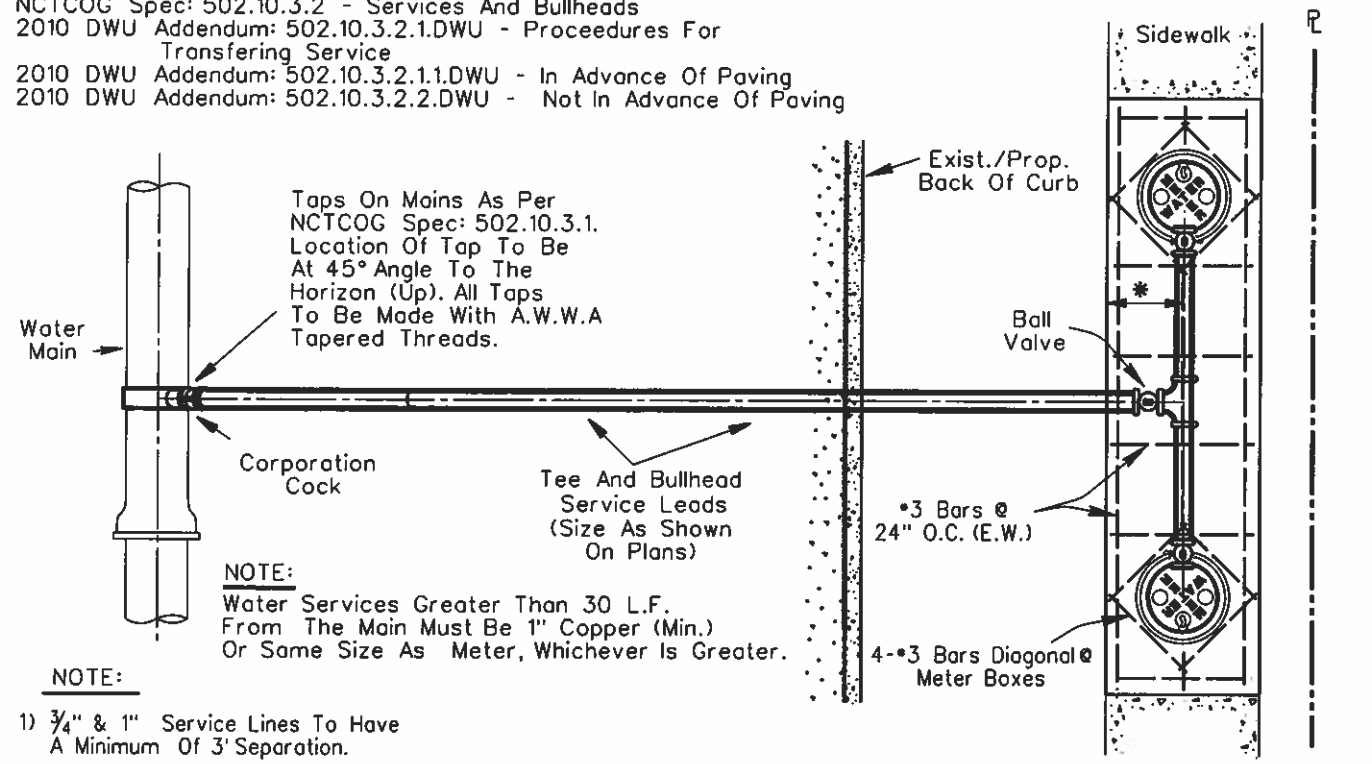
WATER MAIN IN PARKWAY

NCTCOG Spec: 502.10.3.1 - Taps And Tap Assemblies In Water Conduit
2010 DWU Addendum:
502.10.3.1.1.DWU - Taps Through
502.10.3.1.7.DWU - Tapping Of PVC Pipe

1 1/2" OR 2" WATER SERVICE INSTALLATIONS (SIDEWALK 5' FROM CURB)

	DWU	(PAGE No.) 206
	DATE OCT. 2010	

NCTCOG Spec: 502.10.3.1 -Taps And Tap Assemblies In Water Conduit
NCTCOG Spec: 502.10.3.2 - Services And Bullheads
2010 DWU Addendum: 502.10.3.2.1.DWU - Proceedures For Transfering Service
2010 DWU Addendum: 502.10.3.2.1.1.DWU - In Advance Of Paving
2010 DWU Addendum: 502.10.3.2.2.DWU - Not In Advance Of Paving

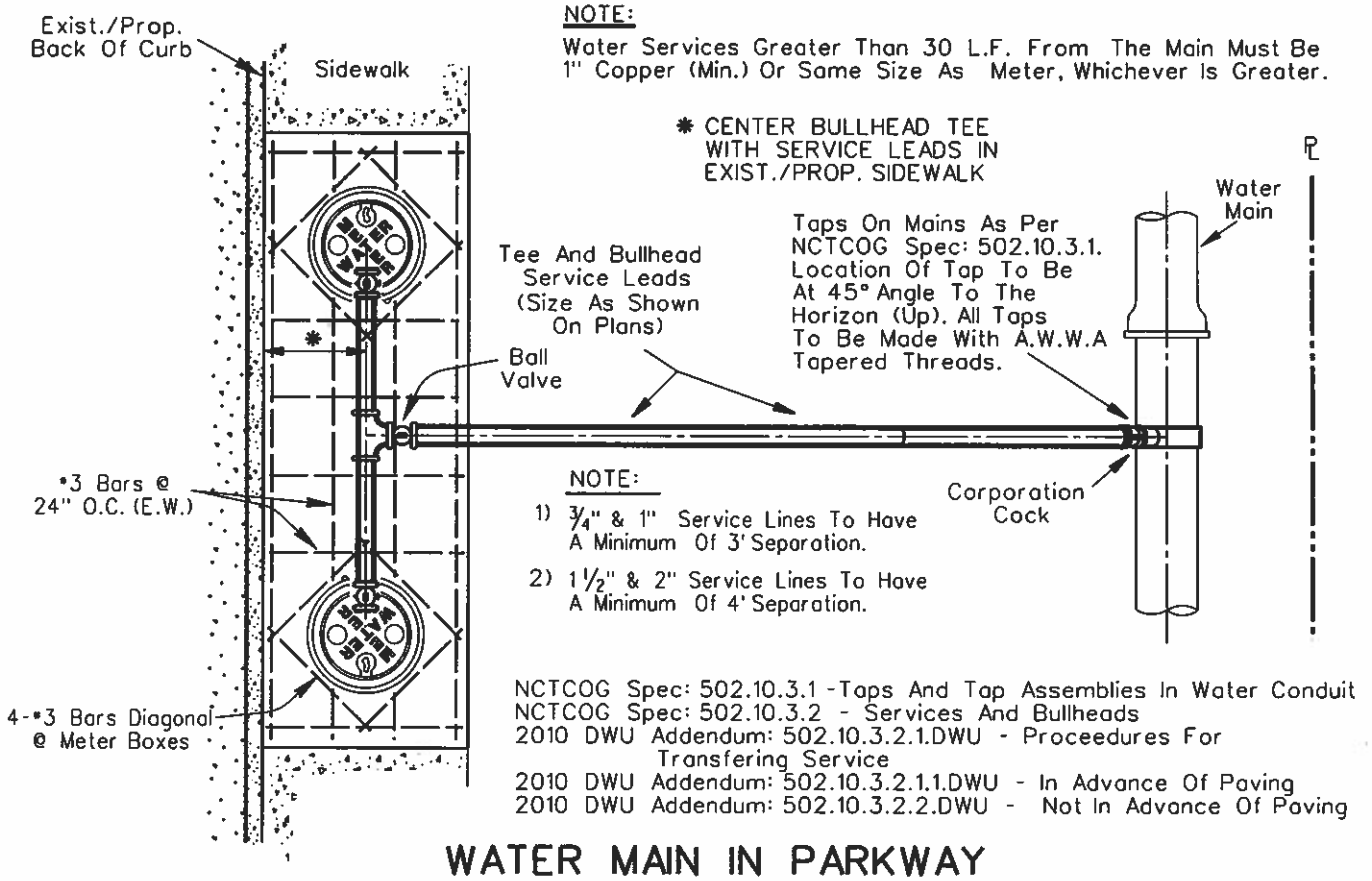


NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

NOTE:
1) ¾" & 1" Service Lines To Have A Minimum Of 3' Separation.
2) 1½" & 2" Service Lines To Have A Minimum Of 4' Separation.

* CENTER BULLHEAD TEE WITH SERVICE LEADS IN EXIST./PROP. SIDEWALK

WATER MAIN IN STREET



NOTE:
Water Services Greater Than 30 L.F. From The Main Must Be 1" Copper (Min.) Or Same Size As Meter, Whichever Is Greater.

* CENTER BULLHEAD TEE WITH SERVICE LEADS IN EXIST./PROP. SIDEWALK

NOTE:
1) ¾" & 1" Service Lines To Have A Minimum Of 3' Separation.
2) 1½" & 2" Service Lines To Have A Minimum Of 4' Separation.

NCTCOG Spec: 502.10.3.1 -Taps And Tap Assemblies In Water Conduit
NCTCOG Spec: 502.10.3.2 - Services And Bullheads
2010 DWU Addendum: 502.10.3.2.1.DWU - Proceedures For Transfering Service
2010 DWU Addendum: 502.10.3.2.1.1.DWU - In Advance Of Paving
2010 DWU Addendum: 502.10.3.2.2.DWU - Not In Advance Of Paving

WATER MAIN IN PARKWAY

BULL HEAD SERVICES

	DWU	(PAGE NO.) 206A
	DATE OCT. 2010	

Installation For Advanced Metering Infrastructure (AMI) Meter

1. The Contractor Shall Not Remove, Damage, Or Otherwise Disturb The AMI Meter Endpoint Components Except By Direction Of The Meter Reading Operation (MRO) Technician. The Installer Shall Be Liable For The Replacement Cost Of Any Lost Or Damaged AMI Components.

2. For Meters 2" Or Smaller:
   The Contractor Shall Install A New Meter Box With A New Meter AMI Lid For Water Meters 2" And Smaller In Existing And Proposed AMI Areas With The Following Configuration As Applicable:

   -For 5/8" to 1" Meters: 12" Water Meter AMI Lid As Per the Approved Material List.

   -For 1 1/2" to 2" Meters: 20" Water Meter AMI Lid As Per the Approved Material List.

   The Contractor Shall Also Return The Existing AMI Lids From Existing AMI Area TO DWU MRO For All Meters 2" And Smaller.

   For Meters 3" Or Larger:
   The Contractor Shall Either Connect To The Existing Meter Vault Or Construct A New Meter Vault As Specified On The Plans.

3. All Meters In The Existing And Proposed AMI Area Shall Be AMI Ready Meters As Furnished By DWU. A Non AMI Ready Meter Shall Be Replaced With An AMI Ready Meter By DWU.

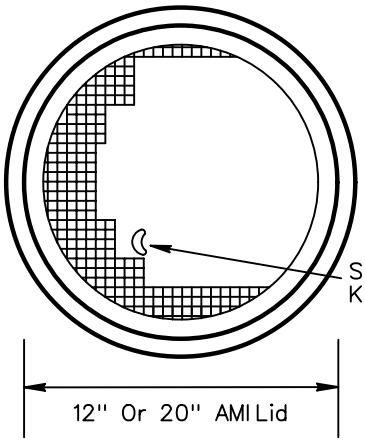
4. The Contractor Shall Contact DWU MRO Five (5) Working Days In Advance At 214-670-5537 And By Email At DWUMRO@dallascityhall.com Before Any Removal, Disconnection, Reconnection, Or Installation Of AMI Endpoint Components.

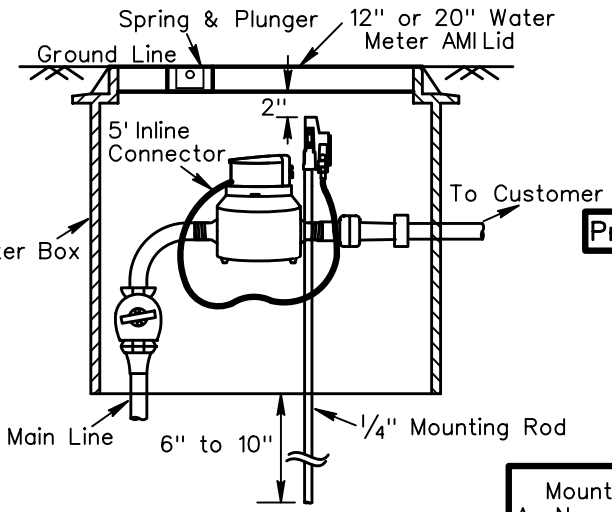
REFER TO PAGES 206C & 206D

Installation Requirements For AMI Meter		DWU	(PAGE No.) 206B
		DATE MAY 2012	

Fixed Network Or Mobile System
(100W Endpoint Or Approved Equal)

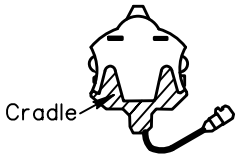
100W Endpoint



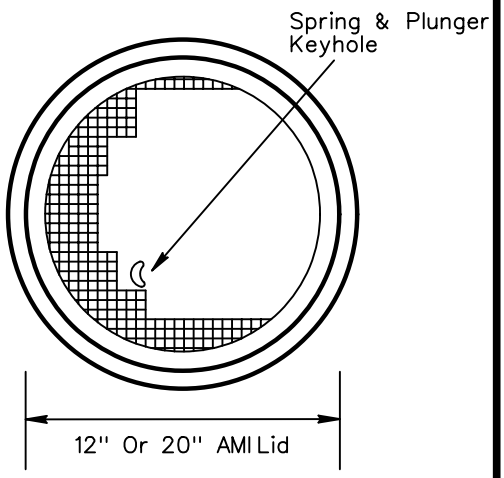


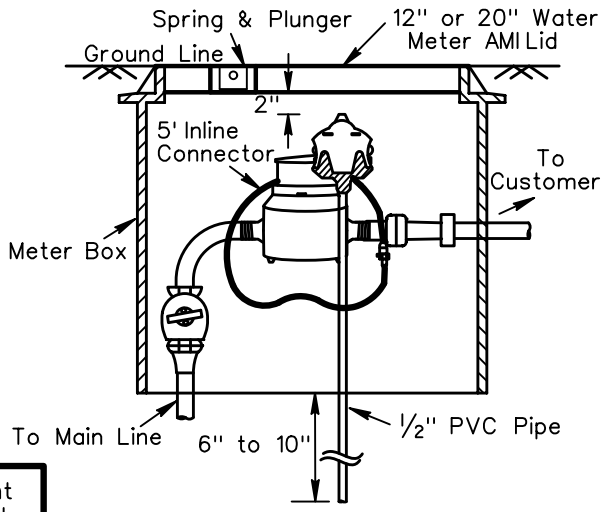
Finished Installation With
100W Endpoint Configuration

Fixed Network
(200W Endpoint Or Approved Equal)



200W Endpoint With
External Mounting Cradle





Finished Installation With
200W Endpoint Configuration

Plan View

Profile View

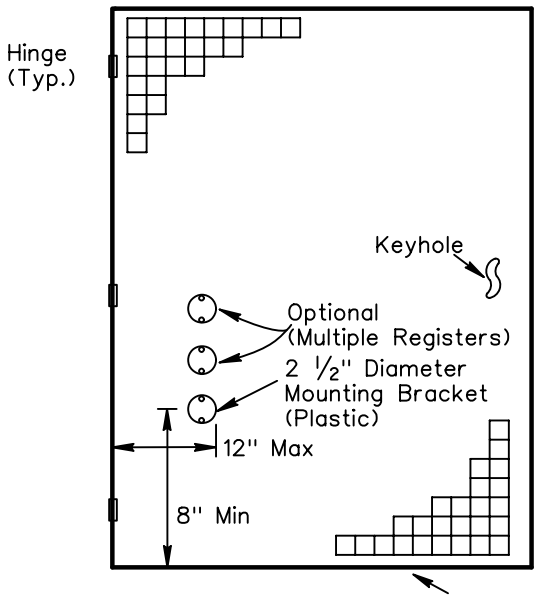
Mount The Endpoint
As Near To The Center
Of The Meter Box
As Possible Without
Touching The Meter

REFER TO PAGES 206B & 206D

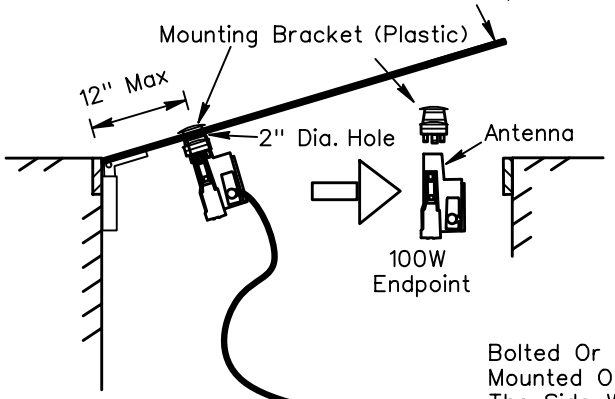
AMI Meter Installation Details For 2" Or Smaller Meters

	DWU	(PAGE No.) 206C
	DATE MAY 2012	

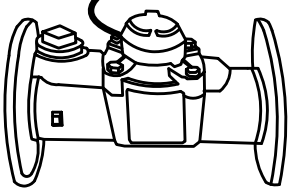
Fixed Network Or Mobile System
(100W Endpoint Or Approved Equal)



4'x3' Access Hatch
Per DWU Spec.

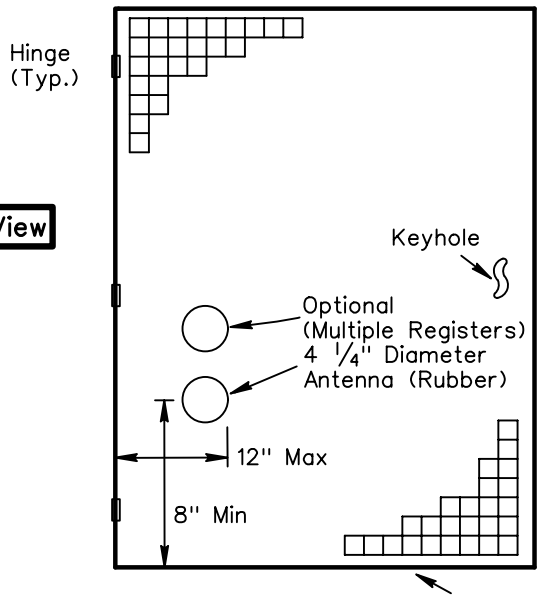


25' Inline Connector Cable

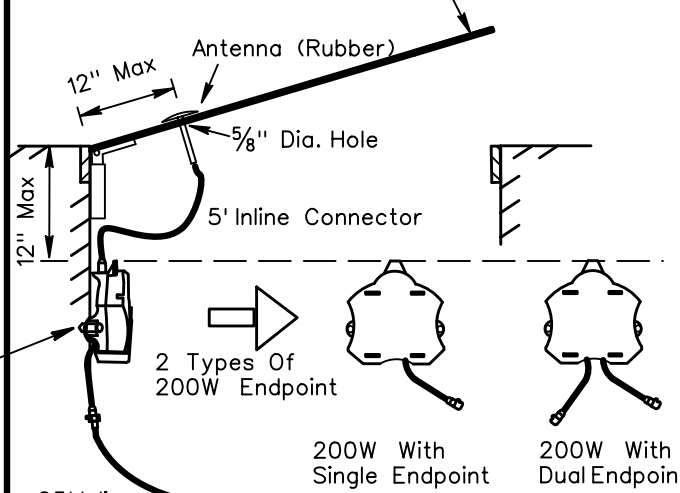


AMI Meter With AMI Encoded
Register With Factory Potted
25' Inline Connector Cable

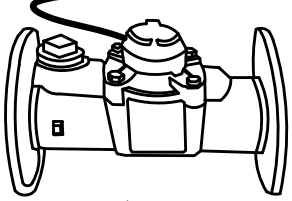
Fixed Network
(200W Endpoint Or Approved Equal)



4'x3' Access Hatch
Per DWU Spec.



25' Inline
Connector Cable



AMI Meter With AMI Encoded
Register With Factory Potted
25' Inline Connector Cable

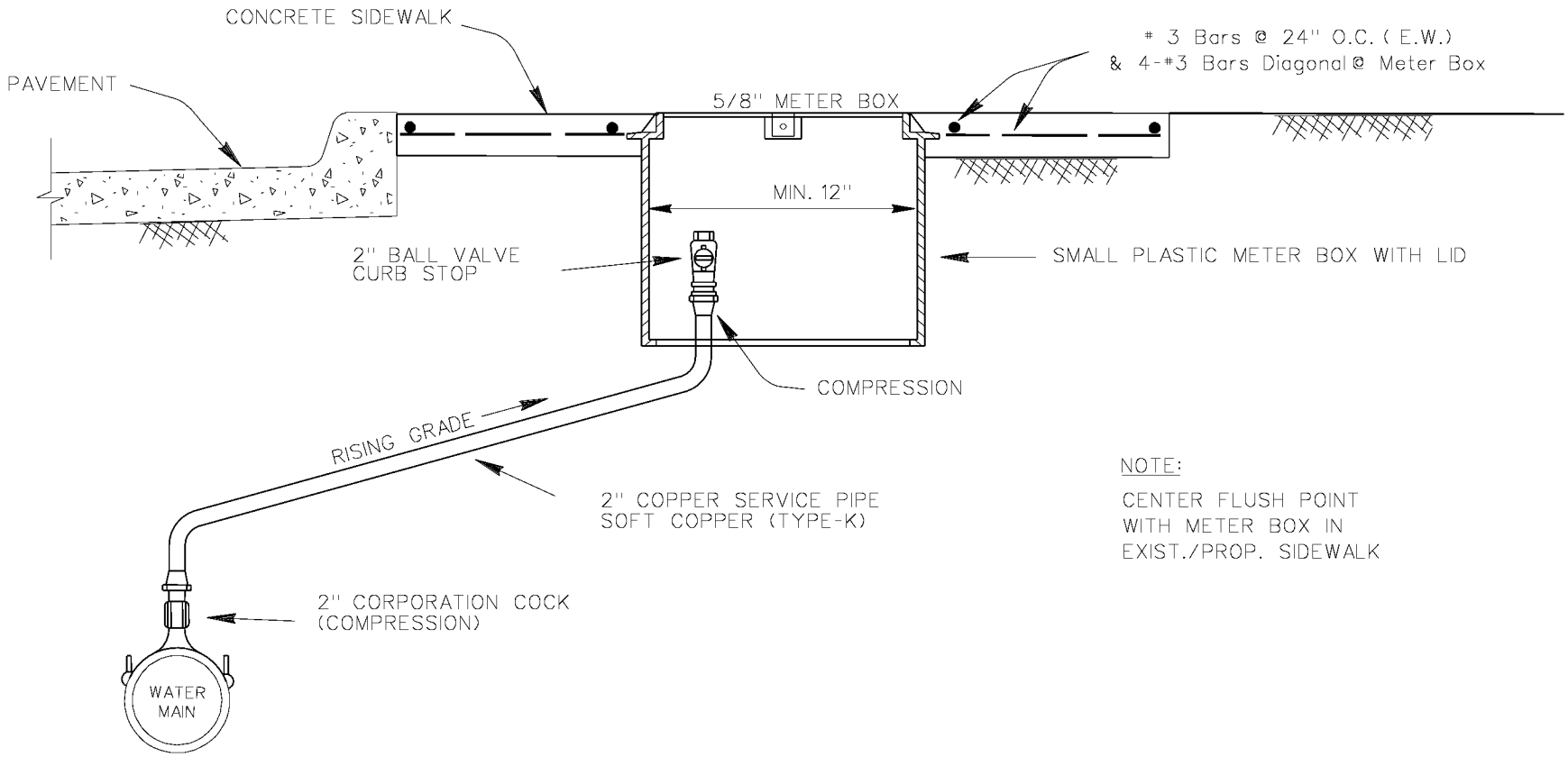
Plan View

Profile View

REFER TO PAGES 206B & 206C

AMI Meter Installation Details For 3" And Larger Meters

	DWU	(PAGE No.) 206D
	DATE MAY 2012	



NOTE:

CENTER FLUSH POINT
WITH METER BOX IN
EXIST./PROP. SIDEWALK

MANUAL FLUSH POINT

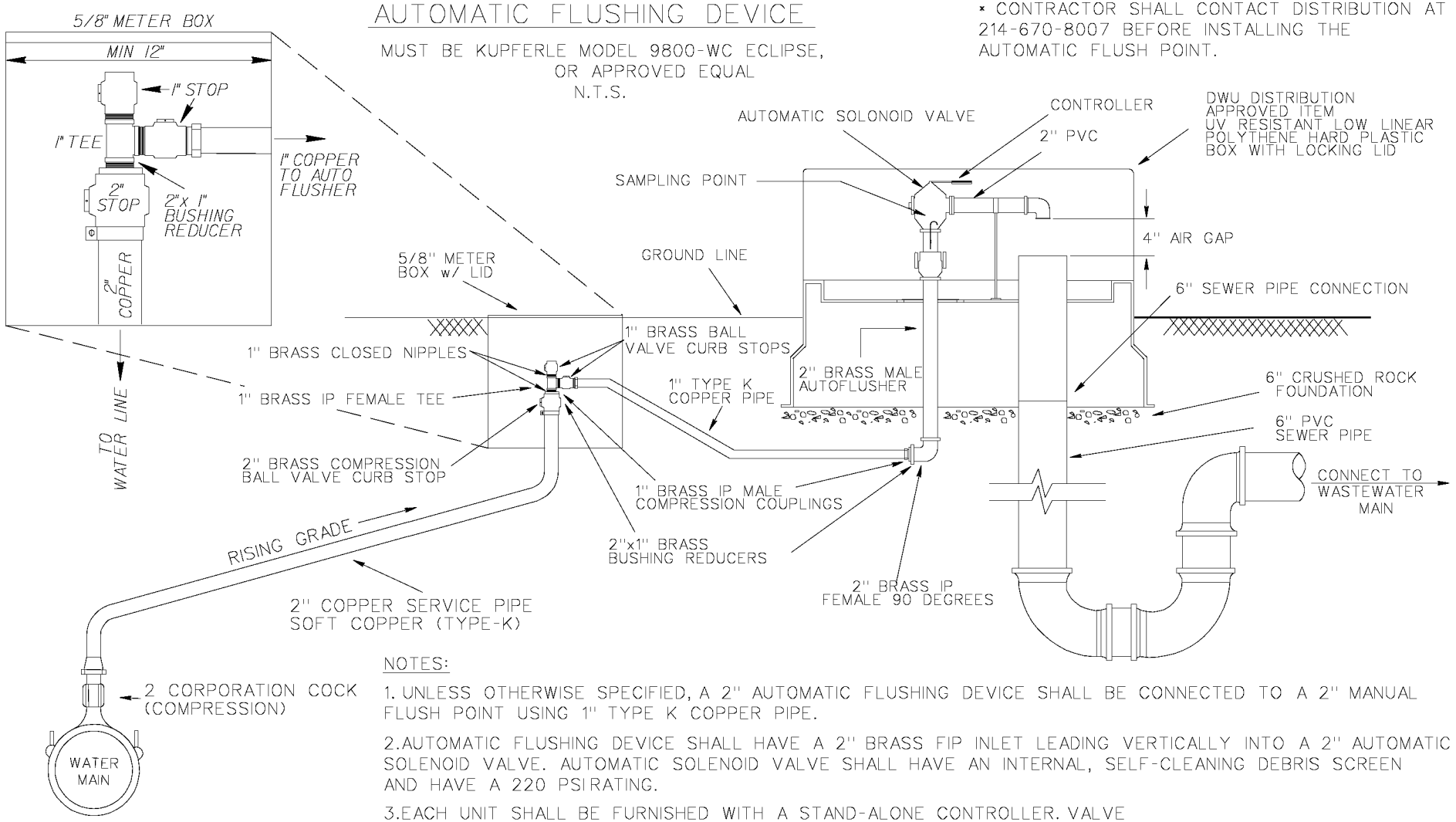
2 INCH MINIMUM
OR
LARGER/SMALLER IF STATED ON PLANS
N.T.S.

MANUAL FLUSH POINT INSTALLATION		DWU	(Page No.) 207
		DATE OCT. 2012	

AUTOMATIC FLUSHING DEVICE

MUST BE KUPFERLE MODEL 9800-WC ECLIPSE,
OR APPROVED EQUAL
N.T.S.

* CONTRACTOR SHALL CONTACT DISTRIBUTION AT 214-670-8007 BEFORE INSTALLING THE AUTOMATIC FLUSH POINT.



NOTES:

1. UNLESS OTHERWISE SPECIFIED, A 2" AUTOMATIC FLUSHING DEVICE SHALL BE CONNECTED TO A 2" MANUAL FLUSH POINT USING 1" TYPE K COPPER PIPE.

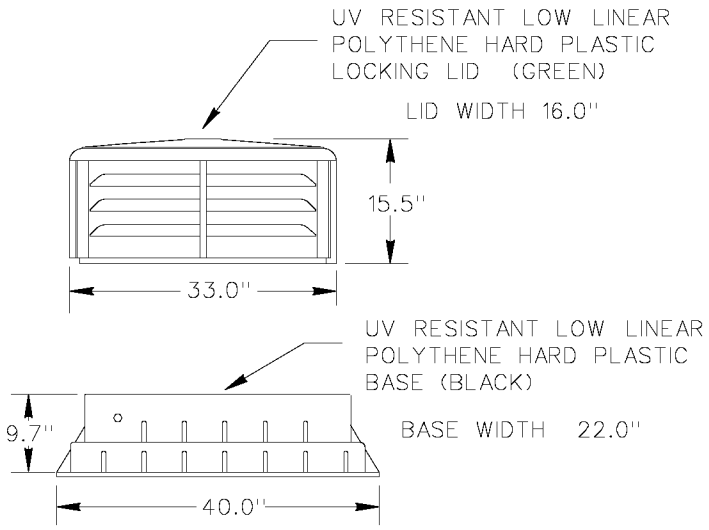
2. AUTOMATIC FLUSHING DEVICE SHALL HAVE A 2" BRASS FIP INLET LEADING VERTICALLY INTO A 2" AUTOMATIC SOLENOID VALVE. AUTOMATIC SOLENOID VALVE SHALL HAVE AN INTERNAL, SELF-CLEANING DEBRIS SCREEN AND HAVE A 220 PSI RATING.

3. EACH UNIT SHALL BE FURNISHED WITH A STAND-ALONE CONTROLLER. VALVE CONTROLLER WILL NOT REQUIRE A SECOND HAND-HELD DEVICE FOR PROGRAMMING. CONTROLLER MUST HAVE A MINIMUM OF 9 POSSIBLE FLUSHING CYCLES PER DAY, SHALL BE SUBMERSIBLE TO 12 FEET, OPERATE 9 VOLT BATTERY AND HAVE RESIN-SEALED ELECTRICAL COMPONENTS. SOLENOID SHALL HAVE NO LOOSE PARTS WHEN REMOVED FROM VALVE. EACH UNIT SHALL HAVE A DOUBLE VALVE, ALL BRASS SAMPLING POINT. REMOVAL OF 2" SOLENOID VALVE SHALL BE POSSIBLE VIA A QUICK DISCONNECT BELOW THE VALVE.

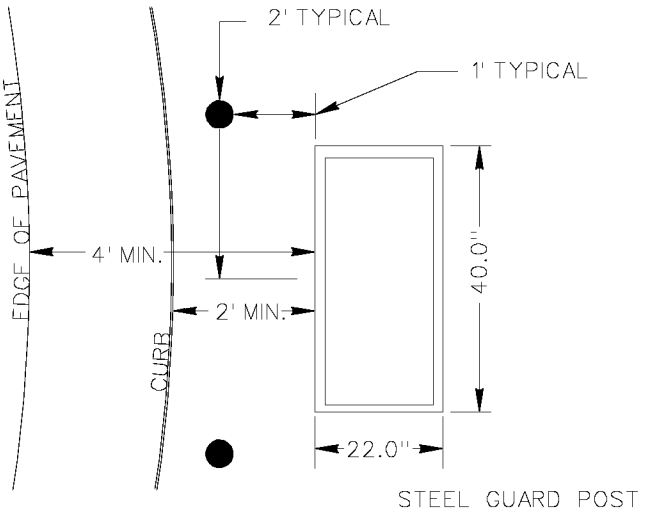
4. ALL ABOVE-GROUND COMPONENTS SHALL BE CONTAINED WITHIN A UV-RESISTANT LOCKING COVER KUPFERLE FOUNDRY COMPANY. 2511 NORTH 9TH STREET ST. LOUIS, MO. 63102 1-800-231-3990.

AUTOMATIC FLUSH POINT		DWU	(Page No.) 207 A
		DATE OCT 2012	

AUTOMATIC FLUSHING DEVICE DIMENSION



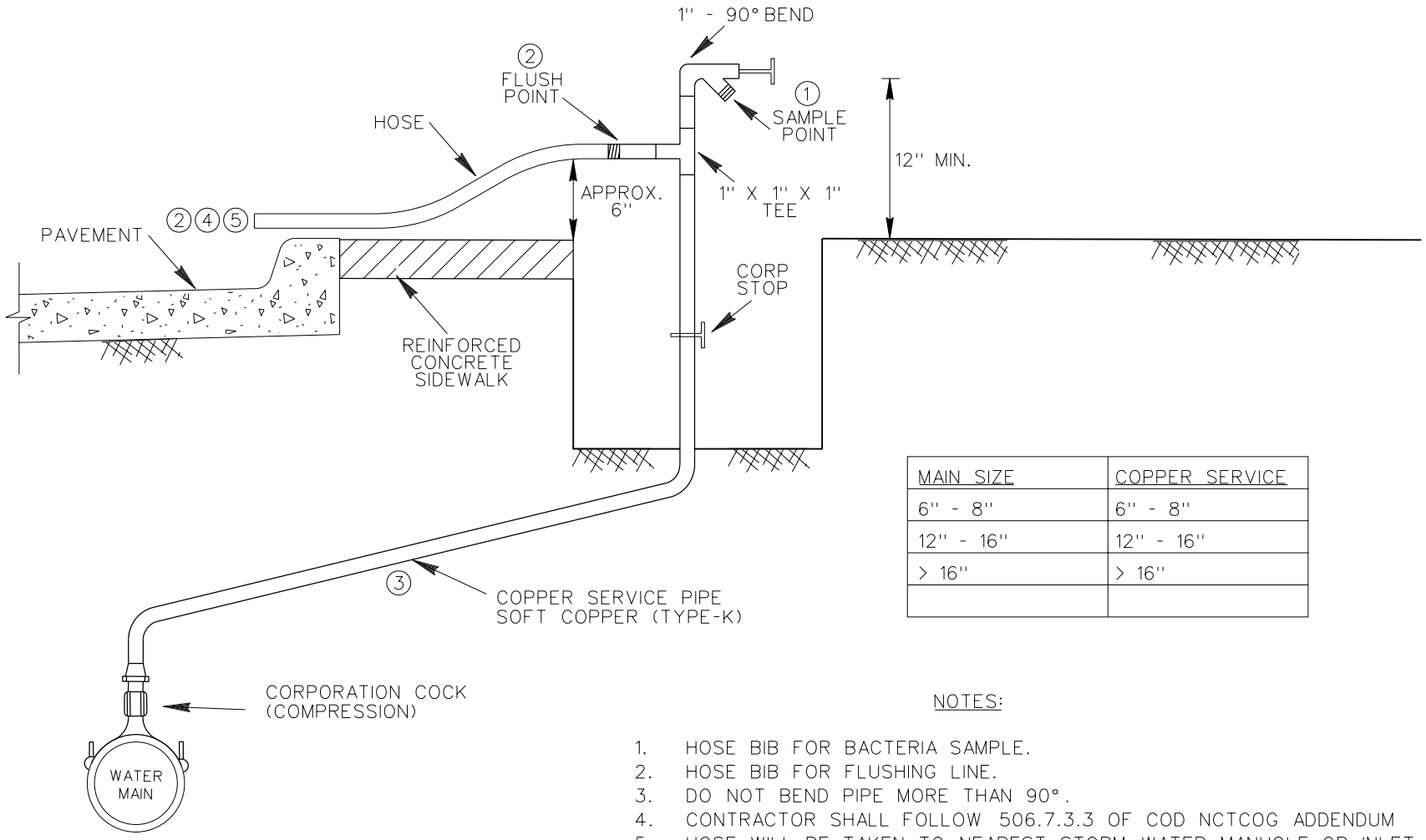
AUTO FLUSH POINT STREET LOCATION



NOTES:

1. SIDEWALK: SET 1 FT MIN BEHIND SIDEWALK
2. NO SIDEWALK: SET 2 FT MIN BEHIND CURB
   INSTALL 2 - 6" STEEL GUARD POSTS AS PER STANDARD DRAWINGS 236
3. NO CURB: SET 4 FT MIN BEHIND STREET
   INSTALL 2 - 6" STEEL GUARD POSTS AS PER STANDARD DRAWINGS 236

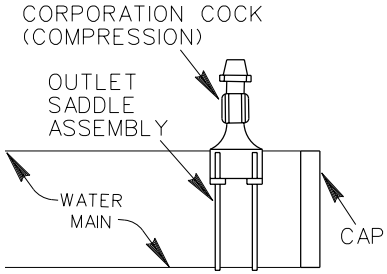
AUTOMATIC FLUSH POINT LOCATION		DWU	(PAGE NO.) 207B
		DATE OCT. 2012	



MAIN SIZE	COPPER SERVICE
6" - 8"	6" - 8"
12" - 16"	12" - 16"
> 16"	> 16"

NOTES:

1. HOSE BIB FOR BACTERIA SAMPLE.
2. HOSE BIB FOR FLUSHING LINE.
3. DO NOT BEND PIPE MORE THAN 90°.
4. CONTRACTOR SHALL FOLLOW 506.7.3.3 OF COD NCTCOG ADDENDUM
5. HOSE WILL BE TAKEN TO NEAREST STORM WATER MANHOLE OR INLET.



MAIN LATERAL VIEW
N.T.S.

TEMPORARY FLUSH POINT WITH SAMPLE POINT

N.T.S.

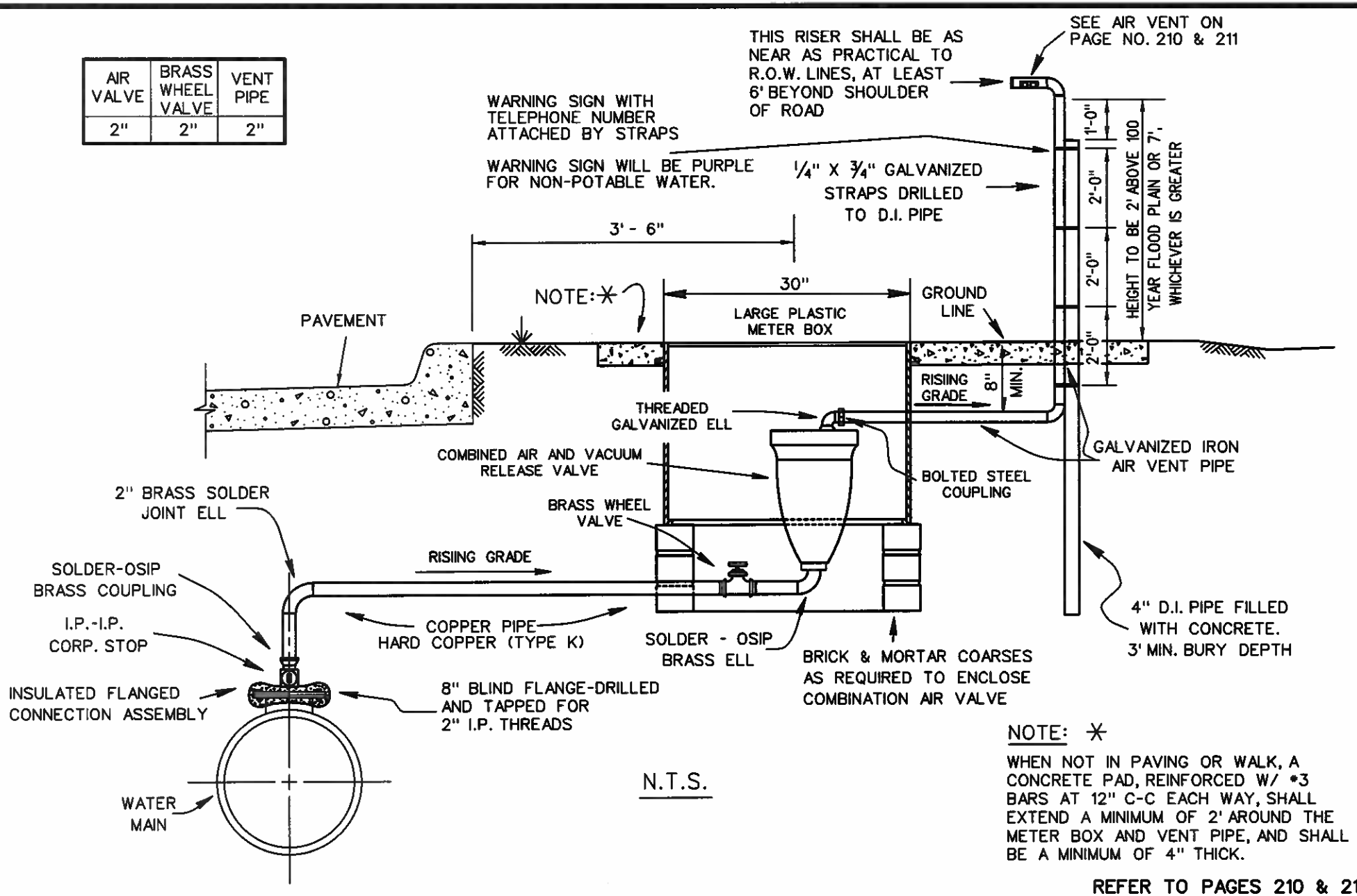
FLUSH POINT WITH SAMPLE POINT INSTALLATION

DWU

(Page No.) 207C

DATE DEC. 2011

AIR VALVE	BRASS WHEEL VALVE	VENT PIPE
2"	2"	2"



N.T.S.

NOTE: *

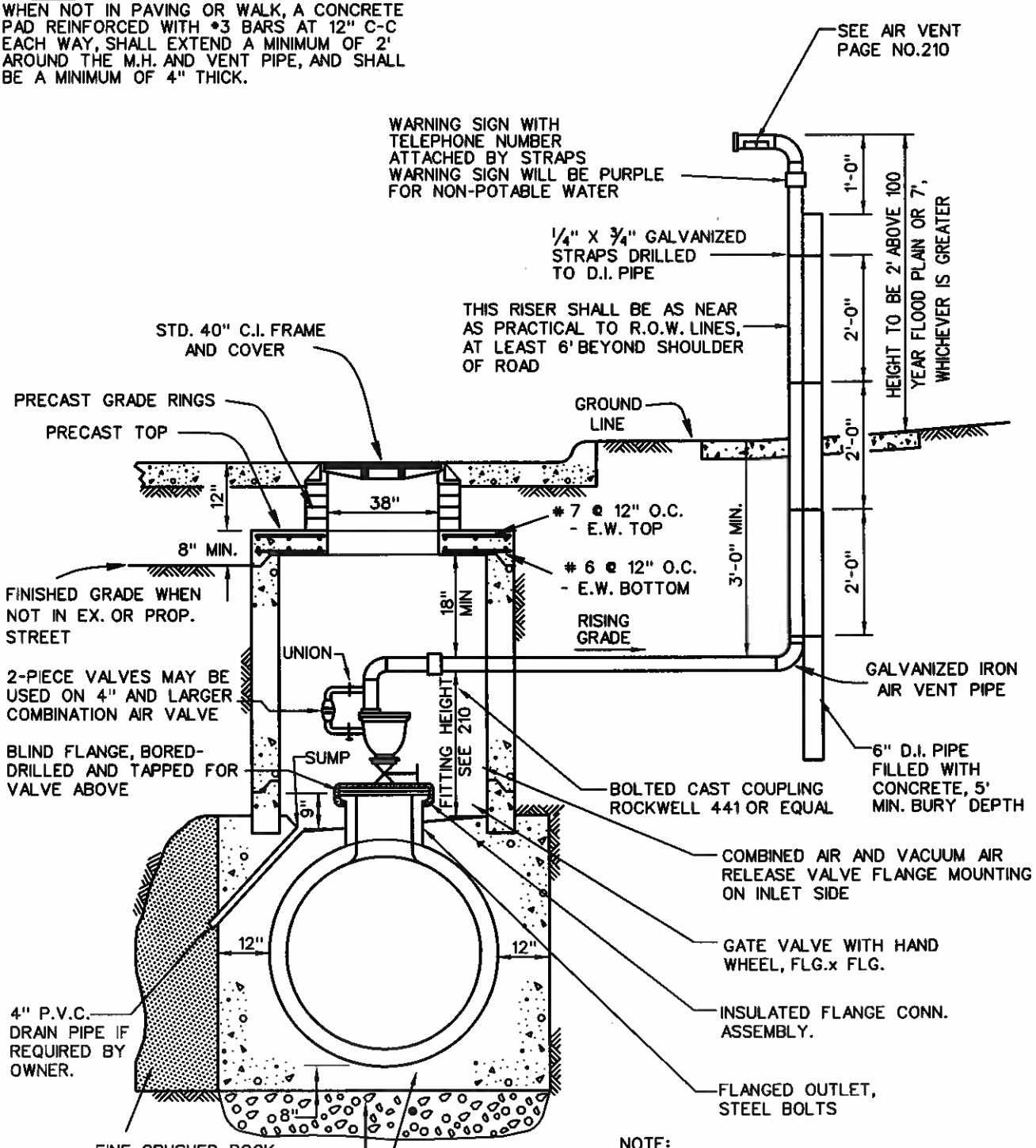
WHEN NOT IN PAVING OR WALK, A CONCRETE PAD, REINFORCED W/ #3 BARS AT 12" C-C EACH WAY, SHALL EXTEND A MINIMUM OF 2' AROUND THE METER BOX AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.

REFER TO PAGES 210 & 211

AIR RELEASE VALVE TYPE "1"

DWU	(Page No.)	208
DATE OCT. 2011		

NOTE:
WHEN NOT IN PAVING OR WALK, A CONCRETE PAD REINFORCED WITH #3 BARS AT 12" C-C EACH WAY, SHALL EXTEND A MINIMUM OF 2' AROUND THE M.H. AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.

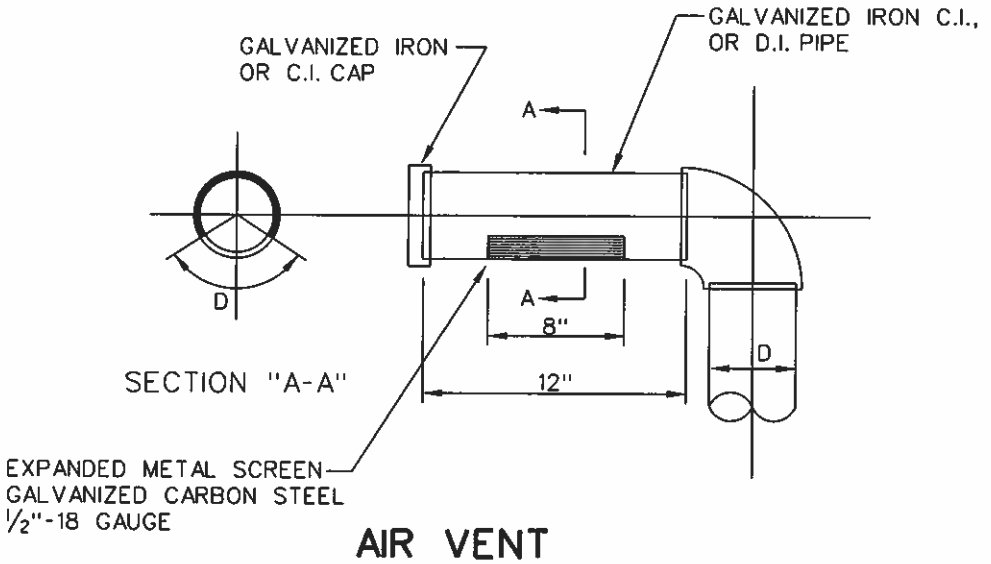


NOTE:
ON 4" AND LARGER TWO PIECE COMBINATION AIR VALVES, THE OUTLET PIPING OF THE SMALL VALVE SHALL BE VENTED INTO THE SIDE OF THE LARGER VENT PIPE THAT GOES ABOVE GROUND.

REFER TO PAGES 210 & 211

AIR RELEASE VALVE TYPE "2"

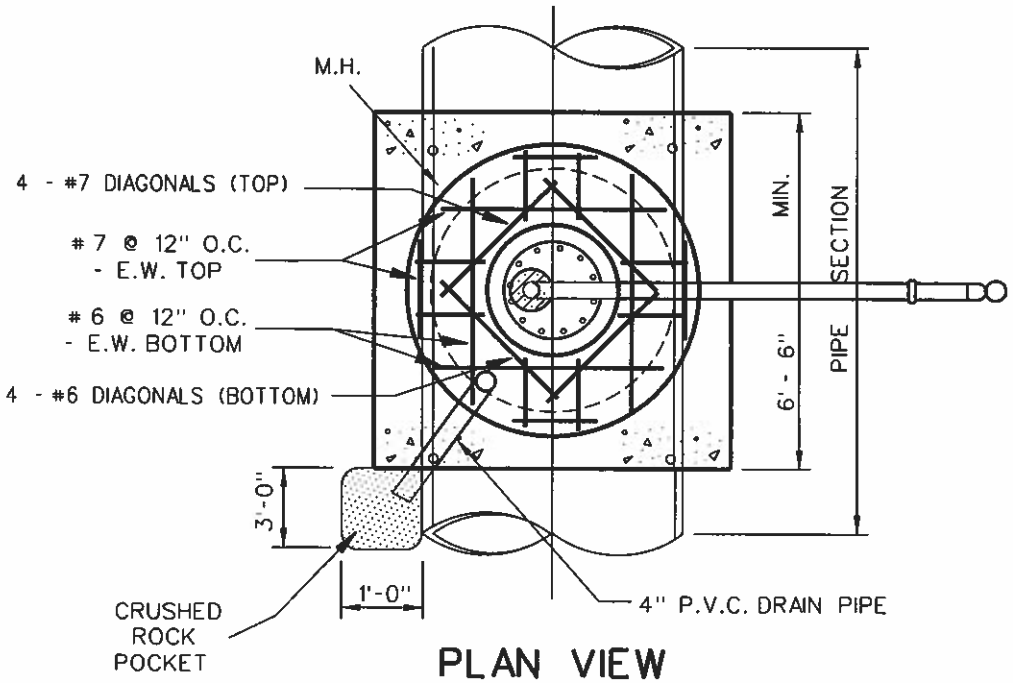
DWU	(Page No.)	209
DATE OCT. 2011		



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 PAINTED BLACK IRON
3"	3"	18"	31"	3"	5'	
4"	4"	18"	38"	4"	5'	CLASS 52 DUCTILE IRON
6"	6"	18"	46"	6"	5'	
8"	8"	18"	53"	8"	6'	
10"	10"	20"	62"	10"	6'	
12"	12"	24"	72"	12"	6'	



PLAN VIEW

N.T.S.

REFER TO PAGES 208, 209, & 211

AIR RELEASE VALVE TYPE "2"

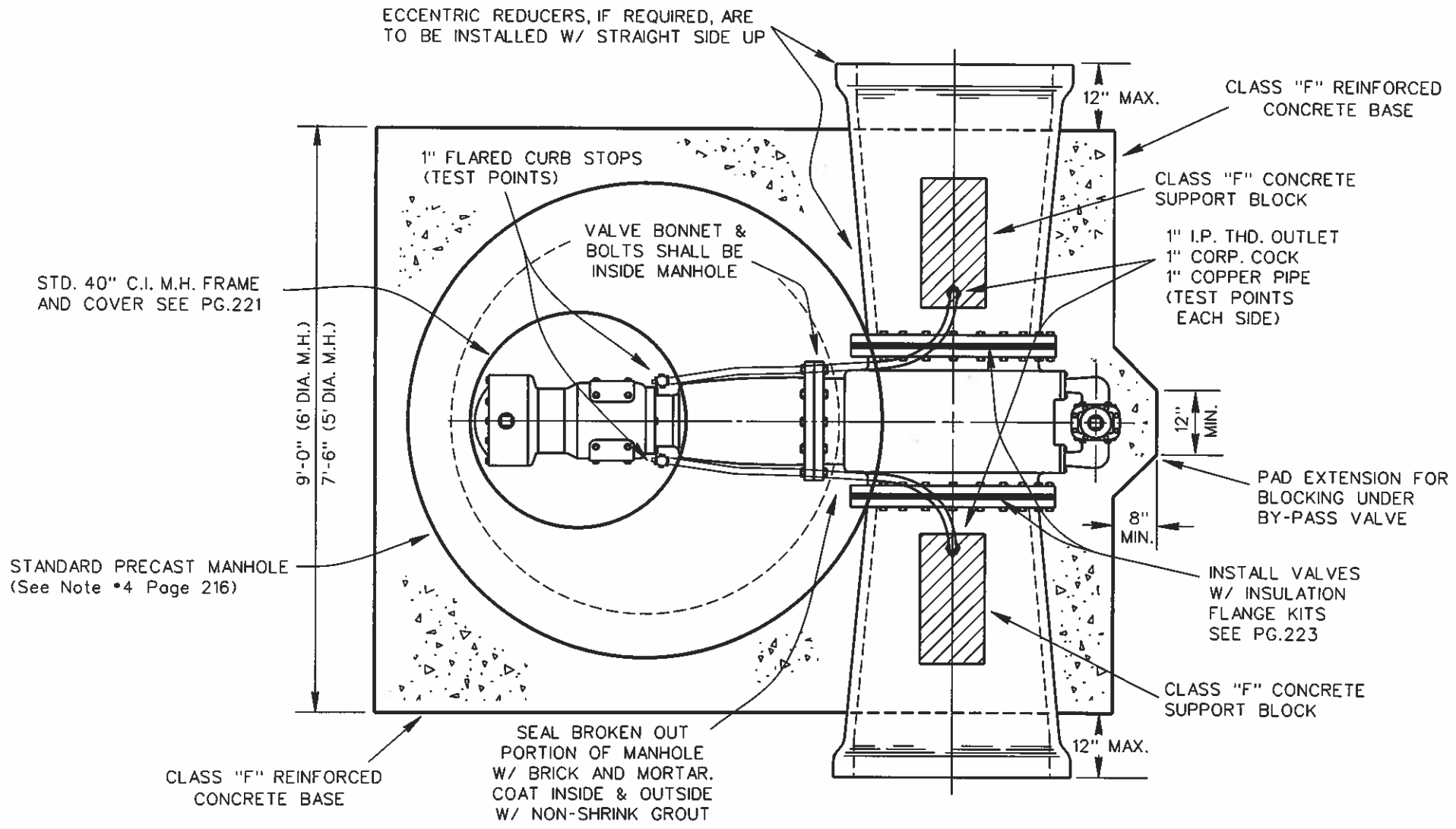
DWU		(Page No.) 210
DATE OCT. 2009		

GENERAL NOTES

1. Manholes must be precast.
2. 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. Where the air valve is installed on a non-potable water line, the sign must be painted purple to designate the type of water.
4. Vent pipe must be extended a minimum of 2 feet above the water surface of the 100 year flood (AS STATED ON DESIGN PLANS), or 7 feet above ground line, whichever is greater
5. All underground portions of Ductile Iron Pipe will be encased in polywrap.
6. The following table of dimensions govern the required depths of cover for the installation of Type 2 air valves within public rights-of-ways:

TABLE OF DIMENSIONS FOR DEPTH 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

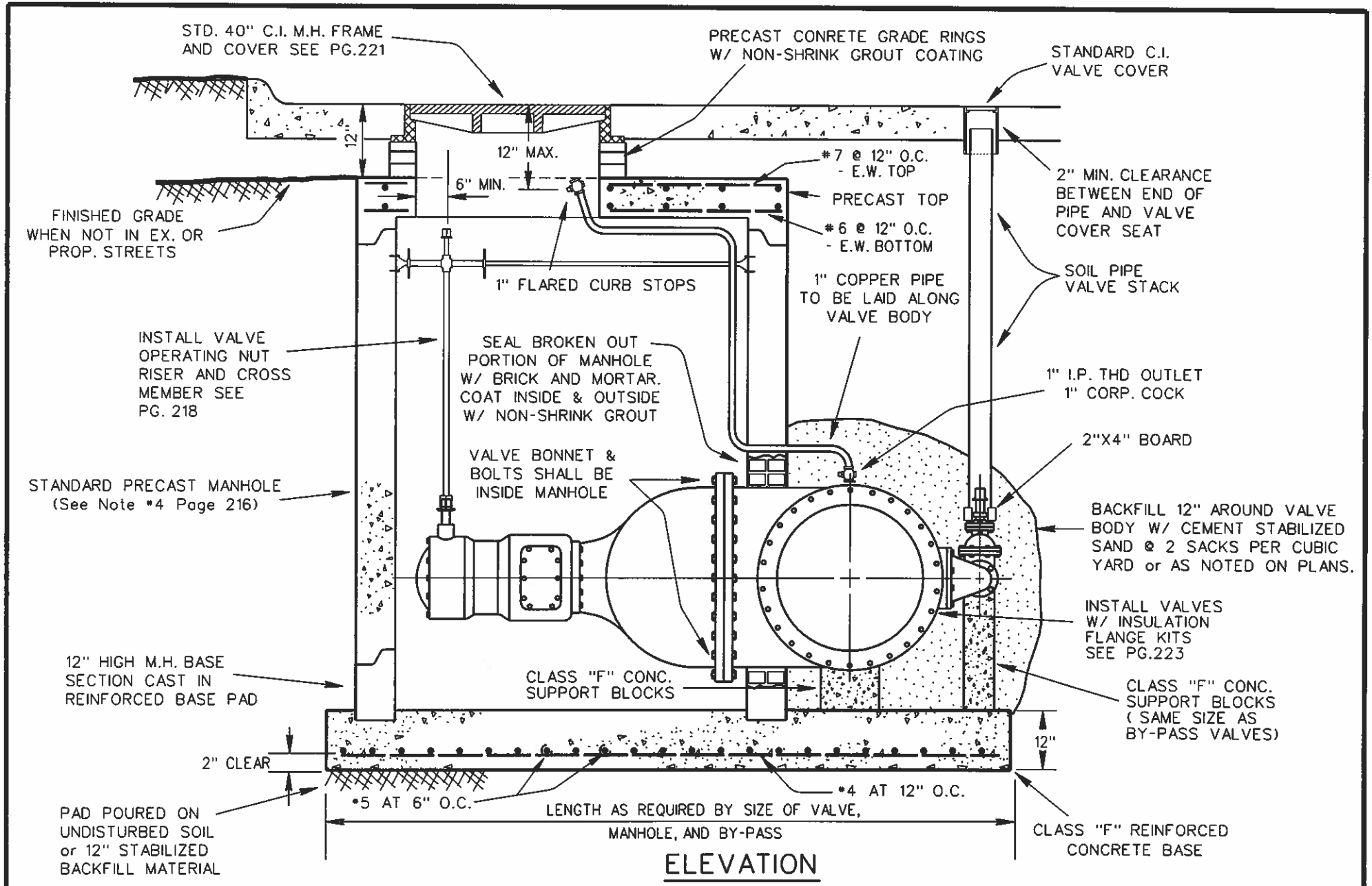


PLAN

REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

HORIZONTAL GATE VALVE WITH MANHOLE INSTALLATION

DWU	(Page No.) 212
DATE OCT.2009	

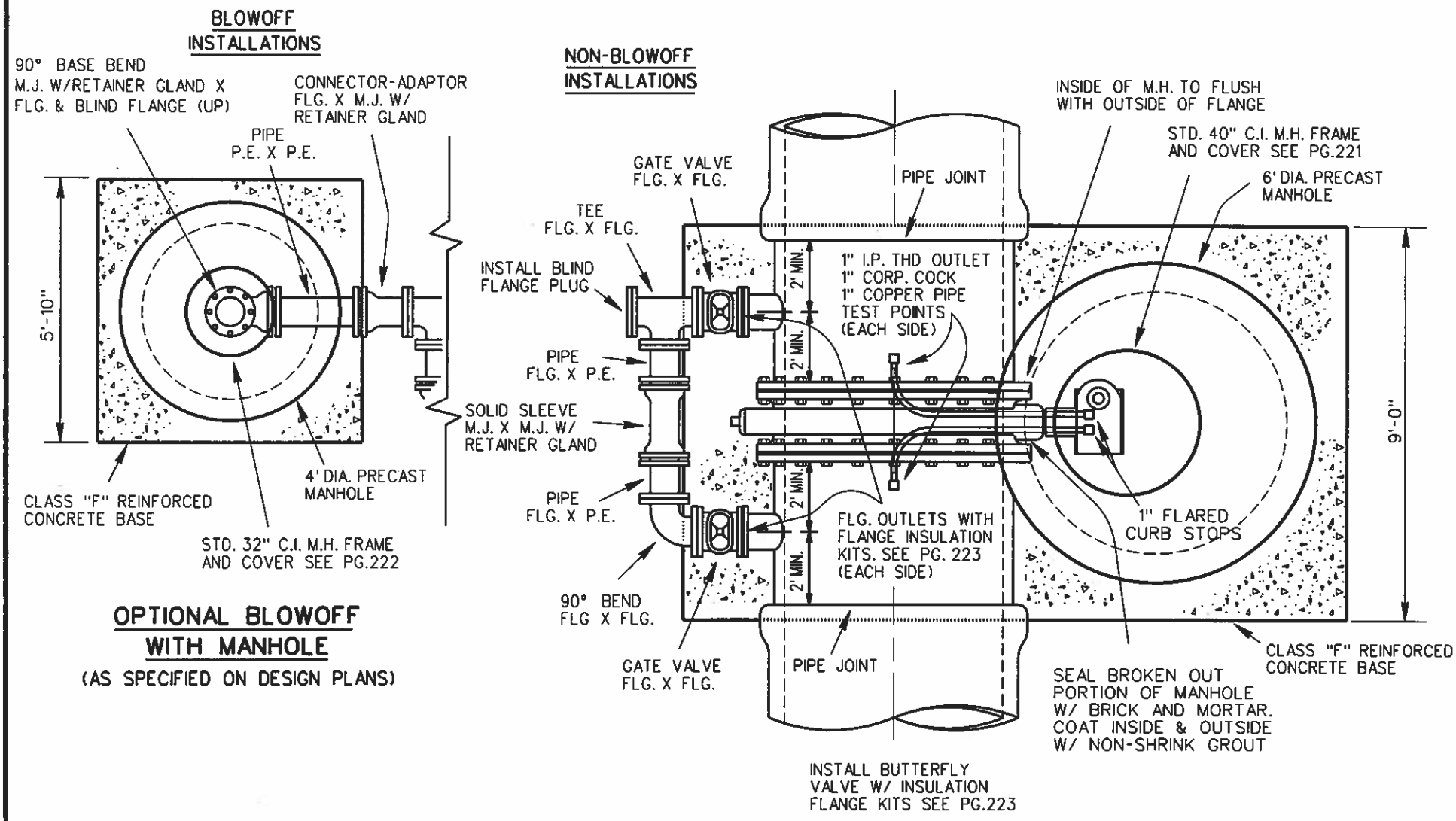


ELEVATION

REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

HORIZONTAL GATE VALVE WITH MANHOLE INSTALLATION

DWU	(Page No.) 213
DATE OCT. 2010	



OPTIONAL BLOWOFF WITH MANHOLE

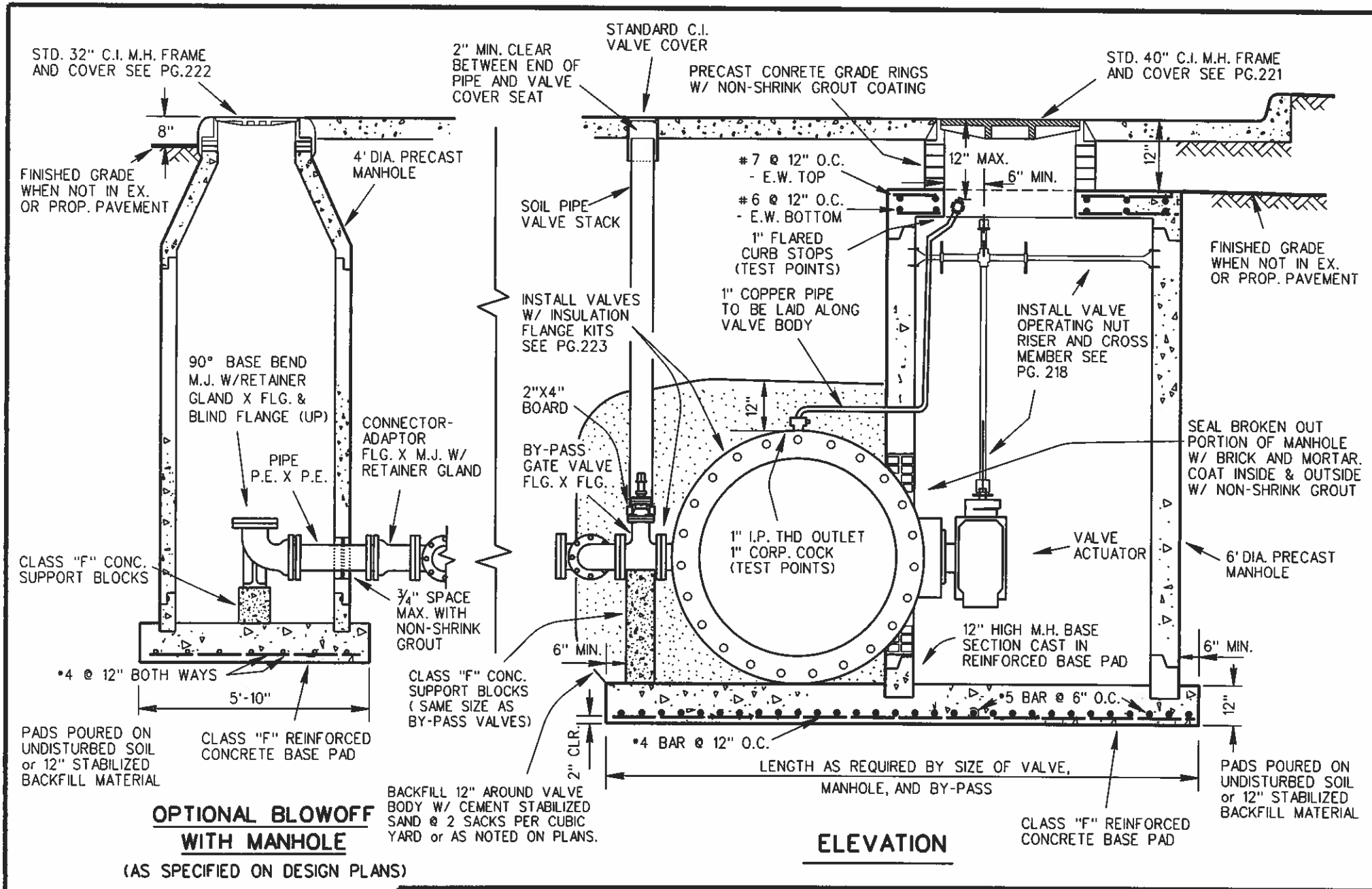
(AS SPECIFIED ON DESIGN PLANS)

PLAN

REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

BUTTERFLY VALVE WITH MANHOLE INSTALLATION

	DWU	(Page No.) 214
	DATE OCT.2009	



OPTIONAL BLOWOFF WITH MANHOLE

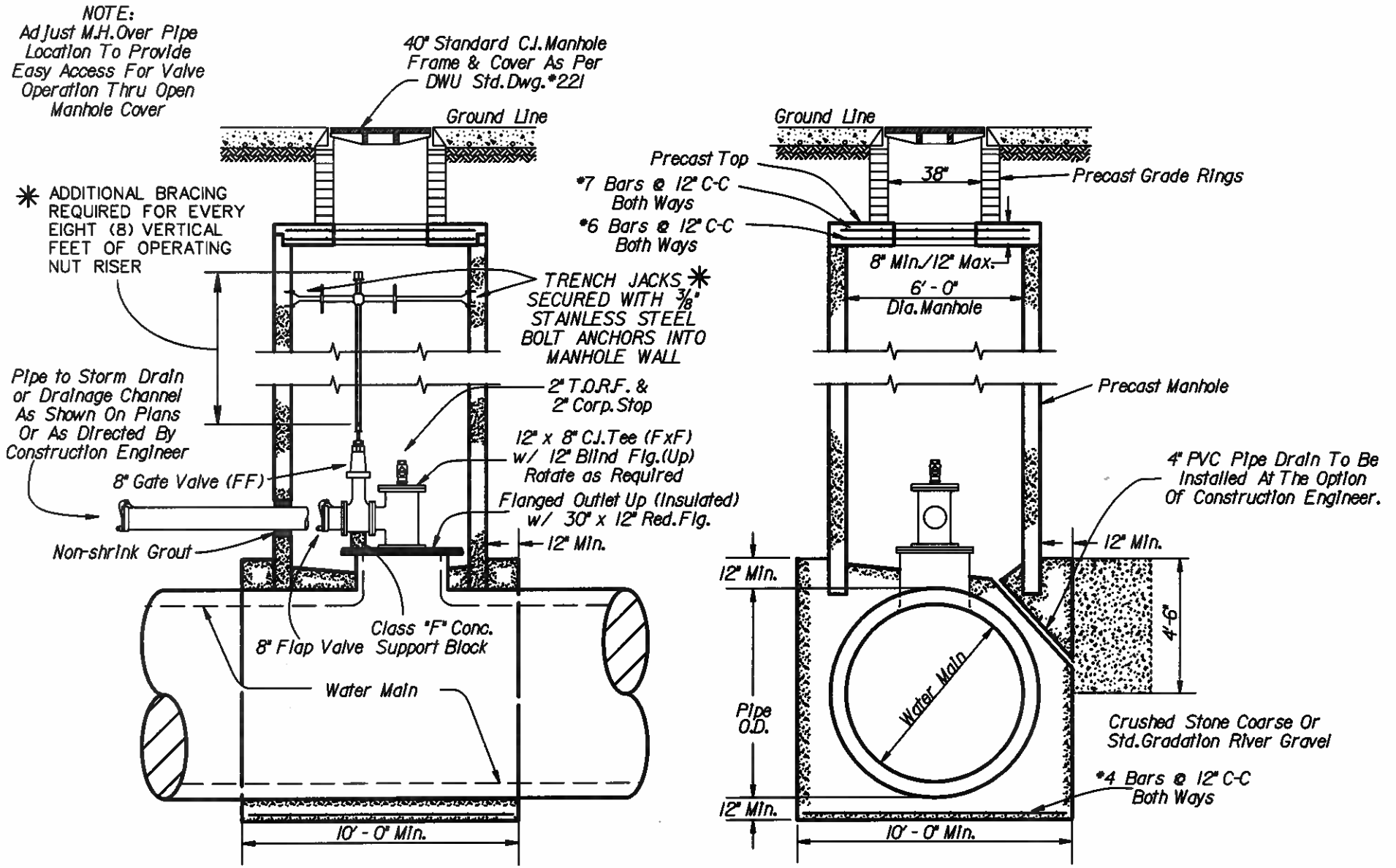
(AS SPECIFIED ON DESIGN PLANS)

ELEVATION

REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

BUTTERFLY VALVE WITH MANHOLE INSTALLATION

DWU	(Page No.) 215
DATE OCT. 2010	



FLANGED OUTLET SIZES	
Pipe Diameter	Flange Size
42" and smaller	12"
48" and larger	30"

REFER TO PAGE 218

LARGE MAIN BLOW-OFF

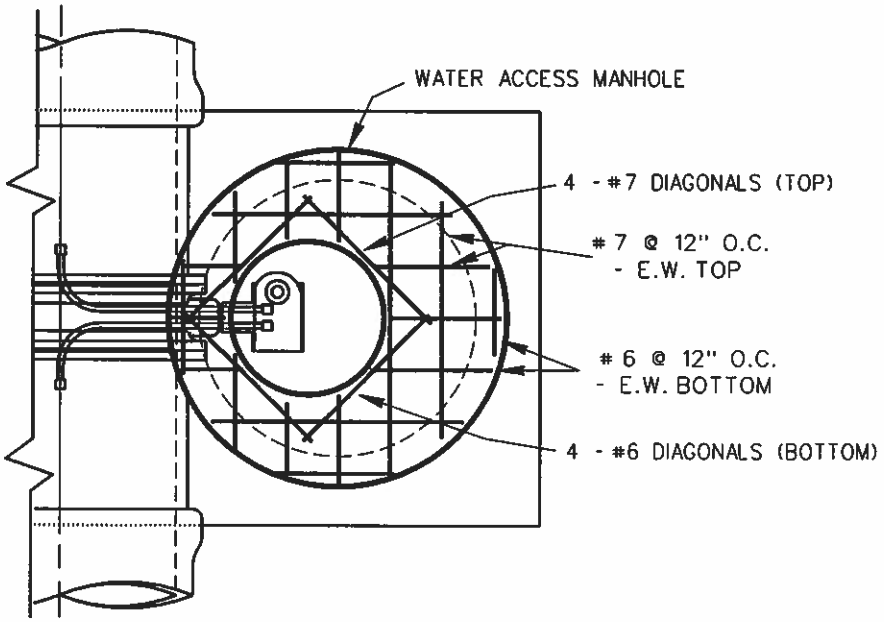
DWU

(Page No.) 215A

DATE OCT. 2011

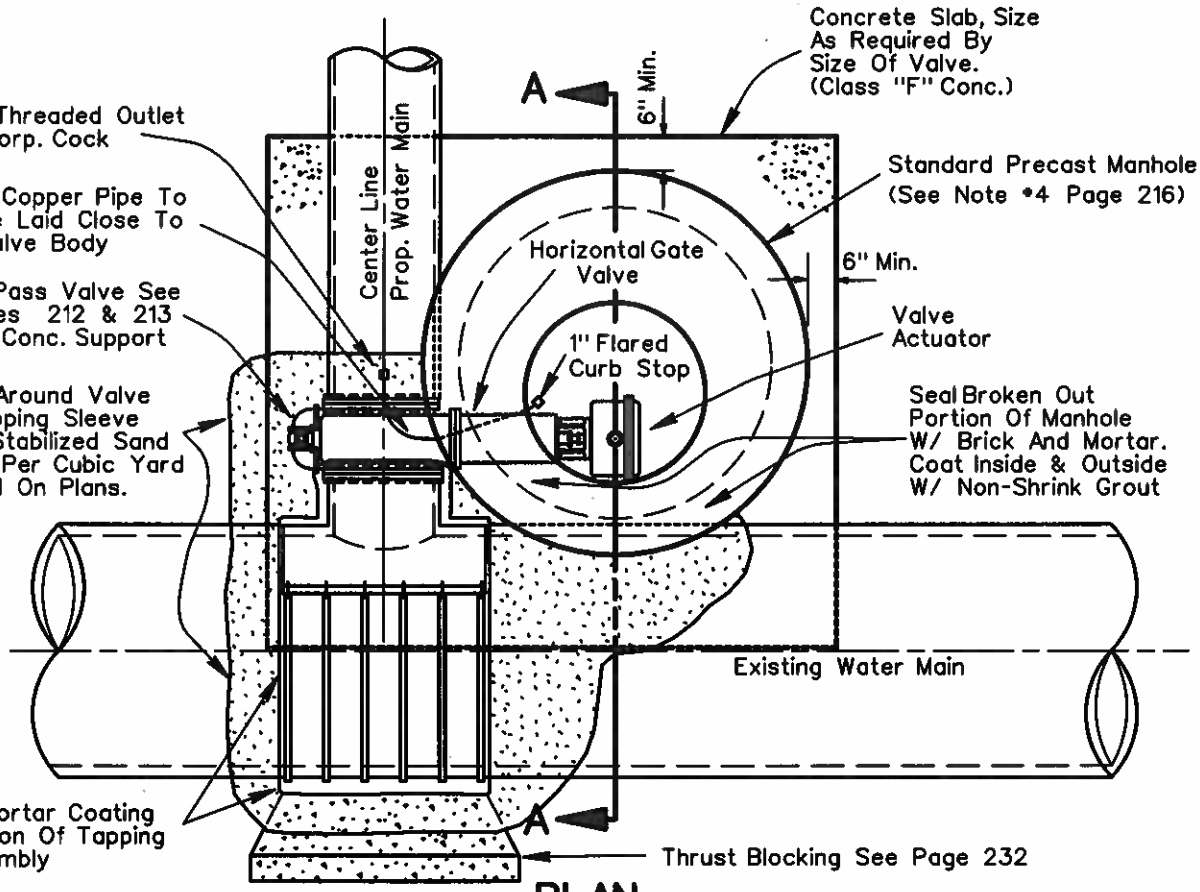
GENERAL NOTES

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.

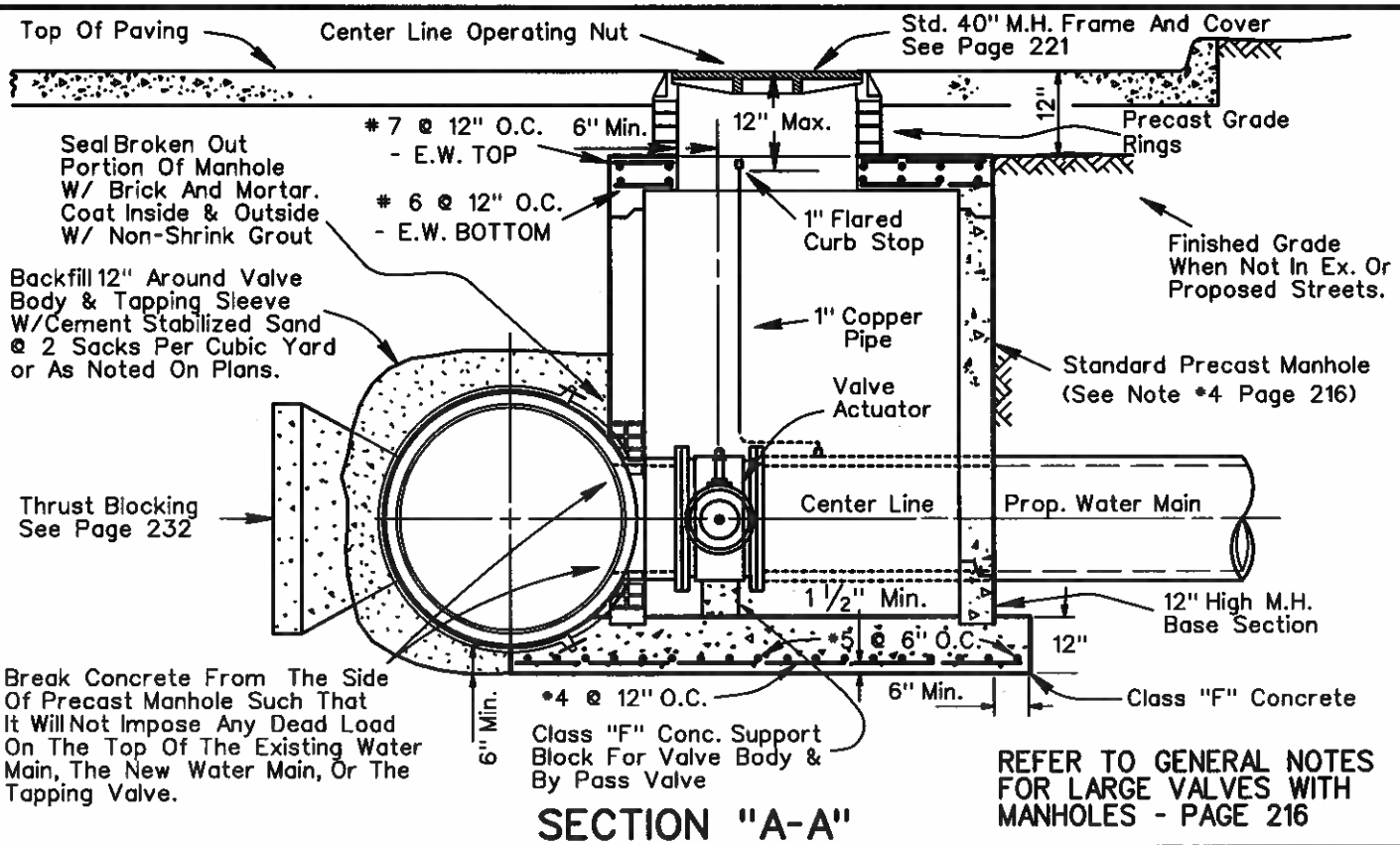


PLAN VIEW FOR TYPICAL REINFORCING
FOR WATER ACCESS MANHOLE TOPS
(MANHOLE FOR VALVE ACCESS SHOWN)

GENERAL NOTES FOR LARGE VALVES WITH MANHOLES		DWU	(Poge No.) 216
		DATE OCT. 2010	



PLAN

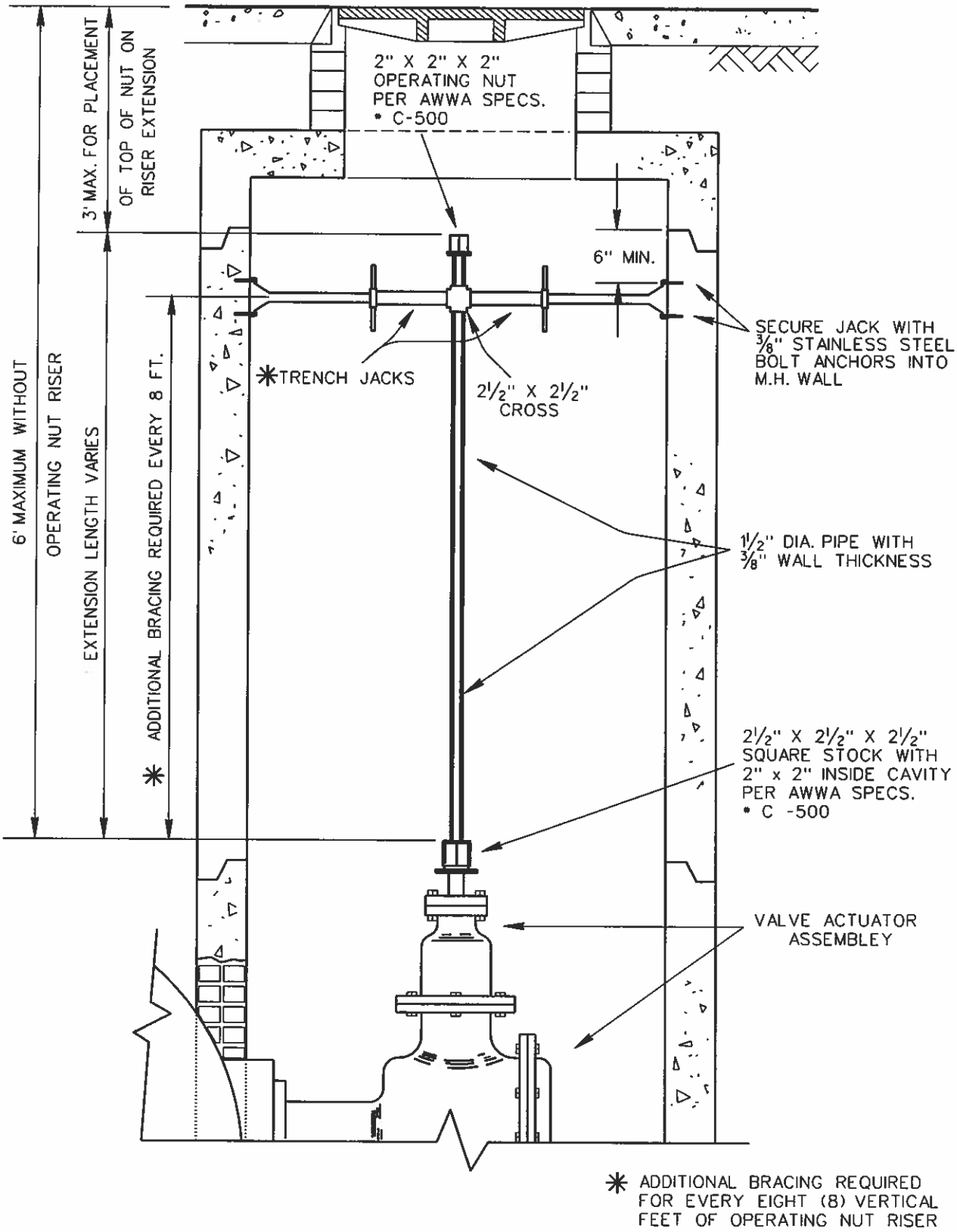


SECTION "A-A"

REFER TO GENERAL NOTES FOR LARGE VALVES WITH MANHOLES - PAGE 216

LARGE TAPPING VALVE INSTALLATION

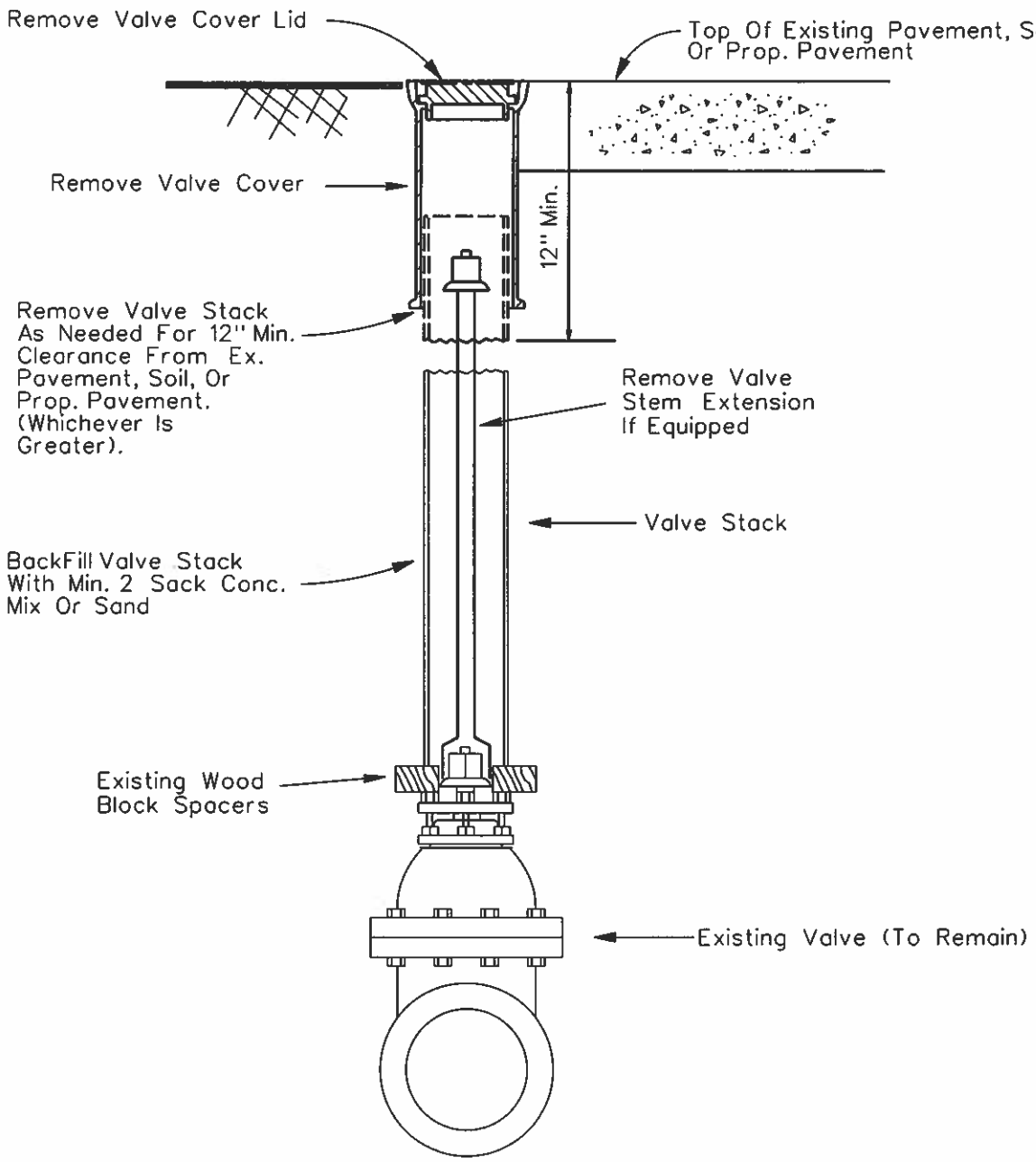
		(PAGE NO.)
DWU		217
DATE OCT. 2011		



* ADDITIONAL BRACING REQUIRED FOR EVERY EIGHT (8) VERTICAL FEET OF OPERATING NUT RISER

OPERATING NUT RISER
(For Large Valve Installations)

DWU		(PAGE NO.) 218
DATE DEC.2001		



NOT IN PAVEMENT

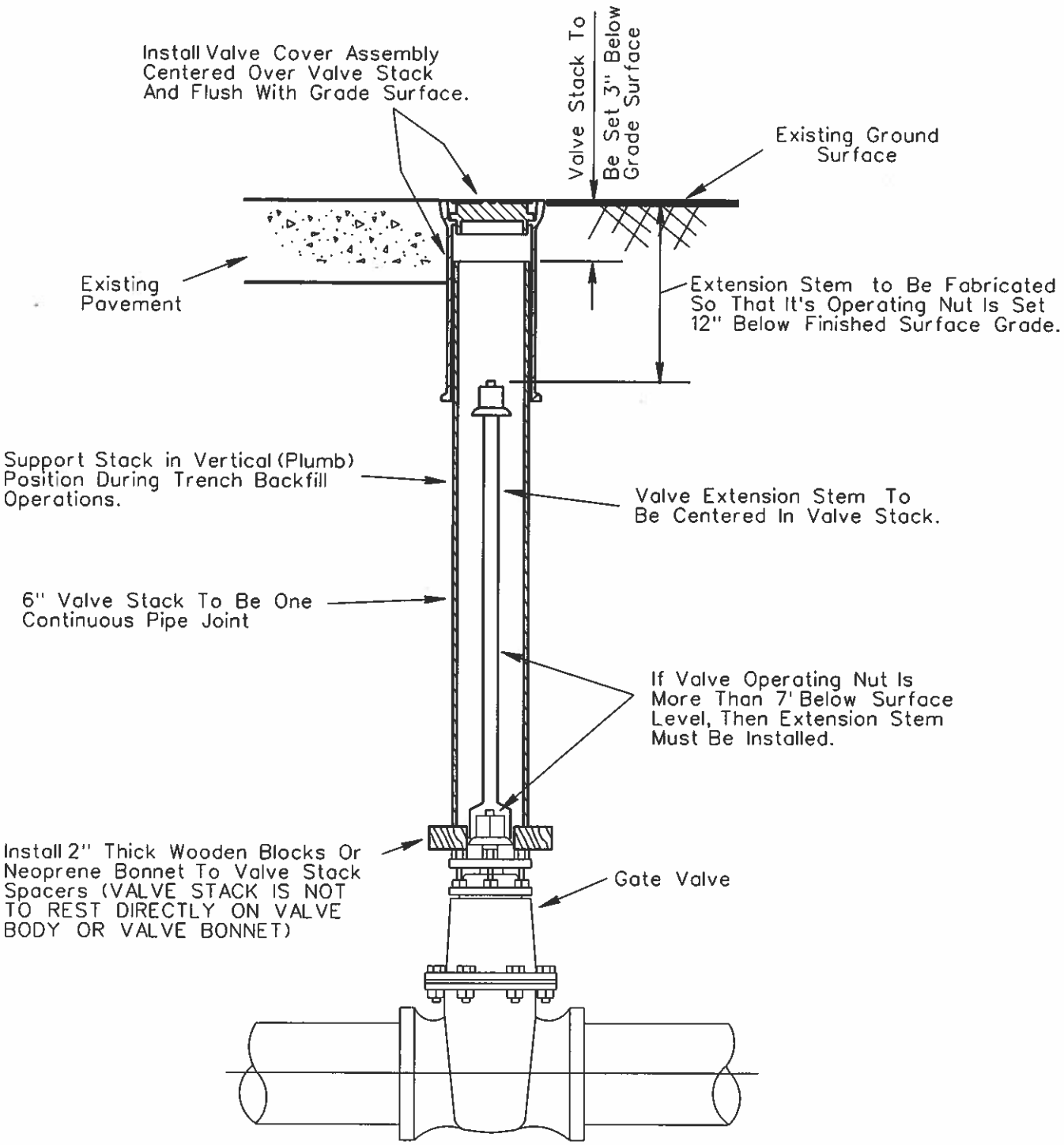
Match Existing Soil & Compact As Needed Or As Required By Construction Inspector.

IN PAVEMENT

All Cuts And Repairs To Ex. Paving Must Conform P.W. & T. Pavement Cut And Repair Standards Manual.

4" to 16" GATE VALVE ABANDONMENT

DWU		(PAGE NO.) 219
DATE JAN. 2010		

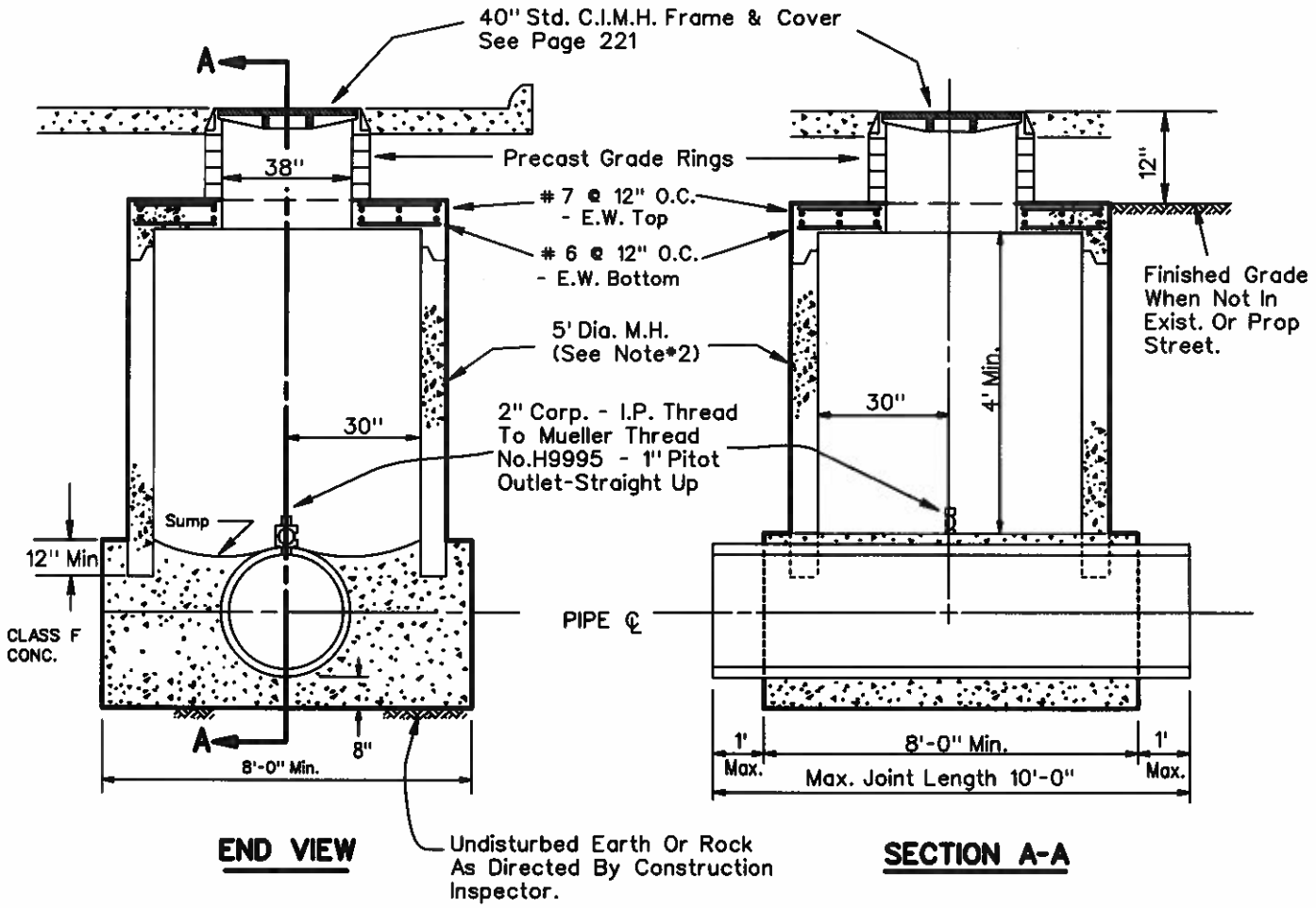


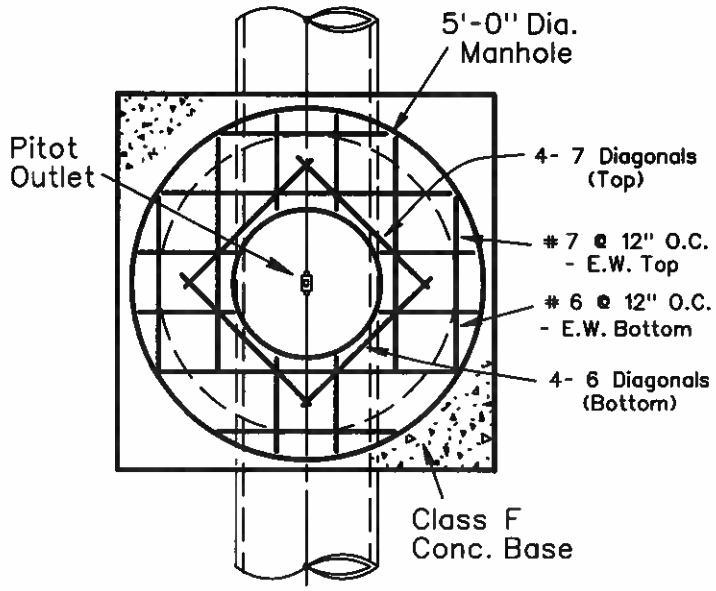
4" to 16" GATE VALVE COVER, STACK, & STEM INSTALLATION

DWU

(PAGE NO.) 219A

DATE JUNE 2002



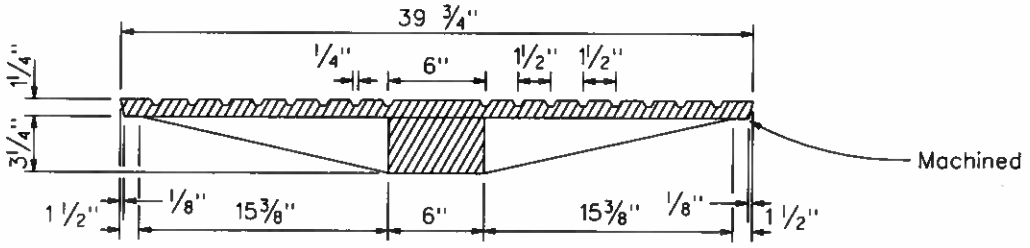


TOP VIEW

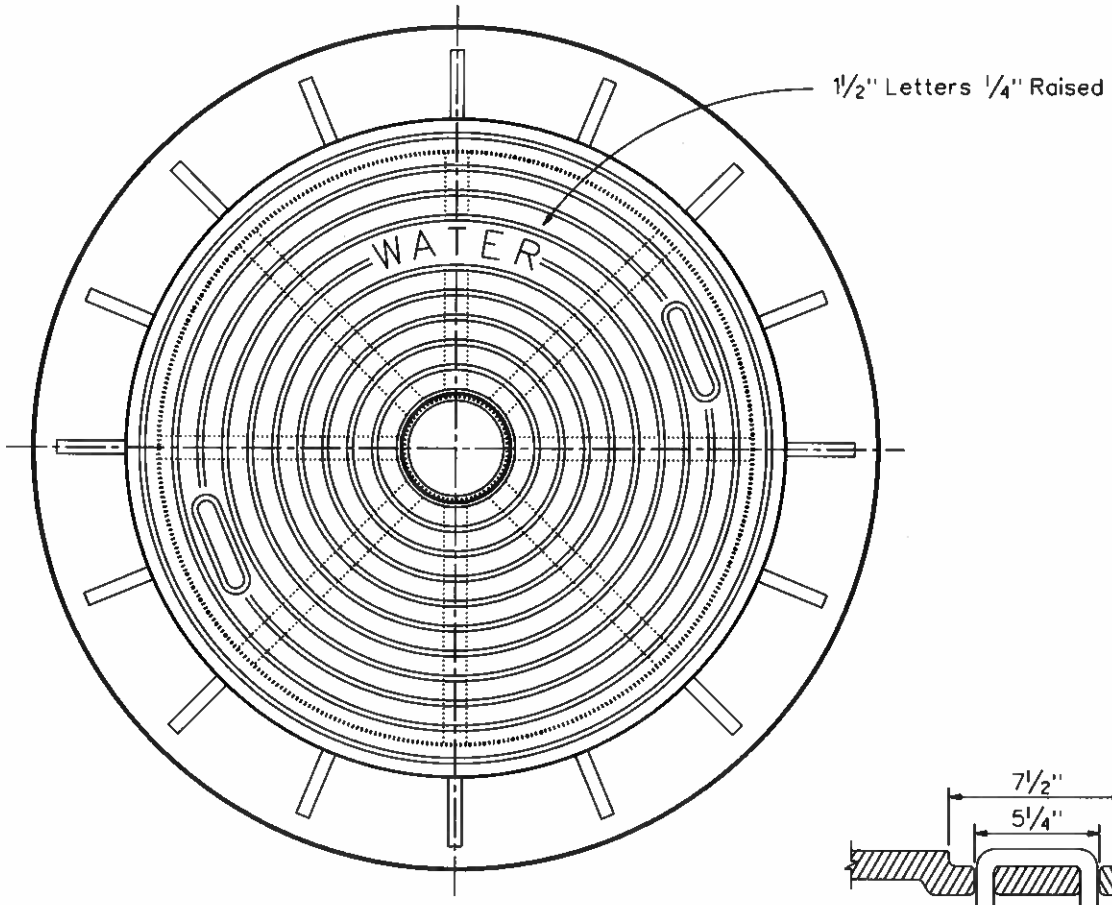
NOTES

1. Locate Pitot Outlets At Least 20 Pipe Diameters From Any Bends, Tees, Reducers Or Other Obstructions.
2. Precast Grade Rings Shall Be Eliminated When Not In Existing Or Proposed Street (Open Country). In This Case, 40" Standard C.I. M.H. Frame And Cover Shall Be Set In M.H. Top.

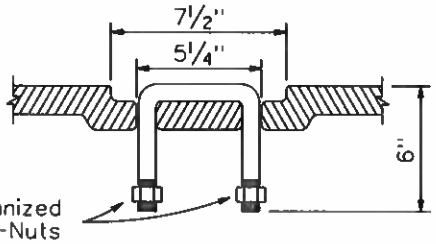
PITOT OUTLET		DWU	(PAGE NO.) 220
		DATE OCT. 2011	

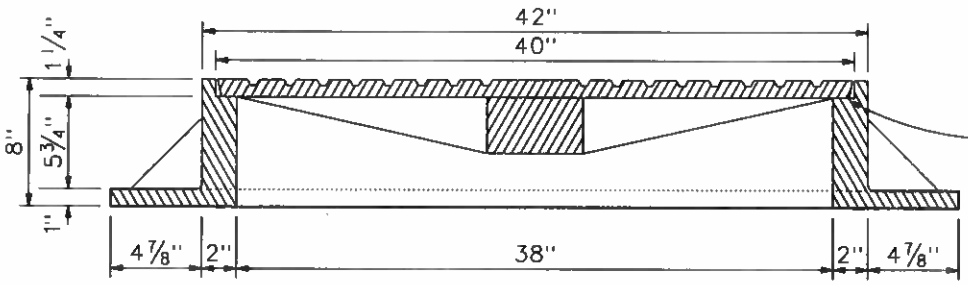


SECTION THRU COVER



PLAN

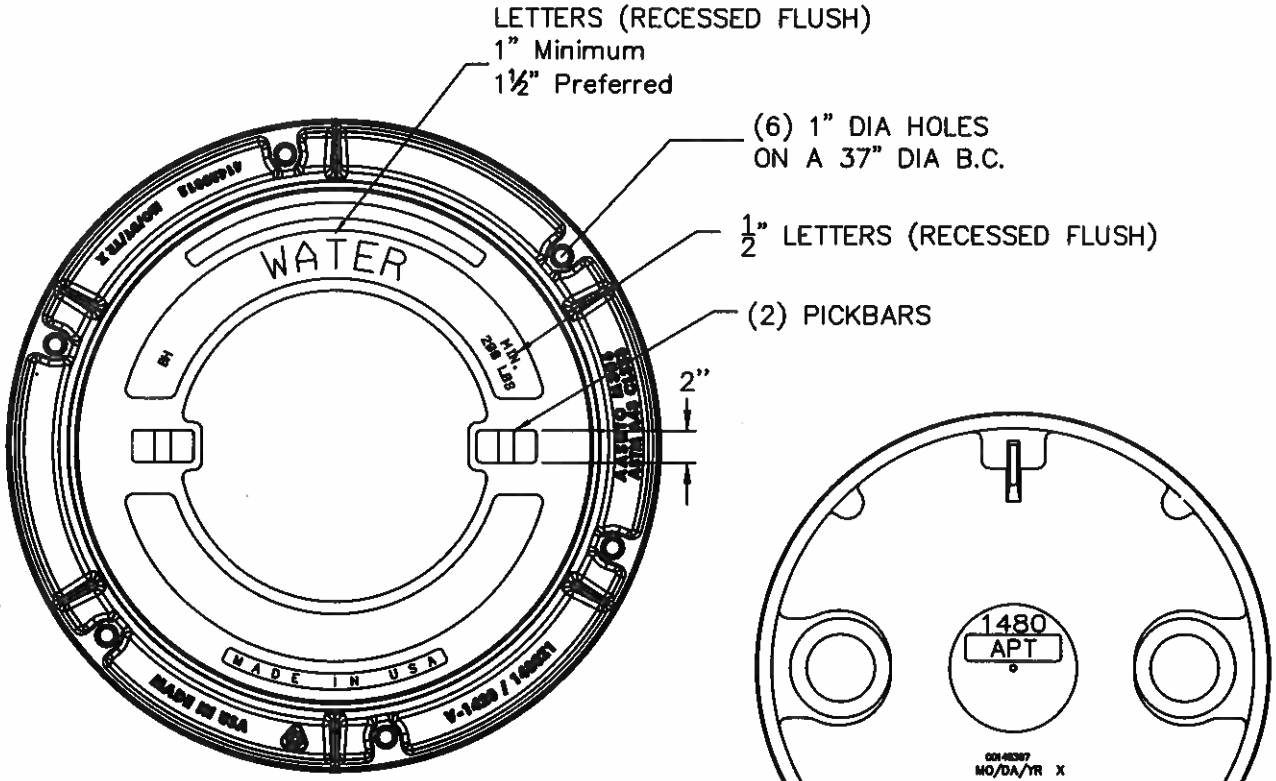




SECTION THRU FRAME

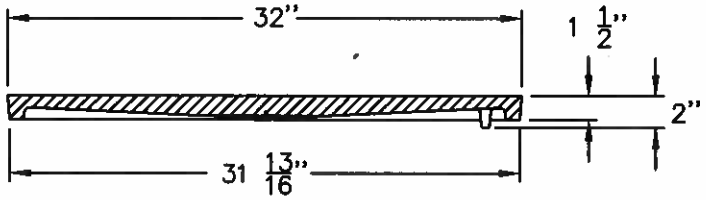
Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

STANDARD 40" MANHOLE FRAME AND COVER		DWU	(PAGE NO.) 221
		DATE DEC.2001	

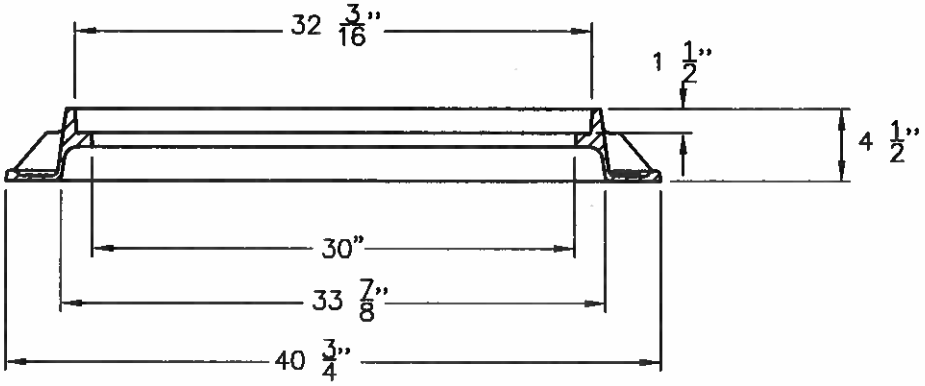


PLAN VIEW

BOTTOM VIEW OF COVER



COVER SECTION

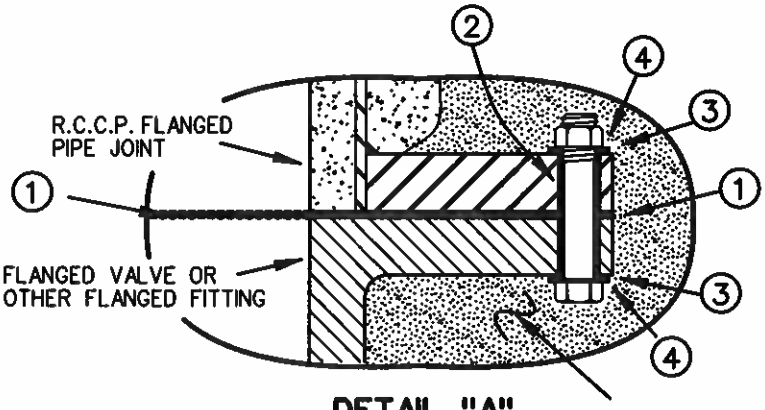


COVER – GRAY IRON
ASTM A48 CL35B
FRAME – GRAY IRON
ASTM A48 CL35B

STANDARD 32" MANHOLE. FRAME AND COVER	WATER	DWU	(PAGE NO.) 222
		DATE OCT.2011	

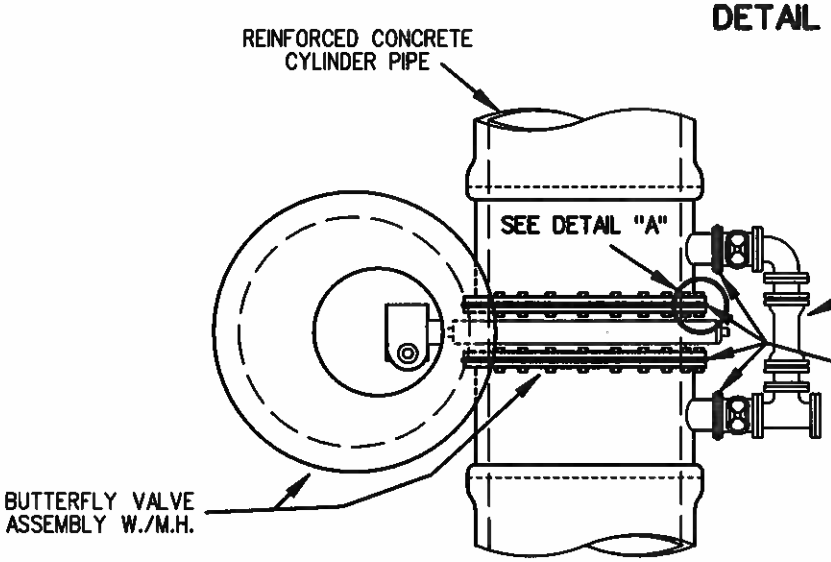
INSULATING MATERIAL (KIT)

1. 1/8" THICK - CIRCULAR (DOUGHNUT) GASKET
2. INSULATING SLEEVE FOR EACH BOLT
3. 2 ~ INSULATING WASHERS FOR EACH BOLT
4. 2 ~ STEEL WASHERS FOR EACH BOLT

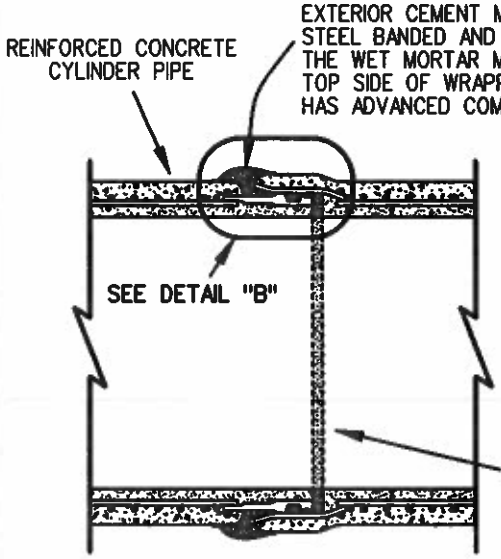


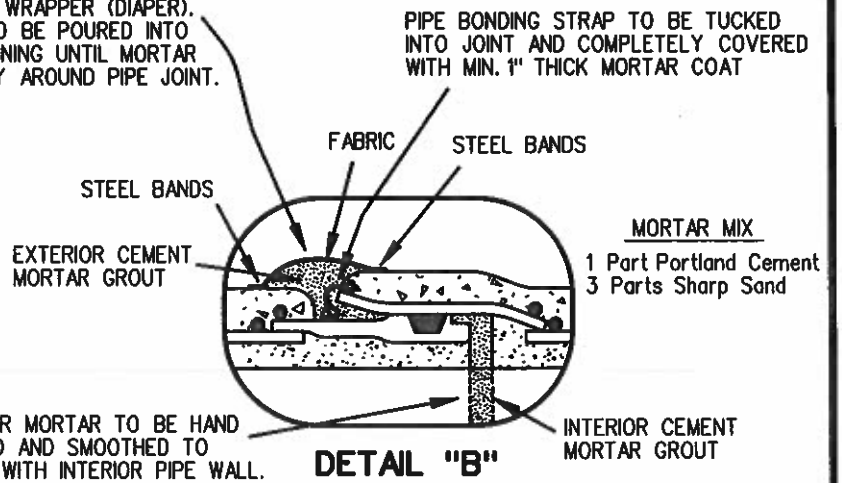
DETAIL "A"

ALL FLANGE BOLTS & FLANGES TO BE COVERED WITH CEMENT MORTAR AT LEAST 1" THICK.
(UNLESS NOTED OTHERWISE ON DESIGN PLANS OR OTHER SPECIFIC INSTALLATION DETAILS)



INSULATION KIT INSTALLATION DETAIL
(FOR R.C.C.P. INSTALLATIONS)



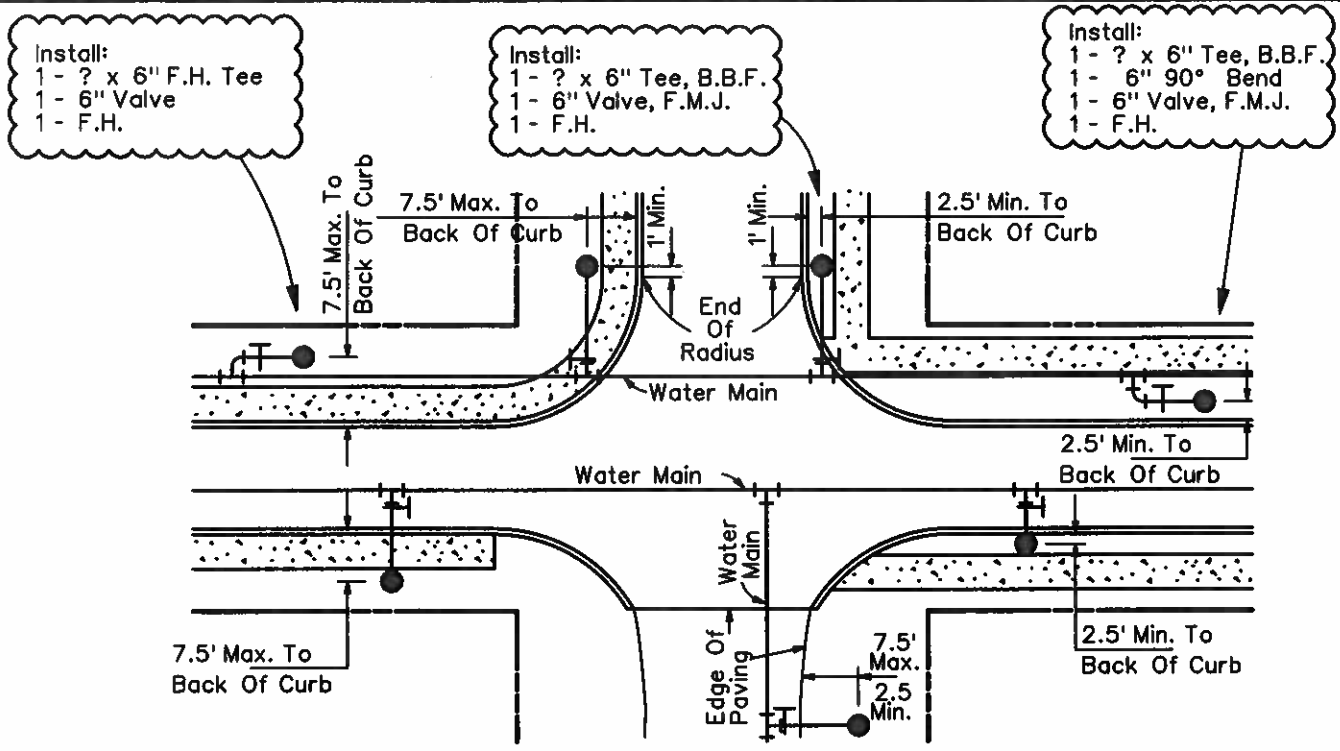


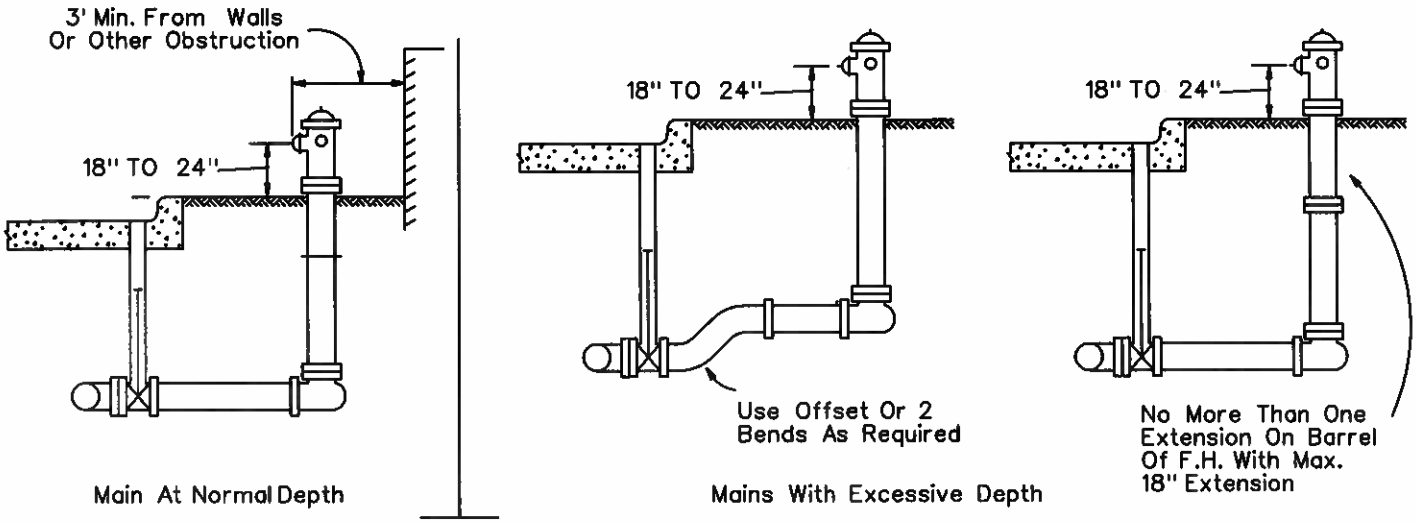
DETAIL "B"

MORTAR PROTECTION @ R.C.C.P. JOINTS
(BELL & SPIGOT JOINT SHOWN - ALSO APPLIES TO FLANGED JOINTS)

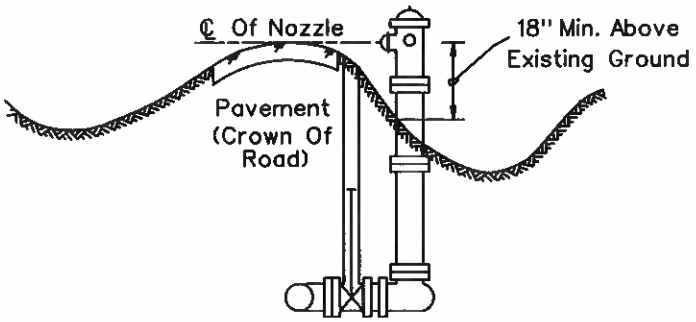
MORTAR PROTECTION SHALL BE PER PIPE MANUFACTURER RECOMMENDATION.

MORTAR PROTECTION @ R.C.C.P. JOINTS & INSULATION KIT FOR FLANGED JOINTS		DWU	(PAGE NO.) 223
		DATE OCT. 2011	





ELEVATION VIEW OF FIRE HYDRANT



When No Curb Or Gutter Exists, Set F.H. On Front Slope Of Ditch With ℄ Of Nozzle Equal To The Crown Of The Road.

GENERAL NOTES

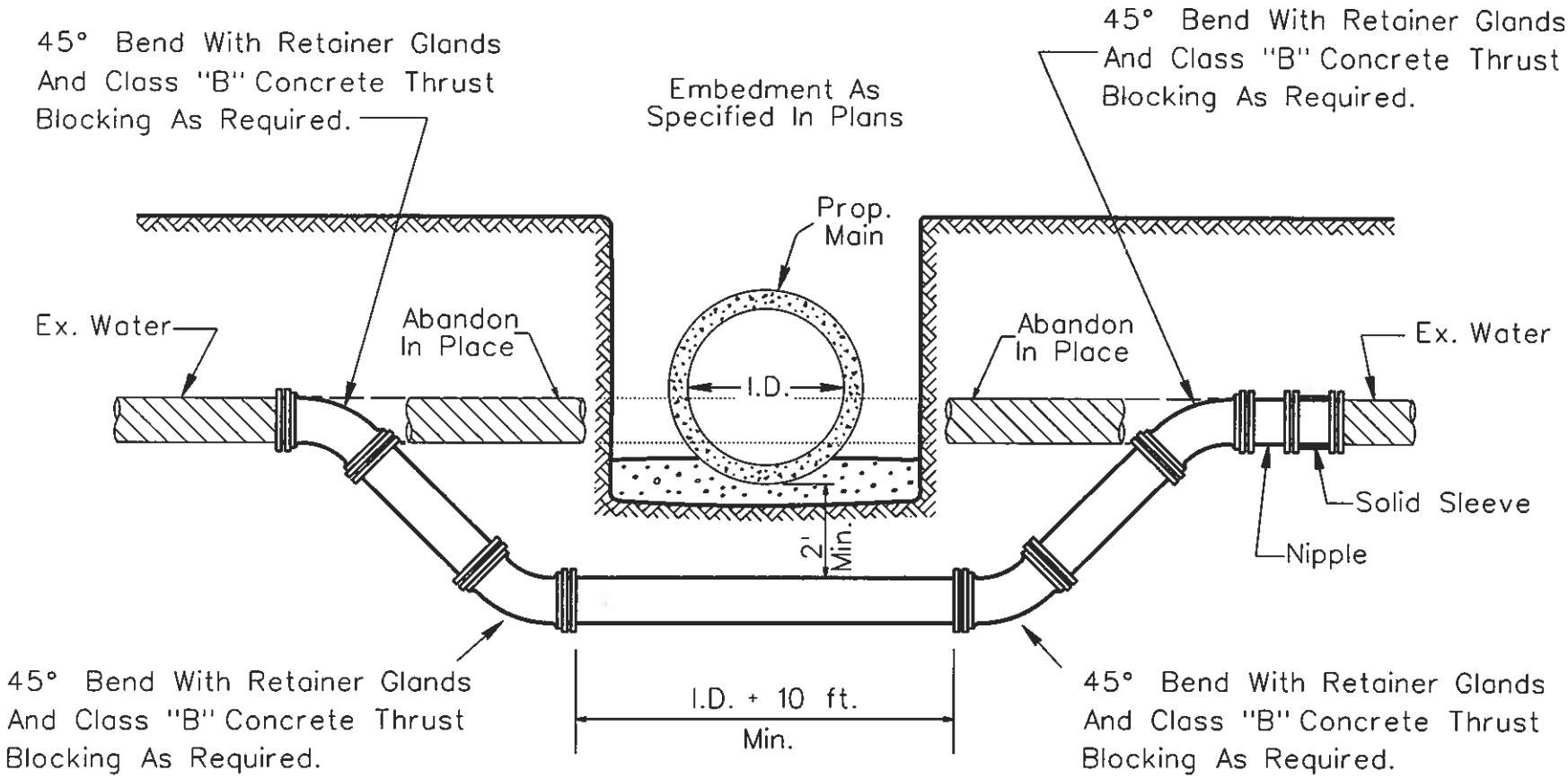
1. ℄ Of F.H. Barrel Shall Not Be Less Than 2.5 Or More Than 7.5 From Back Of Curb Or Edge Of Pavement.
2. Do Not Set F.H. In An Existing Or Proposed Sidewalk, Unless Otherwise Noted.
3. All Tees For F.H.s Must Provide Secure Anchoring From The Main To F.H. Valves
4. Set F.H. On The Lot Line Extended When Possible.
5. On Private Contracts, The Developer's Engineer Will Stake Location & Grade, Must Still Meet DWU Requirements.
6. Never Place F.H. Where Fire Truck Could Not Park Beside It.

METHODS FOR SETTING FIRE HYDRANTS

DWU

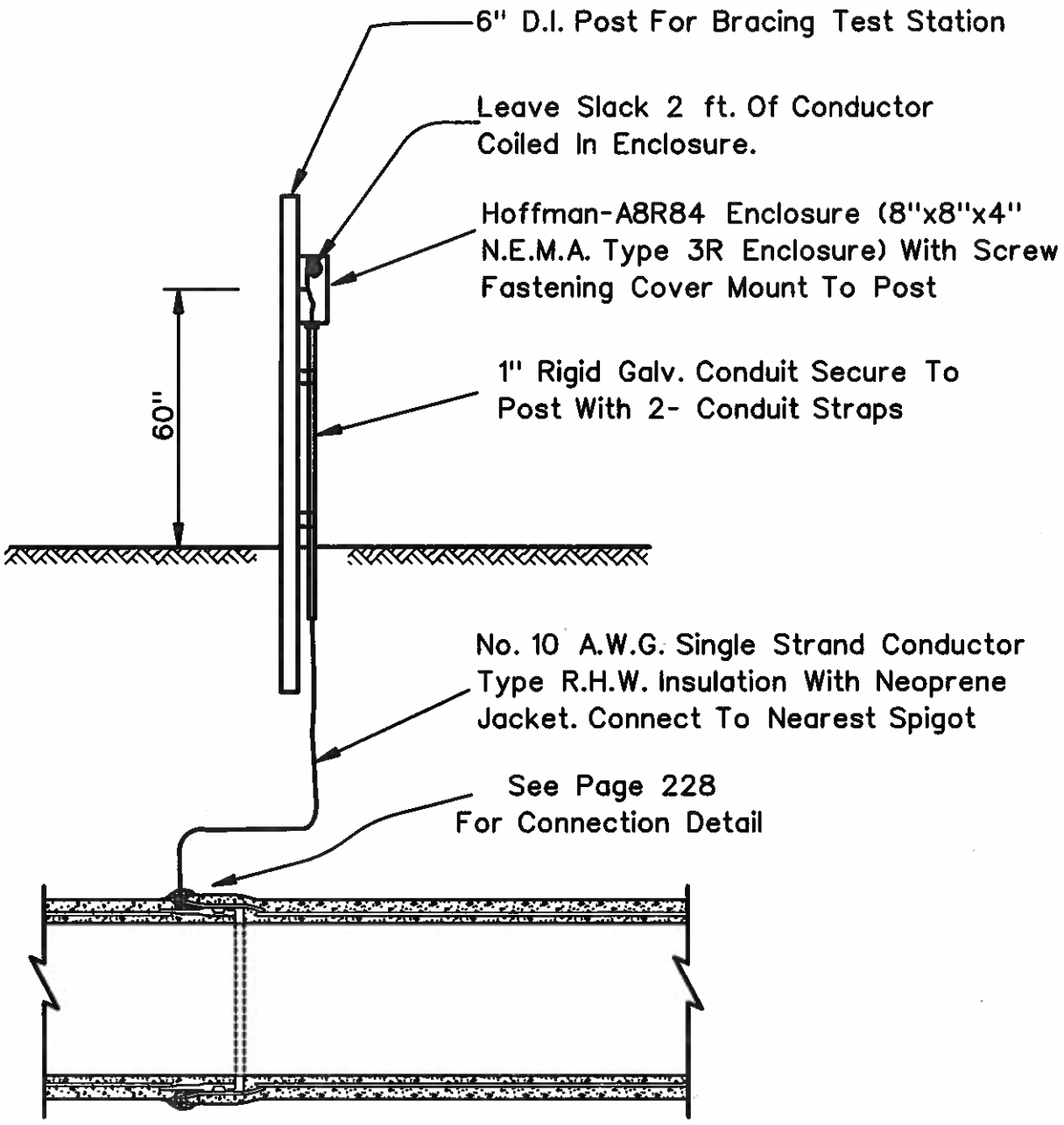
(PAGE NO.) 224

DATE OCT. 2011



Pipe Material As Specified on Plans

STANDARD WATER MAIN LOWERING		DWU	(PAGE NO.) 225
		DATE APRIL 2001	

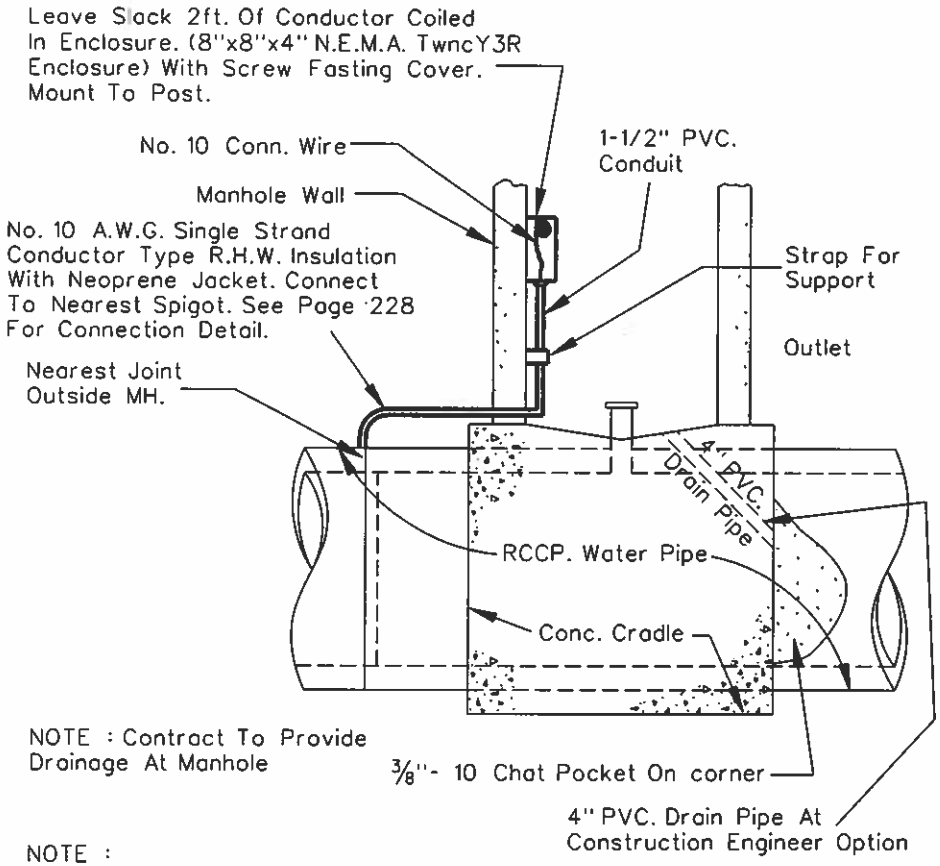


NOTE :

Conductor To Be Continuous With No Splices. Avoid Breaks To Conductor Jacket Or Insulation. Any Breaks To Jacket Insulation Must Be Repaired With 2 Layers Of 600V. Electrical Heat Shrink Tape. Any Contact Of Bare Conductor To Soil Will Render Erroneous Test Results When Monitoring Pipe Conditions.

PIPE-TO-SOIL POTENTIAL TEST STATION (POST MOUNTED)		DWU	(PAGE NO.) 226
		DATE OCT. 2011	

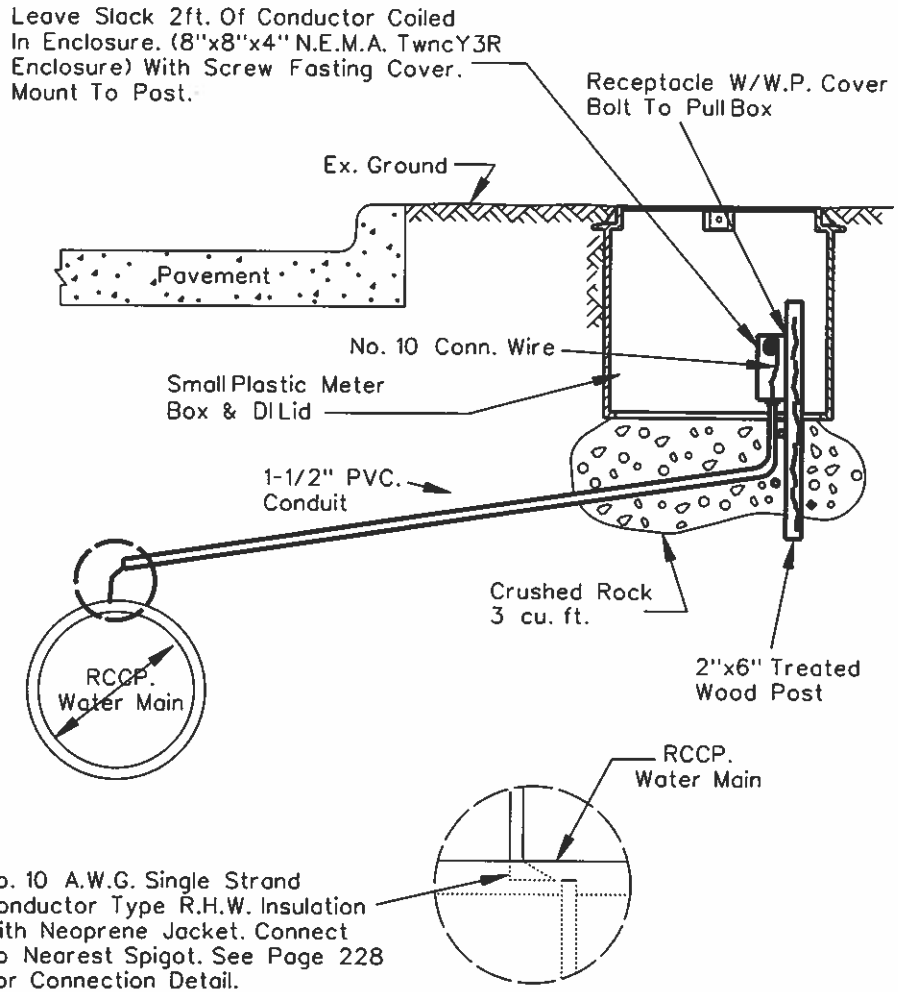
TEST STATION INSIDE MANHOLE TYPE I



NOTE : Contract To Provide Drainage At Manhole

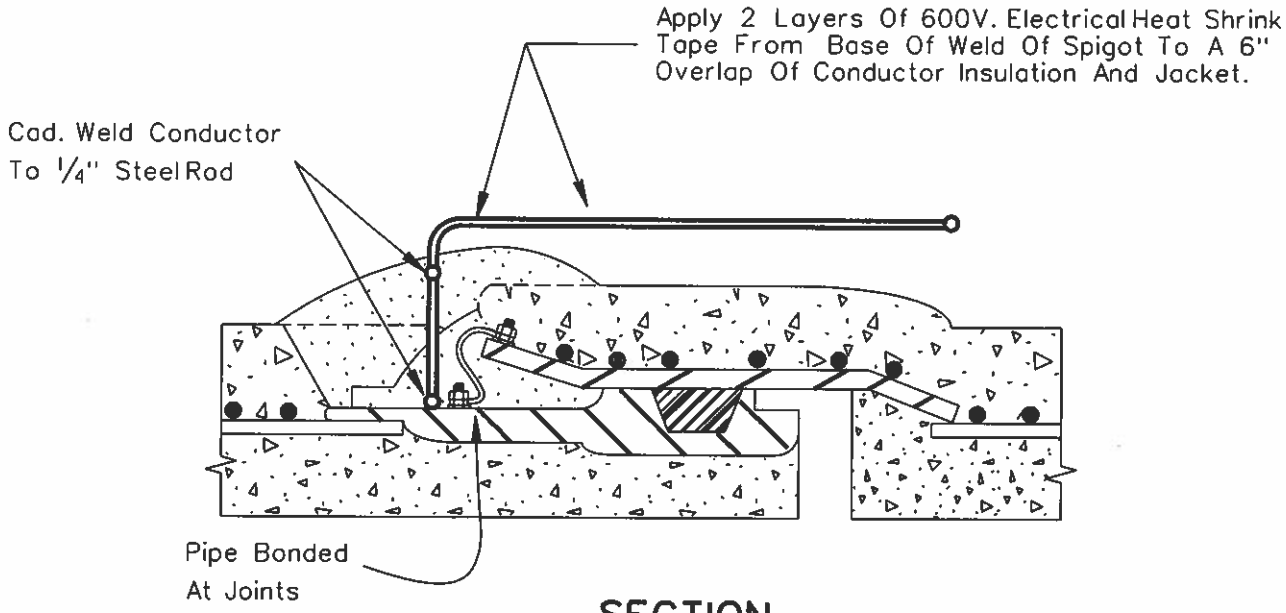
NOTE :
Conductor To Be Continuous With No Splices.
Avoid Breaks To conductor Jacket Or Insulation.
Any Breaks To Jacket insulation Must Be Repaired With 2 Layers Of 600V. Electrical Heat Shrink Tape. Any Contact Of Bare Conductor To Soil Will Render Erroneous Test Results When Monitoring Pipe Conditions.

TEST STATION IN METER BOX TYPE II

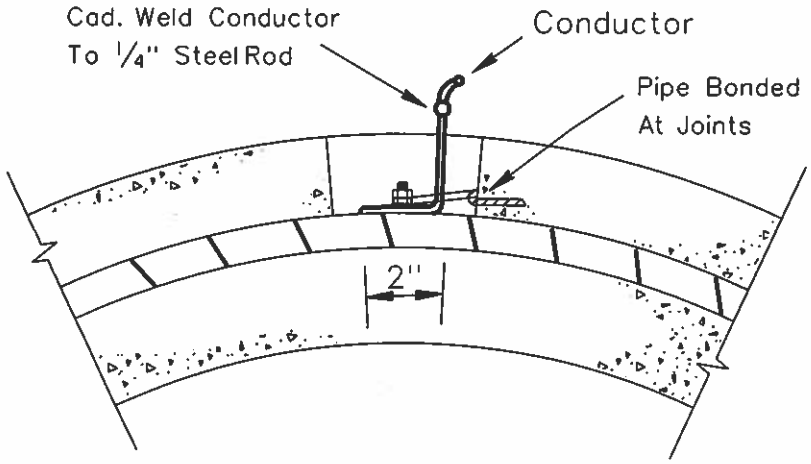


PIPE-TO-SOIL POTENTIAL TEST STATION (BURIED CONFIGURATION)

DWU	(Page No.) 227
DATE DEC.2001	



SECTION



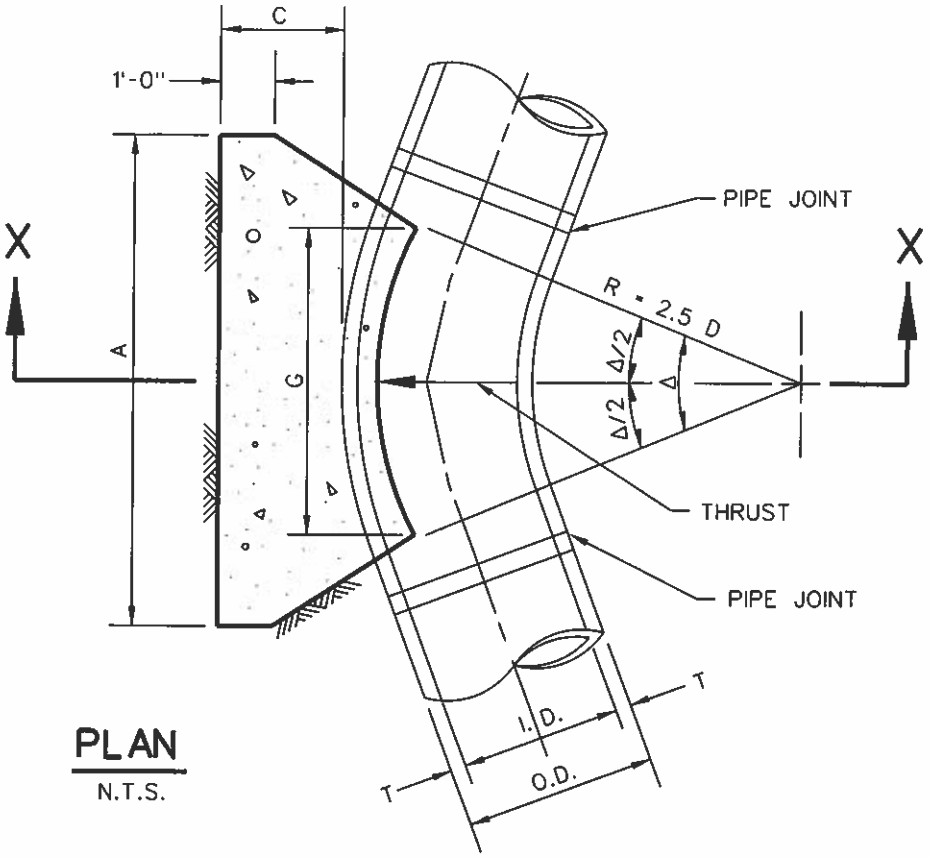
END VIEW

NOTE :

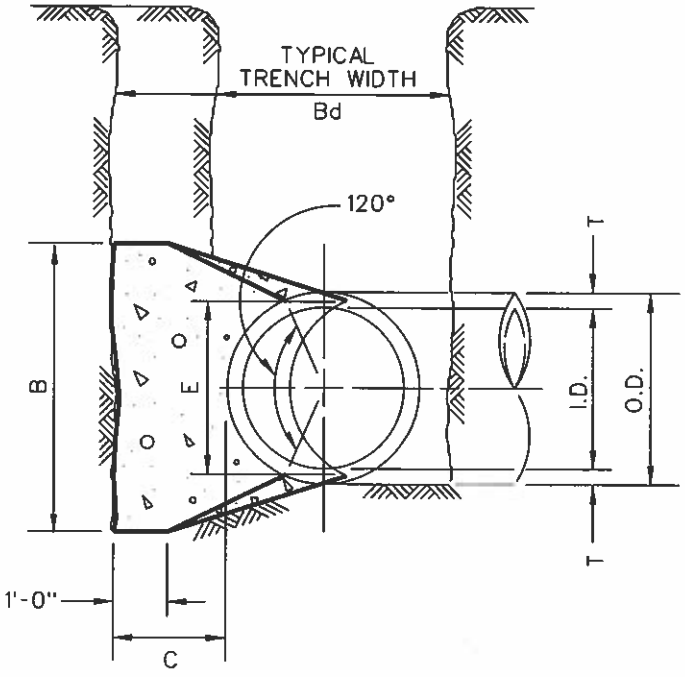
Conductor To Be Continuous With No Splices. Avoid Breaks To Conductor Jacket Or Insulation. Any Breaks To Jacket Insulation Must Be Repaired With 2 Layers Of 600V. Electrical Heat Shrink Tape. Any Contact Of Bare Conductor To Soil Will Render Erroneous Test Results When Monitoring Pipe Conditions.

REFER TO PAGES 226 & 227

DETAIL OF TEST CONDUCTOR CONNECTION TO PIPE		DWU	(PAGE NO.) 228
		DATE MARCH 2003	



PLAN
N.T.S.



SECTION X-X
N.T.S.

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZONTAL THRUST BLOCK AT PIPE BEND		DWU	(Page. No.) 229
		DATE DEC.2001	

TABLES OF DIMENSIONS AND QUANTITIES

I.D. (IN.)	T (IN.)	C Δ = 11.25° (FT.)	C Δ ≥ 22.50° (FT.)	E (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 = 11.25°									Δ= 22.50°							
			EARTH			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 AT PIPE BEND

DWU

(Page No.) 230

DATE DEC.2001

TABLES OF DIMENSIONS AND QUANTITIES

I.D. (IN.)	Δ = 30° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	I.D. (IN.)	Δ = 45° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK 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

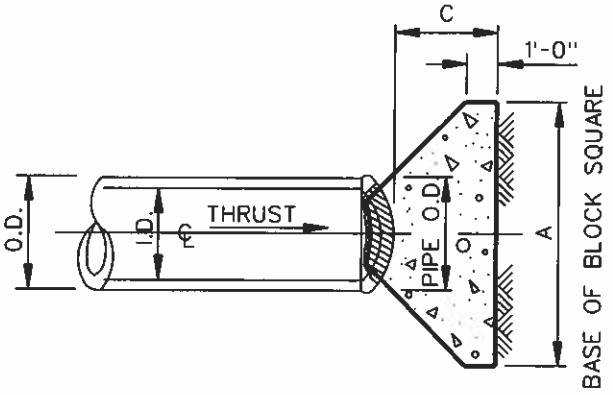
I.D. (IN.)	Δ = 67.50° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	I.D. (IN.)	Δ = 90° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)
4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	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	3.5	2.5	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	362.8	33.0	11.0	66.2	22.0	8.5	32.5
72	18.7	339.5	28.5	12.0	57.8	19.0	9.0	28.4	72	23.8	431.8	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	26.0	10.0	53.2
84	21.8	462.1	33.5	14.0	94.7	22.0	10.5	46.5	84	27.7	587.7	42.0	14.0	134.4	28.0	10.5	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

REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZONTAL THRUST BLOCK AT PIPE BEND

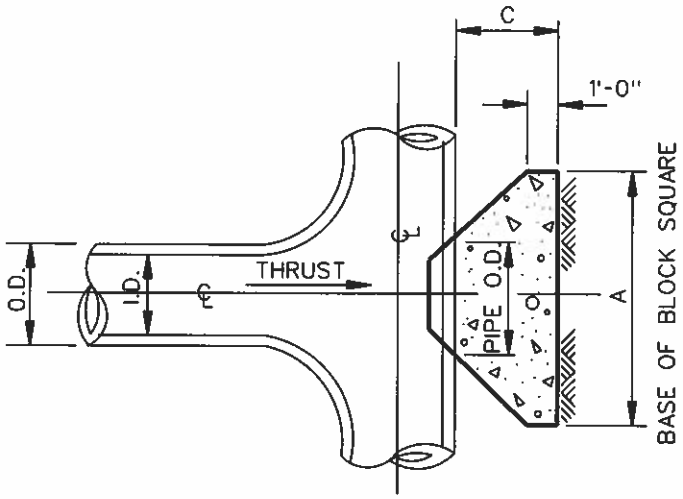
DWU

DATE DEC.2001



PLAN OF PLUG THRUST BLOCK

N.T.S.



PLAN OF TEE THRUST BLOCK

N.T.S.

			EARTH		ROCK	
I.D. (IN.)	THRUST (TONS)	C (FT.)	A (FT.)	VOL. (C.Y.)	A (FT.)	VOL. (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
36	76.3	4.0	9.0	7.3	6.5	4.2
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	15.7
66	257.0	6.5	16.5	36.8	11.5	20.5
72	305.0	7.5	17.5	47.2	12.5	27.2
78	358.0	8.0	19.0	58.9	13.5	33.7
84	416.0	8.5	20.5	72.3	14.5	41.2
90	477.0	9.0	22.0	87.7	15.5	49.7
96	543.0	9.5	23.5	104.8	16.5	61.0

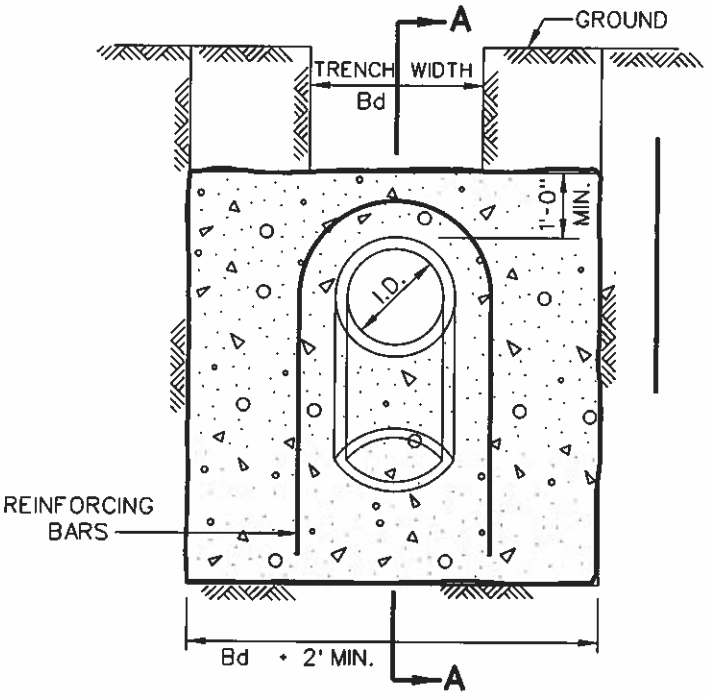
REFER TO GENERAL NOTES FOR THRUST BLOCKING - PAGE 234

HORIZONTAL THRUST BLOCK AT TEES AND PLUGS

DWU

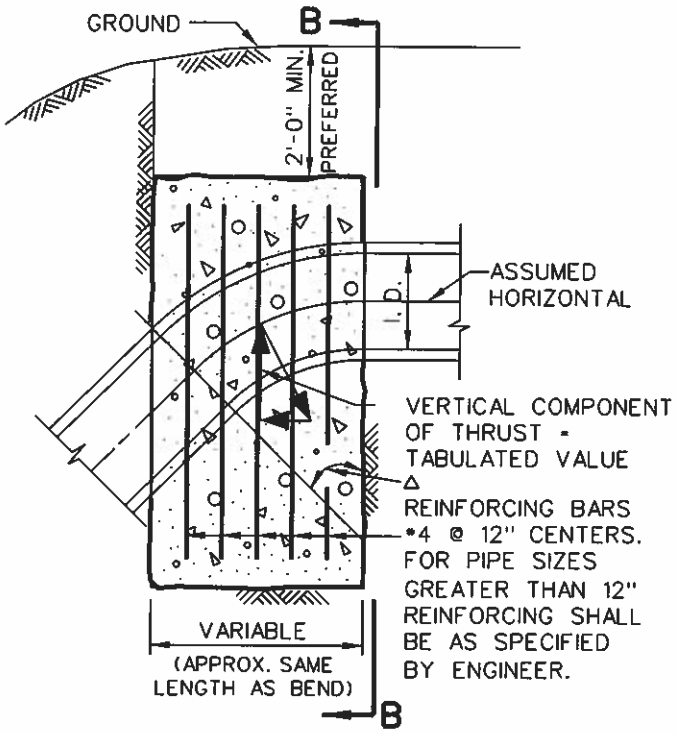
(Page No.) 232

DATE DEC.2001



ELEVATION "B-B"

N.T.S.



SECTION "A-A"

N.T.S.

Δ →	11.25°		22.50°		30°		45°		67.50°		90°		← Δ
I.D. (IN.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	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 AT PIPE BEND

DWU

(Page No.) 233

DATE DEC.2001

GENERAL NOTES FOR ALL THRUST BLOCKS:

1. Concrete for blocking shall be CLASS "B". See NCTCOG 702.2.4.2
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.

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

THRUST BLOCK GENERAL NOTES		DWU	(Page No.) 234
		DATE OCT. 2012	

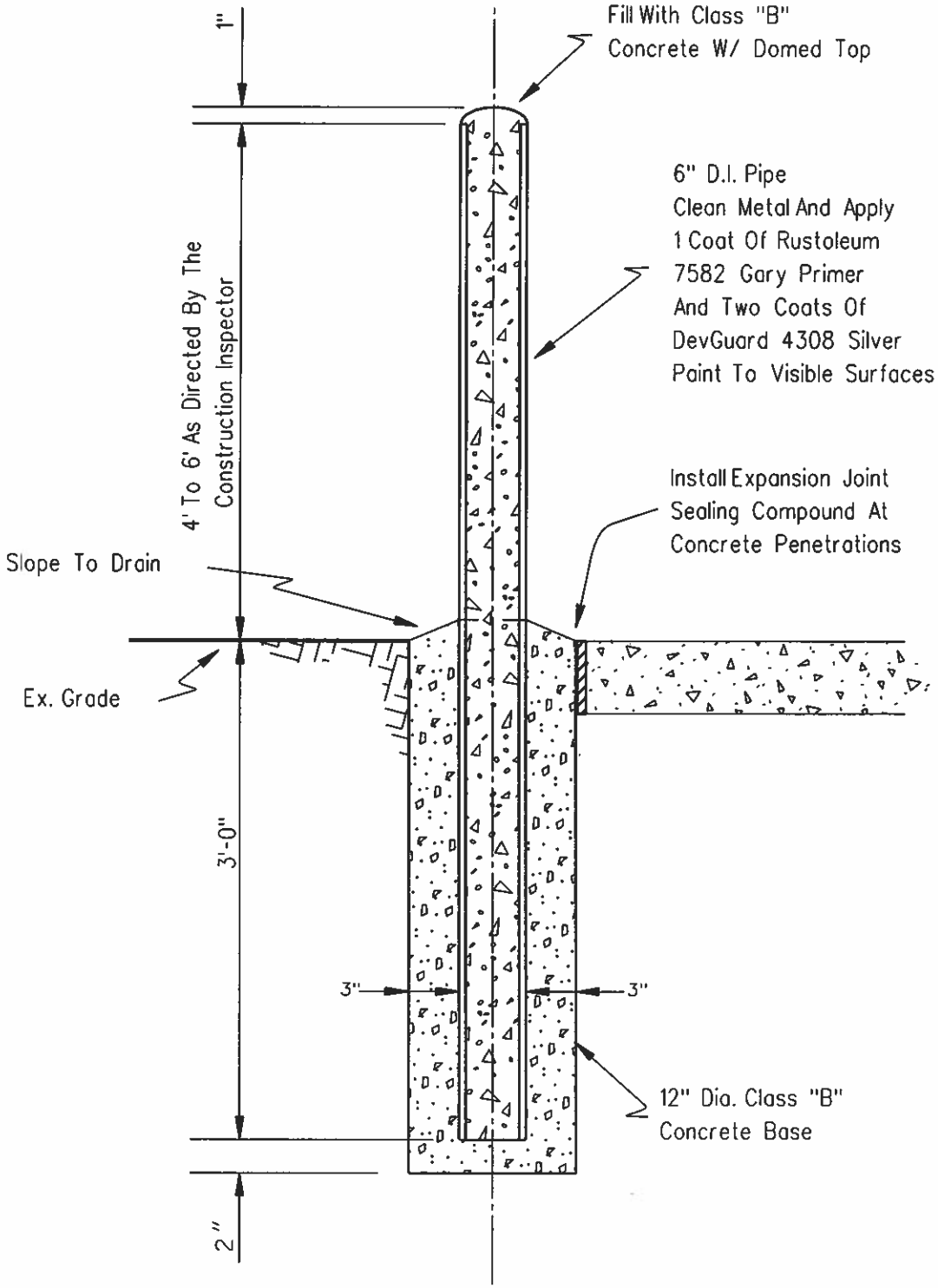
SIZE AND MATERIAL TYPE OF WATER MAINS	EMBEDMENT TYPE PER DEPTH IN EARTH			EMBEDMENT TYPE PER DEPTH IN ROCK		
	0' -8'	8' -16'	>16'	0' -8'	8' -16'	>16'
16" And Smaller Ductile Iron	D+	C	B	C	C	B
18" And Larger Ductile Iron	B	B	B	B	B	B
16" And Smaller Pretensioned	C	C	B	C	C	B
18" And Larger Pretensioned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

EMBEDMENT TYPES- SPECIFIED FOR WATER MAINS

DWU

(PAGE NO.) 235

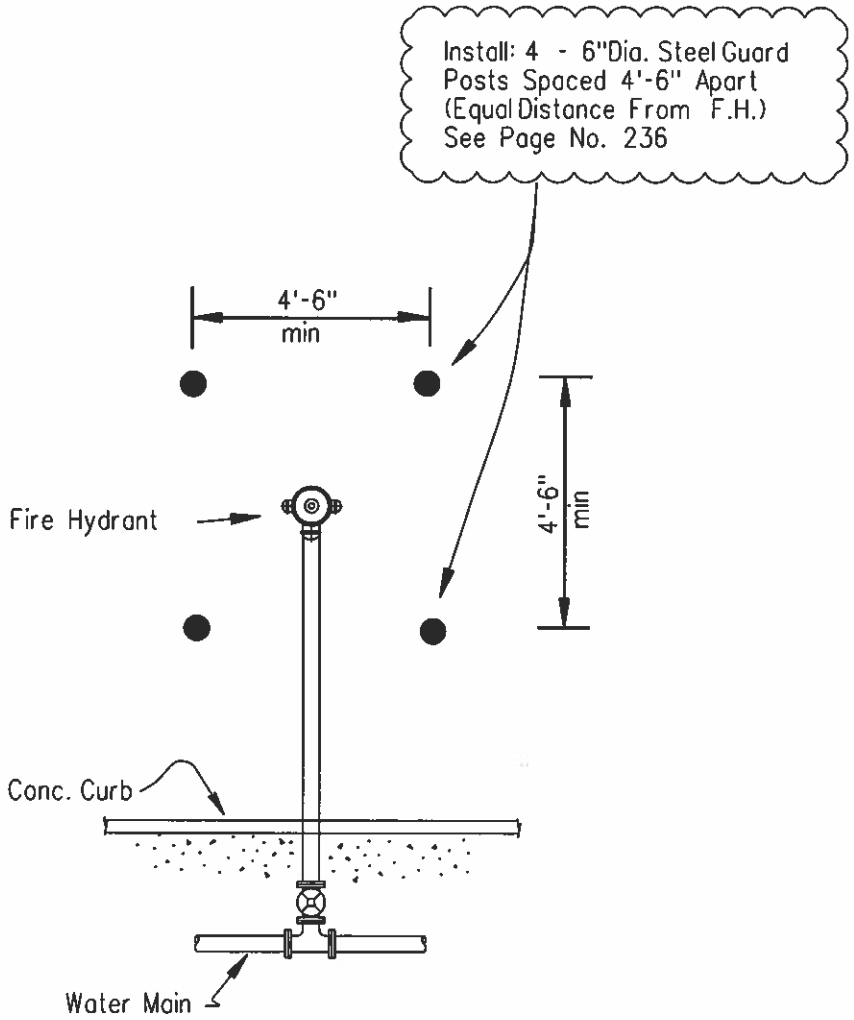
DATE JAN 2010



STEEL GUARD POST

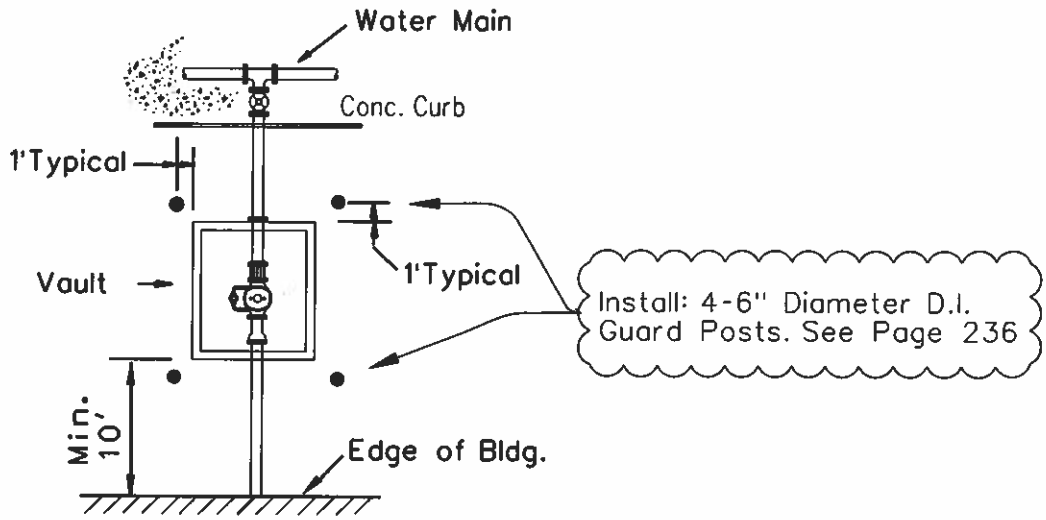
(SIZE DESIGNATED ON PLANS)
N.T.S.

STEEL GUARD POST DETAIL		DWU	(PAGE NO.) 236
		DATE OCT. 2010	

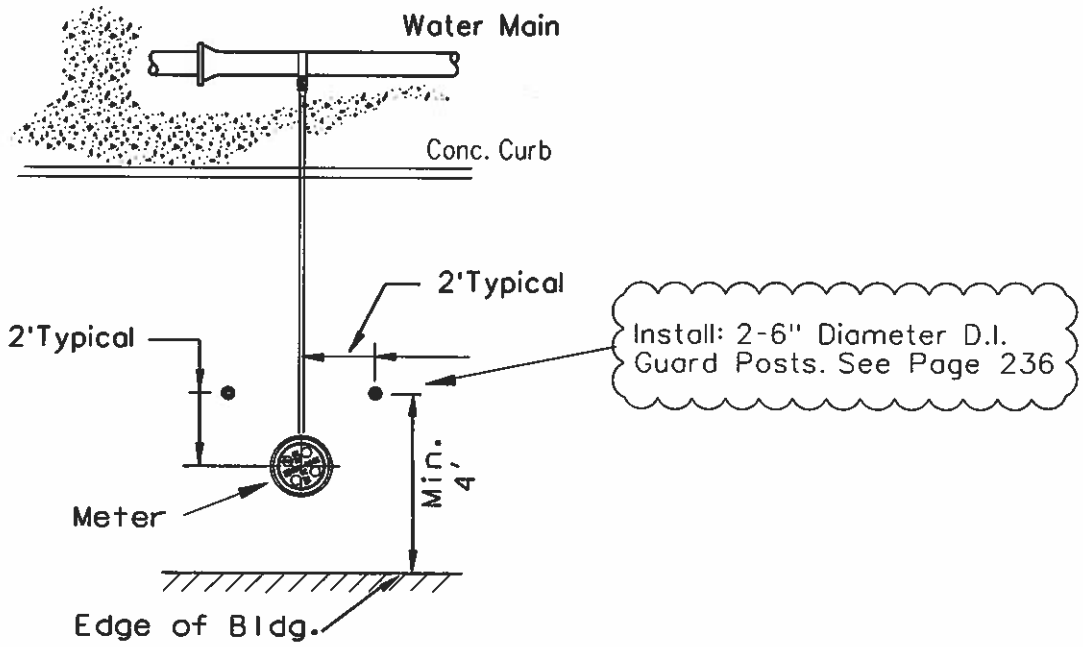


Refer. To Pages 224 & 236

GUARD POST PROTECTION FOR FIRE HYDRANTS		DWU	(PAGE NO.) 237
		DATE JAN. 2010	



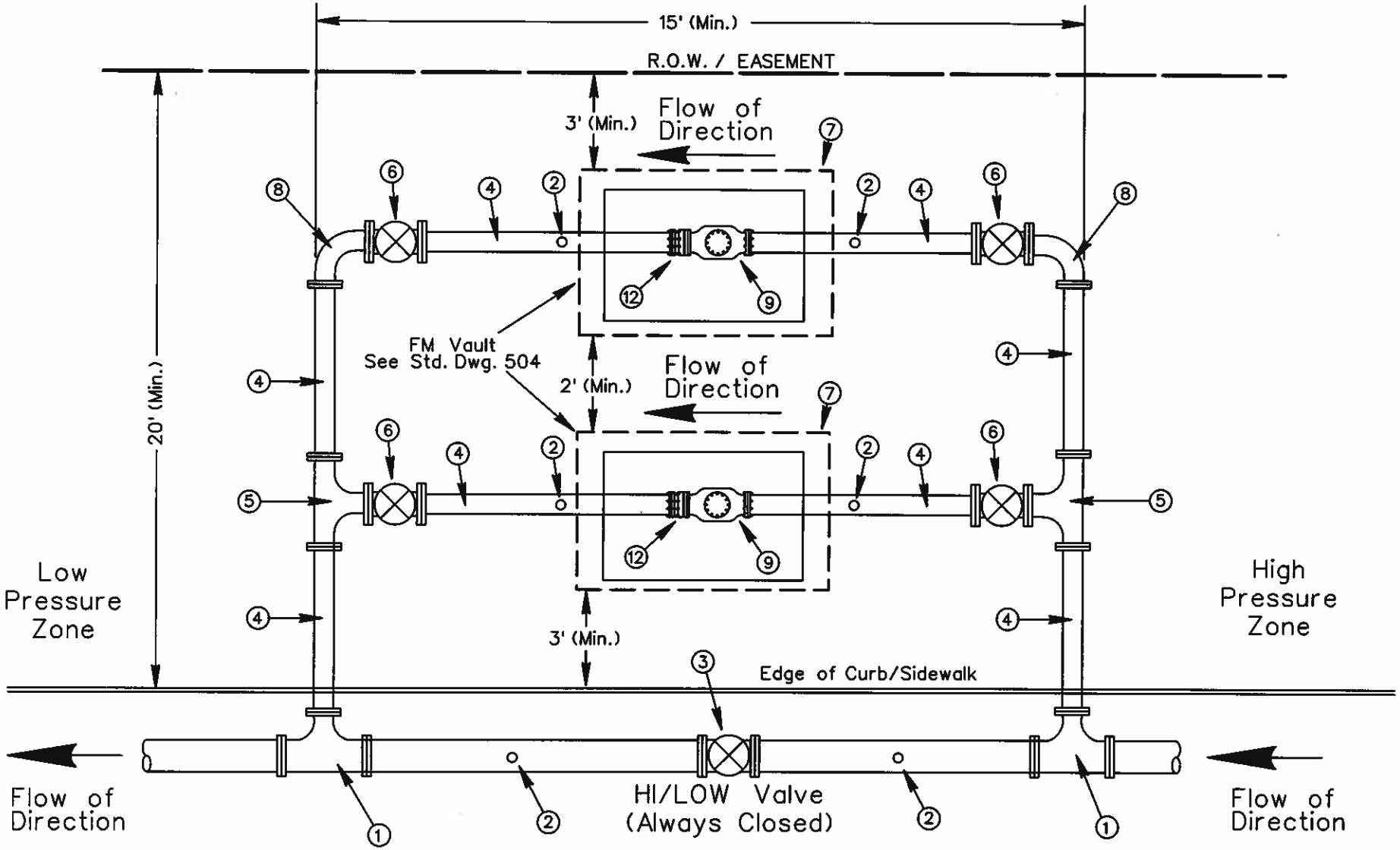
DETAIL FOR METER VAULTS



DETAIL FOR METERS 2" AND SMALLER

GUARD POST PROTECTION FOR WATER METERS		DWU	(PAGE NO.) 238
		DATE JAN. 2010	

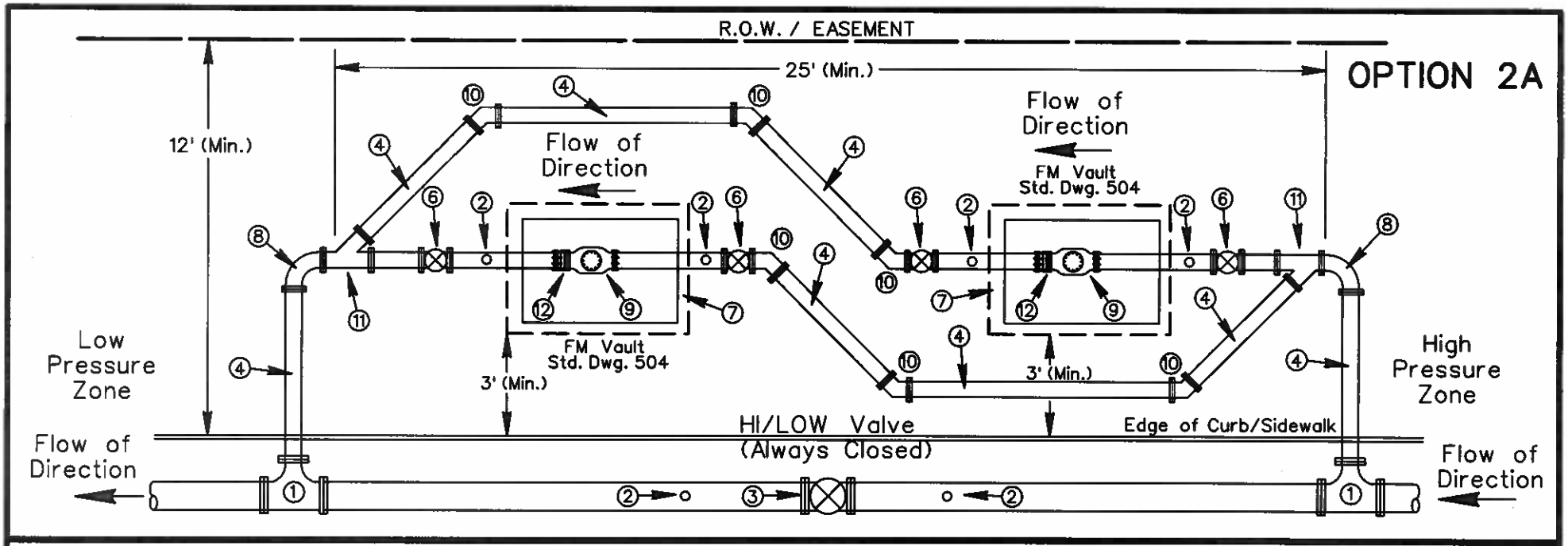
ATTENTION: PRV Design Subject to DWU Approval.

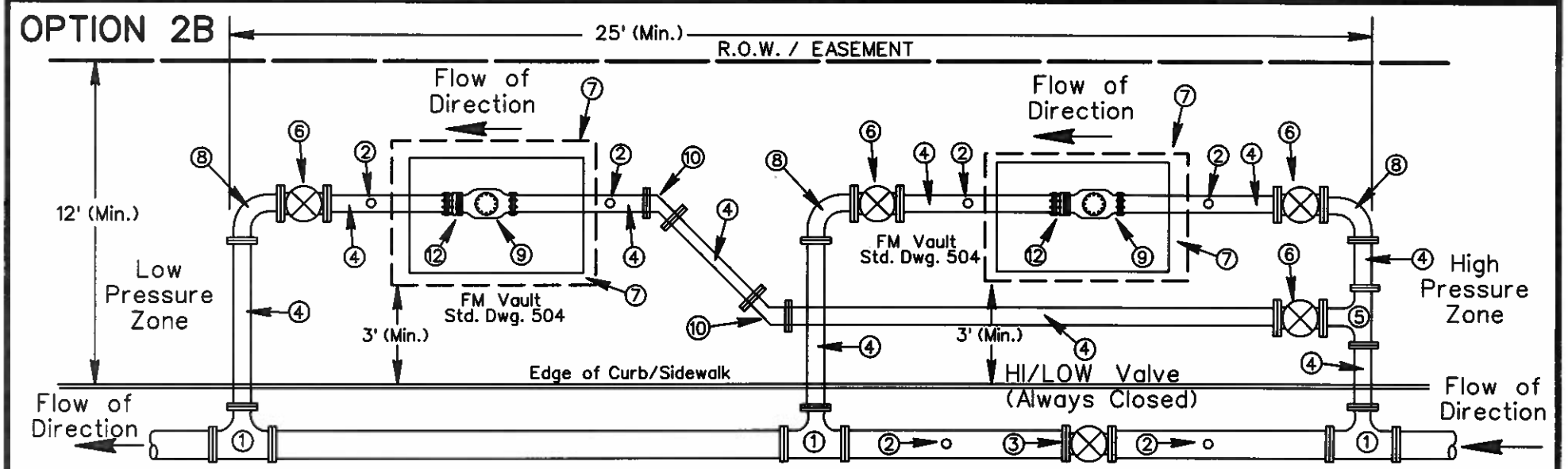


Refer To Pages 242, 243, 244, 245 & 504

DUAL PRV ASSEMBLY (OPTION 1)

DWU	(PAGE NO.) 239
DATE OCT. 2011	



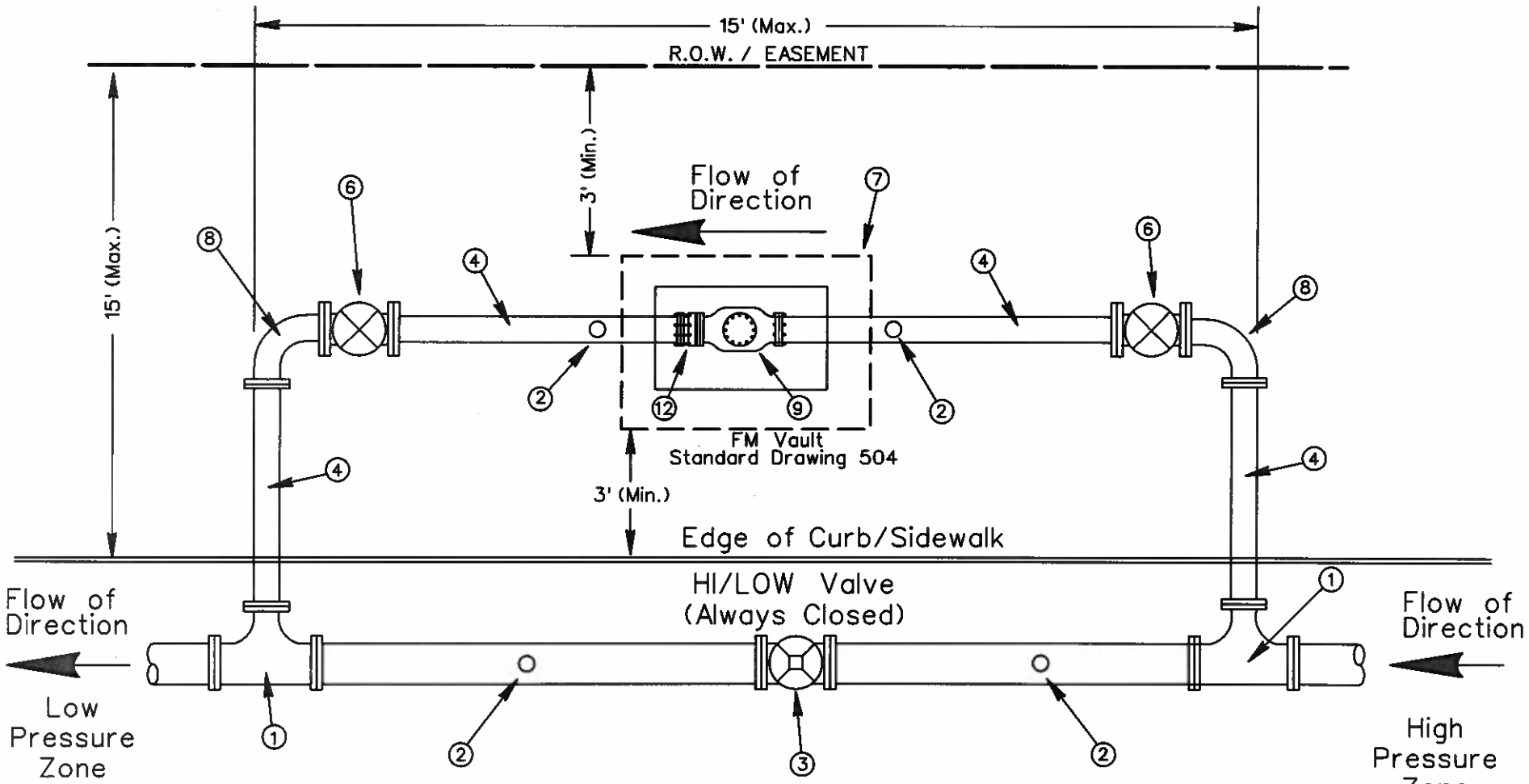


ATTENTION:
PRV Designs Are Subject To DWU Approval.

Refer To Pages
242, 243, 244, 245 & 504

DUAL PRV ASSEMBLY (OPTIONS 2A & 2B)

	DWU	(PAGE NO.) 240
	DATE OCT. 2011	



NOTE: Single PRV Assemblies Require Special Approval by DWU.

Refer To Pages 242, 243, 244, 245 & 504

SINGLE PRV ASSEMBLY

DWU		(PAGE NO.) 241
DATE OCT. 2011		

			MAIN SIZE		
Tag No.	Description	Fitting/Pipe Type	8"	12"	16"
1	Reducing Tee	Flange x Flange	8"x8"x6"(Max)	12"x12"x8"(Max)	16"x16"x12"(Max)
2	1" Flush Point	Copper	1"	1"	1"
3	Hi/Low Valve	Flange x Flange	8"	12"	16"
4	Pipe	Ductile Iron	6"	8"	12"
5	Tee	Flange x Flange	6"x6"x6"	8"x8"x8"	12"x12"x12"
6	Gate Valve	Flange x Flange	6"	8"	12"
7	Precast Vault	Precast	-	-	-
8	90° Bend	Flange x Flange	6"	8"	12"
9	Pressure Reducing Valve	Flange x Flange	4" - 8"	6" - 10"	10" - 16"
10	45° Bend	Flange x Flange	6"	8"	12"
11	45° Wye	Flange x Flange	6"	8"	12"
12	Flange Coupling Adaptor	Flange x Flange	6"	8"	12"

ATTENTION:
PRV Design And Parts Selection Are Subject to DWU Approval.

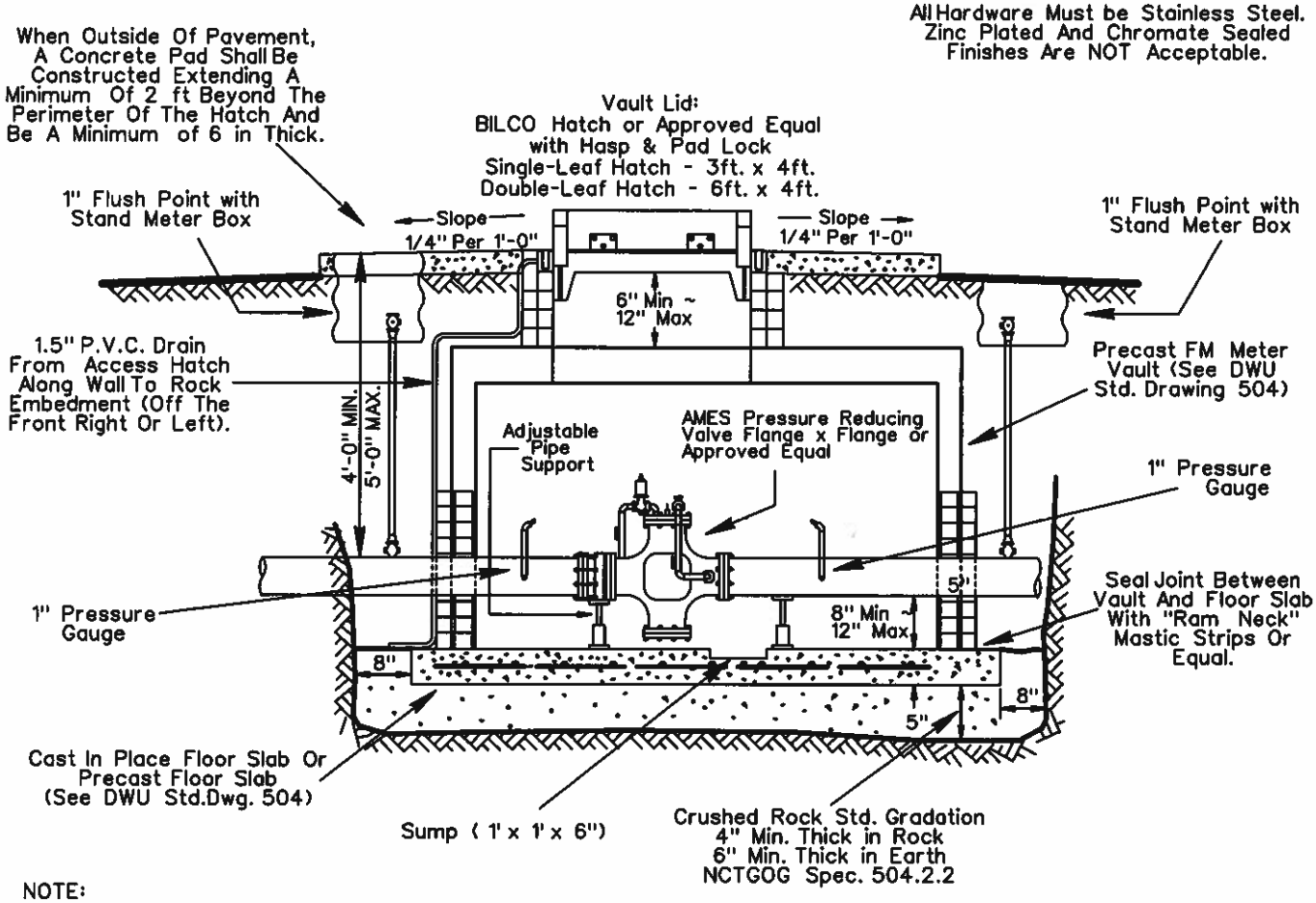
PRV PARTS LIST

DWU

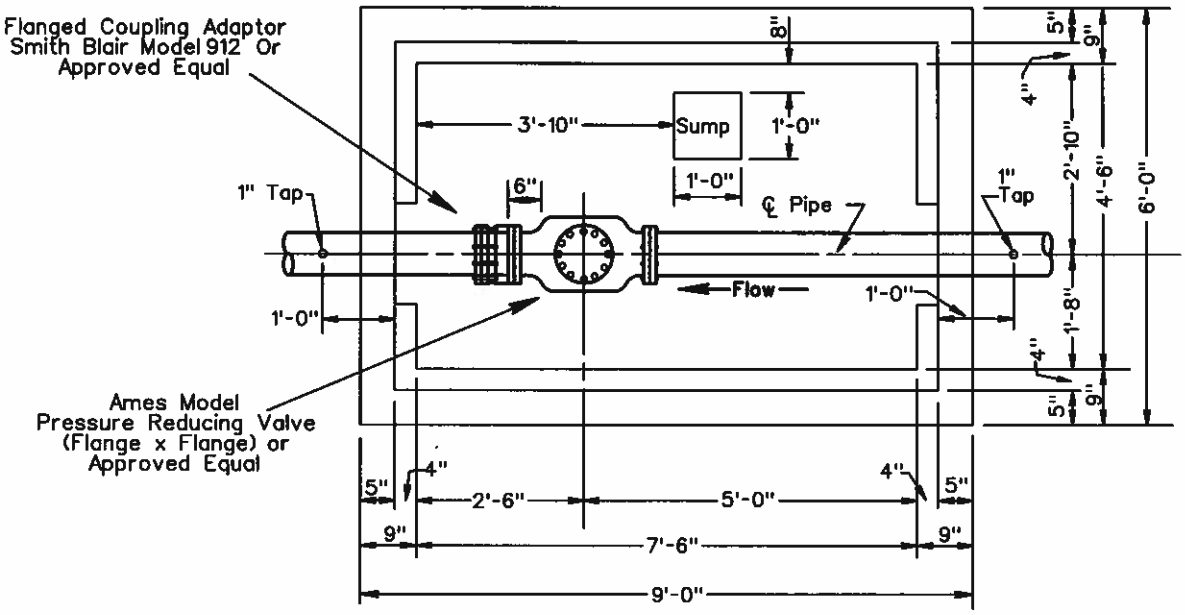
DATE
OCT. 2011

(PAGE NO.)
242

All Hardware Must be Stainless Steel. Zinc Plated And Chromate Sealed Finishes Are NOT Acceptable.



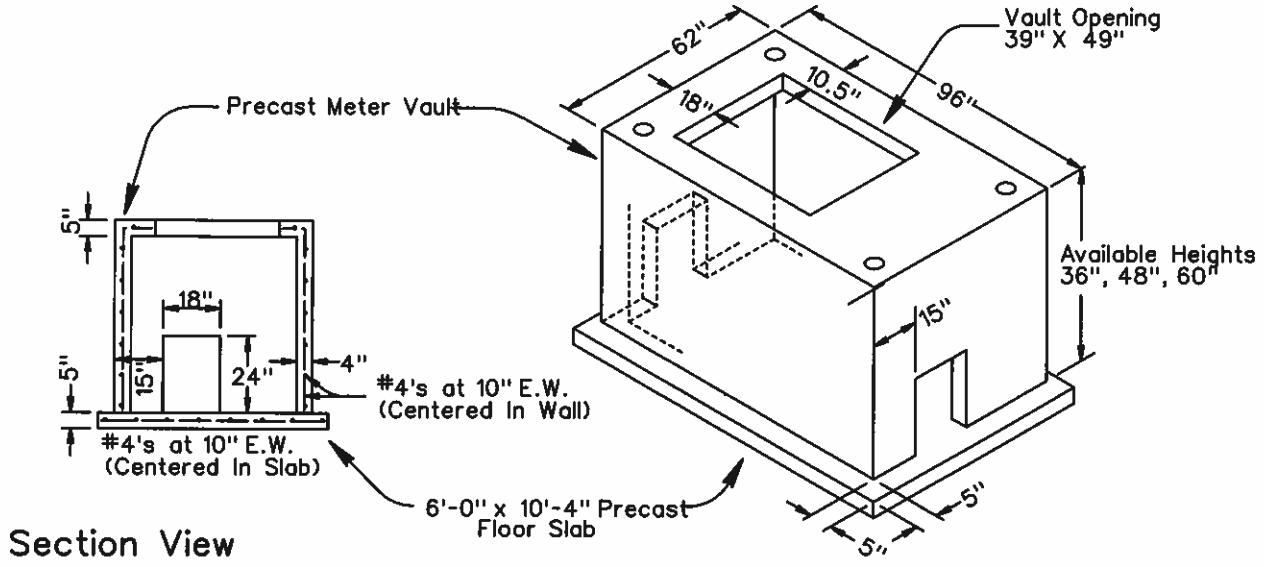
NOTE:
PRV Shall Be Centered Under The Hatch.
The Top Of The Vault Shall Be At Least 6 in Above The Finished Grade.



Refer To Page 504

NCTCOG Spec: 504.2.2 - Pipe Embedment Material for Water and Wastewater Mains

PRV VAULT ELEVATION & SECTIONAL PLAN		DWU	(PAGE NO.) 243
		DATE OCT. 2011	

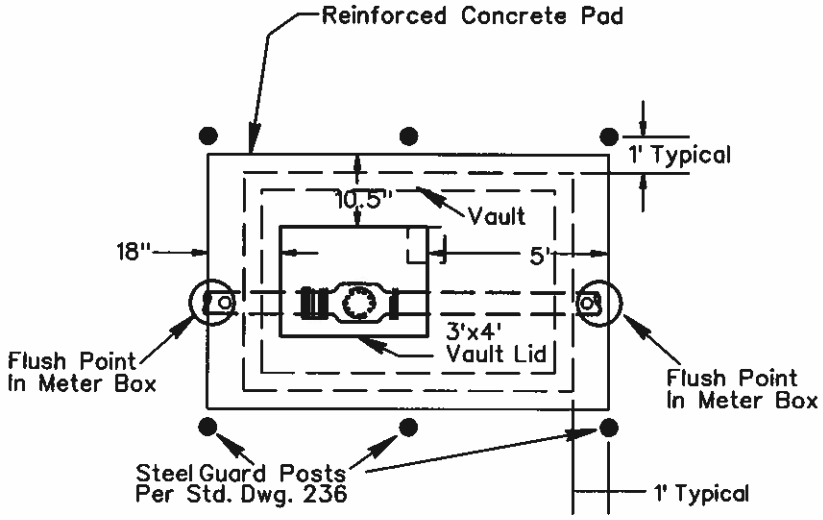


Section View

Vault Size

(NTS)

* Special Applications To Be Determined By Engineer. Vault shall be built according to Engineering Specifications.



Bollard Location Plan

(NTS)

Refer To Pages TO 236

PRV DETAILS		DWU	(PAGE NO.) 244
		DATE OCT. 2011	

1. All pressure-reducing valves shall include a verifiable certification of compliance with the National Sanitation Foundation (NSF)Standard 61. Every bidder shall submit with their bid a signed statement clearly stating the present status of their receiving certification of compliance with the NSF 61 Standard for each particular make, model and size of pressure reducing valve being bid. A failure to submit this verification shall result in the disqualification of that bid and its removal from consideration.

2. Every bidder shall submit re-lined copies of these standard drawings for exception requests needing final approval by DWU. If there are no exceptions to the specification, a signed statement at the bottom of the specification shall indicate "No Exception Taken". A failure to do so shall result in the disqualification of that bid and its removal from consideration.

3. All materials contained in the valves being bid shall be described and specified in the most current manufacturer's product literature.

4. The Distribution Division of the Dallas Water Utilities Department shall be the sole authority in determining the acceptability of any alternate valves.

5. All pressure reducing valves shall be certified by the manufacturer as being capable of withstanding a cold hydrostatic test of at least one hundred percent (100%) above the maximum pressure for which the valve is to operate.

6. All valves, parts and components shall be new and unused original factory-authorized manufacturer's parts and components. No "after-market" substitute parts from other manufacturers shall be accepted. No rebuilt or remanufactured parts allowed.

7. The pressure reducing valve provided shall be designed and constructed to maintain a pre-adjusted downstream pressure regardless of changes in the flow rate.

8. The adjustment range of the pilot valve shall be from 15 to 175 psi.

9. The main body flanges of the pressure reducing valves provided shall have bolt patterns compatible with ANSI/ASME B 16.1.

10. The pressure reducing valves provided shall be complete and shall all have factory-installed position indicators, gauge cocks, control valve isolation valves, strainers and pilot valves.

11. All external control piping on the pressure reducing valve shall be copper or stainless steel.

12. The body of the valve and the cover of the valves shall be fabricated entirely of stainless steel.

13. The entire interior wetted surface of the valve, including the spring, the upper diaphragm support, the disc holder, the seat ring and the shaft shall be fabricated of stainless steel and shall be inherently corrosion-resistant without any special coating.

14. The diaphragm shaft shall be guided at the top and at the bottom.

15. All internal and external threaded studs and nuts shall be fabricated of stainless steel.

16. The seat disc shall be fabricated of Buna-N resilient synthetic rubber.

17. All valves, parts and components shall be supplied with a three (3) year manufacturer's warranty on materials and workmanship.

18. All valves shall be AMES MODEL 605GS reduced port, single chamber pressure reducing valves.

19. All valves, parts, and components shall either be bid Freight On Board (FOB) Factory, Freight Allowed or FOB Destination (4120 Scottsdale, Dallas, Tx 75227)

20. All valves shall be crated in sturdy shipping containers to prevent damage to position indicators, control valves and control valve piping during shipment.

21. The pressure reducing valve must be installed by the manufacturer in the presence of DWU Distribution and Pumping personnel.

22. All construction materials including valves, pipes, fittings and flush points shall conform to the most current version of the NCTCOG specifications, the City of Dallas Addendum to those specifications, this manual and the Approved Materials List.

23. All precast vaults shall meet DWU specifications and be approved by DWU.

24. The location of the vault must be approved by DWU.

25. The minimum depth for the piping in the vault shall be 4 feet.

26. All spool pipe shall be ductile iron pipe.

PRV GENERAL NOTES		DWU	(PAGE NO.) 245
		DATE OCT. 2011	

PART 3

(Series 300)

WASTEWATER MAIN CONSTRUCTION

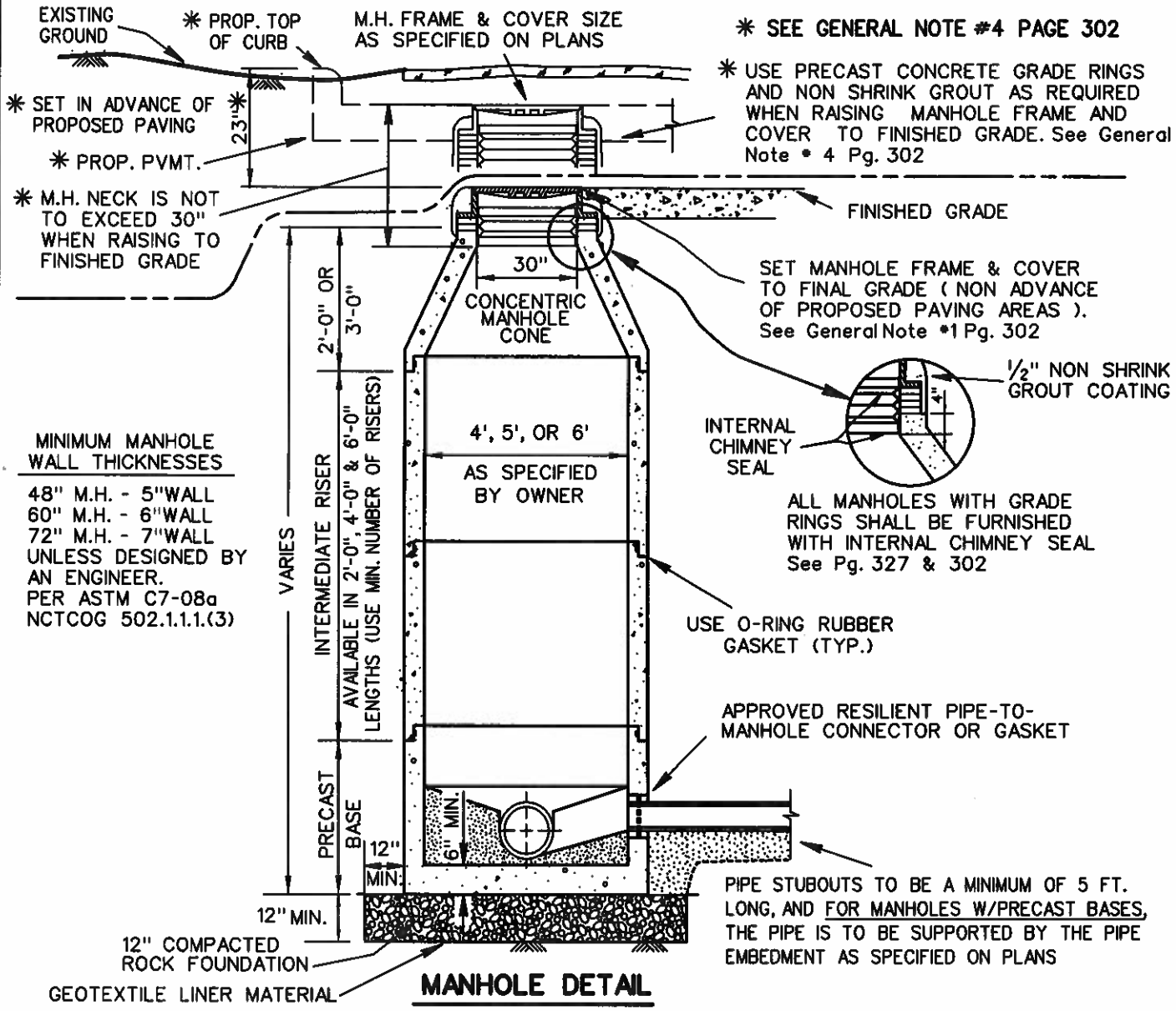
City of Dallas
Water Utilities Department

PART 3
WASTEWATER MAIN CONSTRUCTION

TITLE		Pg.
Wastewater Manhole--Precast	---	301
General Notes For Wastewater Manholes	---	302
Wastewater Manhole--Cast-in-Place	---	303
Wastewater Manhole--Pressure Type	---	304
Wastewater Manhole--Fiberglass	---	305
Wastewater Manhole--Vented	---	306
Wastewater Manhole--Outside Drop Connections	---	307
Wastewater Manhole--Inside Drop Connections	---	308
Wastewater Manhole--Invert Intersection Details	---	309
Wastewater Manhole--Invert Bench Details	---	309A
Manhole Pipe Connector--For Cast-in-Place Manholes	---	310
Wastewater Manhole--False Bottom	---	311
32" Standard Cast Iron Manhole Frame and Cover	---	312
24" Standard Cast Iron Manhole Frame and Cover (Not For New Construction)	---	312A
32" Pressure Type Cast Iron Manhole Frame and Cover	---	313
24" Pressure Type Cast Iron Manhole Frame and Cover (Not For New Construction)	---	313A
40" Pressure Type Cast Iron Manhole Frame and Cover	---	314
40" Standard Cast Iron Manhole Frame and Cover	---	315
Abandonment of Manhole In or Out of Pavement	---	316
Wastewater Main Cleanout	---	317
Cast-Iron Clean Out Casting For Wastewater Mainline	---	318
Wastewater Laterals With Cleanout	---	319
Wastewater Lateral Wye Connection to the Existing Mainline	---	320
Wastewater Lateral Cleanout Frame and Cover	---	321
Wastewater Lateral Connections in Earth and in Rock	---	322
Laterals Types	---	323
Lateral Application Schedule	---	324
Deep-Cut Connection	---	325
Wastewater Lateral Stubout in Advance of Paving	---	326
Wastewater Manhole with Internal Chimney Seal	---	327
Wastewater Access Device	---	328
Wastewater Sample Site – Concrete Platform Detail	---	329

* MANHOLE UNDER PROPOSED PAVING WITHIN STREET R.O.W.

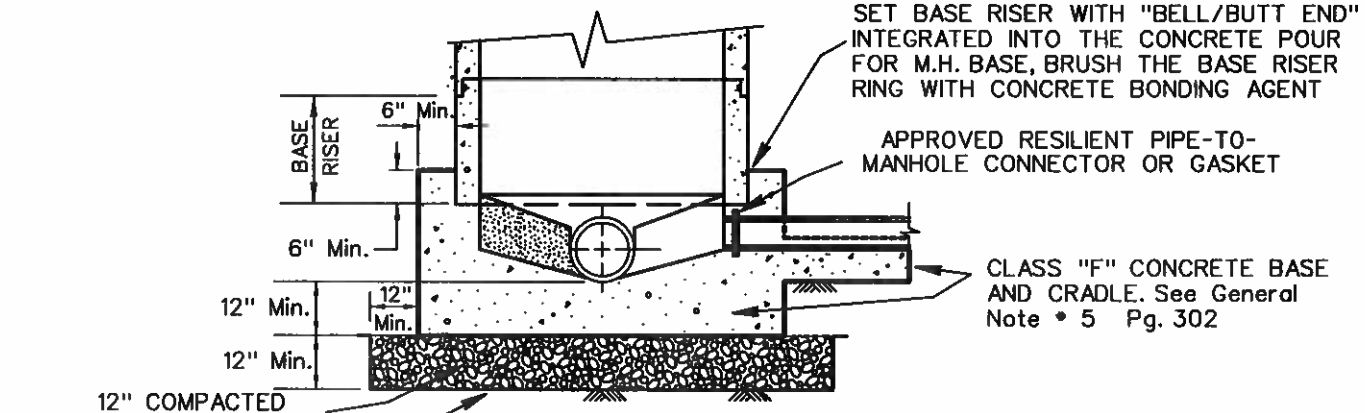
(IN ADVANCE OF PROPOSED PAVING IMPROVEMENT PROJECTS)



MINIMUM MANHOLE WALL THICKNESSES

48" M.H. - 5"WALL
60" M.H. - 6"WALL
72" M.H. - 7"WALL
UNLESS DESIGNED BY AN ENGINEER.
PER ASTM C7-08a
NCTCOG 502.1.1.1.(3)

MANHOLE DETAIL



CAST-IN-PLACE OPTIONAL BASE DETAIL

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE PRECAST		DWU	(Page No.) 301
		DATE OCT. 2011	

GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION

1) 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 of 5 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.

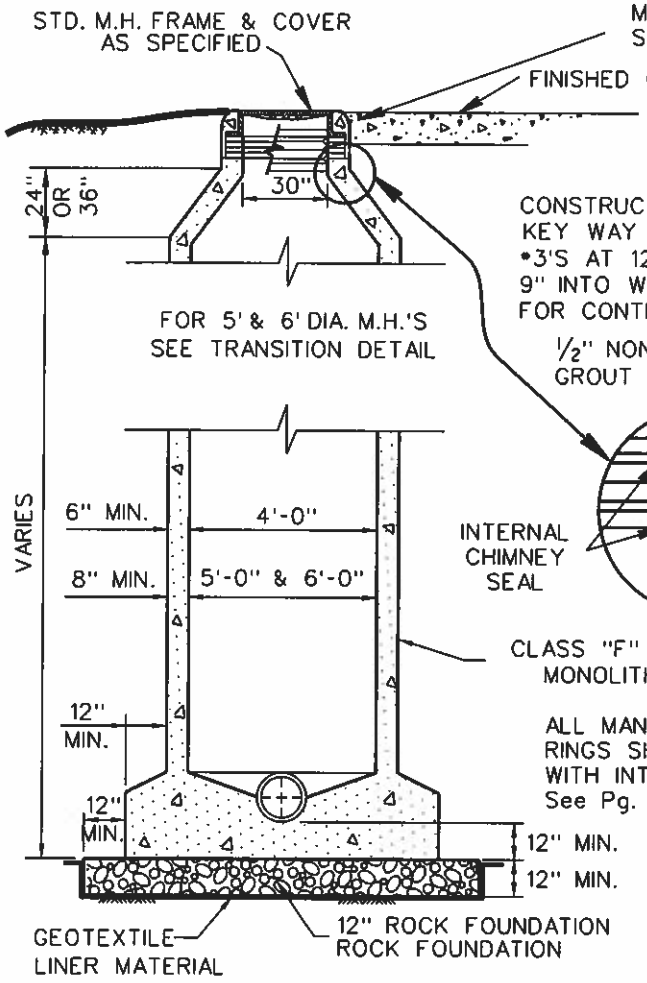
7) False manhole bottoms are required on all advance of paving projects. They shall be constructed, installed, and removed in accordance with details and instructions on page 311.

8) Minimum manhole wall thicknesses are per ASTM C76-08a unless designed by and engineer. The standard thicknesses are: 48" manhole=5"wall; 60" manhole=6" wall; 72" manhole=7"wall

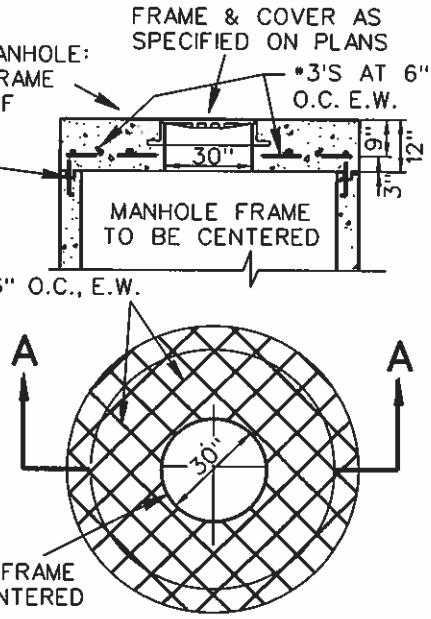
GENERAL NOTES FOR WASTEWATER MANHOLES		DWU	(Page No.) 302
		DATE OCT. 2011	

FOR CONSTRUCTION OF MANHOLES IN ADVANCE OF PROPOSED PAVING PROJECTS, See Detail On Pg. 301 & General Note *4 On Pg. 302.

USE PRECAST CONCRETE GRADE RINGS AND NON SHRINK GROUT AS REQUIRED TO SET MANHOLE FRAME AND COVER TO FINAL GRADE. See General Note *1 On Page 302



MANHOLE DETAIL



ROOF STEEL LAYOUT

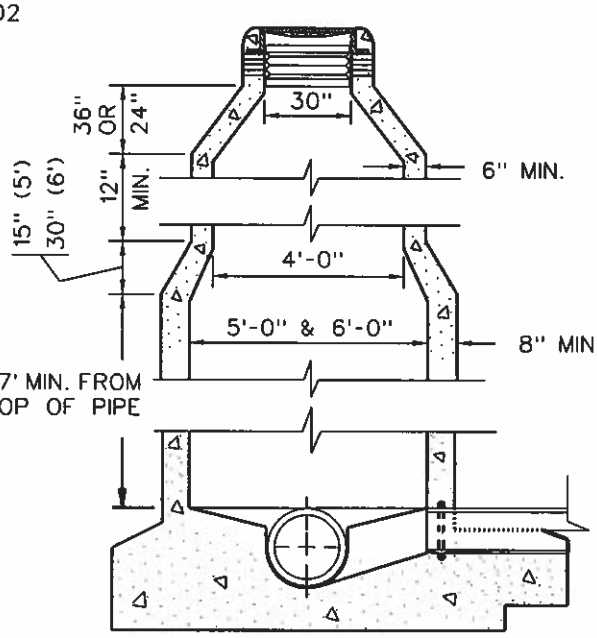
N.T.S.

ALL MANHOLES WITH GRADE RINGS SHALL BE FURNISHED WITH INTERNAL CHIMNEY SEAL See Pg. 327 & 302

CONNECTION DETAIL

N.T.S.

FIRST MAIN LINE JOINT TO BE A MIN. OF 5' LONG, WITH CONC. CRADLE (POURED CONTIGUOUS WITH CONC. BASE) AND UNDER ENTIRE JOINT See General Note * 5 On Pg. 302



TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

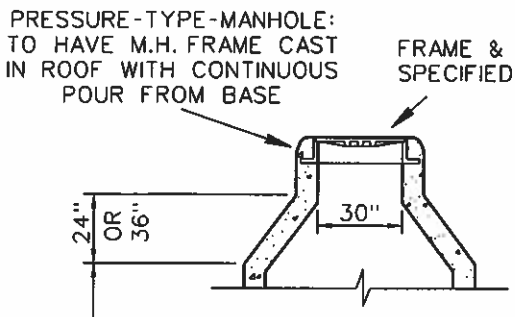
N.T.S.

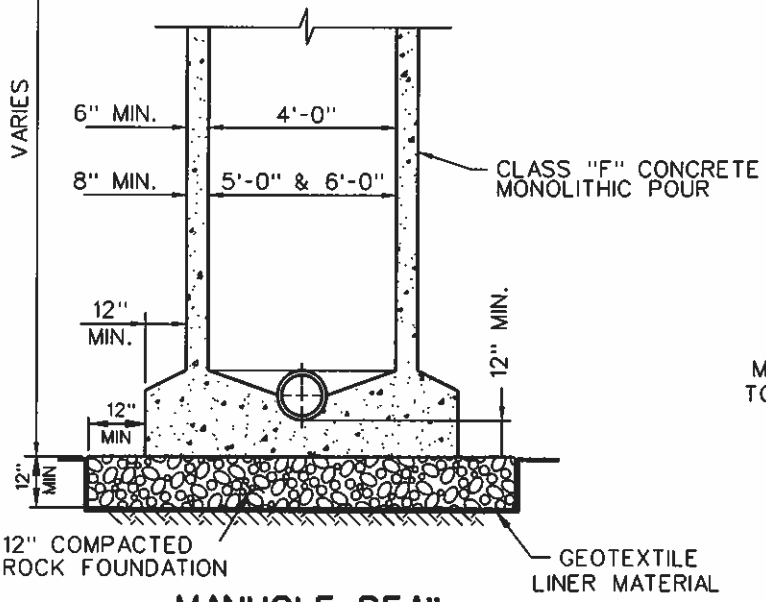
REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE CAST-IN-PLACE		DWU	(Page No.) 303
		DATE OCT. 2010	

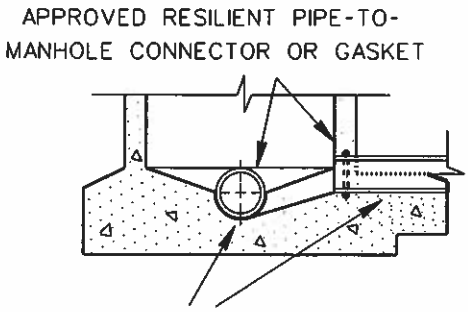
CONCRETE CONE ⇦ ROOF OPTIONS ⇨ REINFORCED CONCRETE SLAB

N.T.S.



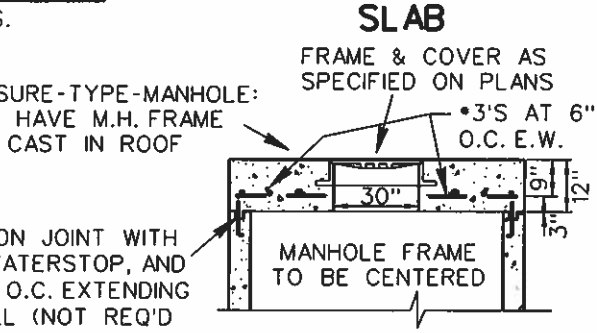


MANHOLE DEAIL



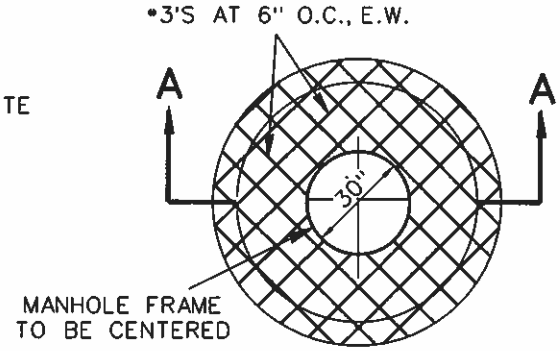
CONNECTION DETAIL

N.T.S.



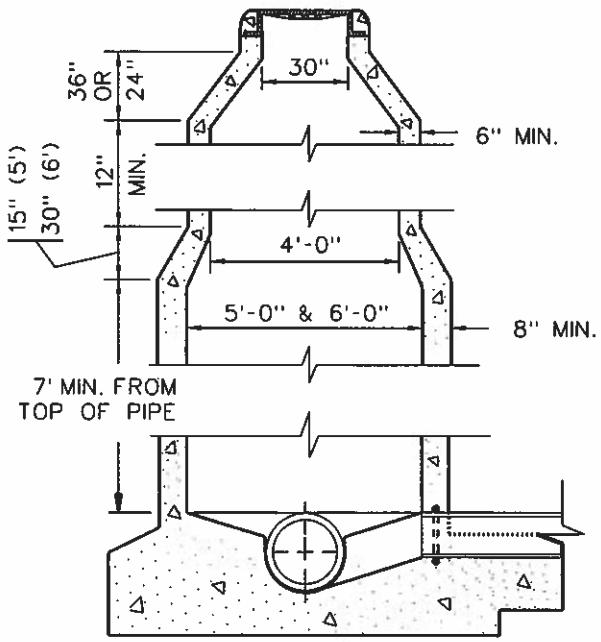
SECTION A - A

N.T.S.



ROOF STEEL LAYOUT

N.T.S.

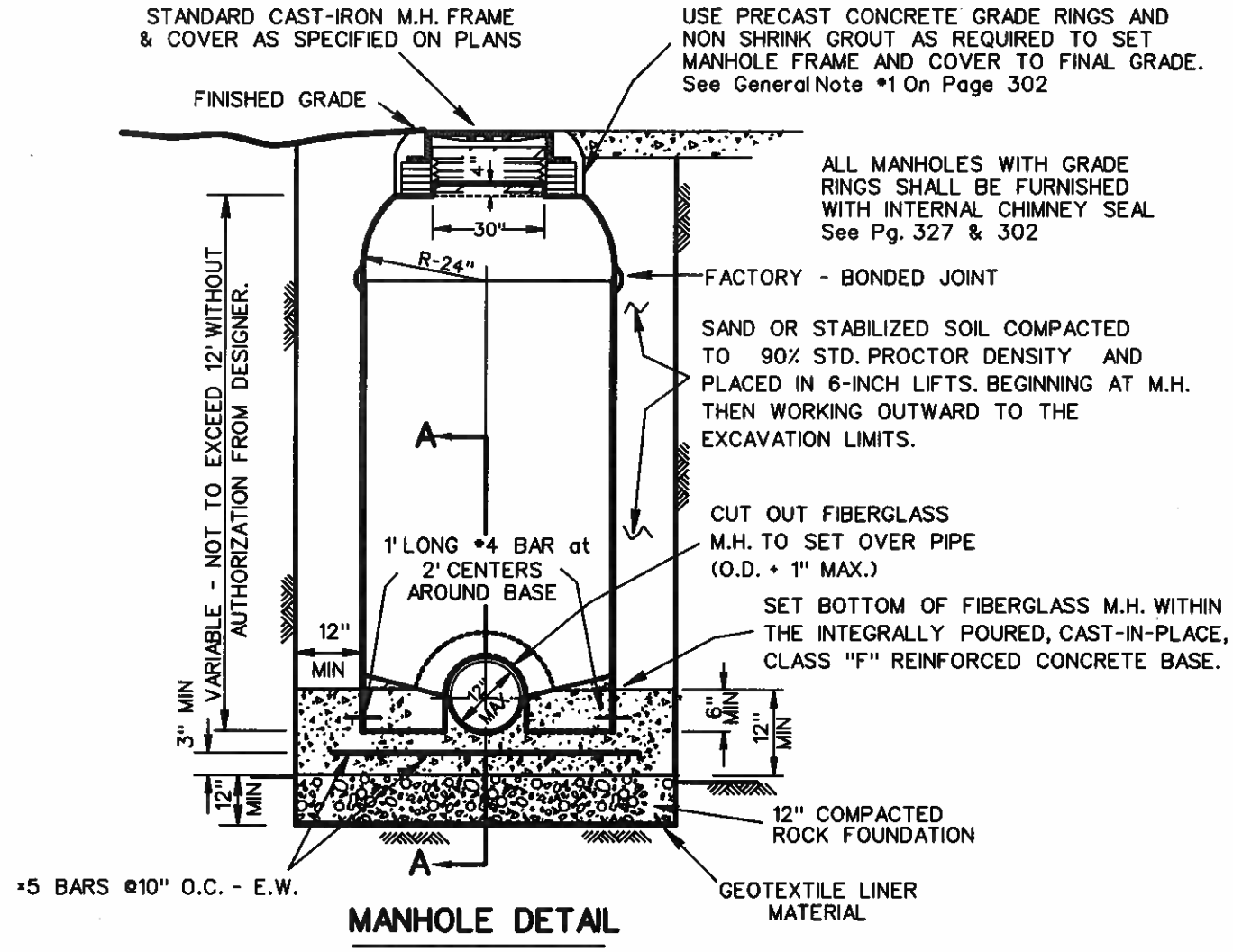


TRANSITION DETAIL FOR 5' & 6' DIA. M.H.'S

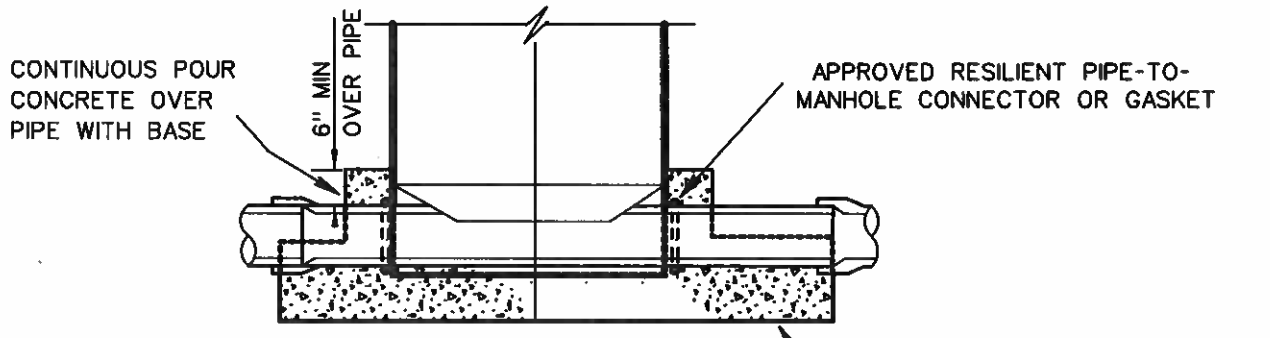
N.T.S.

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE PRESSURE-TYPE		DWU	(Page No.) 304
		DATE OCT. 2010	



MANHOLE DETAIL



SECTION A-A

N.T.S.

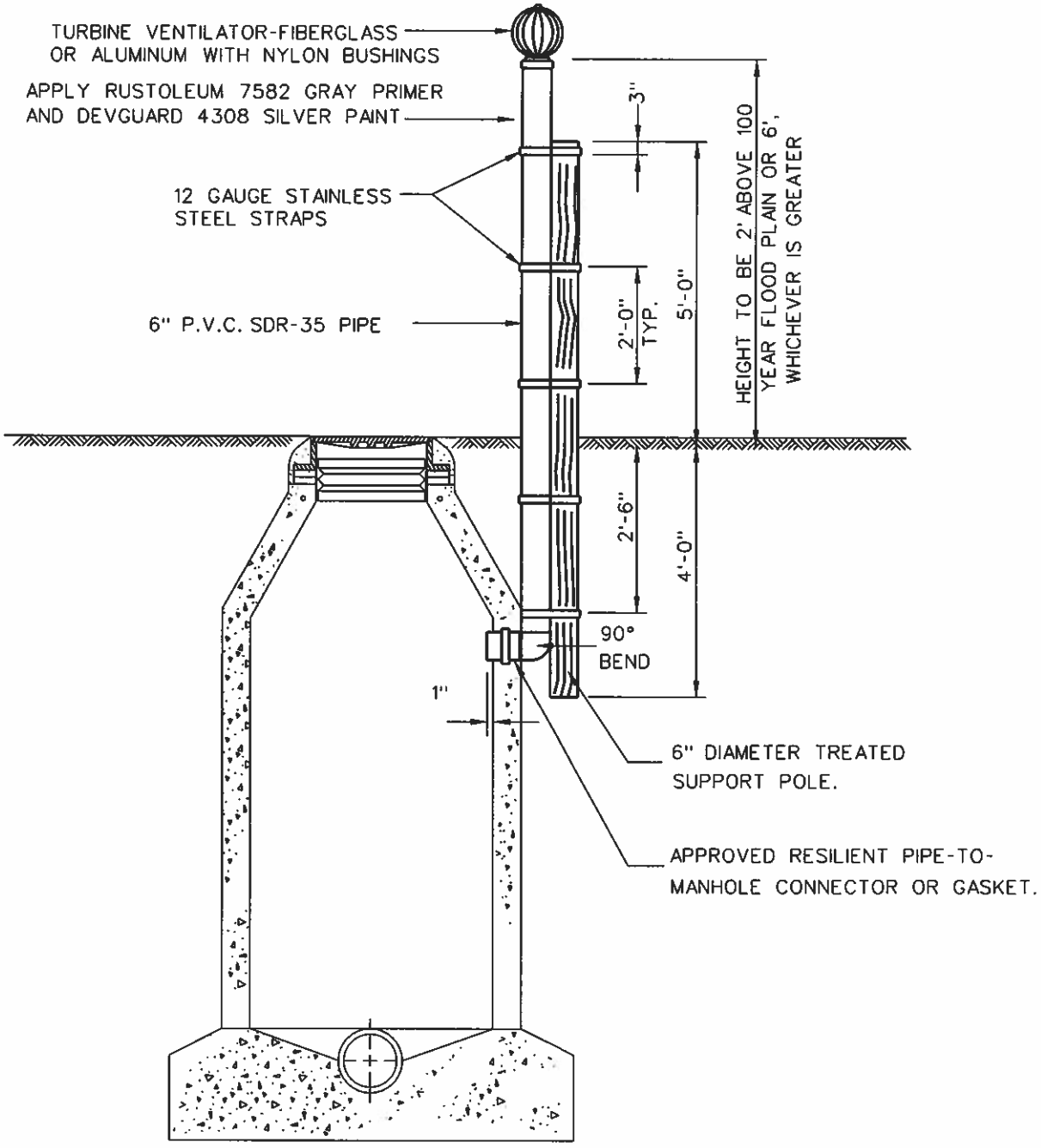
NOTES:

1. FUTURE CONNECTIONS. IF A SEALANT BETWEEN PIPE & M.H. IS NEEDED, USE APPROVED SILICONE SEALANT.
2. DESIGN : HS 20 LOADING

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE FIBERGLASS

		(Page No.)
DWU		305
DATE OCT.2011		



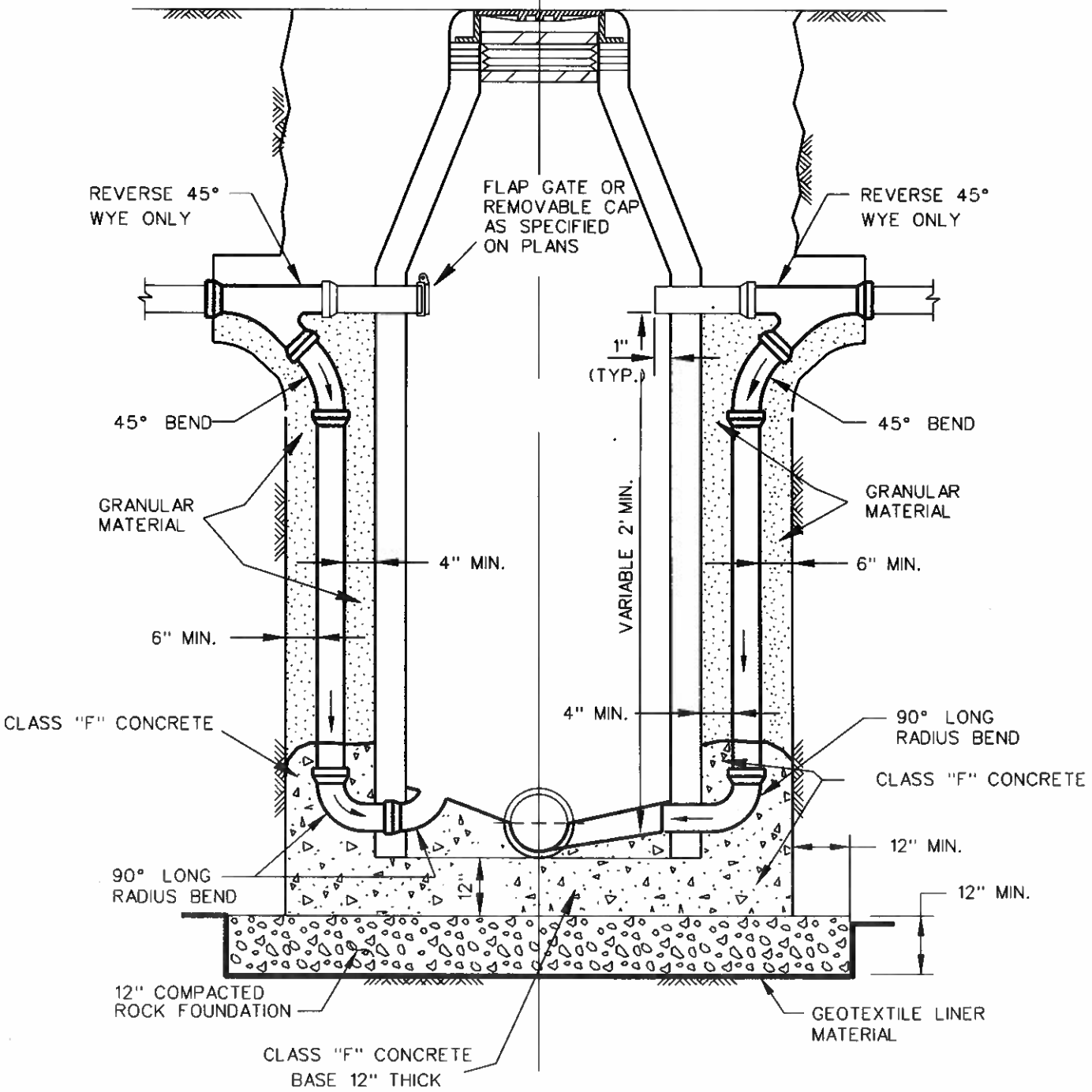
WASTEWATER MANHOLE VENTED

	DWU	(Page No.) 306
	DATE JAN. 2010	

MANHOLE TYPE-AS
SPECIFIED ON PLANS

GAS SEALED DROP CONNECTION
N.T.S.

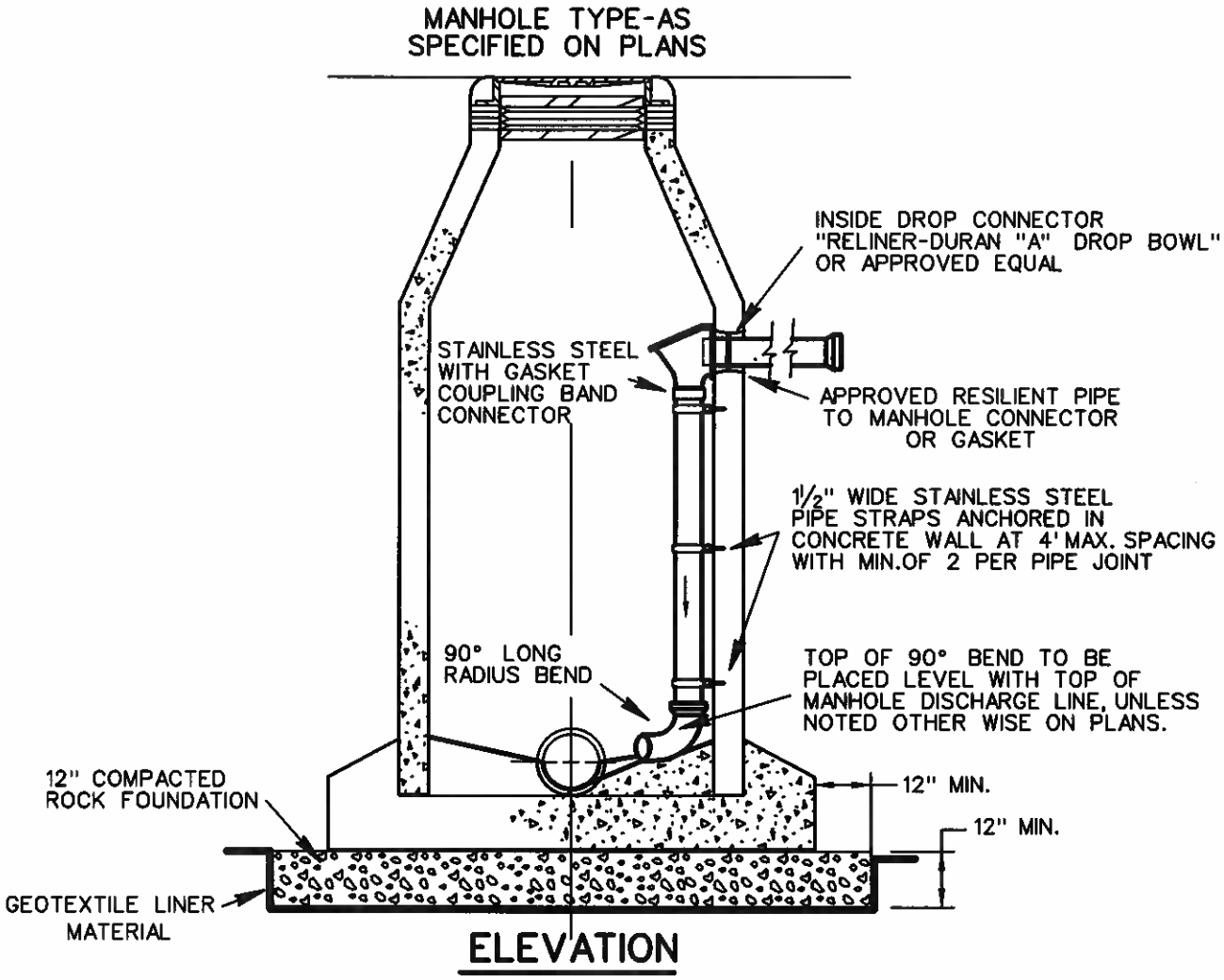
STANDARD DROP CONNECTION
N.T.S.



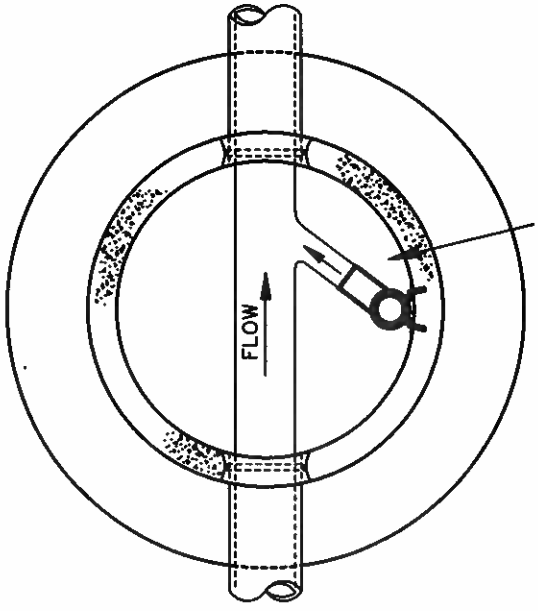
SEE GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE OUTSIDE DROP CONNECTIONS

DWU	(Page No.) 307
DATE OCT.2010	



ELEVATION

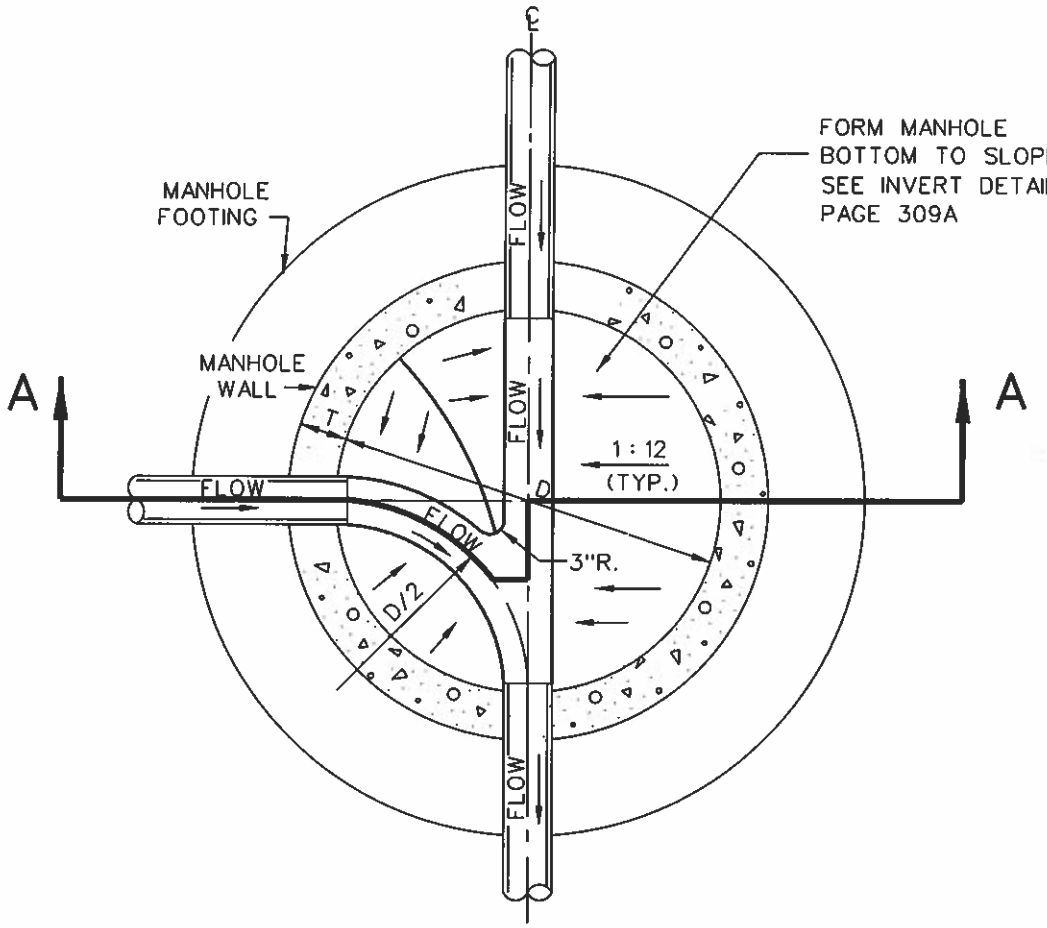


ROTATE LOWER 90° BEND
AND FORM INVERT TO DIVERT
DROP DISCHARGE DOWN STREAM

PLAN

SEE GENERAL NOTES
FOR WASTEWATER MANHOLE
CONSTRUCTION - PAGE 302

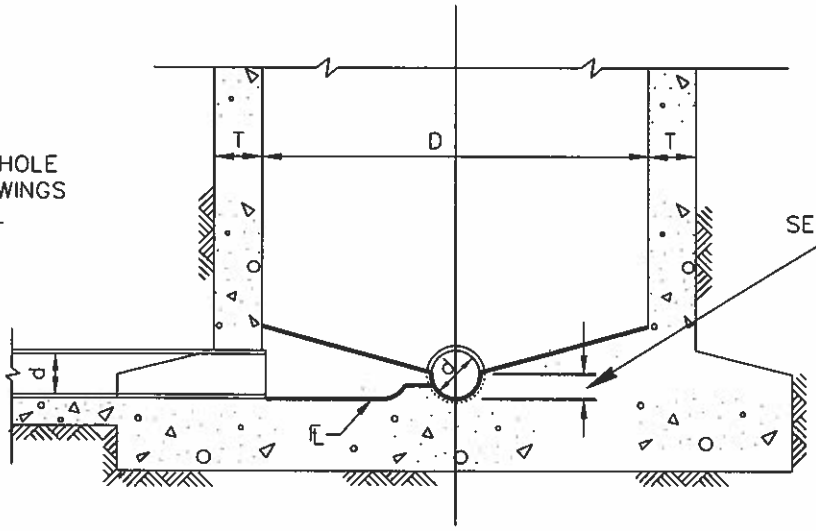
WASTEWATER MANHOLE INSIDE DROP CONNECTION		DWU	(Page No.) 308
		DATE SEP.2010	



PLAN
N.T.S.

T = WALL THICKNESS
D = MANHOLE DIAMETER
d = PIPE DIAMETER

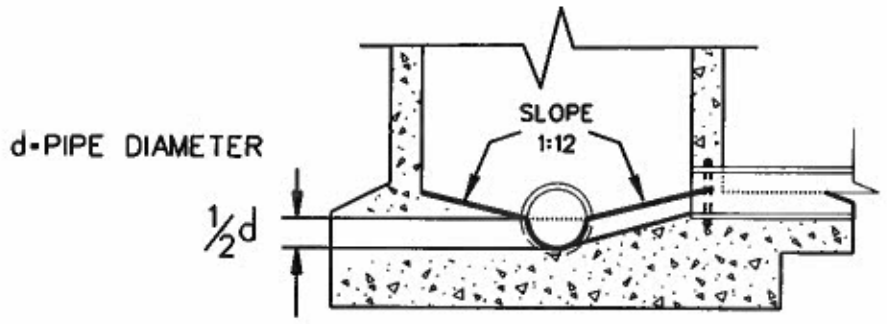
NOTE:
REFER TO MANHOLE STANDARD DRAWINGS FOR ADDITIONAL DETAIL OF M.H.



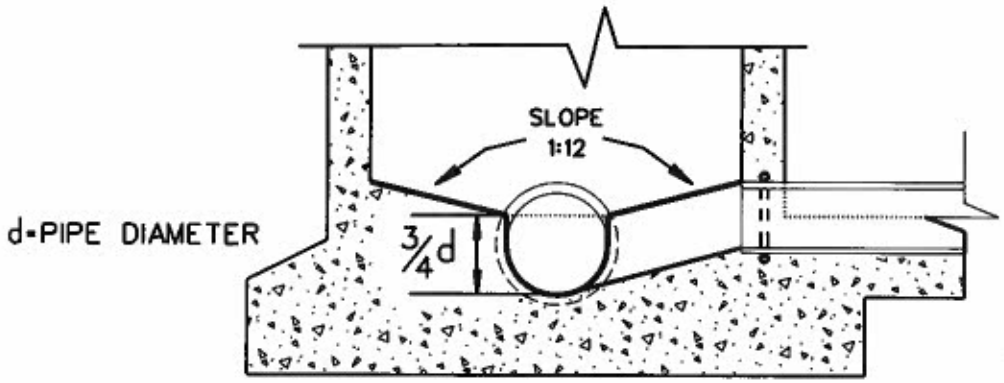
SECTION A-A
N.T.S.

WASTEWATER MANHOLE INVERT INTERSECTION DETAIL

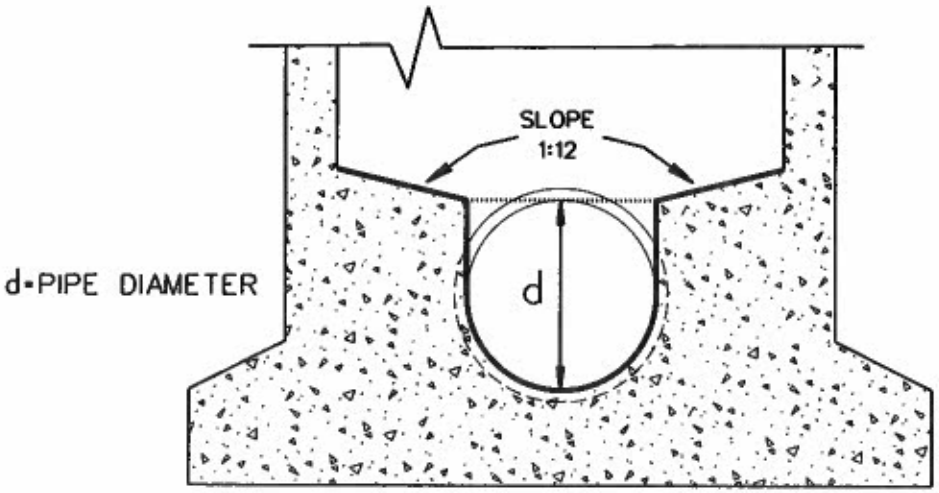
	(Page No.)
DWU	309
DATE DEC.2001	



FOR PIPE SMALLER
THAN 15" IN DIAMETER

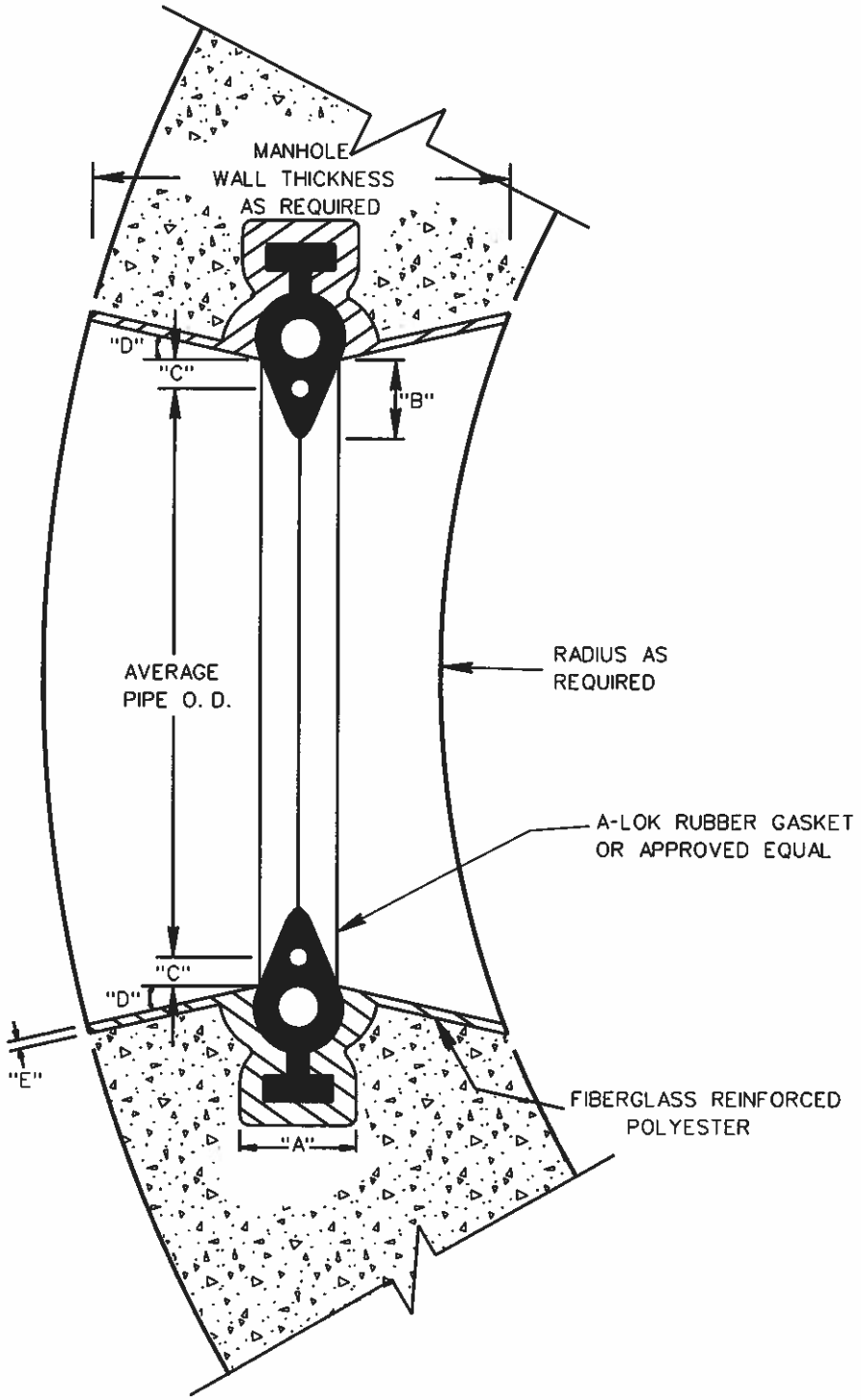


FOR PIPE FROM
15" TO 24" IN DIAMETER



FOR PIPE LARGER
THAN 24" IN DIAMETER

WASTEWATER MANHOLE INVERT BENCH DETAIL		DWU	(Page No.) 309A
		DATE JAN.2001	



DIMENSION FOR MANHOLE PIPE CONNECTOR A.S.T.M. C-923

PIPE SIZE	A	B	C	D	E
4" - 6"	1 1/2"	7/8"	3/8"	10°	1/4"-3/8"
8" - 21"	2 1/8"	1 3/8"	5/8"	10°	1/4"-3/8"
24" - 60"	2 3/8"	1 3/4"	3/4"	10°	1/4"-3/8"

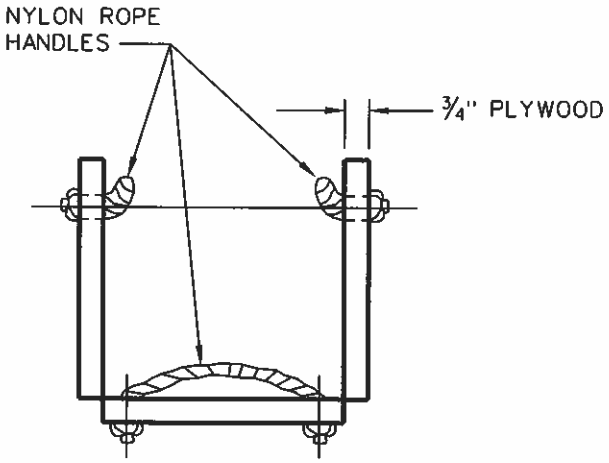
MANHOLE PIPE CONNECTOR (FOR CAST-IN-PLACE MANHOLES)		DWU	(PAGE No.) 310
		DATE JAN. 2010	

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.

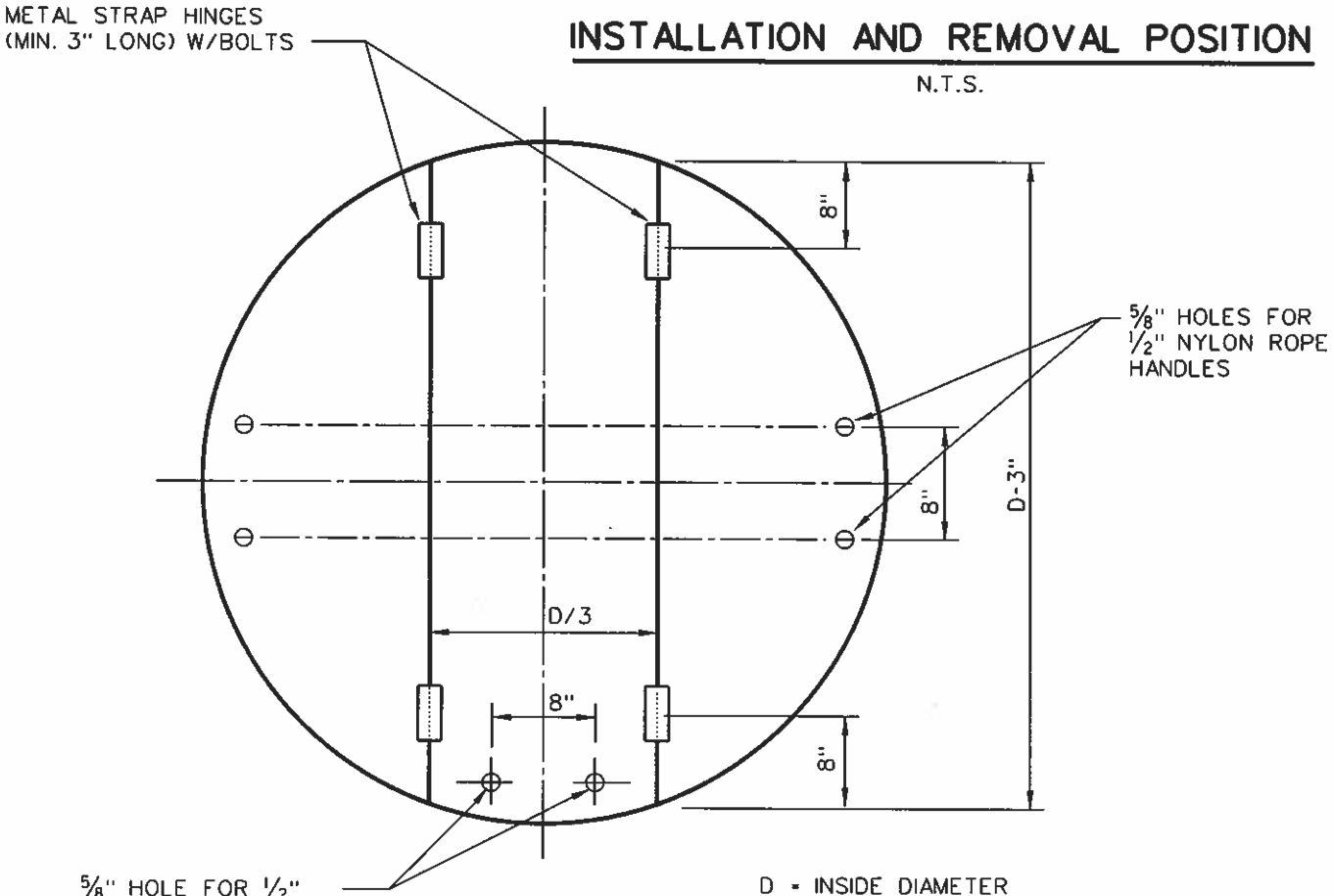
REMOVAL

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.



INSTALLATION AND REMOVAL POSITION

N.T.S.



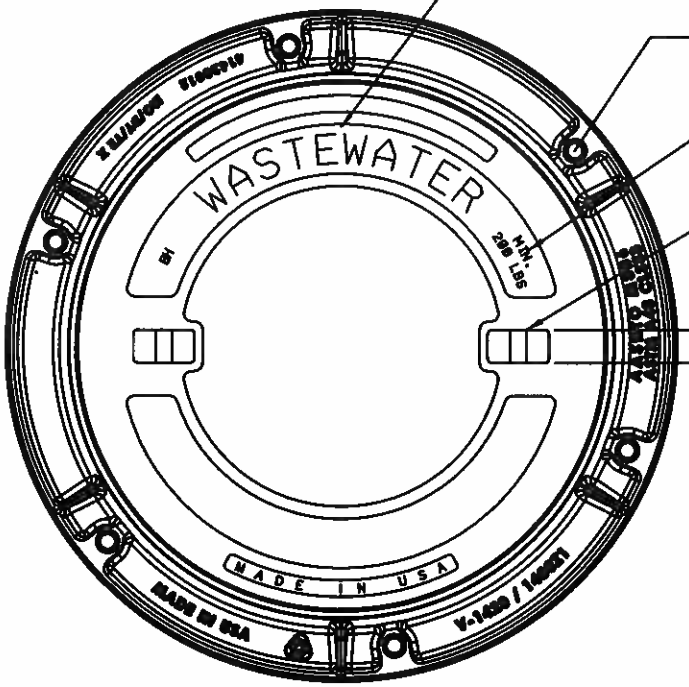
D = INSIDE DIAMETER OF MANHOLE

PLAN VIEW

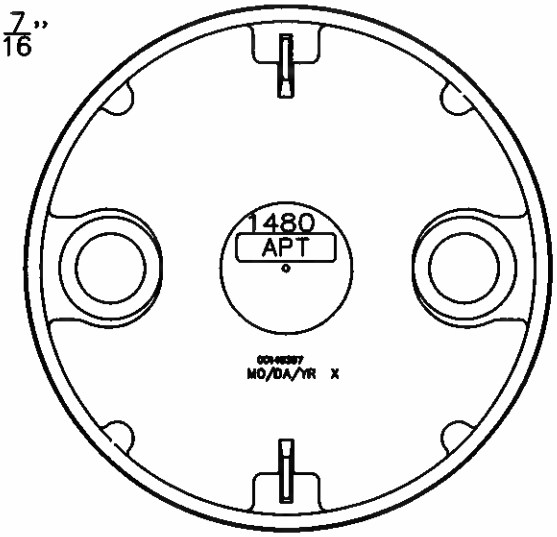
N.T.S.

WASTEWATER MANHOLE FALSE BOTTOM

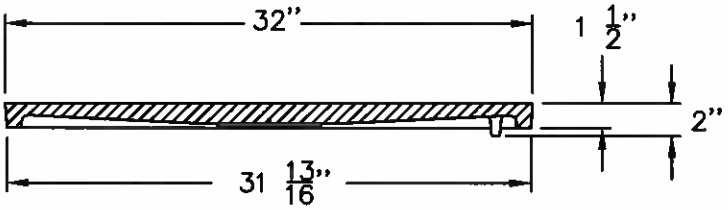
DWU		(Page No.) 311
DATE DEC.2001		



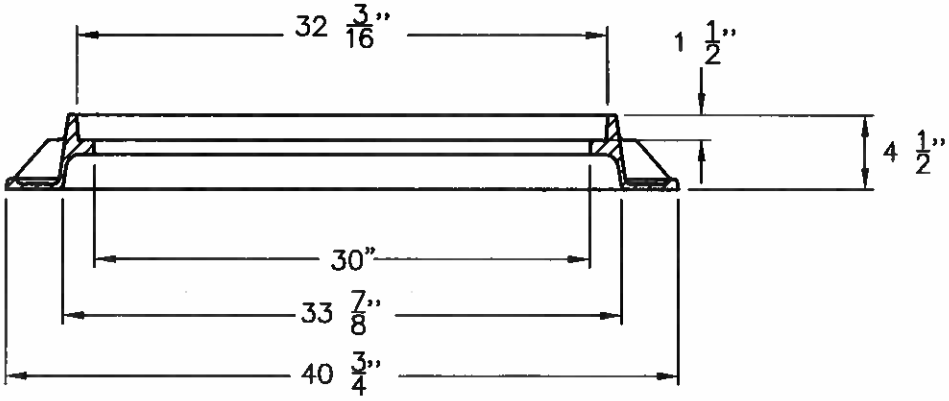
PLAN VIEW



BOTTOM VIEW OF COVER



COVER SECTION

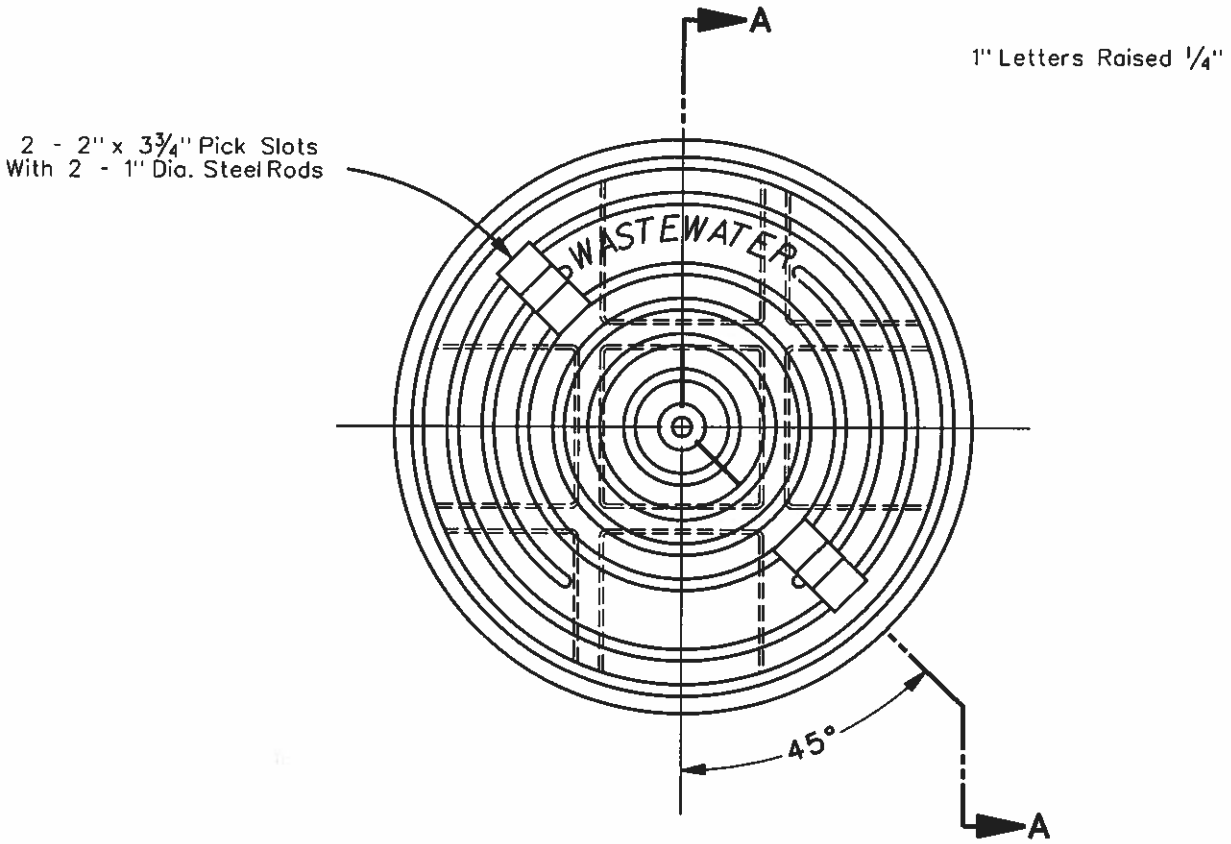


LID MAY BE IDENTIFIED WITH EITHER
"WASTEWATER" OR "SANITARY SEWER"

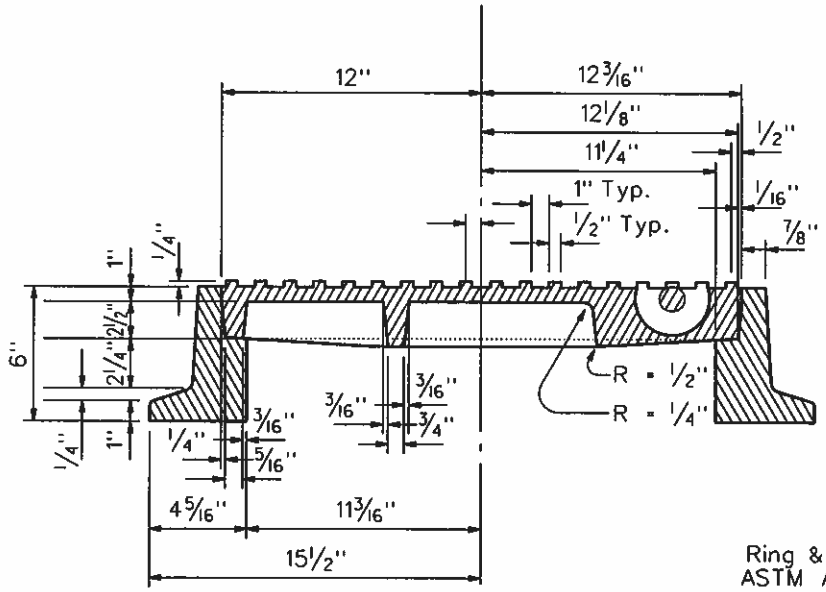
COVER – GRAY IRON
ASTM A48 CL35B
FRAME – GRAY IRON
ASTM A48 CL35B

STANDARD 32" C.I. M.H. FRAME & COVER	WASTEWATER	DWU	(PAGE No.) 312
		DATE OCT.2011	

NOT TO BE USED FOR NEW CONSTRUCTION



PLAN

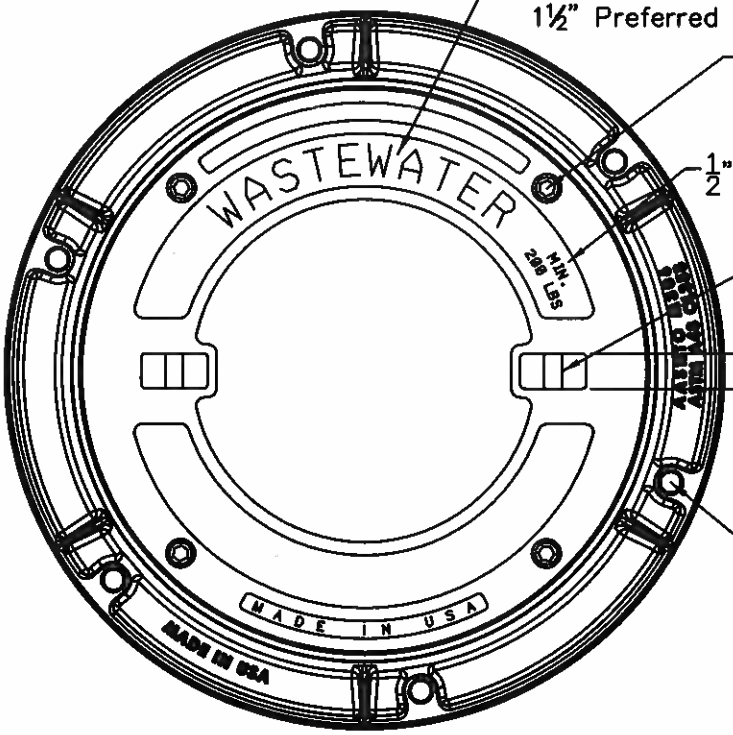


SECTION "A-A"

Ring & Cover Material per
ASTM A48 Class 35B Min.
Gray Iron Castings.

STANDARD 24" C.I. M.H. FRAME & COVER		DWU	(PAGE No.) 312A
		DATE JAN. 2010	

LID MAY BE IDENTIFIED WITH EITHER
"WASTEWATER" OR "SANITARY SEWER"



LETTERS (RECESSED FLUSH)
1" Minimum
1½" Preferred

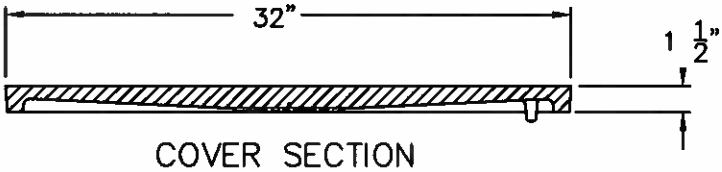
(4) ½"–13 X 2" LG.
SS HEX HEAD BOLTS
W/ STL AND RUBBER
WASHERS

½" LETTERS (RECESSED FLUSH)

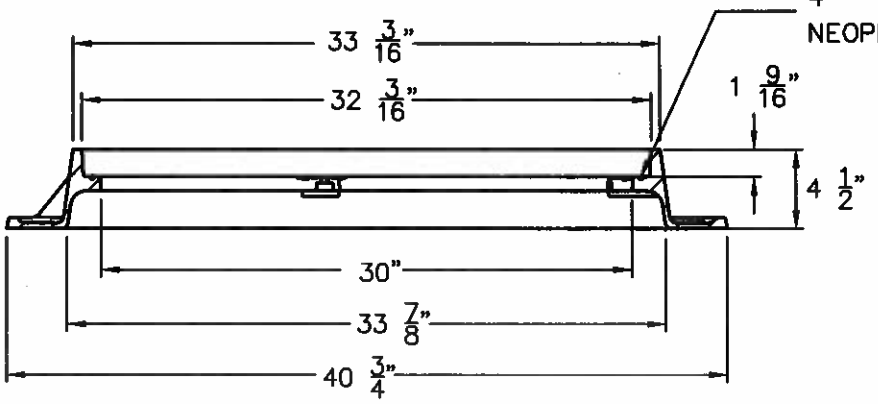
(2) PICKBARS

2 3/16"

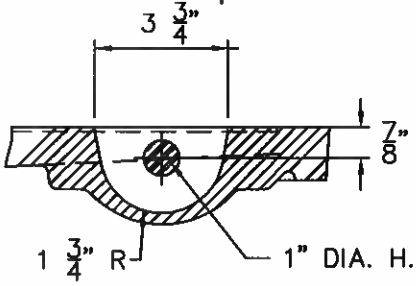
(6) 1 ⅛" DIA. BOLT HOLES
ON 37" DIA. BOLT CIRCLE



COVER SECTION



FRAME SECTION



PICKBAR DETAIL

EON LOCK™ OR EQUAL
POCKETS FOR ½"–13 SQ NUT
ON A 29 3/8" DIA. B.C. (TYP)

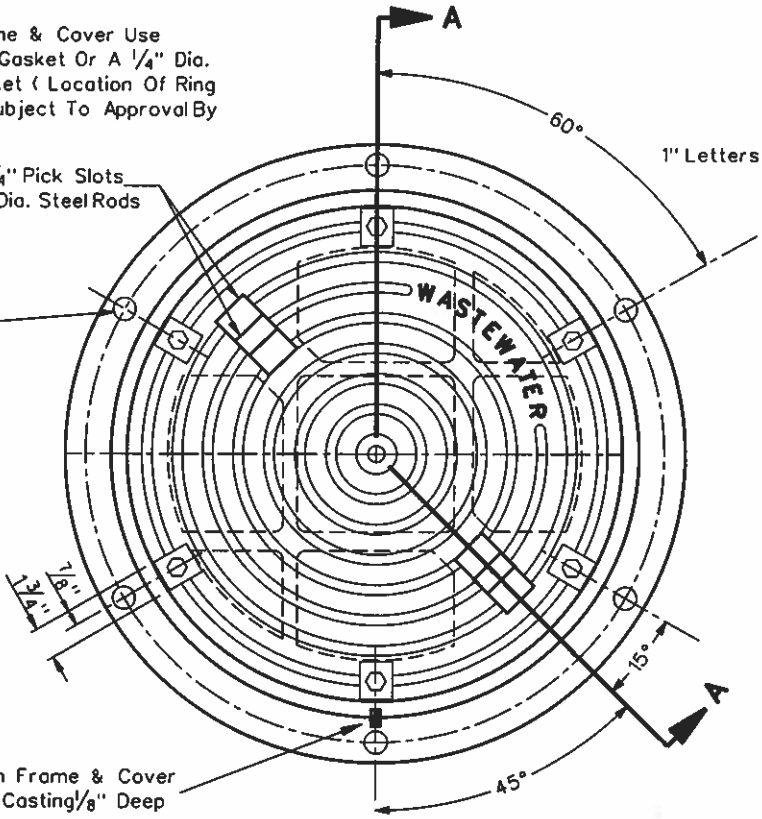
FRAME BOLTING DETAIL

COVER – GRAY IRON
ASTM A48 CL35B
FRAME – GRAY IRON
ASTM A48 CL35B

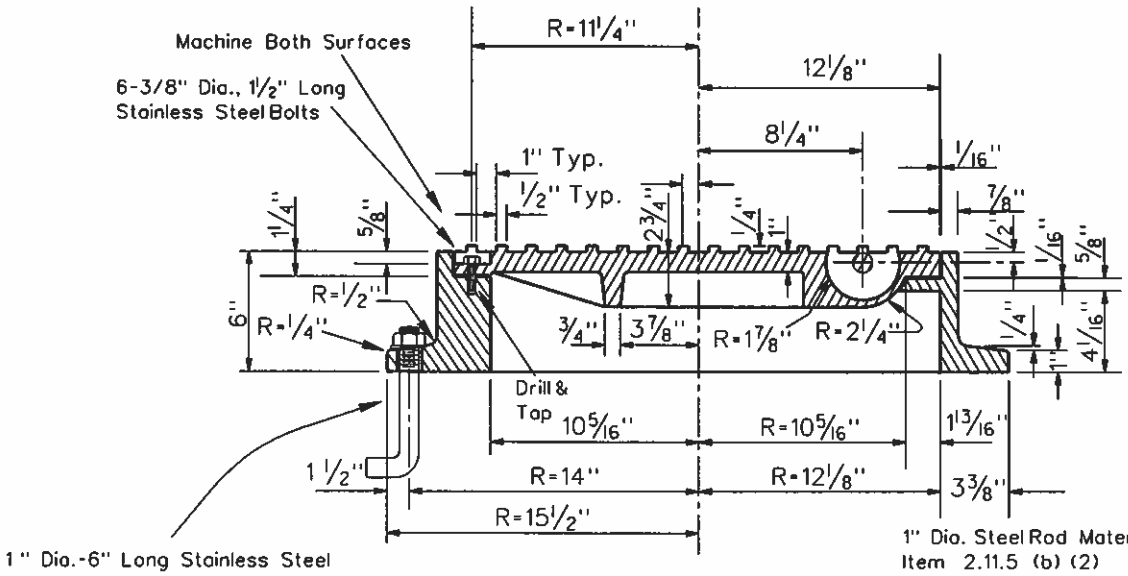
32" PRESSURE TYPE CAST-IRON MH. FRAME & COVER	WASTEWATER	DWU	(PAGE No.) 313
		DATE OCT. 2011	

NOT TO BE USED FOR NEW CONSTRUCTION

NOTE:
For Seal Between Frame & Cover Use Either A 1/6" Copper Gasket Or A 1/4" Dia. Neoprene O-Ring Gasket (Location Of Ring Is Left To Mfr., But Subject To Approval By Construction Engineer.



PLAN



1" Dia.-6" Long Stainless Steel Anchor Bolts w/Hex. Head Nut 6-Required

SECTION "A-A"

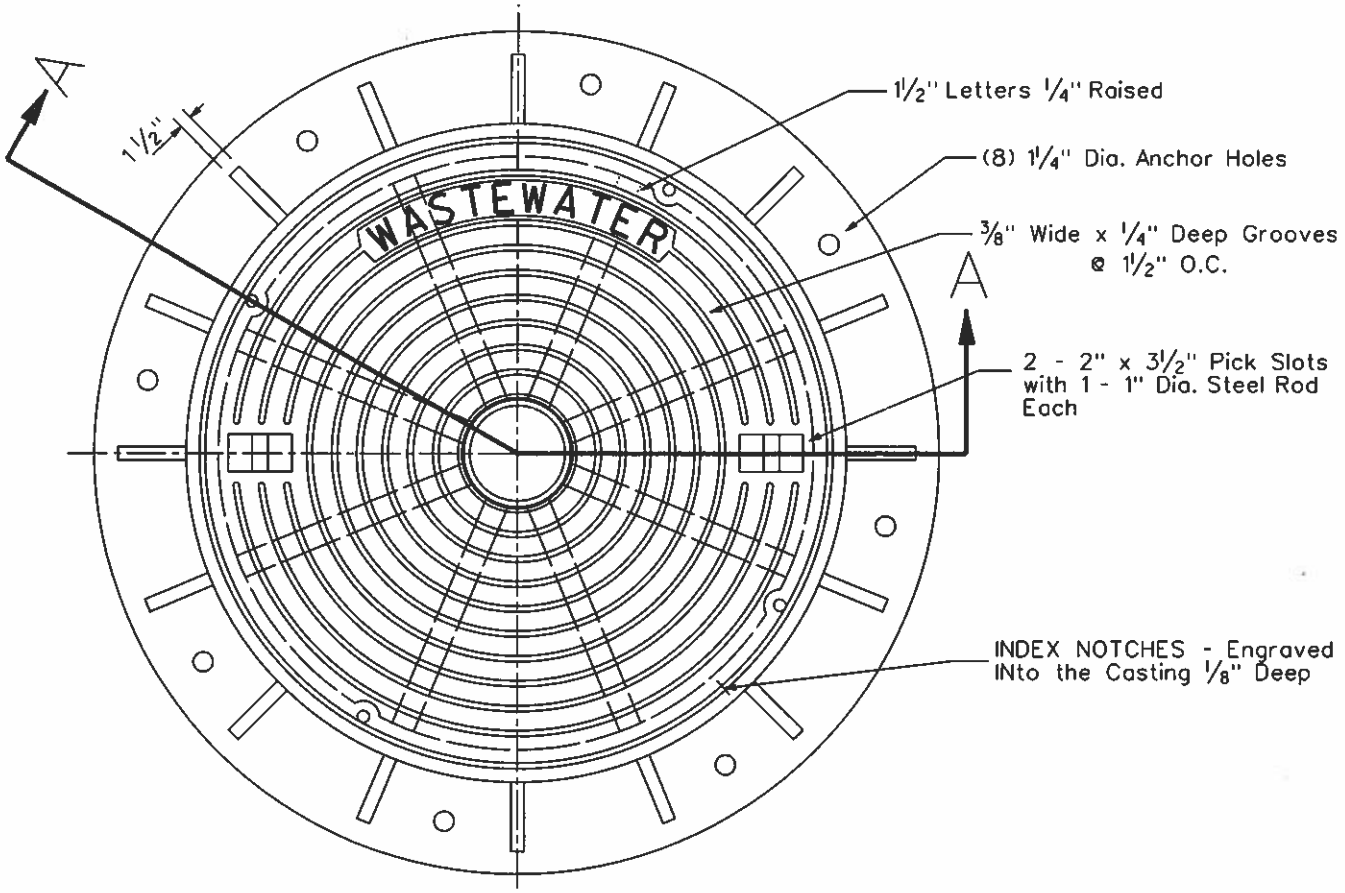
1" Dia. Steel Rod Material Per Item 2.11.5 (b) (2)
Ring & Cover Material Per Item 2.11.5 (c)

Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

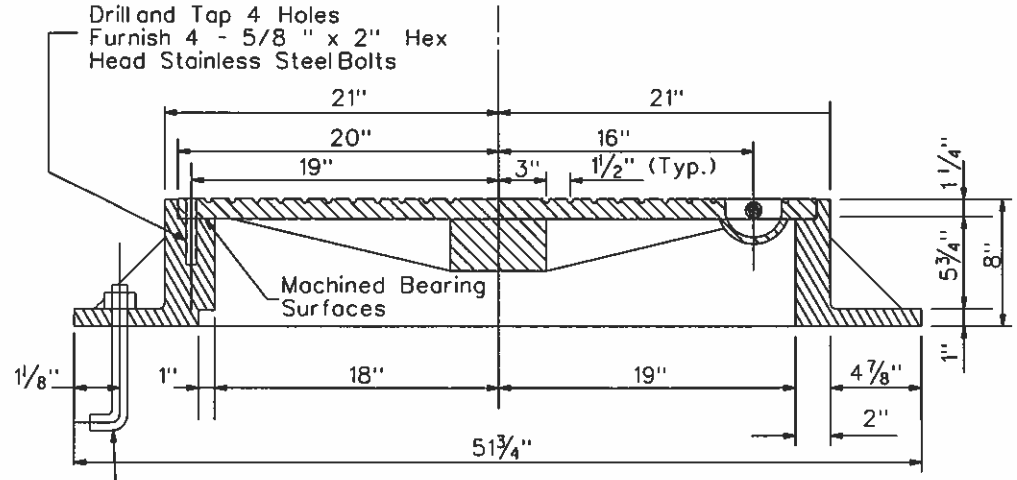
24" PRESSURE TYPE CAST-IRON MH. FRAME & COVER		DWU	(PAGE No.) 313A
		DATE JAN. 2010	

NOTE: For seal between frame and cover use either a 1/16" thick copper gasket or a 1/4" diameter neoprene "O"-ring. Location of the "O"-ring is left to the manufacturer, but subject to approval by DWU Construction Engineer.

LID MAY BE IDENTIFIED WITH EITHER "WASTEWATER" OR "SANITARY SEWER"



PLAN

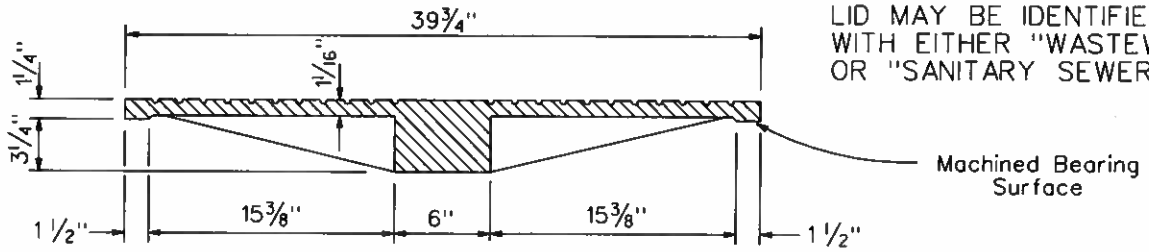


SECTION "A-A"

1" Dia. - 6" Long Stainless Steel Anchor Bolts w/ Hex Head Nuts 8 Required

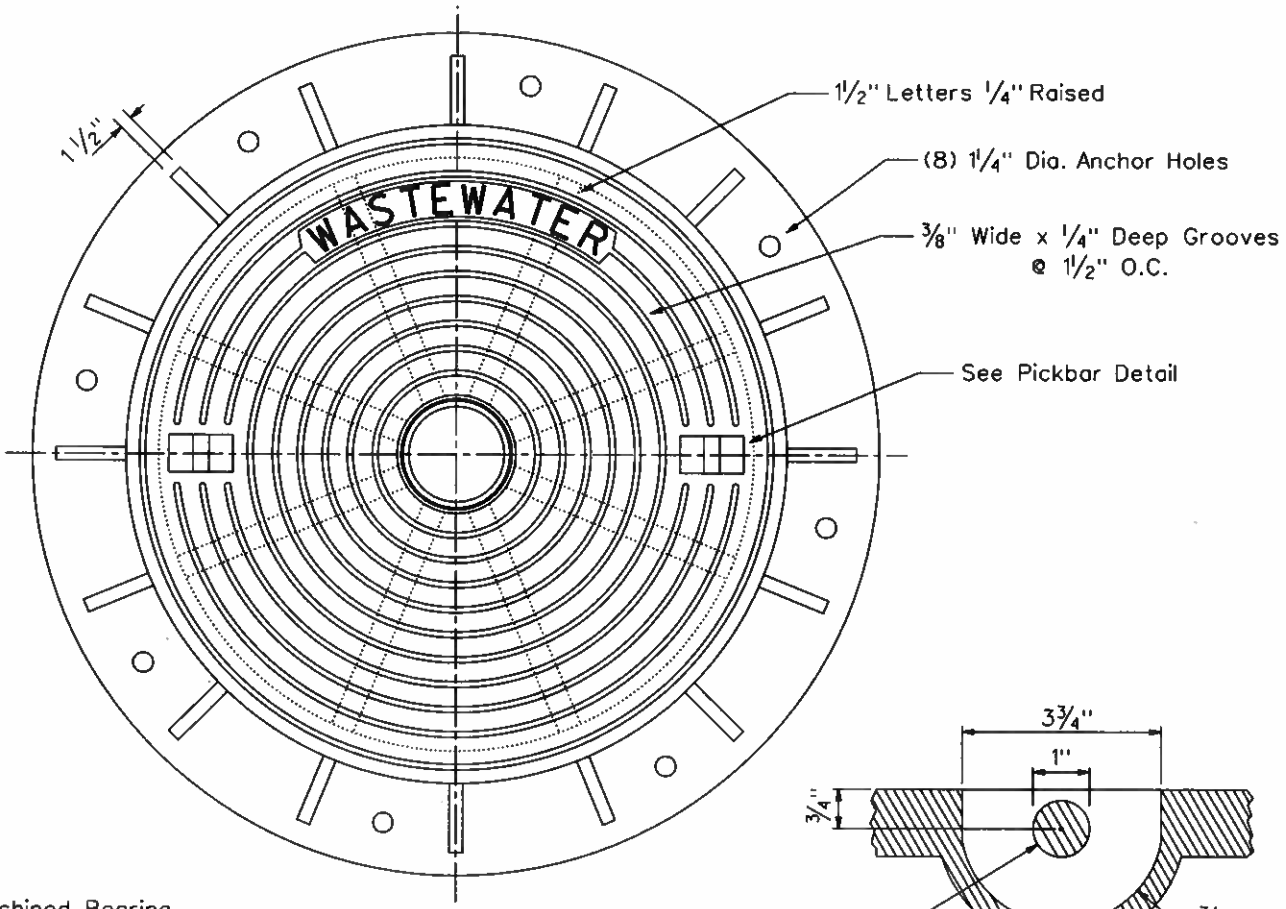
Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

40" PRESSURE TYPE CAST IRON M.H. FRAME & COVER		DWU	(PAGE NO.) 314
		DATE JAN. 2010	



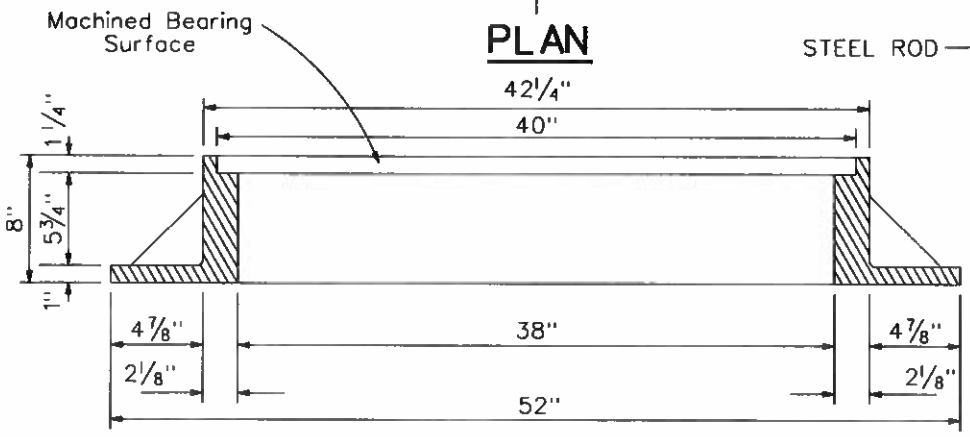
LID MAY BE IDENTIFIED WITH EITHER "WASTEWATER" OR "SANITARY SEWER"

SECTION THRU COVER



PLAN

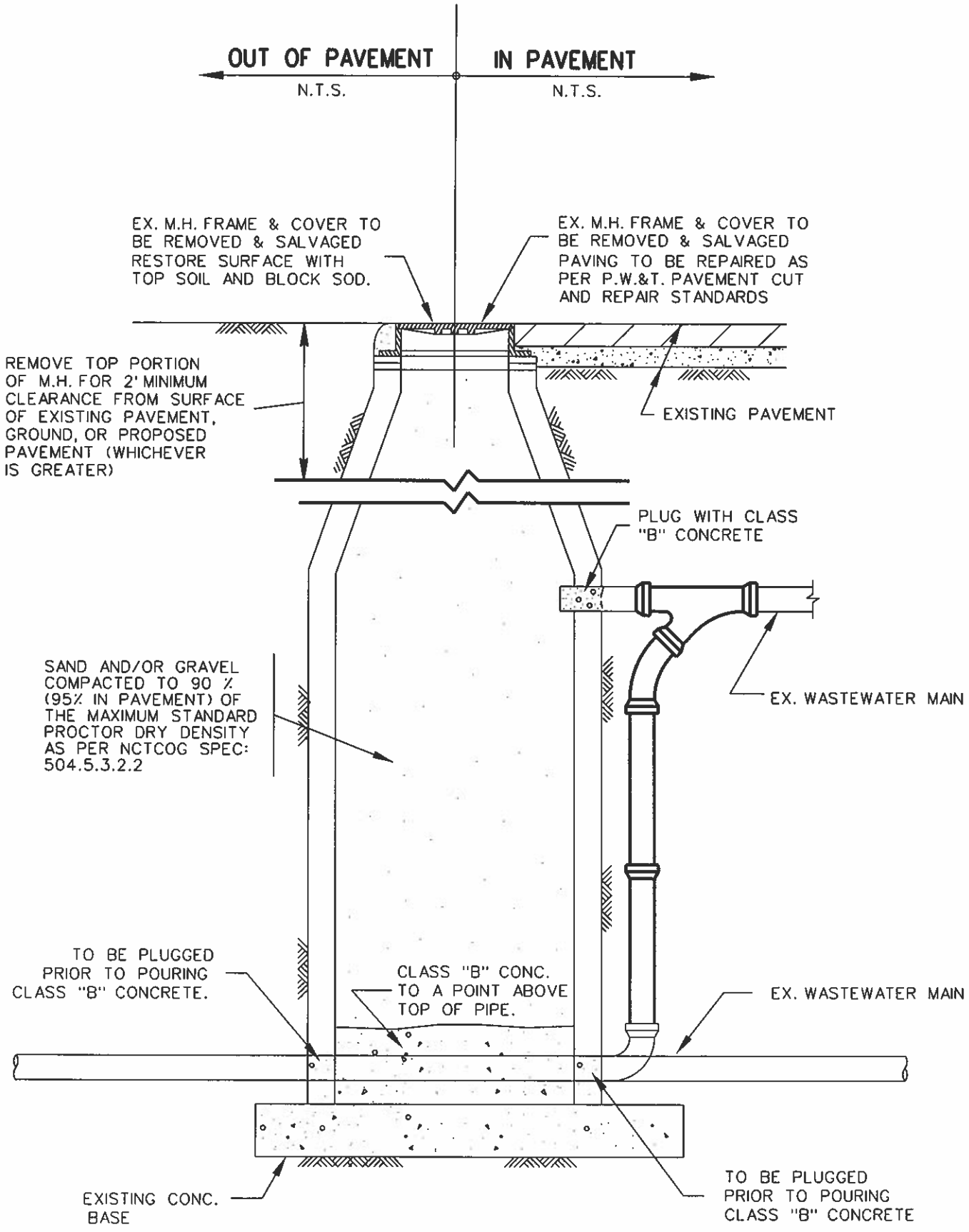
PICKBAR DETAIL



SECTION THRU FRAME

Ring & Cover Material per ASTM A48 Class 35B Min. Gray Iron Castings.

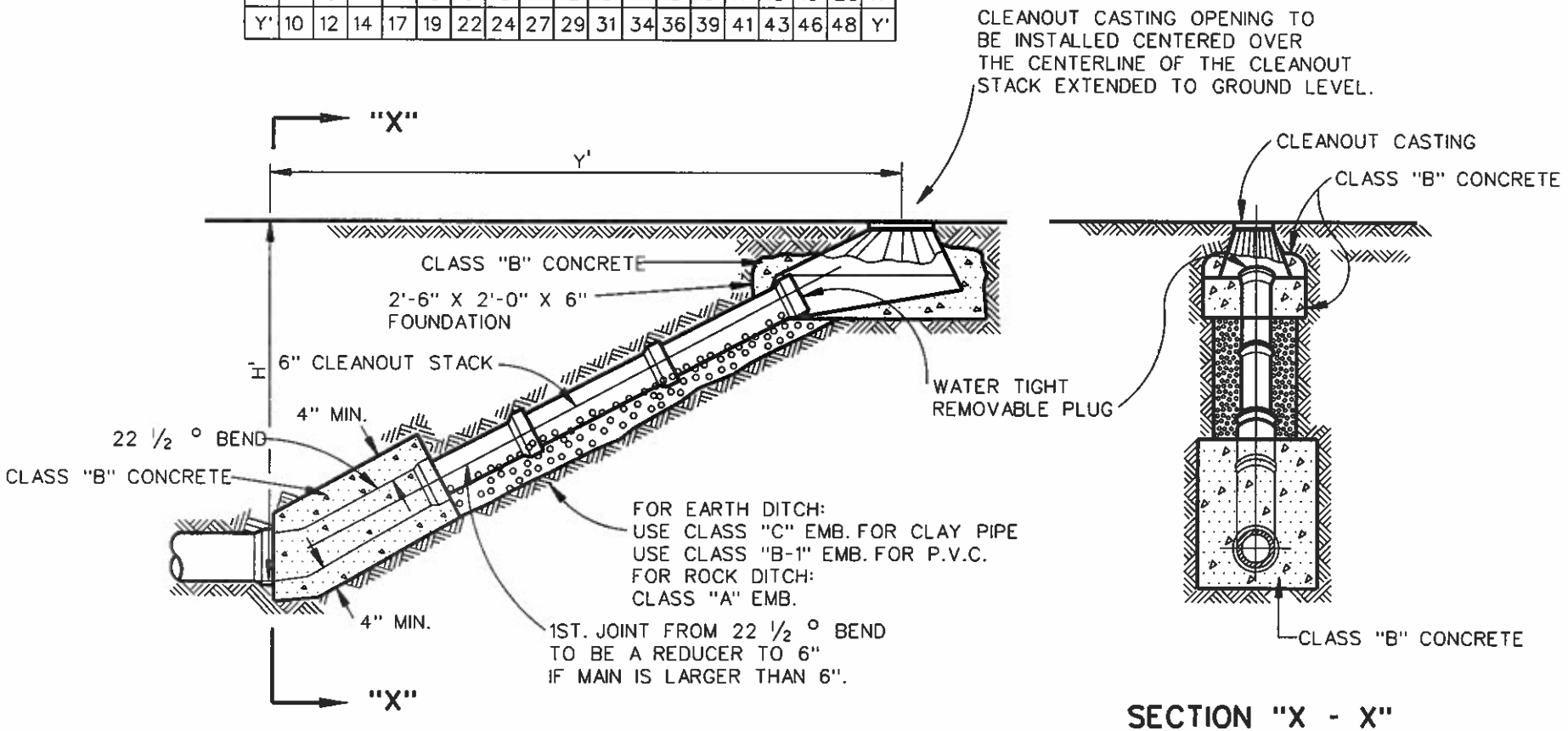
STANDARD 40" MANHOLE FRAME AND COVER		DWU	(PAGE NO.) 315
		DATE DEC. 2001	



NCTCOG Spec: 504.5.3.2.2. - Densities - Areas Not Subjected To Or Influenced By Vehicular Traffic
2009 DWU Addendum: 504.5.3.2.2.DWU: Densities - Areas Not Subjected To Or Influenced By Vehicular Traffic

ABANDONMENT OF MANHOLE IN OR OUT OF PAVEMENT		DWU	(Page No.) 316
		DATE OCT.2010	

H'	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	H'
Y'	10	12	14	17	19	22	24	27	29	31	34	36	39	41	43	46	48	Y'



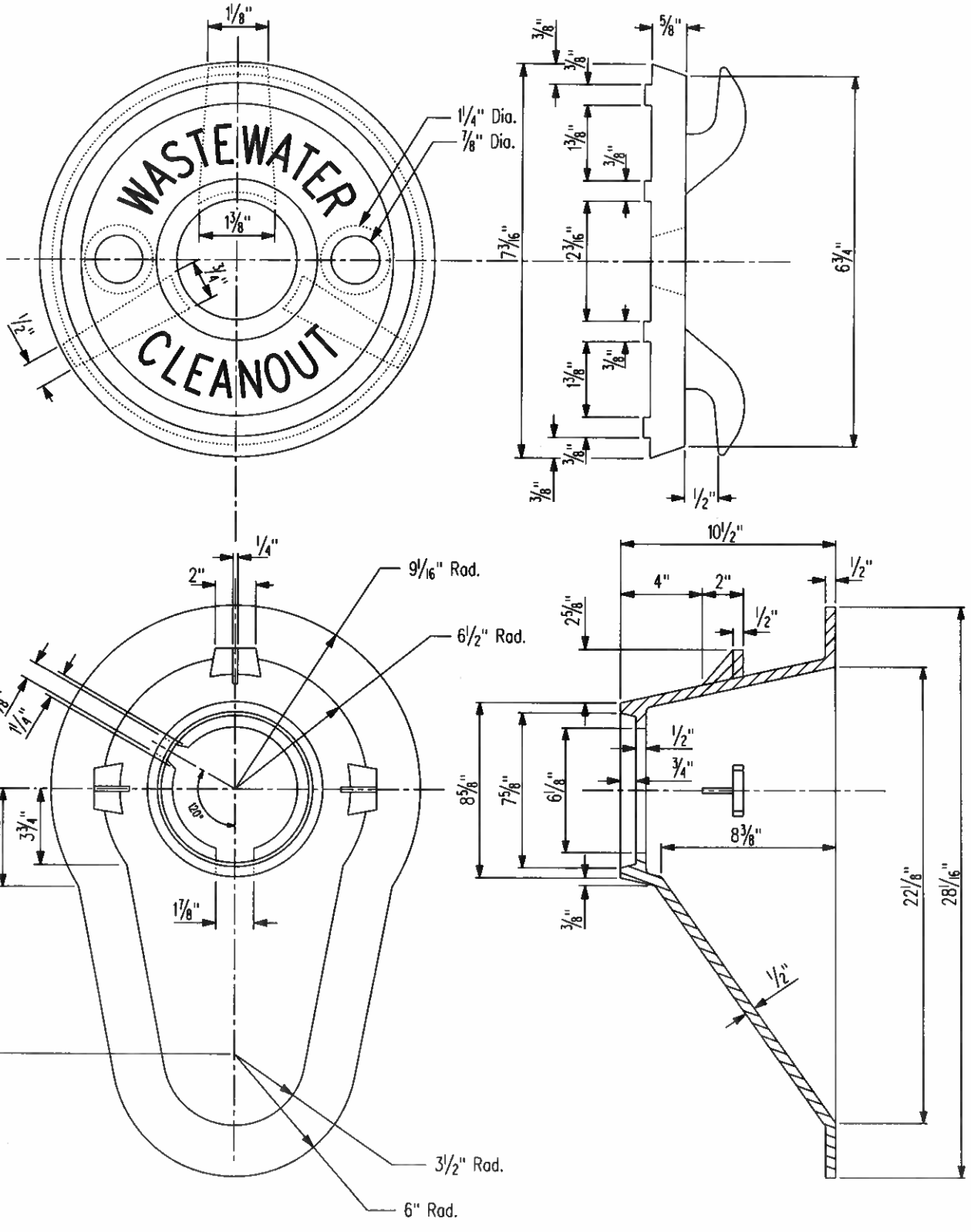
PROFILE VIEW
N.T.S.

SECTION "X - X"
N.T.S.

NOTE:
IF CLEANOUT IS PLACED IN ADVANCE OF PAVEMENT PLACE SAND AROUND CLEANOUT CASTING IN LIEU OF CLASS "B" CONCRETE.

WASTEWATER MAIN CLEANOUT

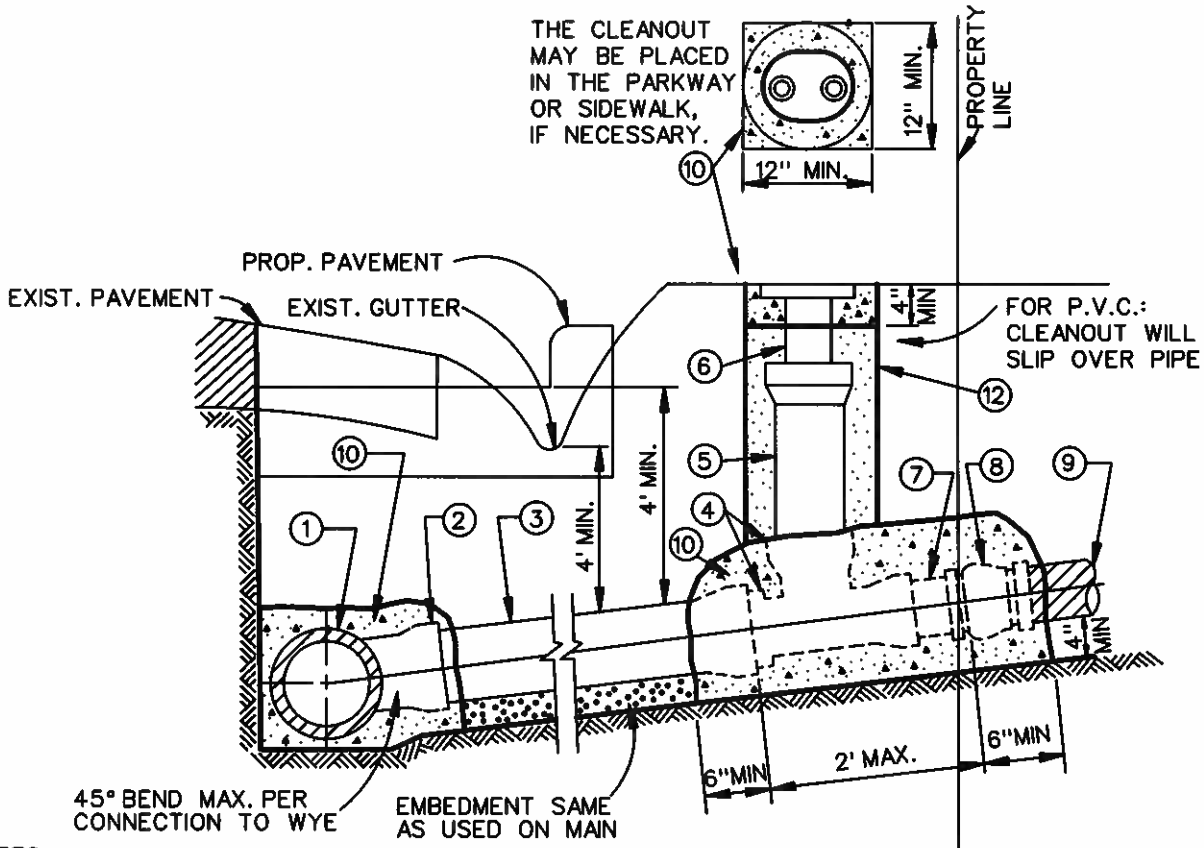
	DWU	(Page No.) 317
	DATE JAN.2001	



CAST IRON C.O. CASTING FOR WASTEWATER MAINLINE		DWU	(PAGE No.) 318
		DATE JAN. '98	

KEY:

1. WASTEWATER MAIN
2. 6" WYE OR TAPPING SADDLE (SEE NOTE 8)
3. 6" WASTEWATER LAT. (LENGTH VARIES)
4. 6" X 4" RED. AND 4" X 4" TEE OR 6" X 4" TEE.
5. 4" STACK (LENGTH VARIES)
6. 4" WASTEWATER LAT. CLEANOUT CASTING
7. 4" WASTEWATER PIPE (LENGTH VARIES)
8. ADAPTOR
9. BUILDING SEWER LAT.
10. CLASS "B" CONCRETE
11. 6" X 4" REDUCER
12. COMPACTED AS SPECIFIED, OR INUNDATED SAND



NOTES:

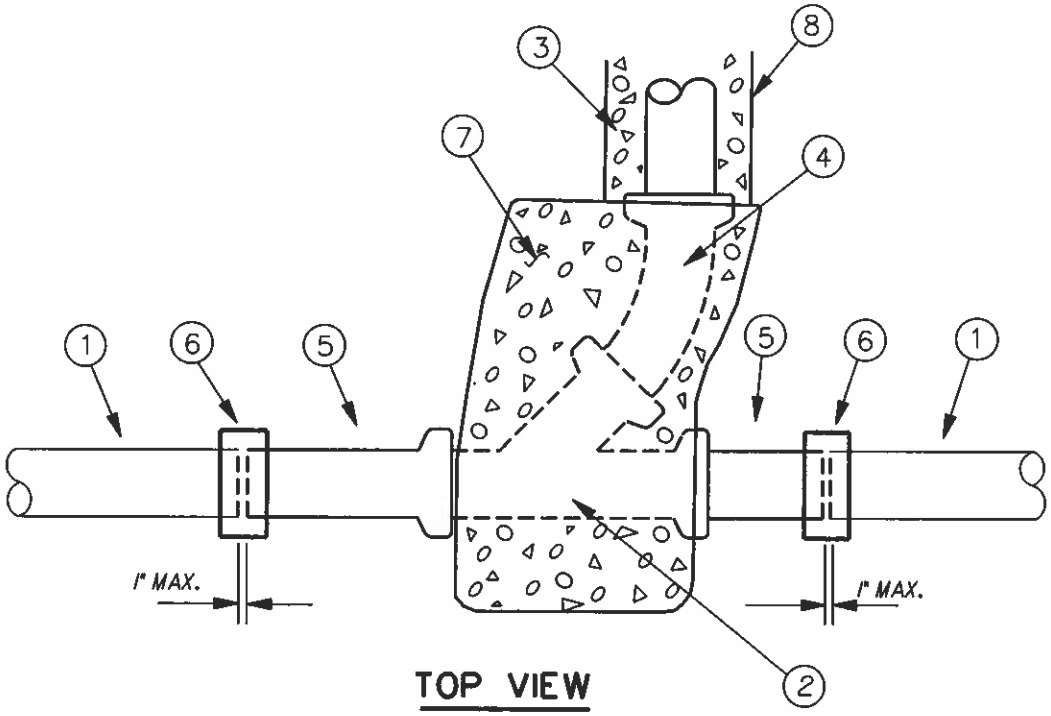
1. CLEANOUT CASTING TO BE FURNISHED AND PLACED PER SPECIAL CONDITIONS. IN VEHICLE TRAFFIC AREAS AND FOR COMMERCIAL MAINLINE LATERALS, WASTEWATER CLEANOUT SHALL BE OF CAST IRON.
2. SLOPE OF LATERAL TO BE 1% MIN., 2% MAX. UNLESS INSTRUCTED OTHERWISE BY OWNER.
3. THE WASTEWATER LATERAL SHALL BE CONNECTED TO BUILDING LATERAL AND CONSTRUCTED IN SUCH MANNER AS TO CLEAR EXISTING UTILITES AND PROPOSED FACILITIES SUCH AS STORM SEWER MAINS, PAVING, SIDEWALKS, RETAINING WALLS, ETC. VERTICAL BENDS (22.5° MAX.) MAY BE USED IF APPROVED BY OWNER.
4. THE MAINLINE LATERAL CONNECTION TO THE PRIVATE BUILDING LATERAL SHALL BE AS CLOSE TO THE PROPERTY LINE AS POSSIBLE.
5. INSTALL 4" STOPPER OR CAP AT PROPERTY LINE IF BUILDING LATERAL DOES NOT EXIST.
6. SUBSTITUE 4" FOR 6" FITTINGS IF PLANS OR SPEC. COND. CALL FOR 4" LATERALS.
7. THE CLEANOUT STACK & CASTING MAY BE PLACED IN THE PARKWAY, VEHICLE TRAFFIC AREAS, OR SIDEWALK, IF NECESSARY.
8. TAPPING SADDLES CAN ONLY BE USED IN CONJUNCTION WITH PIPE BURSTING OR IF THE EXISTING MAIN IS 10" OR LARGER.

WASTEWATER LATERALS WITH CLEANOUT

	DWU	(Page No.) 319
	DATE OCT. 2011	

KEY

① WASTEWATER MAIN
② WYE (45° MAX.)
③ MAINLINE LATERAL
④ 45° BEND (MAX.)
⑤ ADAPTOR
⑥ RUBBER SLEEVE COUPLING OR PVC ADAPTER COUPLING
⑦ CLASS "B" CONCRETE
⑧ EMBEDMENT SAME AS USED ON MAIN.



TOP VIEW

NOTES :

A) THE WYE AND ADAPTORS INSTALLED SHALL BE OF THE SAME MATERIAL AS THE WASTEWATER MAINLINE.

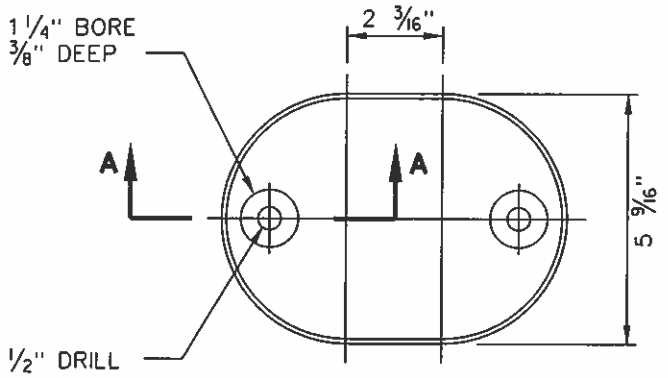
B) THE WYE AND ADAPTORS SHALL BE ASSEMBLED PRIOR TO INSTALLATION.

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.

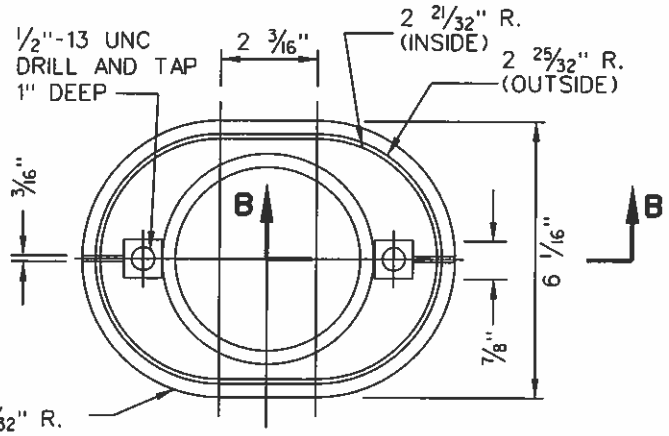
D) THE EMBEDMENT USED SHALL BE EQUAL TO THAT USED FOR THE MAINLINE SEWER.

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

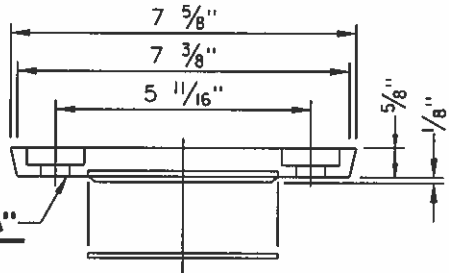
WASTEWATER LATERAL WYE CONNECTION TO THE EXISTING MAINLINE		DWU	(PAGE No.) 320
		DATE JAN. 2010	



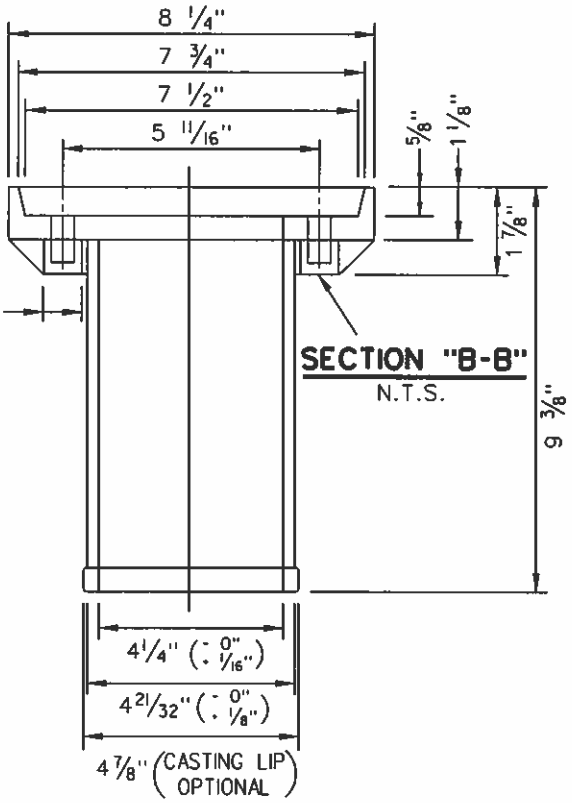
COVER
N.T.S.



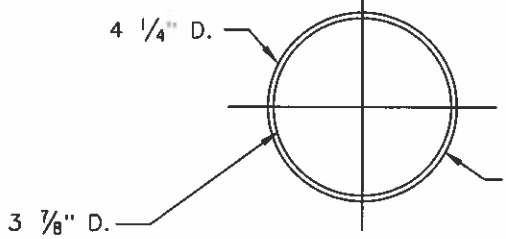
CLEANOUT FRAME TOP
N.T.S.



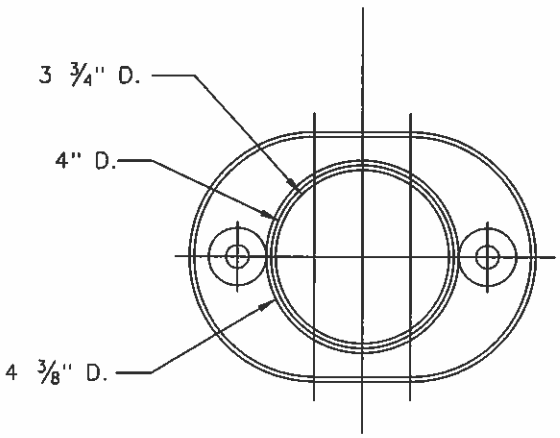
SECTION "A-A"
N.T.S.



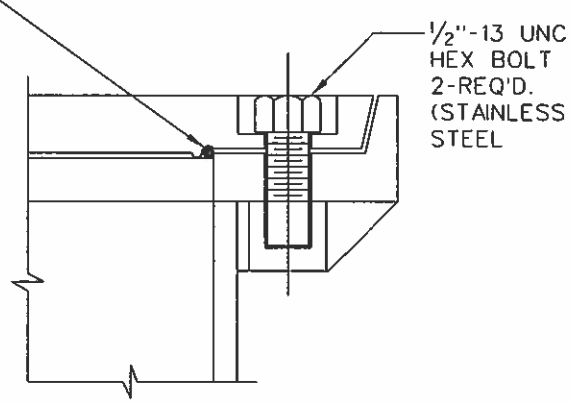
SECTION "B-B"
N.T.S.



3/16" DIA. RUBBER
"O-RING" GASKET



CLEANOUT FRAME BOTTOM
N.T.S.



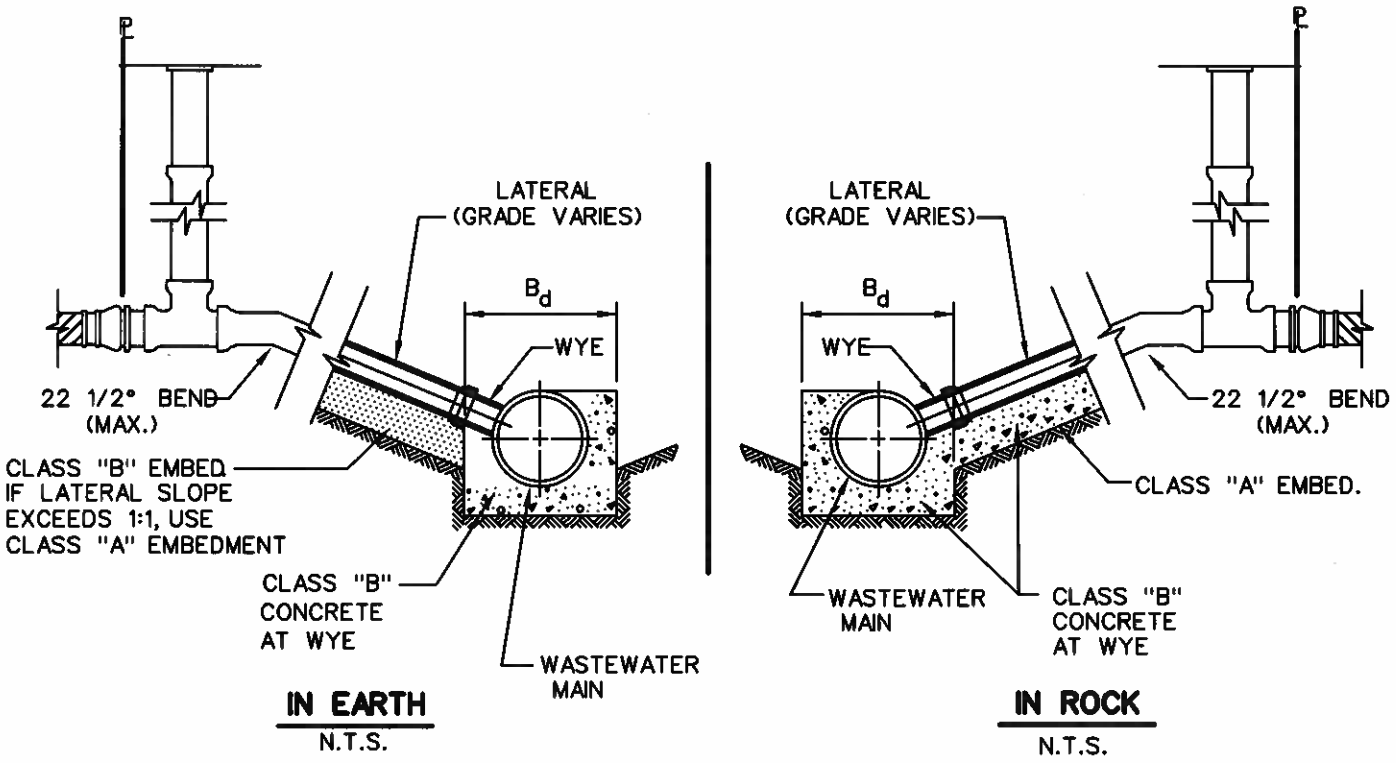
ASSEMBLY VIEW
N.T.S.

NOTES:

1. THE WORDS "WASTEWATER LATERAL CLEANOUT" SHALL BE CAST INTO TOP OF COVER.
2. MATERIALS TO BE CAST IRON, P.V.C. OR ABS PLASTIC.

WASTEWATER LATERAL CLEANOUT FRAME & COVER

		(Page No.) 321
DWU		
DATE JUNE 2002		



TRENCH WITH SLOPING SIDES

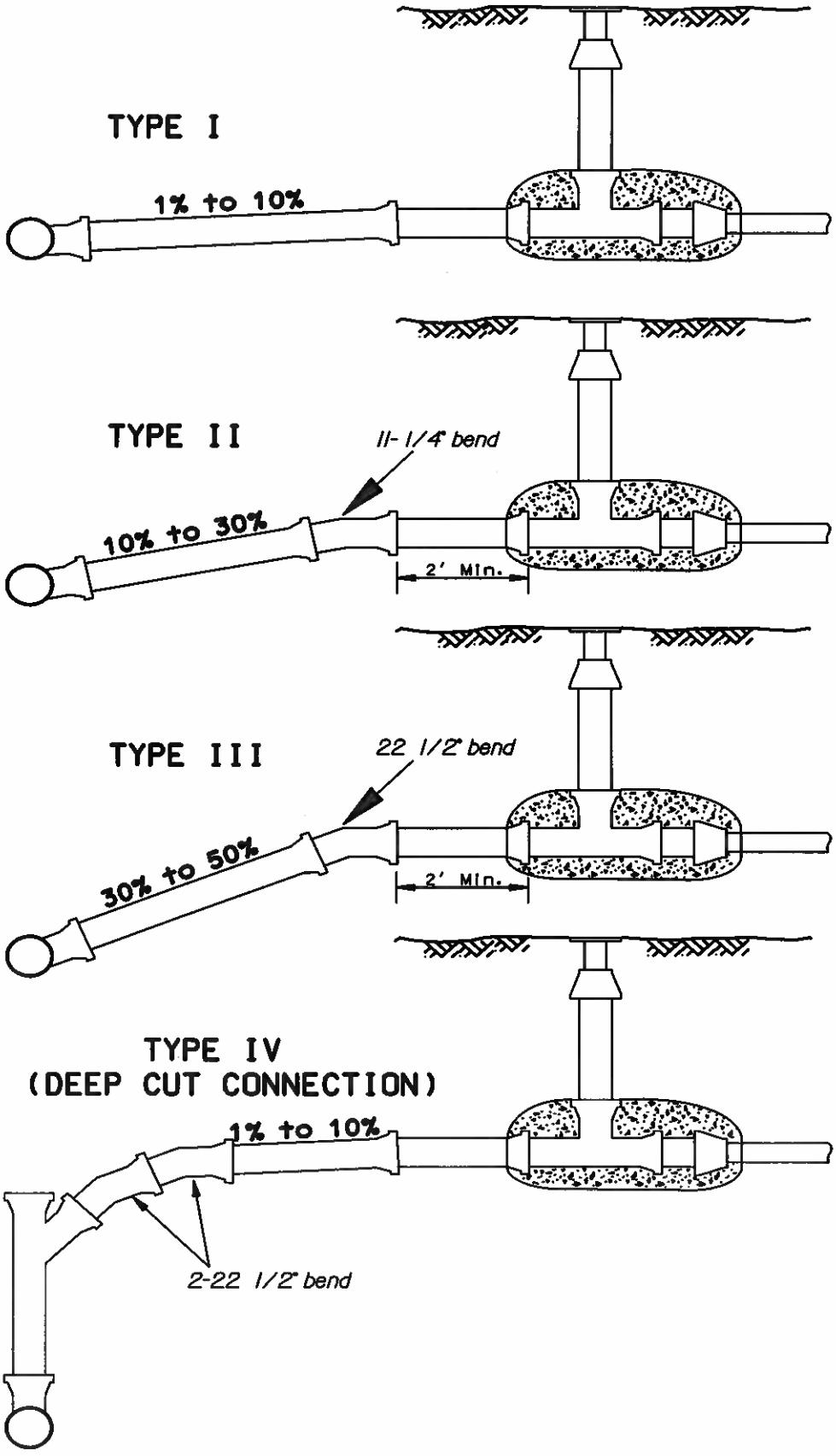
N.T.S.

NOTES:

1. WYE SHALL BE SUPPORTED AS SHOWN FOR WYE CONNECTION SUPPORT.
2. LATERALS ARE TO CLEAR ALL EXISTING UTILITIES. 11 1/4" OR 22 1/2° BEND, ONLY, MAY BE REQUIRED.

REFER TO PAGES 319, 320, 323, 324 & 325

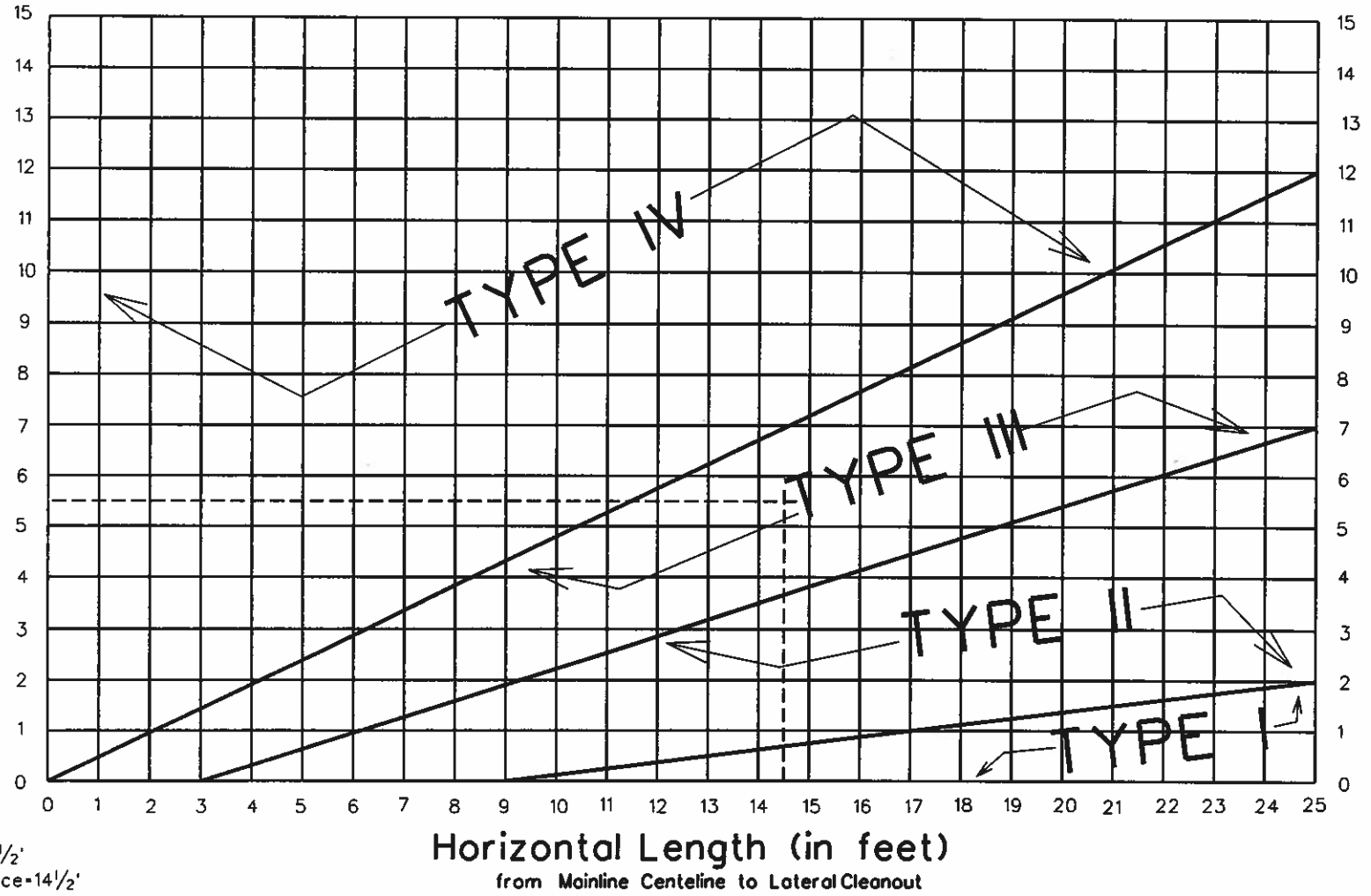
WASTEWATER LATERAL CONNECTIONS IN EARTH & IN ROCK		DWU	(Page No.) 322
		DATE OCT. 2011	



REFER TO PAGES 319, 320, 324 & 325

LATERALS TYPES

		DWU	(PAGE NO.) 323
		DATE OCT. 2011	

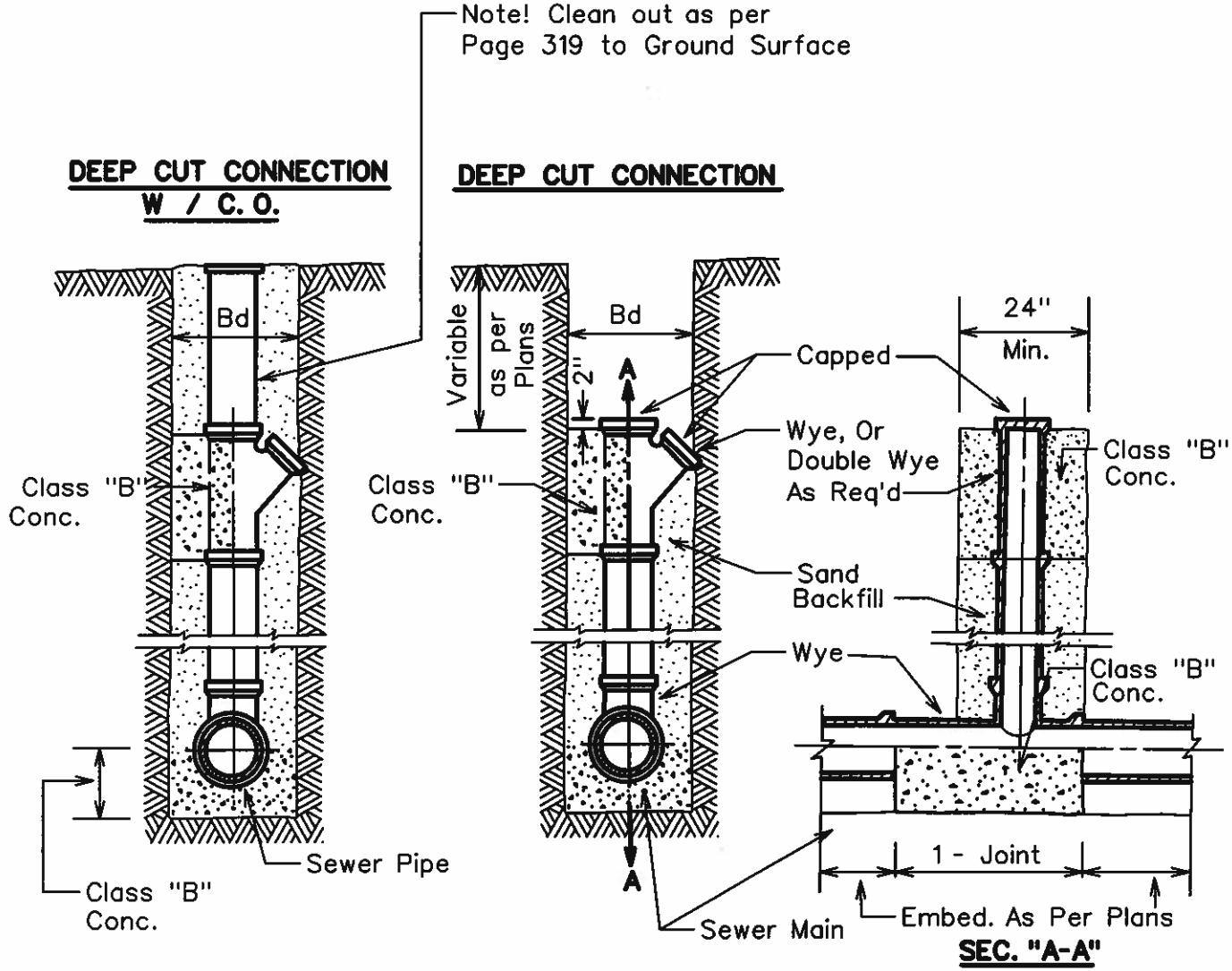


Example:
Vertical Depth = 5½'
Horizontal Distance = 14½'
Use Lateral Type III As Shown Above

REFER TO PAGES 323 & 325

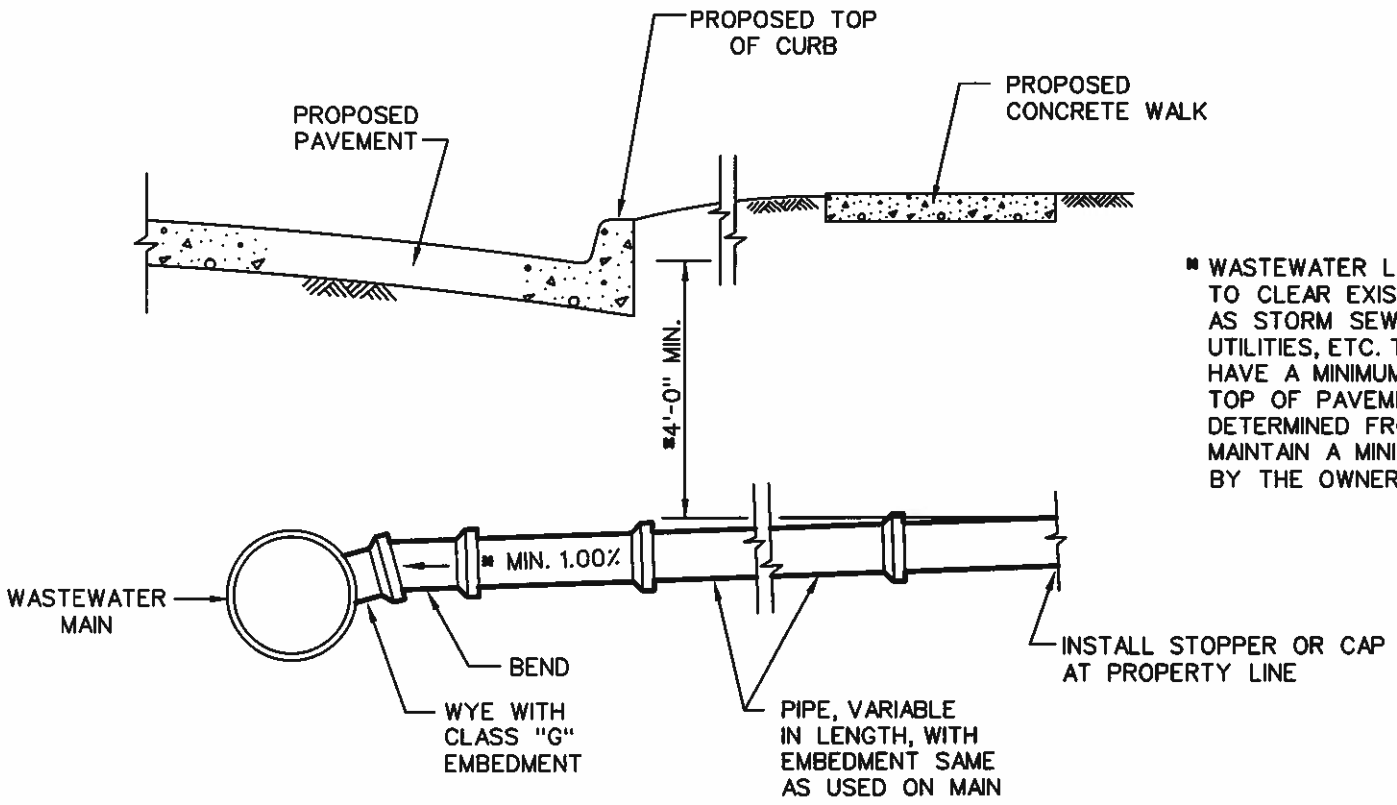
LATERAL APPLICATION SCHEDULE

DWU		(Page No.) 324
DATE DEC. 2010		



Refer To Pages 319, 320, 321, 322, 323 & 324

DEEP - CUT CONNECTION		DWU	(PAGE NO.) 325
		DATE OCT. 2011	



* WASTEWATER LATERALS ARE TO BE CONSTRUCTED TO CLEAR EXISTING AND PROPOSED FACILITIES, SUCH AS STORM SEWER MAINS, RETAINING WALLS, OTHER UTILITIES, ETC. THE WASTEWATER LATERAL SHALL HAVE A MINIMUM COVER OF 4'-0" BELOW THE PROPOSED TOP OF PAVEMENT CURB GRADE AT THE PROPERTY LINE, DETERMINED FROM PAVING GRADE, OR AS REQUIRED TO MAINTAIN A MINIMUM OF 1.00% GRADE, OR AS DIRECTED BY THE OWNER.

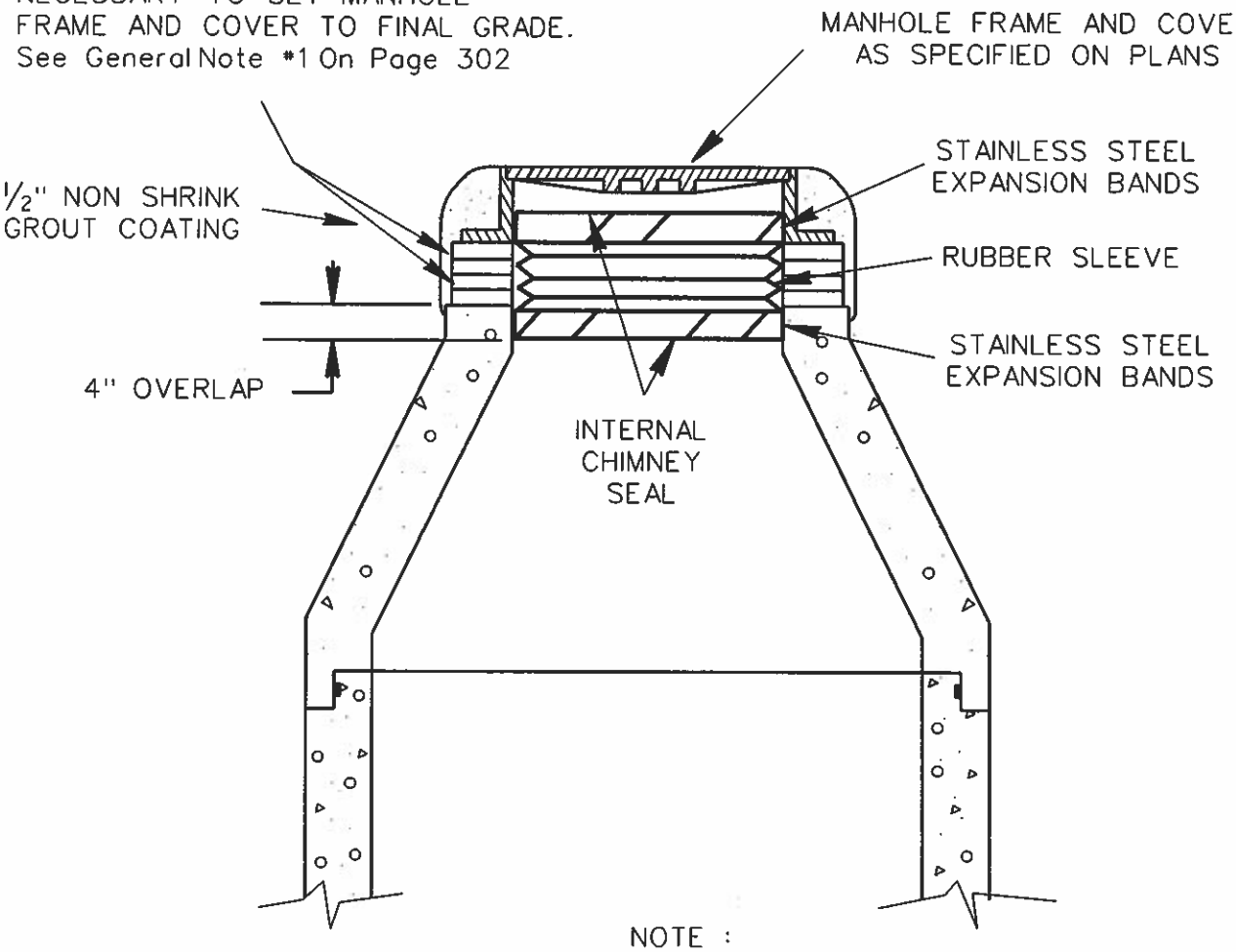
WASTEWATER LATERAL STUBOUT

N.T.S.

REFER TO 319, 320, 321, 322, 323, 324 & 325

WASTEWATER LATERAL STUBOUT		DWU	(Page No.) 326
		DATE OCT. 2011	

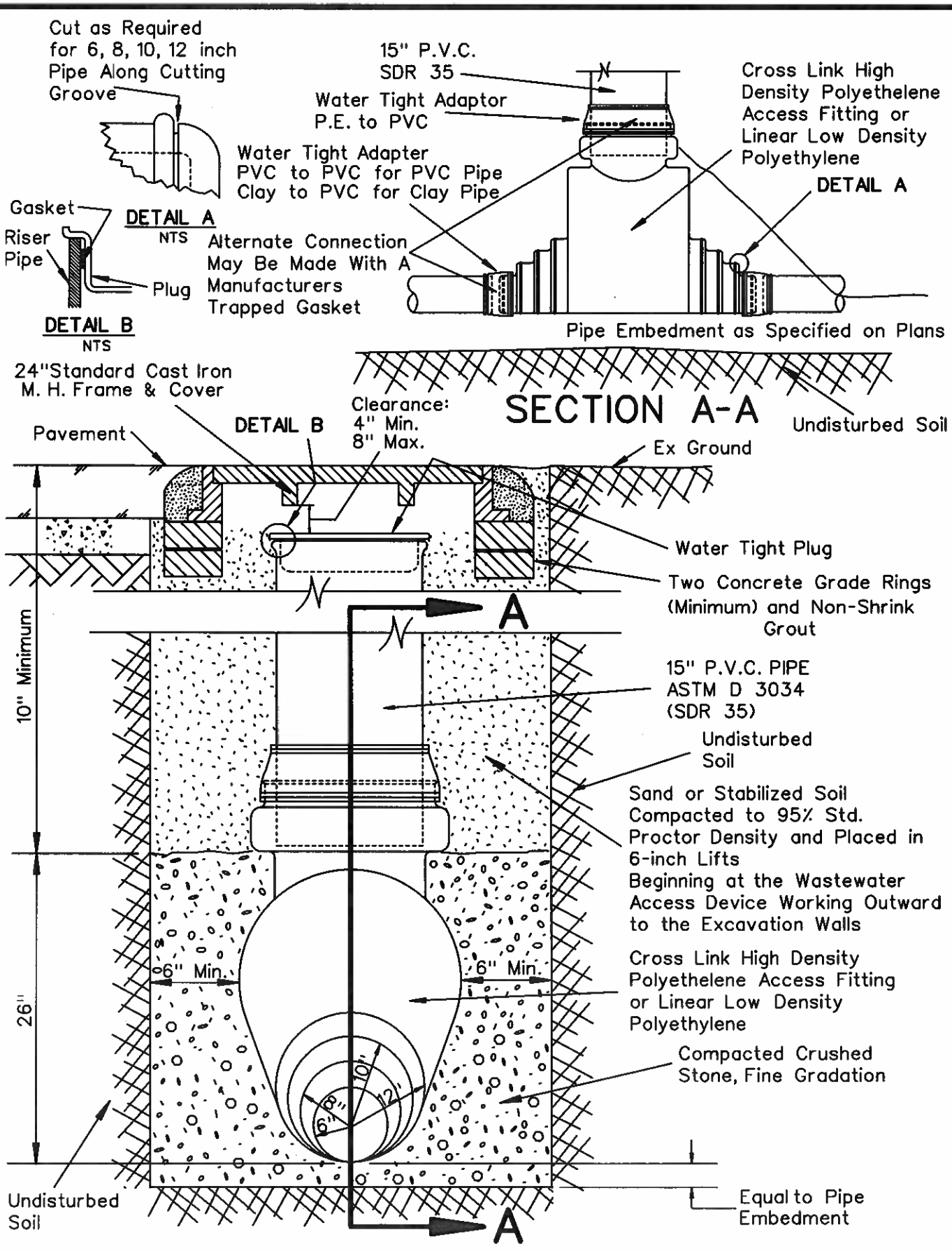
USE PRECAST CONCRETE GRADE RINGS AND NON SHRINK GROUT AS NECESSARY TO SET MANHOLE FRAME AND COVER TO FINAL GRADE. See General Note #1 On Page 302



NOTE :
INTERNAL CHIMNEY SEAL TYPE TO BE APPROVED BY CONSTRUCTION ENGINEER

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302, & DRAWINGS ON PAGES 301, 303, 304, & 305

WASTEWATER MANHOLE INTERNAL SEAL		DWU	(Page No.) 327
		DATE MARCH 2001	

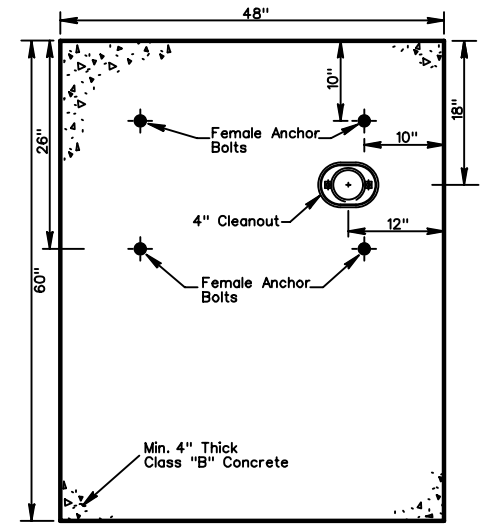


WASTEWATER ACCESS DEVICE

DWU		(Page No.) 328
DATE OCT. 2011		

SAMPLING PLATFORM DETAIL

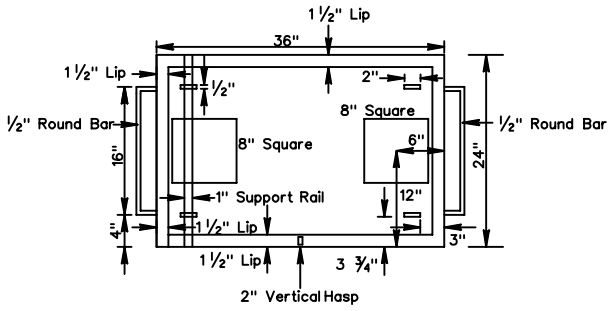
FOR CLEAN OUT



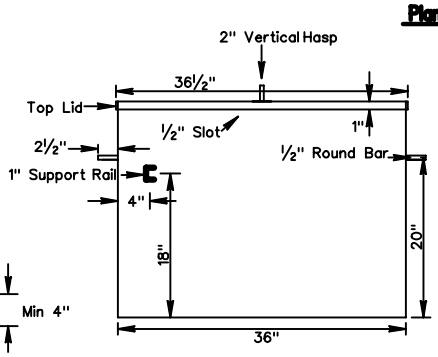
Plan View

Vertical View

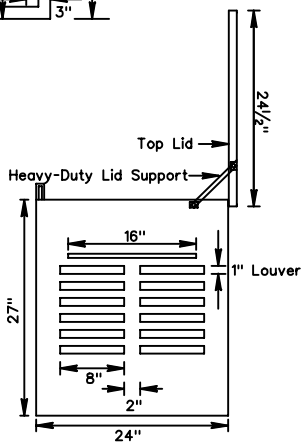
DIAGRAM OF SECURITY BOX



Plan View



Front View



Side View

Not To Scale

SAMPLE SITE CONSTRUCTION NOTES

A. The 5'X4' Platform Is To Be Constructed Of Class "B" Concrete And A Minimum Of 4" Thick. Reinforce Pad With #3 Bars at 12" O.C. In Both Directions And Centered Within Pad

B. The Platform Is To Be Level, With The Cleanout Cover Flush With The Surface Of The Platform.

C. The Platform And Cleanout Cover Are To Be Elevated A Minimum Of 2" To 3" Above Ground Level To Prevent Intrusion Of Rainwater Runoff.

D. The Pipe Opening Shall Be Covered With A C.O. Casting And Cover. The Casting Shall Be Connected To The Pipe With Water Tight Adaptor. The Pipe Running Down From The Platform Should Connect To The Sewer Lateral With A Straight Tee (C. O. Tee), Not A Curve Tee, So That The Wastewater Flow Into The Lateral Be Observed From The Platform. Standard Lateral C. O. Castings (Plastic Or Cast Iron) Will Be Furnished Upon Request.

E. ½" Threaded Female Anchor Bolts Shall Be Set In Each Corner 10" Inset From The Rear And Sides Of The Pad. The Front Bolts Need To Be 26" From The Rear Of The Pad. The Top Of The Female Ancher Bolts Shall Be Flush With The Surface Of The Platform.

F. The Box and Lid Will Be Constructed Of Aluminum Or Steel. All Seams and Joints Are To Be Joined By A Continuous Weld.

G. The Sides of The Box Will Consist Of Two Banks Of 8" Louvers With a Total Of Twelve Stamped. Each Louver Will Be 8"x1". A Sixteen-inch Aluminum Grab Handle Will Be Installed On Each 24" Side Panel. The Support Rail Will Be 18" From The Bottom Of The Box And 4" From The Side Of The Box. The Handle Will Be ½" Round Bar Stock.

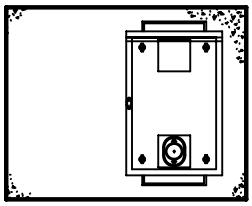
H. The Lid Is Attached To The Box By A Heavy Hinge With A Continuous Weld AlongThe Length Of One Side (36"). The Lid Is To Be Locked To The Box With A Heavy-Duty Hasp, Which Enters Through A Hole Punched In The Lid. The Lid Will Have A 1 ½" Lip.

I. Two Heavy-Duty Plated Steel Lid Supports (See Example) Will Be Installed To Allow Lid To Remain Open During Setup Of An Automatic Sampler.

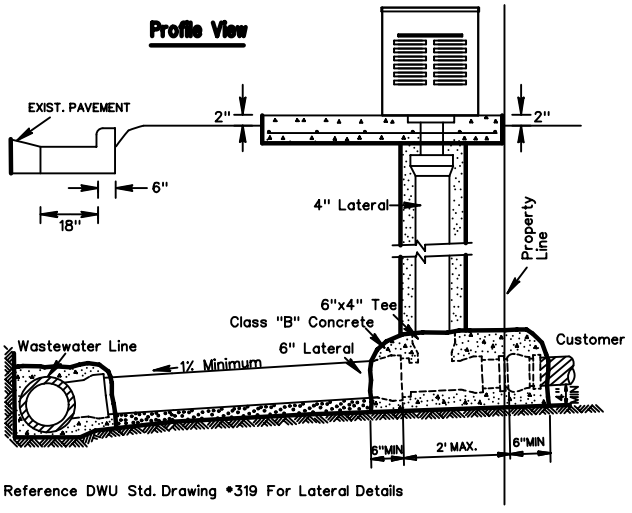
J. The Security Box Will Be Painted White.

K. Modifications May Occur For Security Boxes If Approved And Any Question Concerning The Installation Of The Sample Platform Should Be Addressed To: Pretreatment And Laboratory Services

*Suggested Vendors for Security Boxes:
Company:The EMF Co. Model: DWU CAB-001 Tel: (214) 350-6848
or Approved Equal



Profile View



Reference DWU Std. Drawing #319 For Lateral Details

Not To Scale

WASTEWATER SAMPLE SITE - CONCRETE PLATFORM DETAIL

DWU

(PAGE NO.) 329

DATE OCT. 2011

PART 4

(Series 400)

WATER & WASTEWATER ADJUSTMENTS

City of Dallas
Water Utilities Department

PART 4
WATER AND WASTEWATER ADJUSTMENTS

TITLE		Pg.
Alter & 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

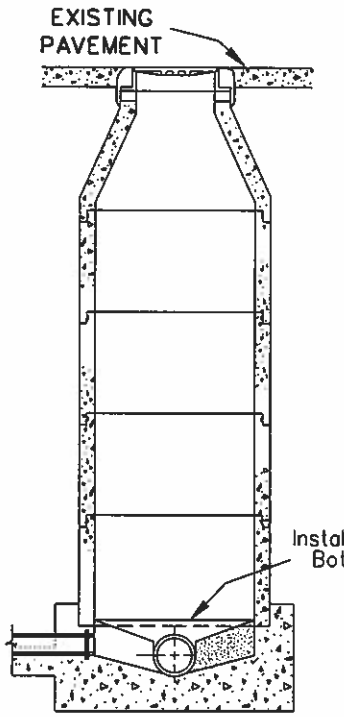


FIGURE 1

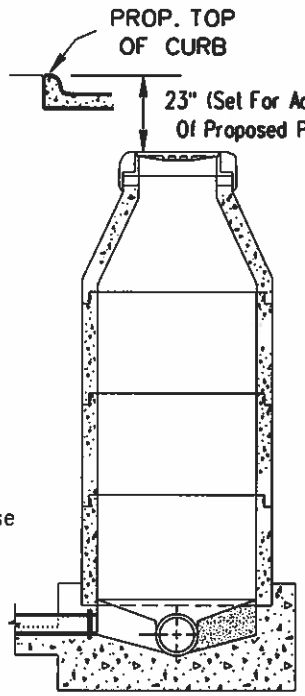


FIGURE 2
PRE-GRADING
(ALTER)

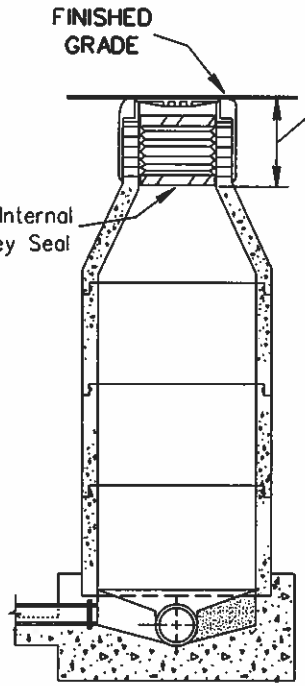


FIGURE 3
PRE-PAVING
(ADJUST)

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.

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
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 STANDARD PRECAST MANHOLE

DWU		(Page No.) 401
DATE DEC. 2001		

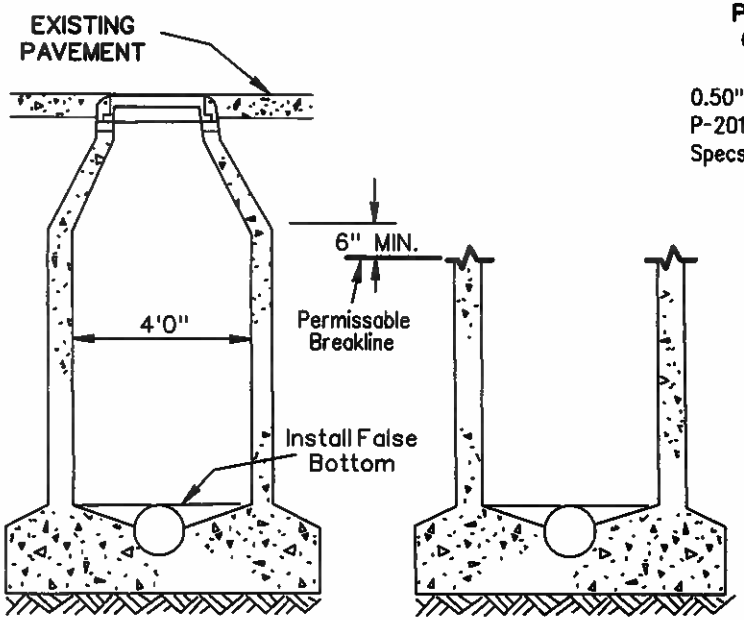


FIG. 1

FIG. 2

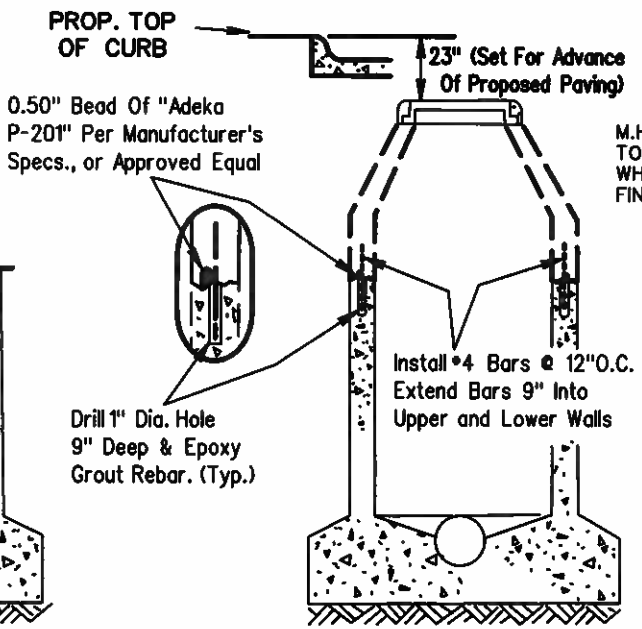


FIG. 3 PRE-GRADING

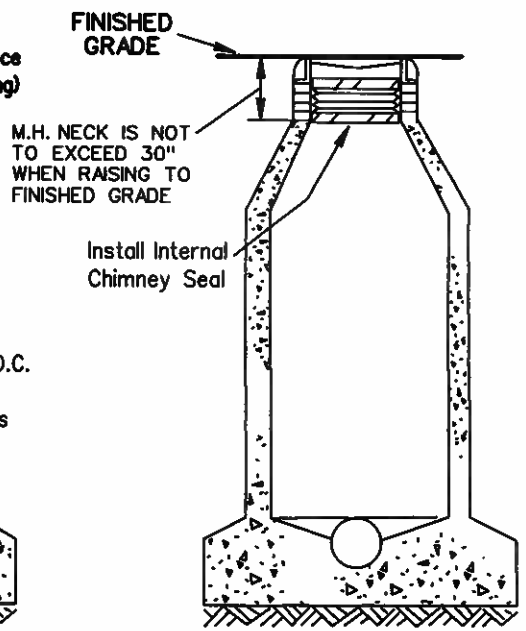


FIG. 4 PRE-PAVING

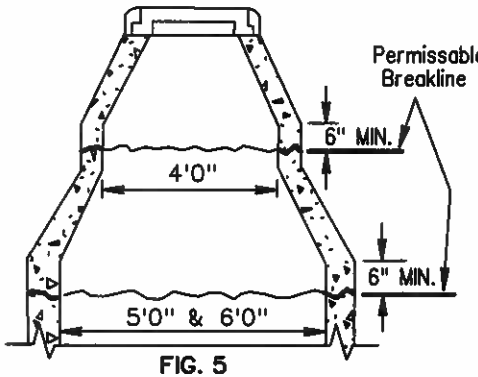


FIG. 5

FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.
2. Remove the existing ring, cover and any grade rings or bricks.

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 an new ring and cover meeting current TCEQ requirements on top of the new section with concrete mortar.

FIGURE 4 PRE-PAVING

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

ALTER & ADJUSTMENT OF STANDARD CAST-IN-PLACE MANHOLE		DWU	(Page No.) 402
		DATE OCT. 2011	

REFER TO PAGE 305--WASTEWATER MANHOLE FIBERGLASS

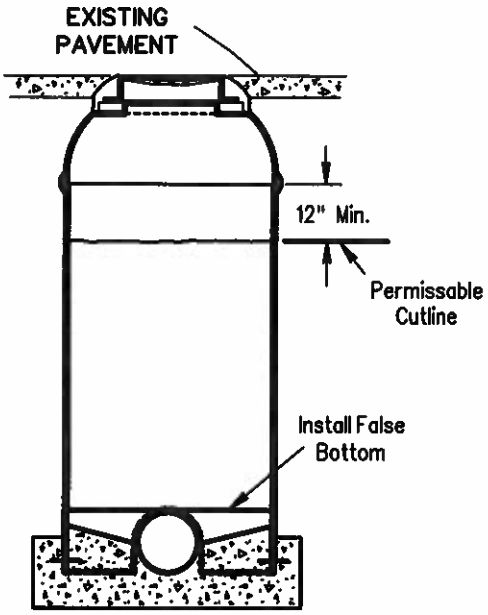


FIGURE 1

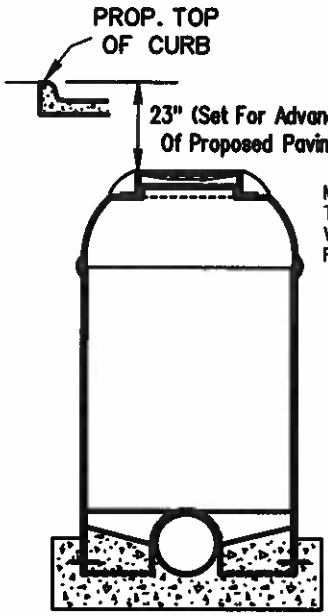


FIGURE 2
PRE-GRADING

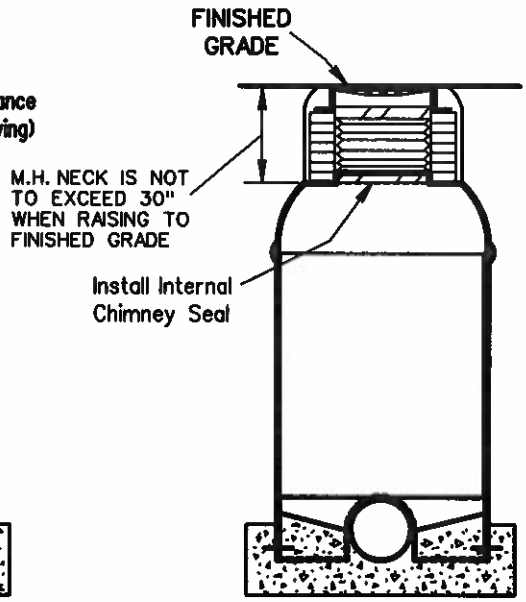


FIGURE 3
PRE-PAVING

FIGURE 1 EXISTING MANHOLE

1. Install a false bottom in the manhole.
2. Remove the existing ring, cover and any grade rings or bricks.
3. 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. Set the new ring and cover meeting current TCEQ requirments on the cone section with concrete mortar.

FIGURE 3 PRE-PAVING

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

ALTER & ADJUSTMENT OF FIBERGLASS MANHOLE		DWU	(PAGE NO.) 403
		DATE OCT. 2011	

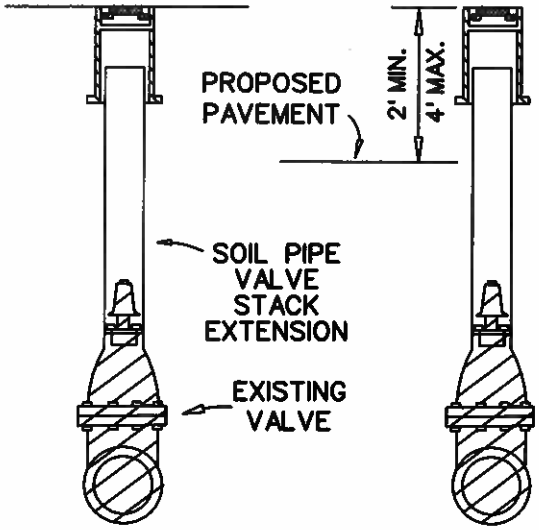


FIG. 1

FIG. 2

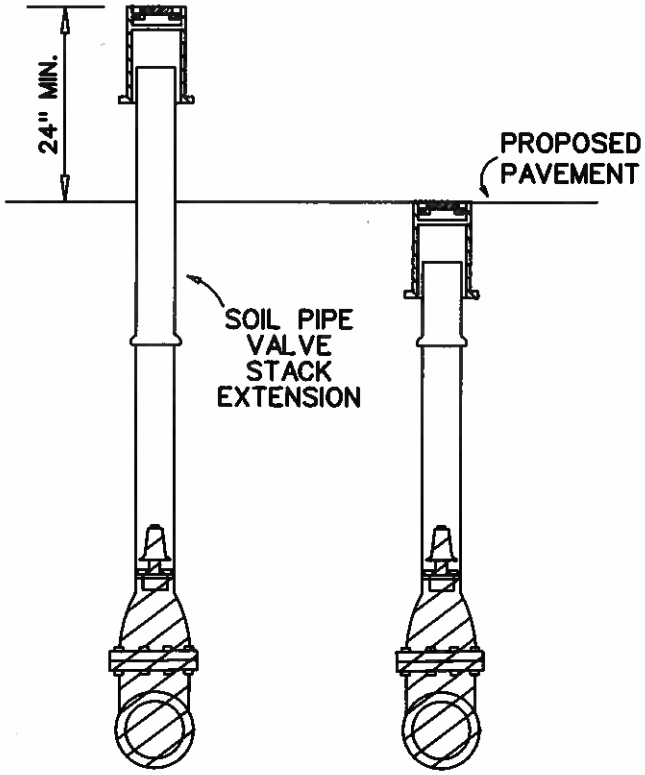


FIG. 3

FIG. 4

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

1. 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.

ALTER & ADJUSTMENT OF VALVE STACK		DWU	(PAGE NO.) 404
		DATE OCT. 2011	

KEY:

1. WASTEWATER MAIN
2. WYE OR TAPPING SADDLE
3. MAINLINE LATERAL
4. TEE
5. 4" STACK
6. 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
11. WATER TIGHT RUBBER SLEEVE COUPLING

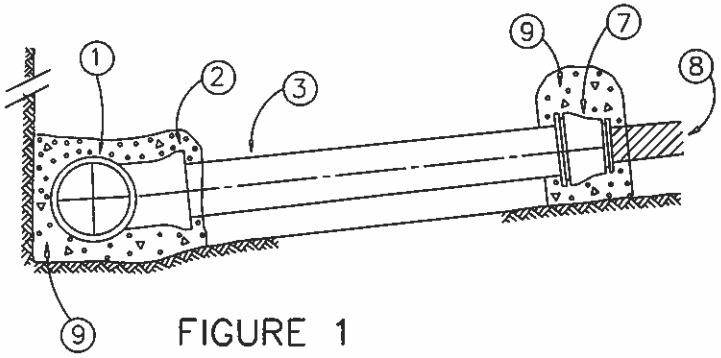


FIGURE 1

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.

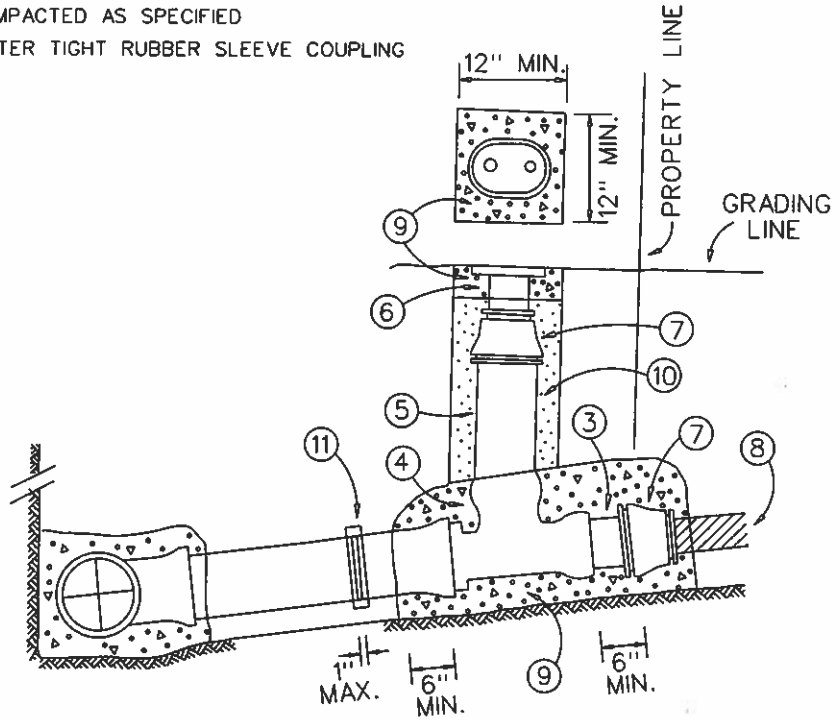


FIGURE 2

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

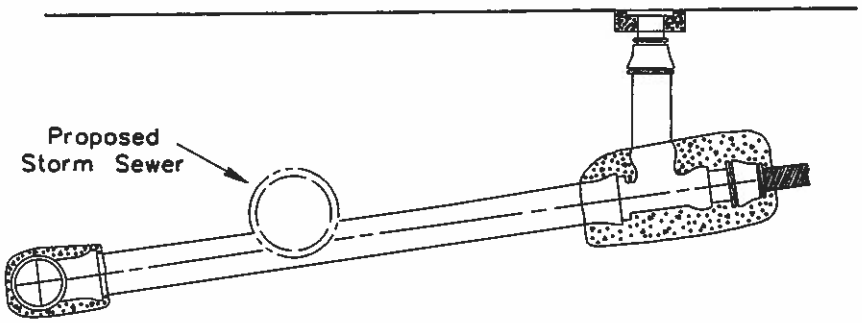


FIGURE 1

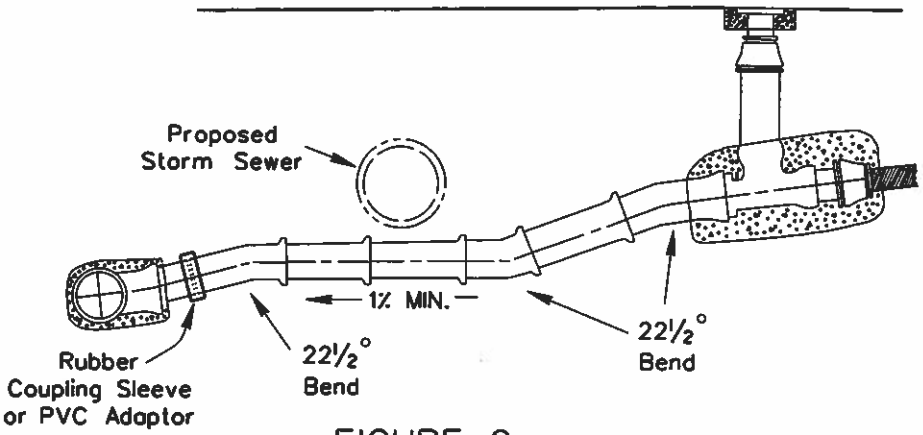


FIGURE 2

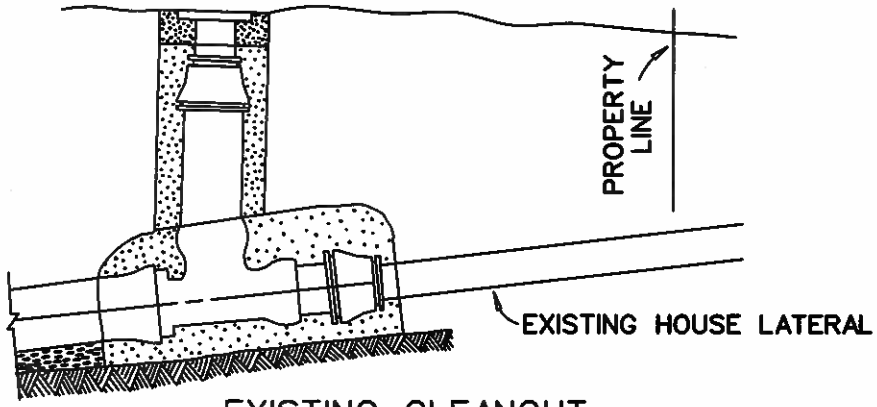
FIGURE 1 EXISTING LATERAL

1. Conflict with a proposed utility shown.

FIGURE 2 PRE-PAVING

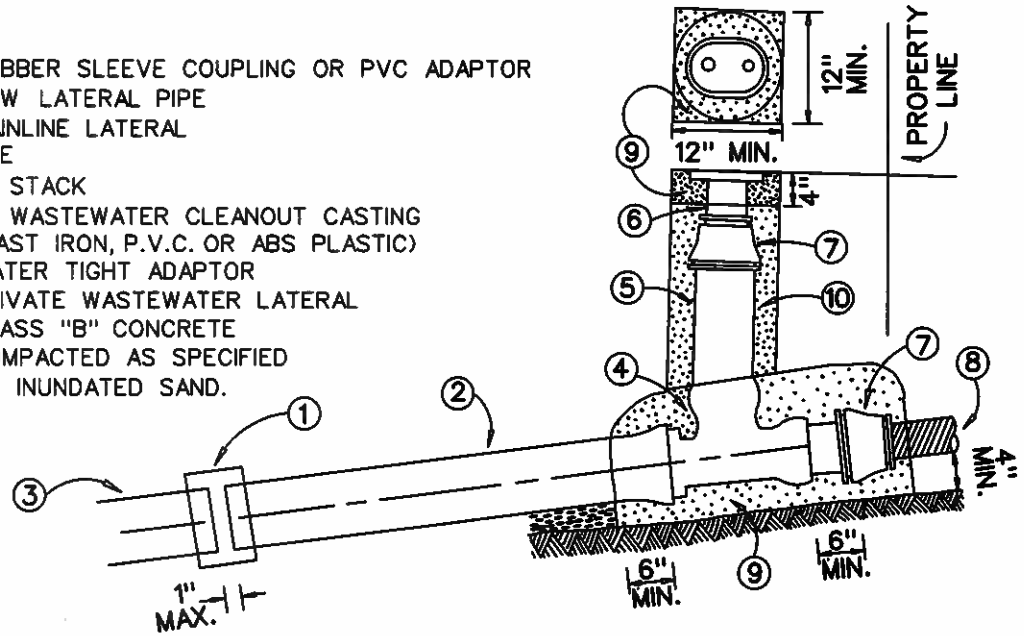
2. The new adjustment may be constructed over or under the proposed conflict:
   A. A downstream minimum grade of 1.0% must be maintained.
   B. Bends greater than 22-½ degrees are NOT permitted.
   C. The new pipe and embedment must be of the same type as the existing.(Unless the lateral is concrete pipe, in which case clay pipe is to be used.)
   D. Connections between the existing lateral pipe and new lateral pipe 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.

ADJUSTMENT OF EXISTING LATERAL		DWU	(Page No.) 406
		DATE JAN. 2010	



EXISTING CLEANOUT

1. RUBBER SLEEVE COUPLING OR PVC ADAPTOR
2. NEW LATERAL PIPE
3. MAINLINE LATERAL
4. TEE
5. 4" STACK
6. 4" WASTEWATER CLEANOUT CASTING (CAST IRON, P.V.C. OR ABS PLASTIC)
7. WATER TIGHT ADAPTOR
8. PRIVATE WASTEWATER LATERAL
9. CLASS "B" CONCRETE
10. COMPACTED AS SPECIFIED OR INUNDATED SAND.



NEW CLEANOUT

NOTES

A) The new lateral pipe 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) 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.

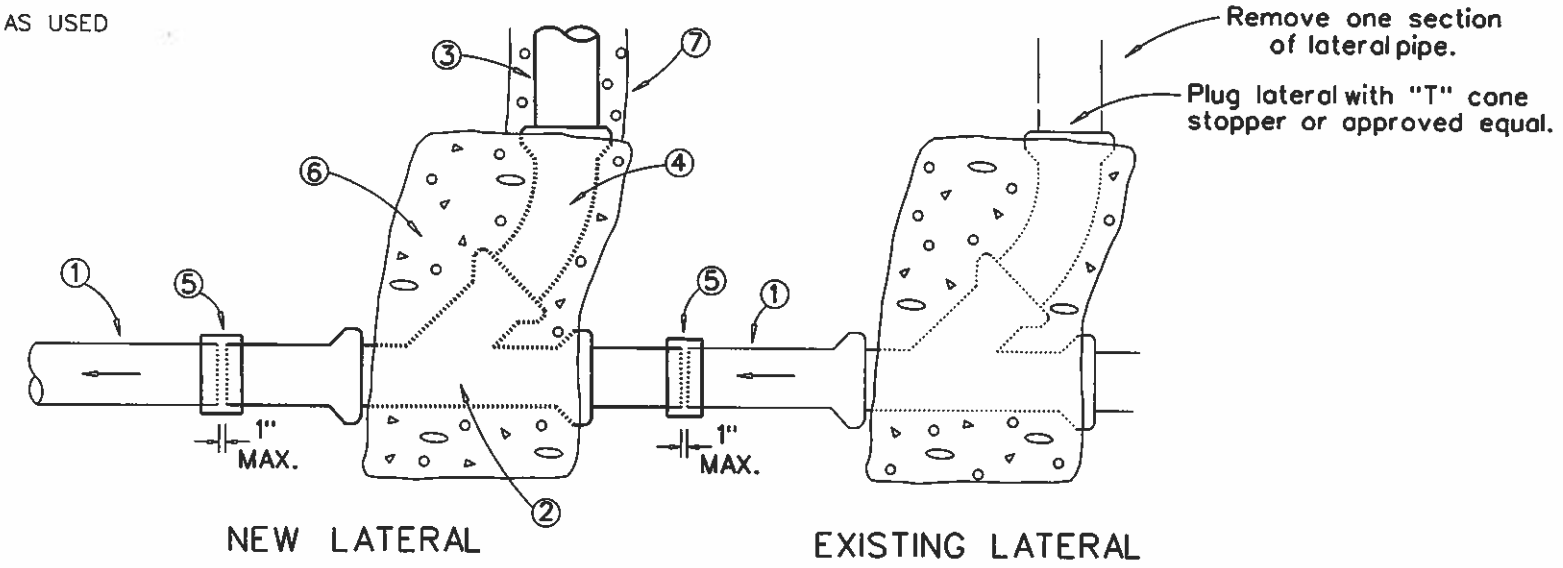
NCTCOG Spec: 702.2.4 - Quality of Concrete
2009 DWU Addendum: Item 702.DWU - Concrete Structures

REPLACE EXISTING LATERAL CLEANOUT

		DWU	(Page No.) 407
		DATE OCT. 2011	

REFER TO PAGE 319 "LATERAL CONSTRUCTION"
FOR PROFILE VIEW

1. WASTEWATER MAIN
2. WYE (45° MAX.)
3. MAINLINE LATERAL
4. 45° BEND (MAX.)
5. WATER TIGHT RUBBER SLEEVE COUPLING OR PVC ADAPTOR
6. CLASS "B" CONCRETE
7. EMBEDMENT SAME AS USED ON MAIN



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 or PVC adaptor. 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) Class "B" concrete shall be installed in accordance with PAGE 322 to support the wye.

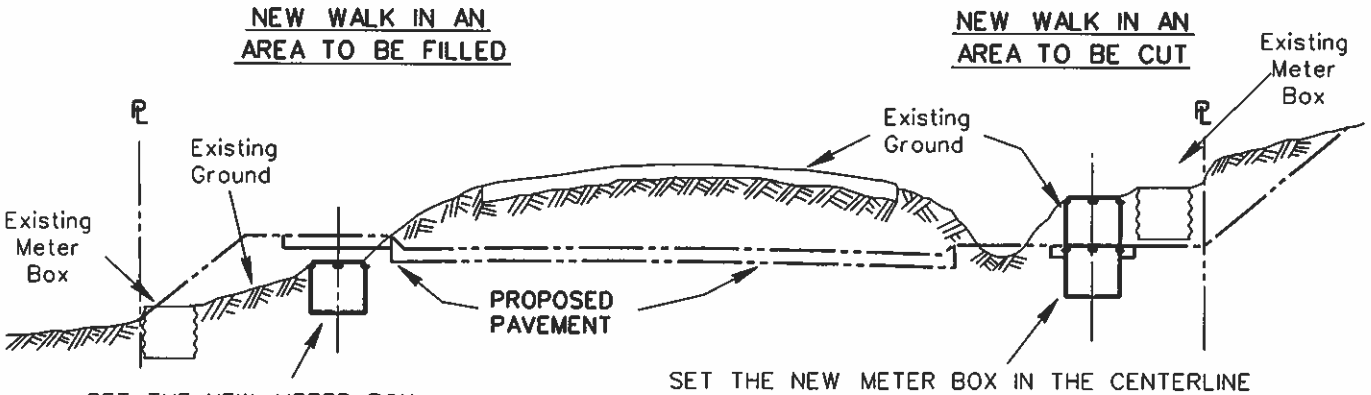
NCTCOG Spec: 702.2.4 - Quality Of Concrete

REPLACE EXISTING LATERAL TO EXISTING MAINLINE

DWU

DATE OCT.2009

(Page No.) 408

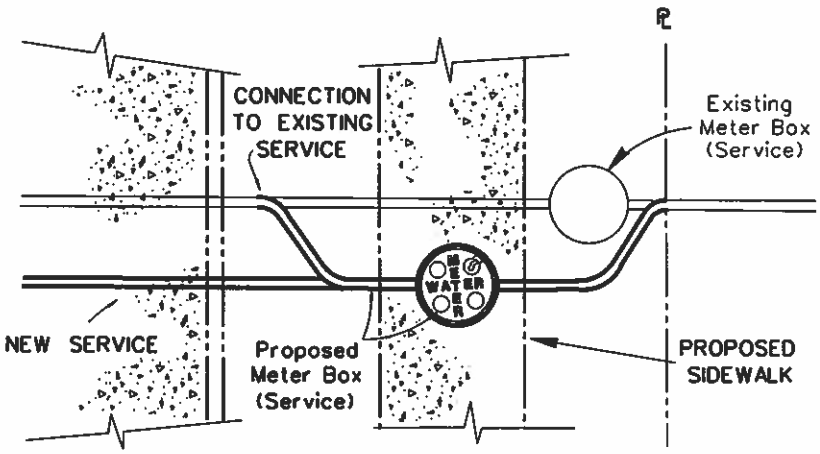


SET THE NEW METER BOX IN THE CENTERLINE OF THE PROP. NEW WALK. SET THE METER BOX AT THE EXISTING GROUND ELEVATION. IT WILL BE RAISED TO GRADE DURING PAVING OPERATIONS.

SET THE NEW METER BOX IN THE CENTERLINE AND AT THE ELEVATION OF THE PROP. NEW WALK. SET THE METER IN THIS BOX. STACK METER BOX ON TOP OF THIS BOX TO THE EXISTING GROUND. PUT THE METER BOX LID ON THE TOP BOX. (THIS IS LIMITED TO 2 STACKED METER BOXES. ANY ADDITIONAL LOWERING TO GRADE WILL BE DONE DURING PAVING OPERATIONS

ELEVATION

A NEW WATER SERVICE IS INSTALLED TO THE NEW BOX. A LINE IS RUN FROM THE NEW BOX TO THE PROPERTY LINE NEXT TO THE EXISTING HOUSE LINE AND TURNED UP WITH A CURB STOP. AFTER FLUSHING, THE NEW LINE IS CONNECTED TO THE EXISTING HOUSE LINE AT THE PROPERTY LINE.



PLAN

IF A NEW SERVICE IS INSTALLED TO REPLACE AN EXISTING SERVICE TO THE EXISTING MAIN, THE CONNECTION WILL BE MADE AS FOLLOWS:

EXISTING MAIN UNDER PRESSURE. Connect the new copper pipe to the existing corporation cock on the main

EXISTING MAIN NOT UNDER PRESSURE. Tap the existing main a minimum of 1' from the existing tap and install a new corporation cock and service. Remove the existing corporation cock and plug the tap with a plug approved by the engineer.

If the new copper pipe is connected to the existing copper pipe, it shall be accomplished with the use of an approved compression type coupling.

If any existing water service is galvanized pipe, it must be replaced to the existing main with a new copper service.

REFER TO PAGES 201 thru 206 WATER SERVICE INSTALLATIONS

METER BOX REPLACEMENT		DWU	(PAGE NO.) 409
		DATE JUNE 2002	

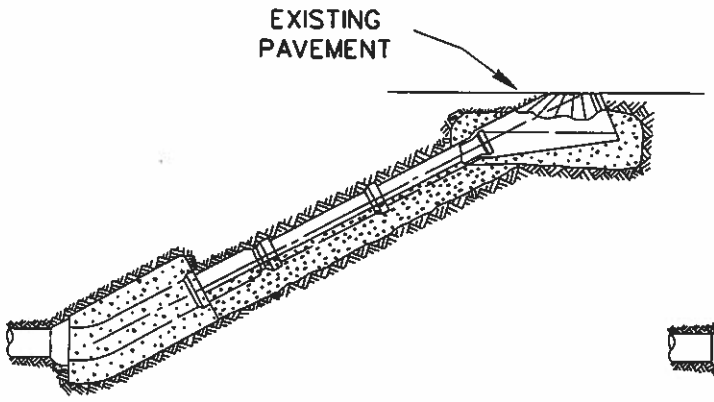


FIGURE 1

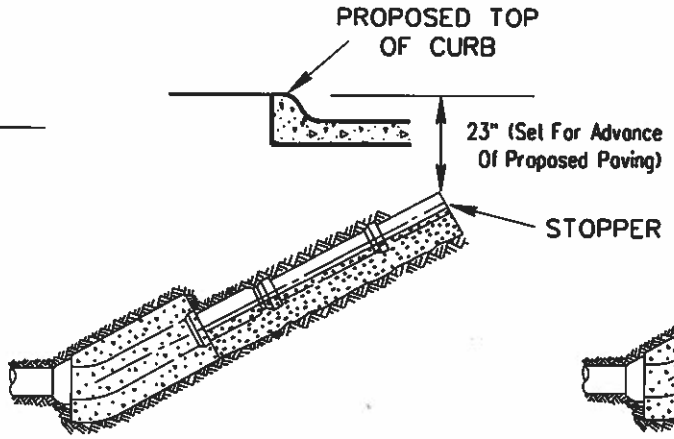


FIGURE 2
PRE - GRADING

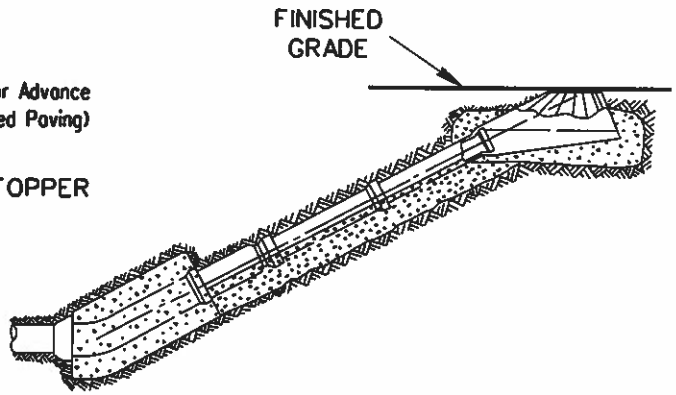


FIGURE 3
PRE - PAVING

FIGURE 1. EXISTING CLEANOUT

1. Remove and salvage the existing cleanout. If the cleanout cannot be salvaged or is damaged prior to final acceptance, it will be replaced by the contractor at no cost to the city.

FIGURE 2. PRE - GRADING

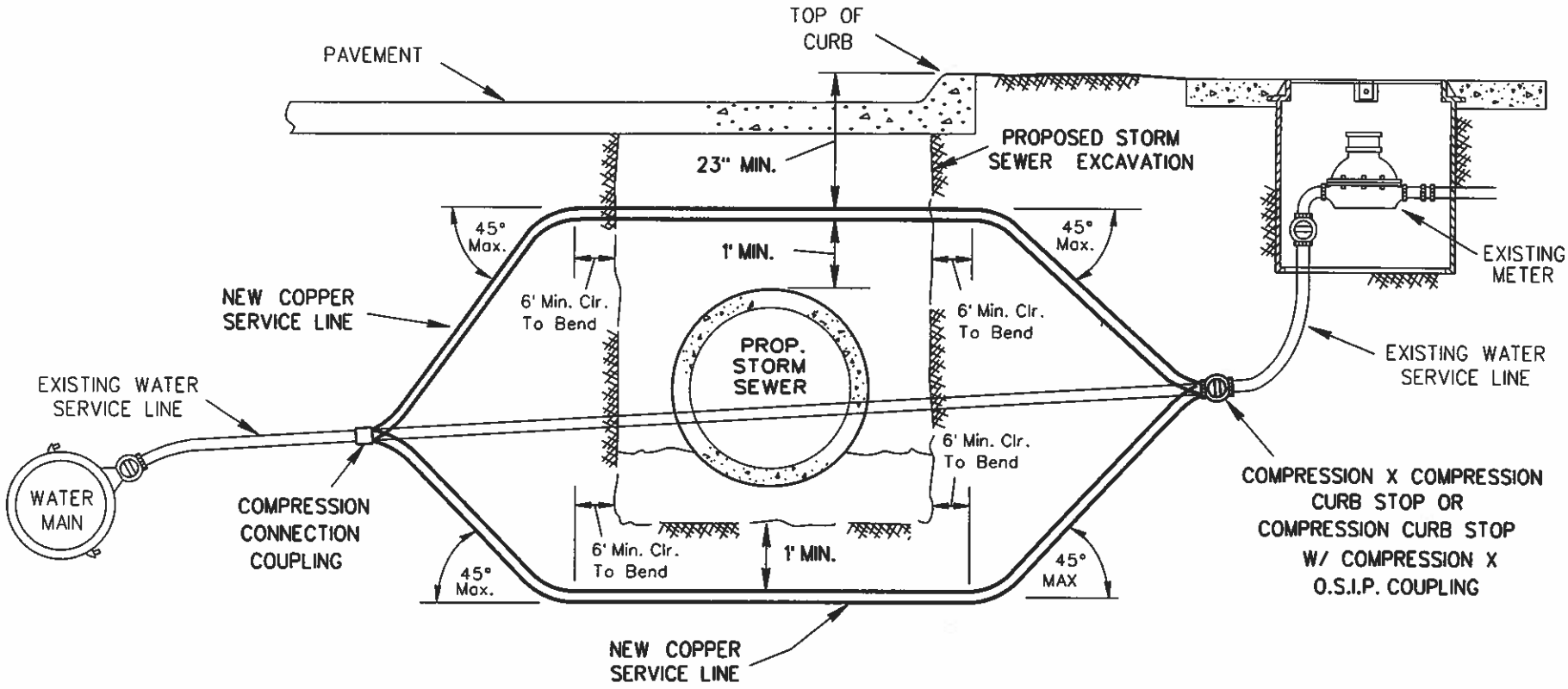
2. Remove the cleanout pipe to a point 23" below the proposed top of curb.
3. Plug the pipe with a "T" Cone Stopper or approved equal.

FIGURE 3. PRE - PAVING

4. Extend the existing cleanout pipe, if required. The connection to the existing pipe will be made with a rubber sleeve coupling. The new pipe and embedment shall be of the same type as the existing.
5. Set the salvaged or new cleanout on a Class B concrete pad.
6. Insert a "T" Cone Stopper or approved equal in the cleanout pipe.

REFER TO PAGE 317 MAINLINE CLEANOUT

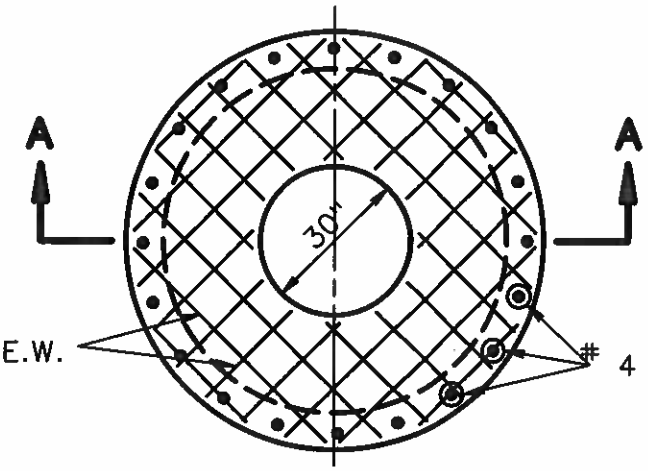
ALTERATION & ADJUSTMENT OF STANDARD MAINLINE CLEANOUT		DWU	(Page) 410
		DATE DEC.2001	



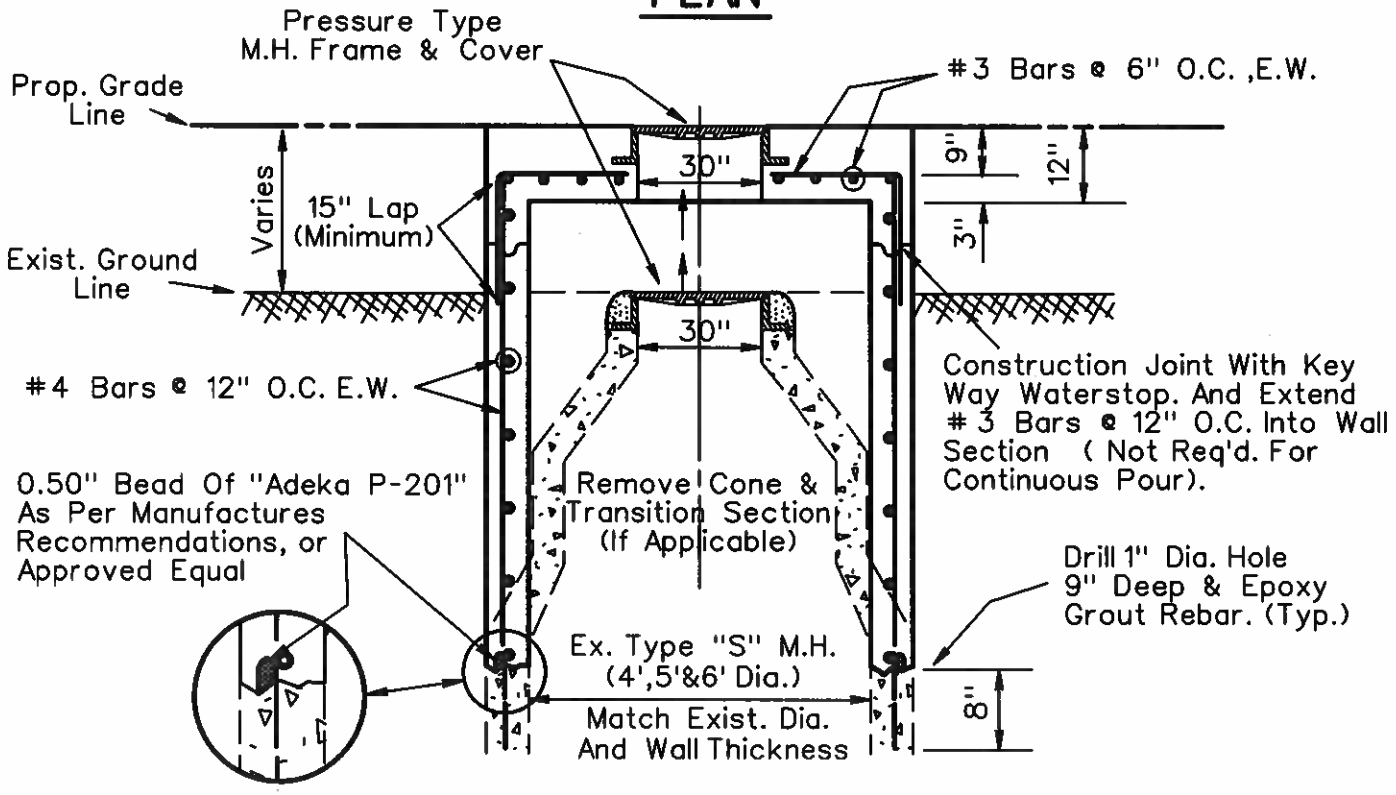
NOTES:

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 EXISTING WATER SERVICE		DWU	(Page) 411
		DATE JAN. 2010	



PLAN



SECTION "A-A"

N.T.S.

NOTES

1) Use an epoxy bonding agent to bond new concrete to existing concrete. Bonding agent shall be "Sikadur 32, Hi Mod" or Approved Equal.

2) Epoxy grout to be a high strength rigid epoxy adhesive manufactured for the purpose of anchoring dowels into hardened concrete. Epoxy grout shall be "Sikadur Hi-Mod, LV No. 32" or approved equal.

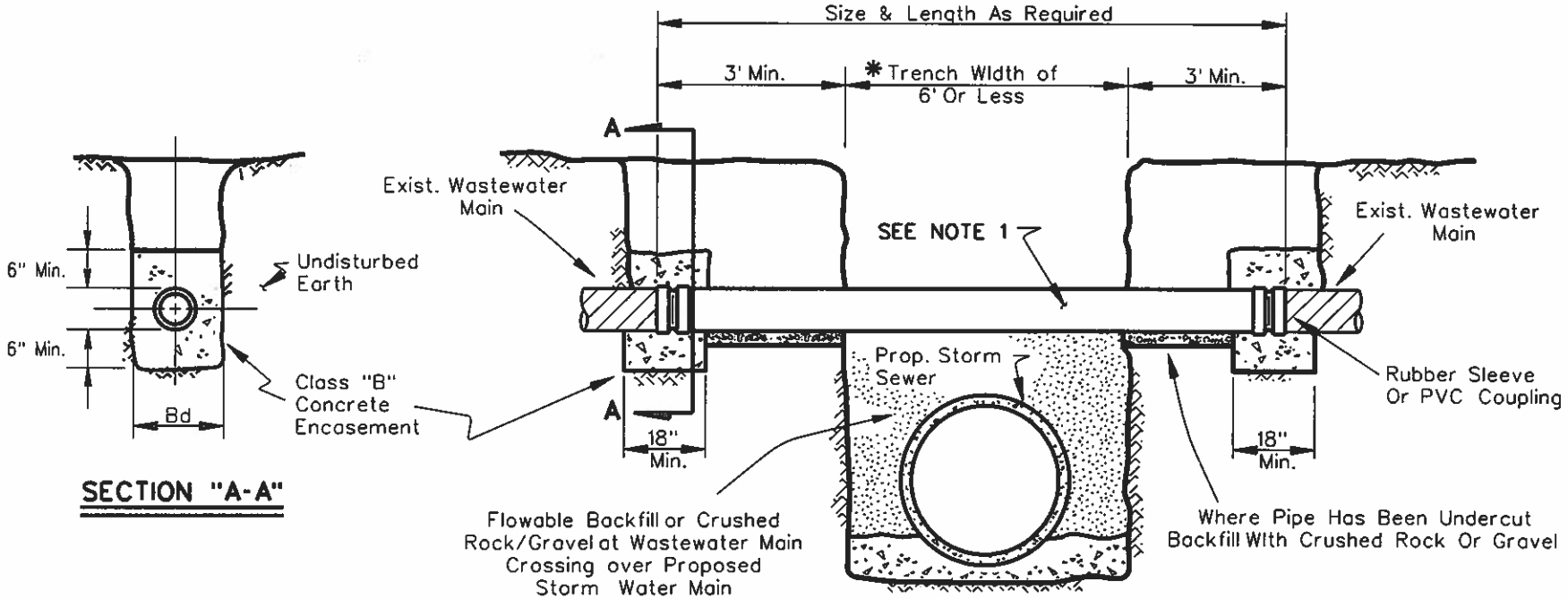
3) Coat the entire outside of the new concrete with a waterproof bituminous coating.

4) Follow construction sequence typical to the notes as outlined on page 402.

ADJUSTMENT OF TYPE "S" MANHOLE		DWU	(PAGE NO.) 412
		DATE OCT. 2011	

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

* If Trench Width Exceeds 6' Or If The Diagonal Crossing Of Trench Exceeds 6', The Use Of Type "A" Utility Support Shall Be Required. See 121. If The Crossing Exceeds 25', A Special Utility Support Design Will Be Required.



SECTION "A-A"

NOTES:

1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE. REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. USE RUBBER SLEEVE COUPLINGS FOR R.C.P./CLAY PIPE WITH CLAY PIPE. USE PRESSURE RATE PVC COUPLINGS FOR PVC PIPE WITH PVC PIPE.
3. RELAY NEW WASTEWATER MAIN TO MATCH EXISTING GRADE.

Contractor Must Contact Wastewater Collection Two Working Days Prior To Construction.

WASTEWATER MAIN UNDERCUT BY PROPOSED STORMWATER MAIN

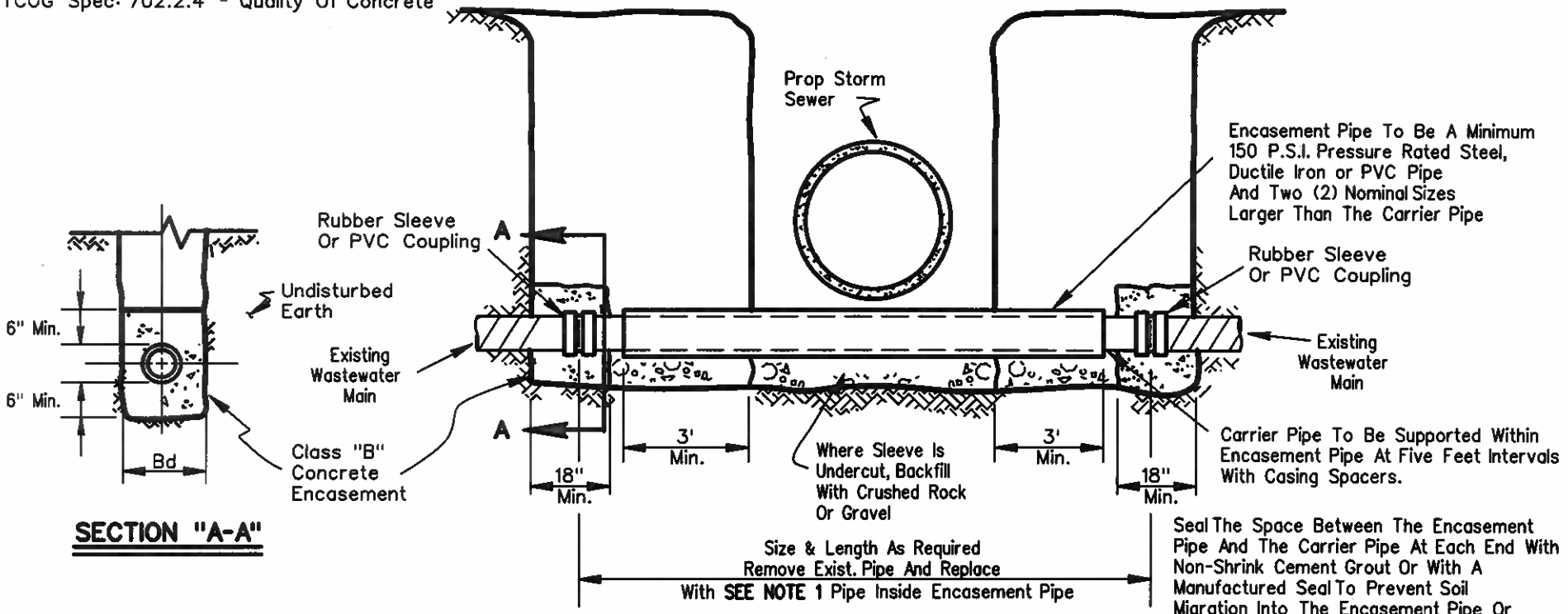
DWU

DATE
OCT.2009

(Page No.)
413

NCTCOG Spec: 501.17 - Poylvinyl Chloride (PVC) Wastewater Pipe And Fittings With Dimensional Control
NCTCOG Spec: 501.7 - Ductile Iron Pressure Pipe and Fittings
2010 DWU Addendum Item 501.7.DWU: Ductile Iron Pressure Pipe And Fittings
2010 DWU Addendum Item 501.7.2.DWU: Joints through 501.7.4.1.DWU: NSF 61 Compliance
NCTCOG Spec: 501.9 - Steel Pipe And Fittings
2010 DWU Addendum Item 501.9.3.DWU: Pipe And Fittings
2010 DWU Addendum Item 501.9.3.1.DWU: NSF 61 Compliance
NCTCOG Spec: 702.2.4 - Quality Of Concrete

Encasement Protection For Wastewater Mains Under Proposed Storm Sewers Where Vertical Clearance Is Less Than 0.5' (To Be Installed By Public Works Storm Sewer Contractor or Trinity Watershed Management).



SECTION "A-A"

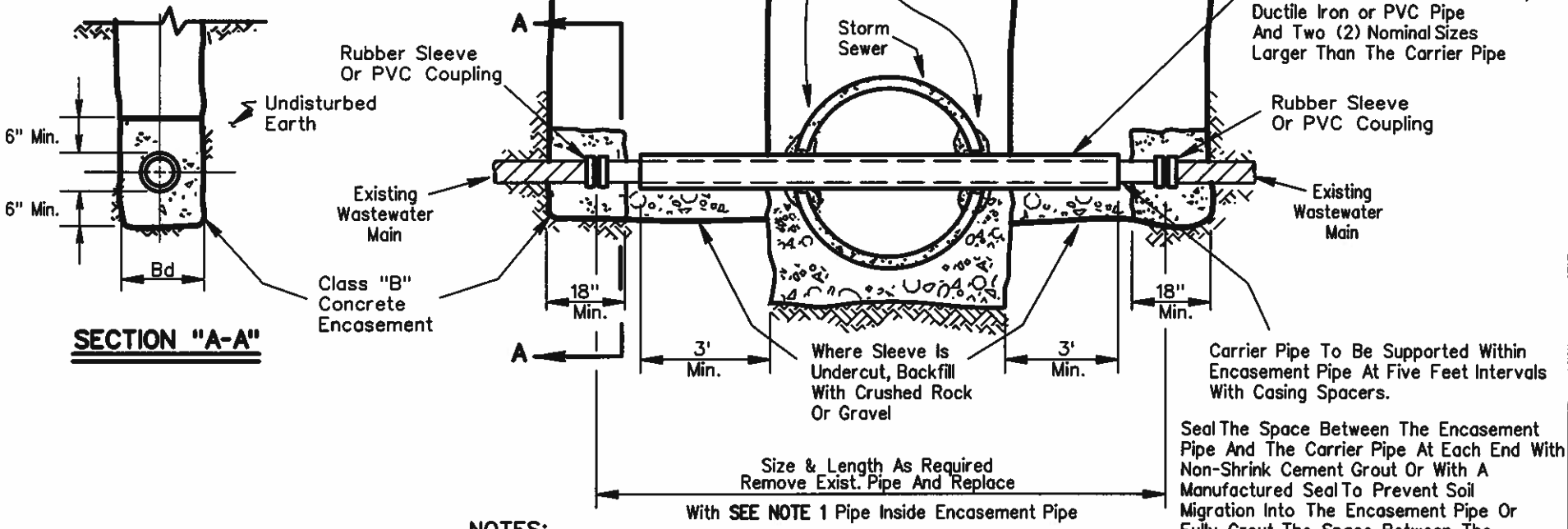
NOTES:

1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE.
   REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. USE RUBBER SLEEVE COUPLINGS FOR R.C.P./CLAY PIPE WITH CLAY PIPE.
   USE PRESSURE RATE PVC COUPLINGS FOR PVC PIPE WITH PVC PIPE.
3. RELAY NEW WASTEWATER MAIN TO MATCH EXISTING GRADE.

Contractor Must Contact Wastewater Collection Two Working Days Prior To Construction.

ENCASEMENT PROTECTION FOR WASTEWATER MAIN		DWU	(Page No.) 414
		DATE OCT. 2011	

NCTCOG Spec: 501.17 - Poylvinyl Chloride (PVC) Wastewater Pipe And Fittings With Dimensional Control
NCTCOG Spec: 501.7 - Ductile Iron Pressure Pipe and Fittings
2010 DWU Addendum Item 501.7.DWU: Ductile Iron Pressure Pipe And Fittings
2010 DWU Addendum Item 501.7.2.DWU: Joints through 501.7.4.1.DWU: NSF 61 Compliance
NCTCOG Spec: 501.9 - Steel Pipe And Fittings
2010 DWU Addendum Item 501.9.3.DWU: Pipe And Fittings
2010 DWU Addendum Item 501.9.3.1.DWU: NSF 61 Compliance
NCTCOG Spec: 702.2.4 - Quality Of Concrete



SECTION "A-A"

NOTES:

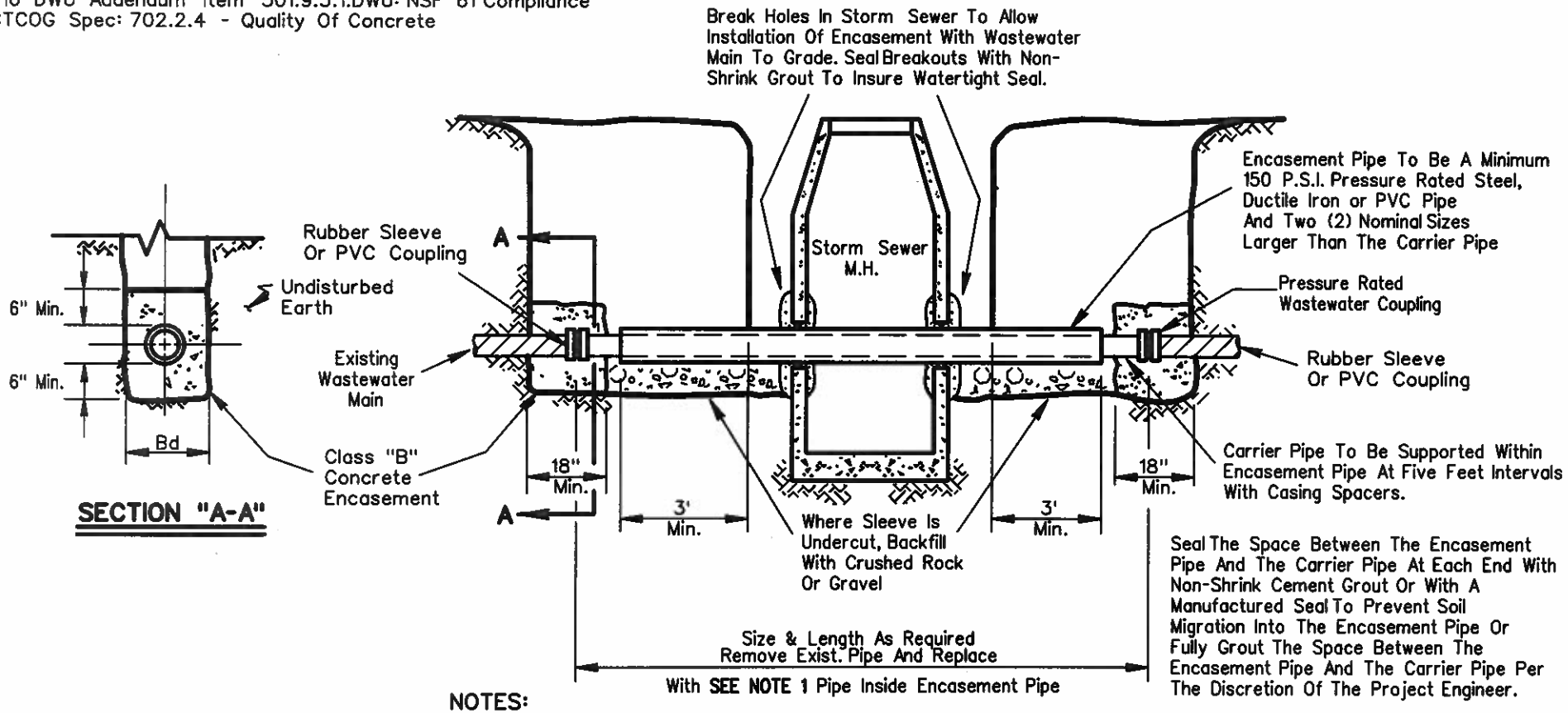
1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE.
   REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. USE RUBBER SLEEVE COUPLINGS FOR R.C.P./CLAY PIPE WITH CLAY PIPE.
   USE PRESSURE RATE PVC COUPLINGS FOR PVC PIPE WITH PVC PIPE.
3. RELAY NEW WASTEWATER MAIN TO MATCH EXISTING GRADE.

Contractor Must Contact Wastewater Collection Two Working Days Prior To Construction.

WASTEWATER MAIN PASSING THROUGH STORM WATER MAIN

	DWU	(Page No.) 415
	DATE OCT.2011	

NCTCOG Spec: 501.17 - Poylvinyl Chloride (PVC) Wastewater Pipe And Fittings With Dimensional Control
NCTCOG Spec: 501.7 - Ductile Iron Pressure Pipe and Fittings
2010 DWU Addendum Item 501.7.DWU: Ductile Iron Pressure Pipe And Fittings
2010 DWU Addendum Item 501.7.2.DWU: Joints through 501.7.4.1.DWU: NSF 61 Compliance
NCTCOG Spec: 501.9 - Steel Pipe And Fittings
2010 DWU Addendum Item 501.9.3.DWU: Pipe And Fittings
2010 DWU Addendum Item 501.9.3.1.DWU: NSF 61 Compliance
NCTCOG Spec: 702.2.4 - Quality Of Concrete



SECTION "A-A"

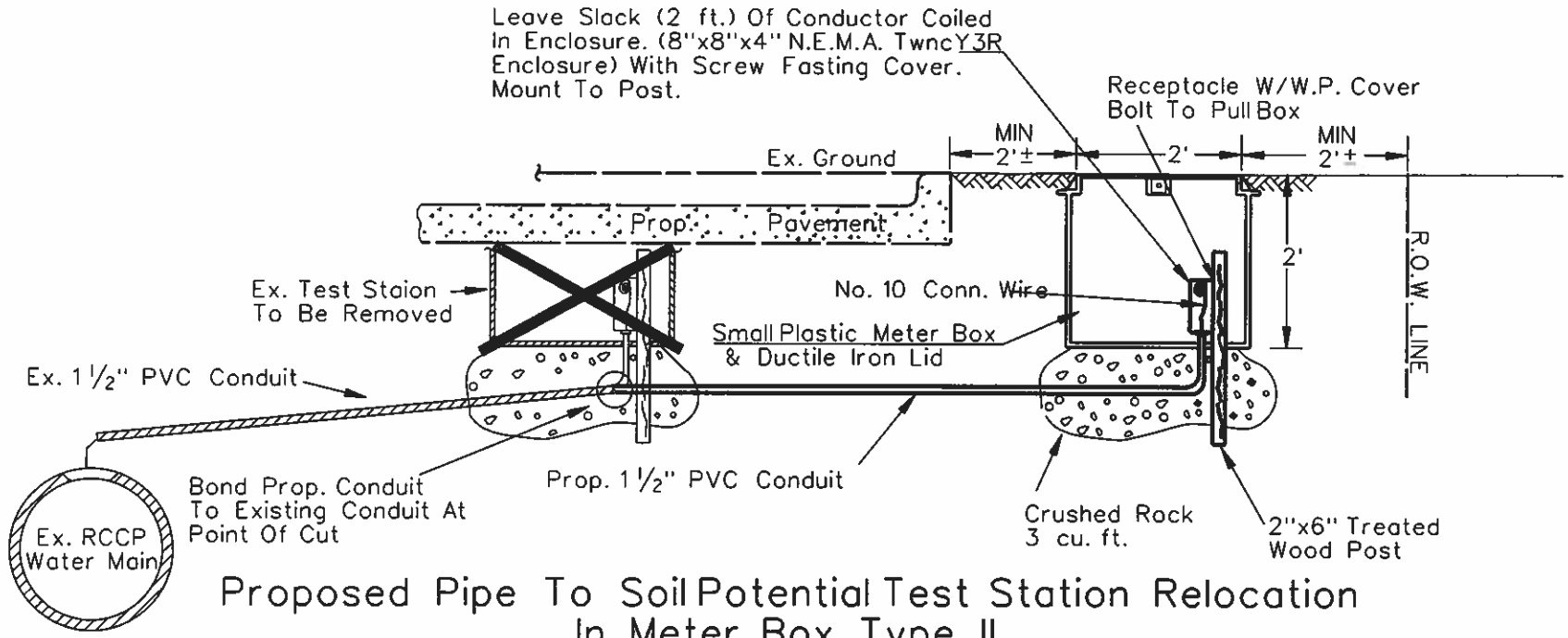
NOTES:

1. REPLACE EX. R.C.P./CLAY PIPE WITH CLAY PIPE.
   REPLACE P.V.C. PIPE WITH P.V.C. PIPE.
2. USE RUBBER SLEEVE COUPLINGS FOR R.C.P./CLAY PIPE WITH CLAY PIPE.
   USE PRESSURE RATE PVC COUPLINGS FOR PVC PIPE WITH PVC PIPE.
3. RELAY NEW WASTEWATER MAIN TO MATCH EXISTING GRADE.

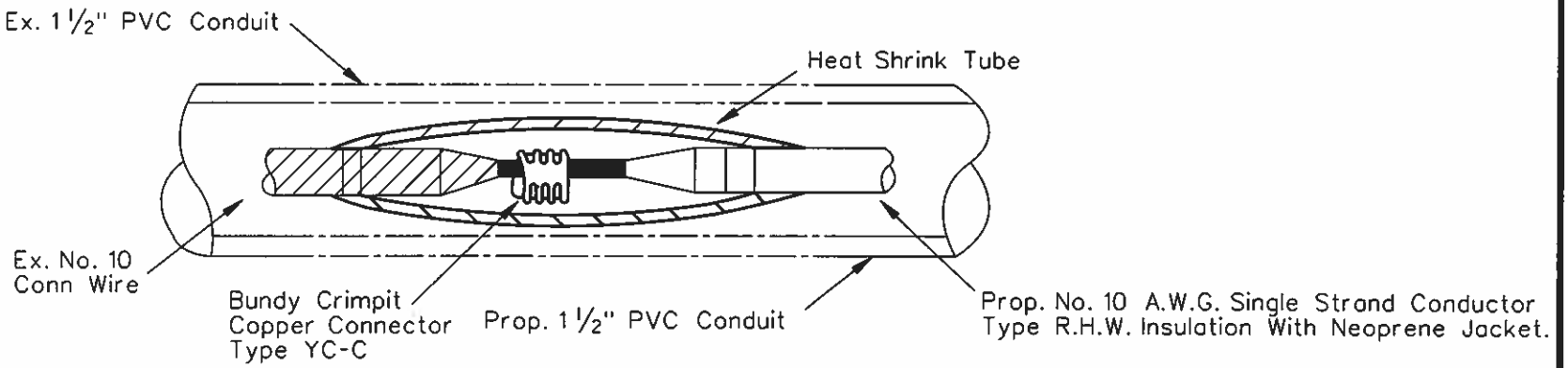
Contractor Must Contact Wastewater Collection Two Working Days Prior To Construction.

WASTEWATER MAIN PASSING THROUGH STORM WATER MANHOLE

	(Page No.)
DWU	416
DATE OCT.2011	



Proposed Pipe To Soil Potential Test Station Relocation In Meter Box Type II



MECHANICAL CABLE SPLICE DETAIL

RELOCATION OF PIPE-TO-SOIL POTENTIAL TEST STATION (BURIED CONFIGURATION)		DWU	(Page No.) 417
		DATE JAN. 2010	

PART 5

(Series 500)

4" AND LARGER WATER SERVICE INSTALLATIONS

City of Dallas
Water Utilities Department

PART 5
LARGE WATER SERVICE INSTALLATIONS

TITLE		Pg.
Large Water Services (4" and Larger) Descriptions and Typical Uses	---	501
Large Service Installation Details and Plan Views	---	502
Minimum Easement Sizes for Large Meter Installation	---	502A
Large Service Installation Detail--Elevation View	---	503
Large Service Installation Details--Precast Vaults (F.M. & D.C. Type)	---	504
Large Service Installation Details--Precast Vaults (10” or Larger Meter Size)	---	505
Large Service Installation Details--General Notes	---	506
4" Combined Service with 4" Meter	---	507
6"Combined Service with 6" Meter	---	508
8" Combined Service with 6" Meter	---	509
8" Combined Service with 8" Meter	---	510
10" Combined Service with 8" Meter	---	511
10" Combined Service with 10" Meter	---	512
4" Domestic Service with 3" Meter	---	513
4" Domestic Service with 4" Meter	---	514
6" Domestic Service with 6" Meter	---	515
8" Domestic Service with 6" Meter	---	516
4" Closed Fireline Service with 4" Detector Check Device	---	517
6" Closed Fireline Service with 6" Detector Check Device	---	518
8" Closed Fireline Service with 6" Detector Check Device	---	519
8" Closed Fireline Service with 8" Detector Check Device	---	520
10" Closed Fireline Service with 10" Detector Check Device	---	521
Suspended Vault Installation Detail Description And General Notes	---	522
Suspended Vault Installation Details--Plan View	---	523
Suspended Vault Installation Details--Elevation 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

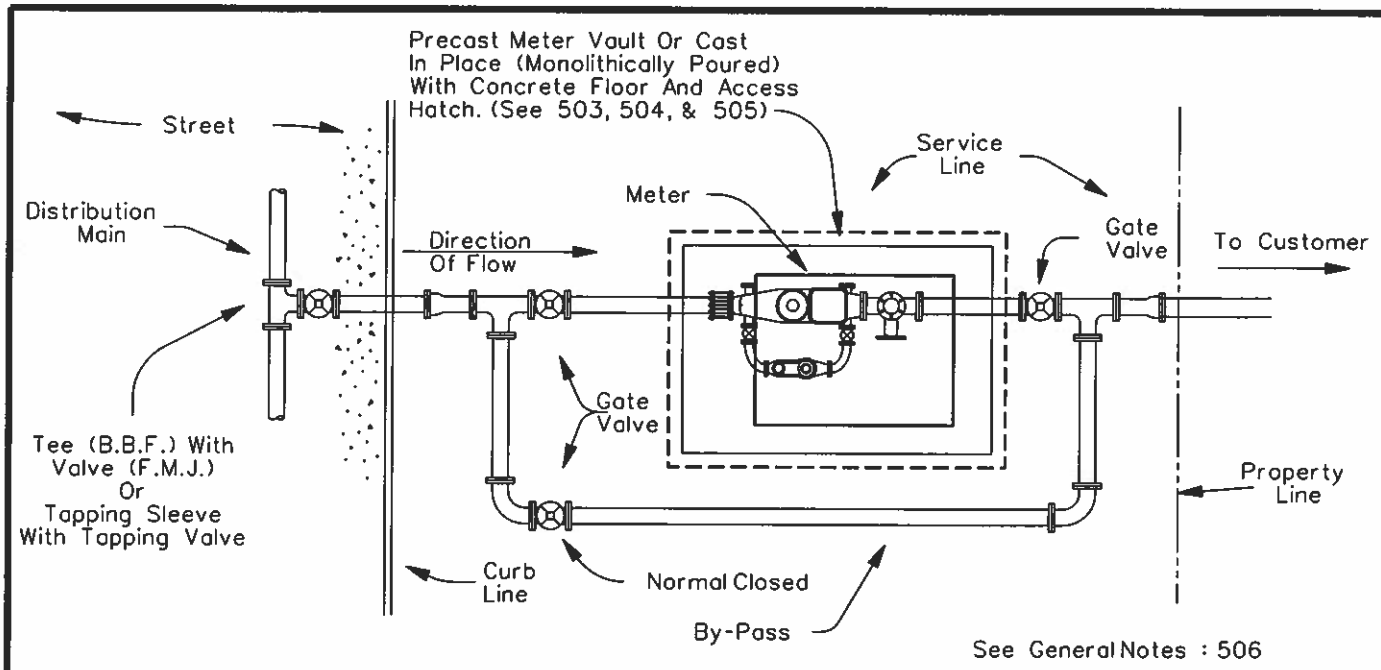
   A) Definition - Domestic water through a single water service and meter.

   B) Metering - Metered with compound meter or turbine meter with domestic type strainer.

4) Irrigation Water Service

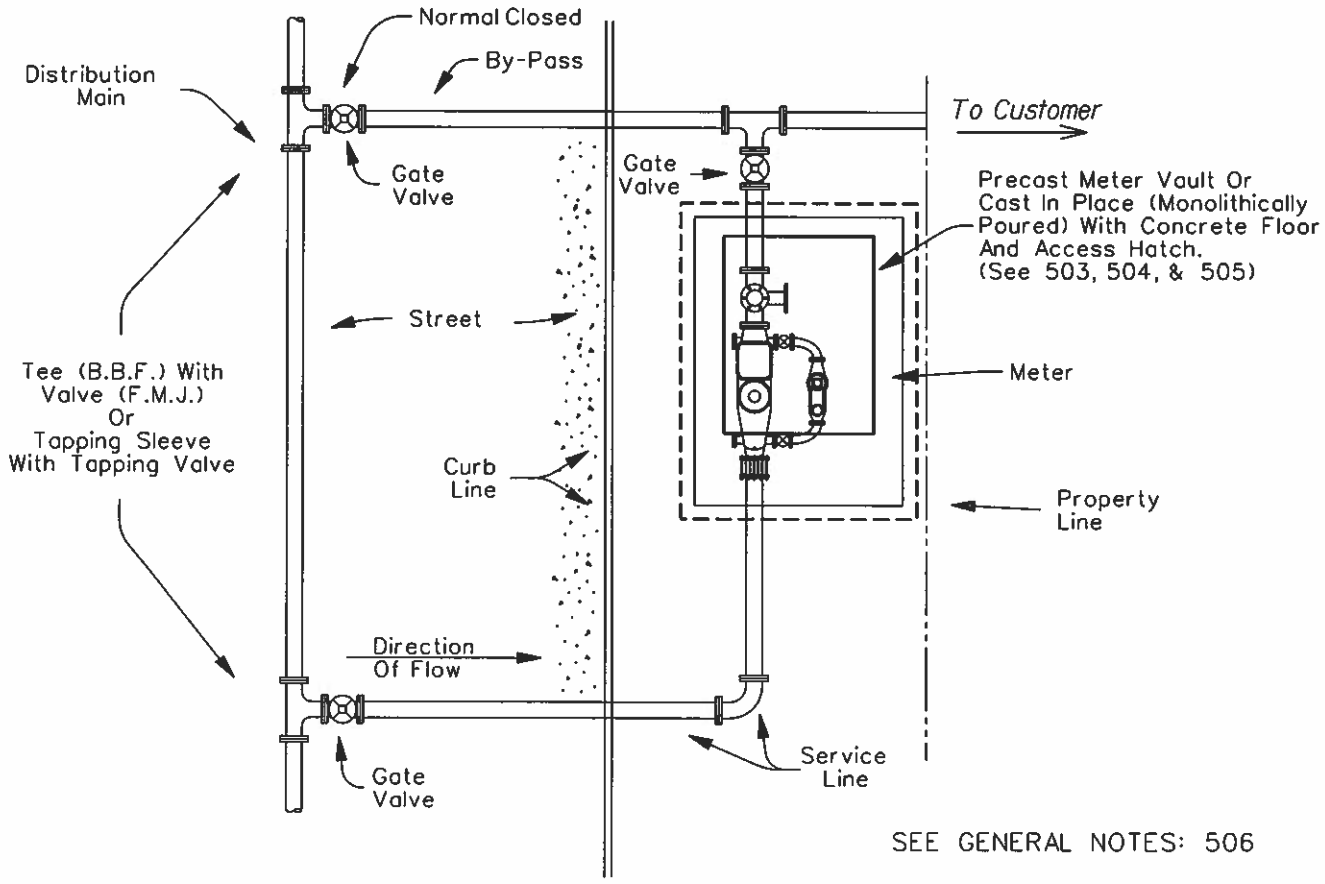
   A) Definition - Same as domestic water through a single water service and meter without a bypass and for irrigation purpose only.

   B) Metering - Metered with compound meter or turbine meter with domestic type strainer.



See General Notes : 506

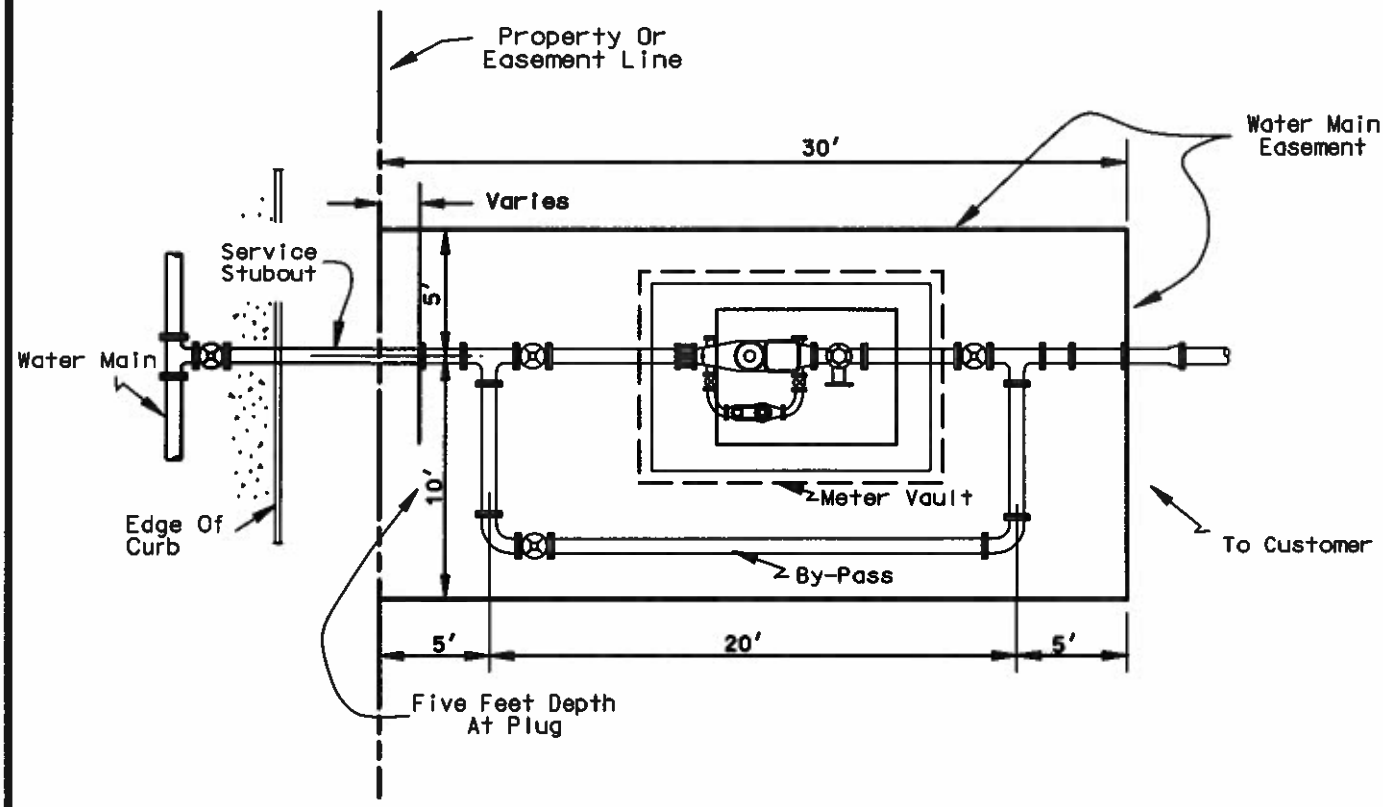
TYPICAL METER ALIGNMENT
(Combined Service Shown)



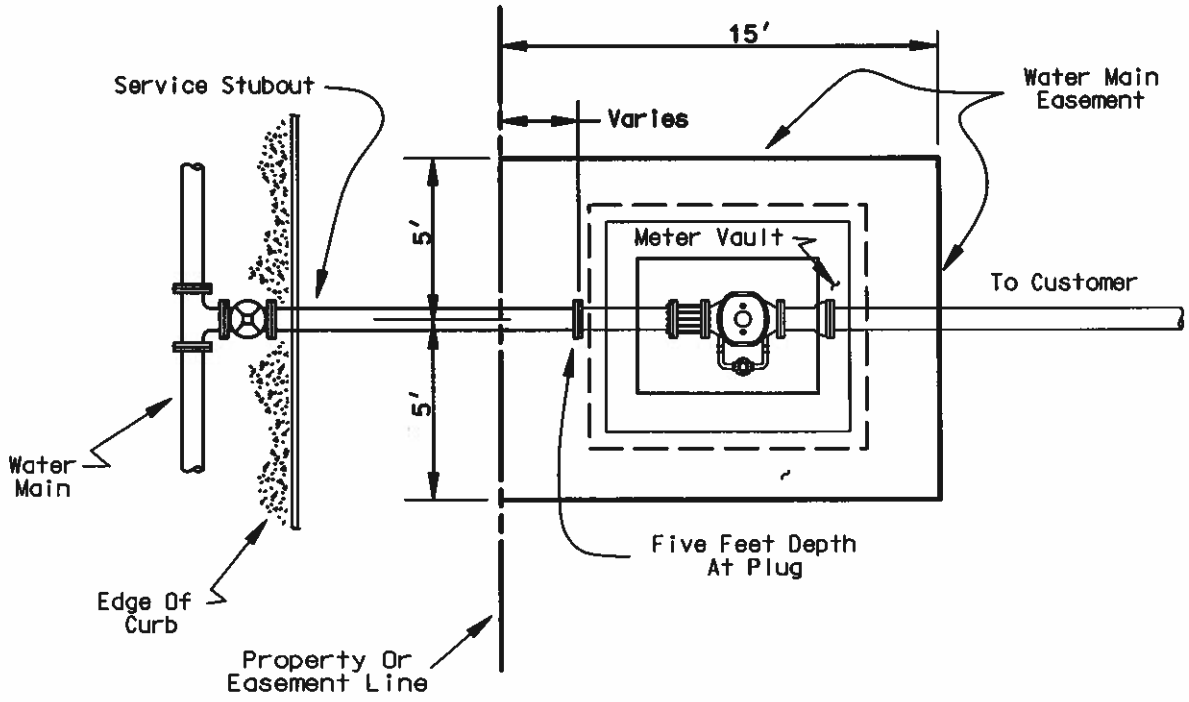
SEE GENERAL NOTES: 506

ALTERNATE METER ALIGNMENT
FOR LIMITED SPACE INSTALLATION
(Combined Service Shown)

LARGE SERVICE INSTALLATION DETAILS PLAN VIEWS		DWU	(Page No.) 502
		DATE JAN. 2010	

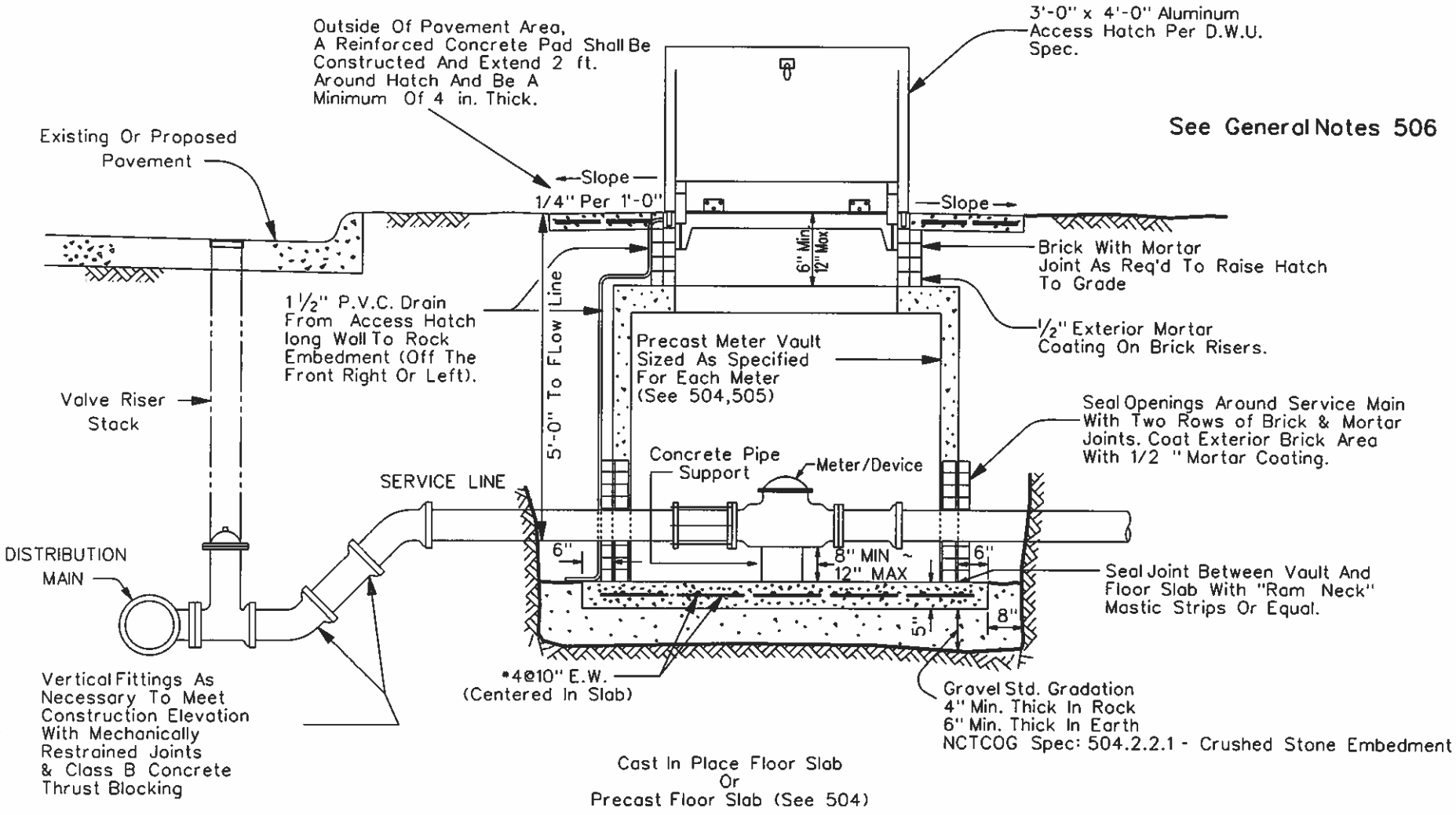


COMBINED SERVICE - 15' x 30' EASEMENT



FIRE LINE SERVICE - 10' x15' EASEMENT

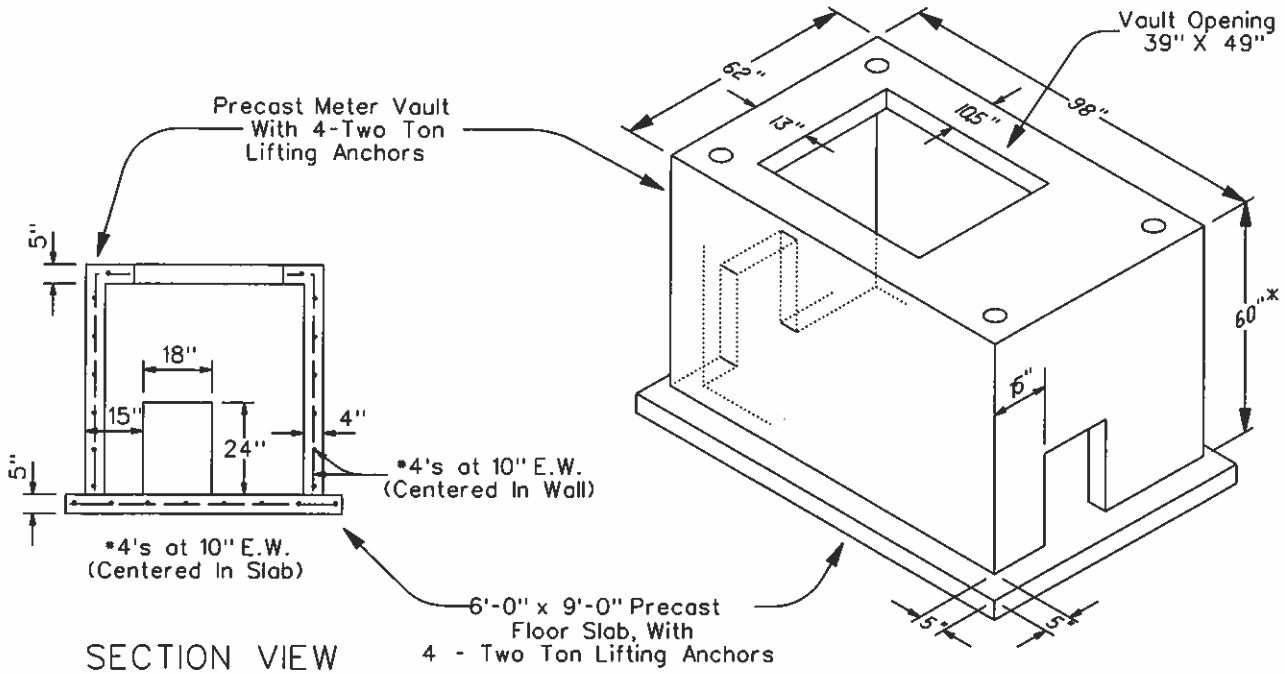
MINIMUM EASEMENT SIZES FOR LARGE METER INSTALLATIONS		DWU	(PAGE NO.) 502A
		DATE OCT. 2011	



TYPICAL FOR ALL LARGE METER VAULTS

NCTCOG Spec: 504.2.2.1 - Crushed Stone Embedment

LARGE SERVICE INSTALLATION DETAIL ELEVATION VIEW		DWU	(Page No.) 503
		DATE OCT.2009	

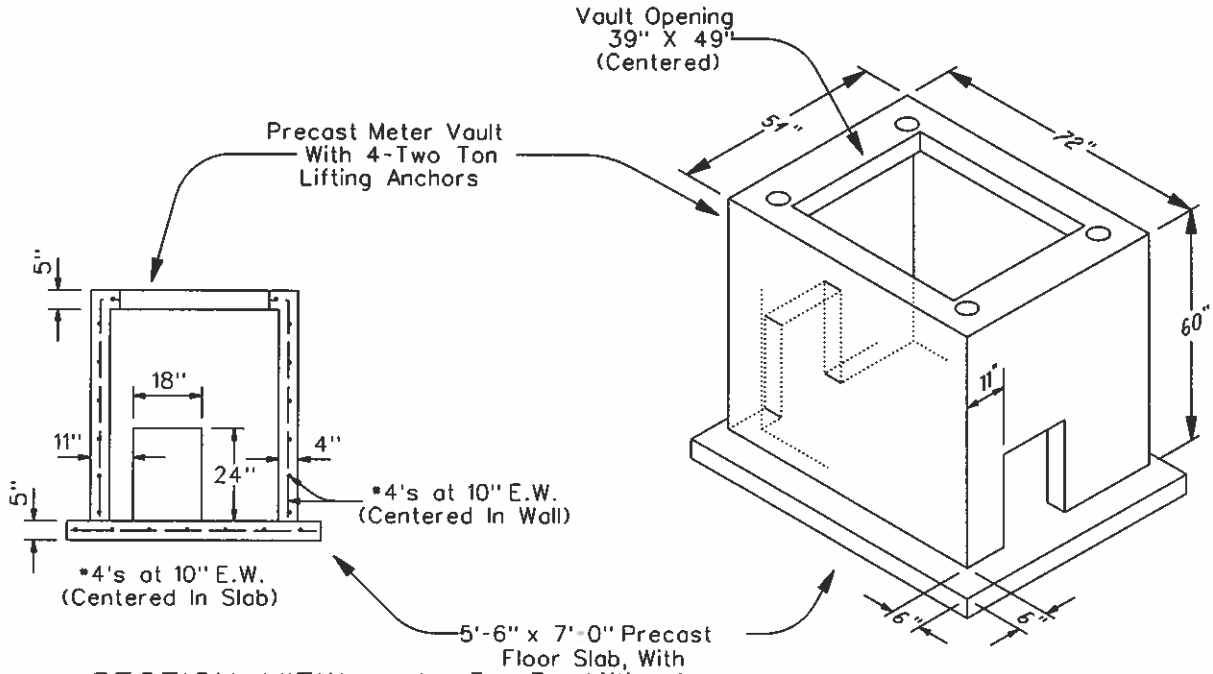


SECTION VIEW

F.M. VAULT

* Available Heights
36", 48", 60"

* Special Applications To Be Determined
By Engineer.



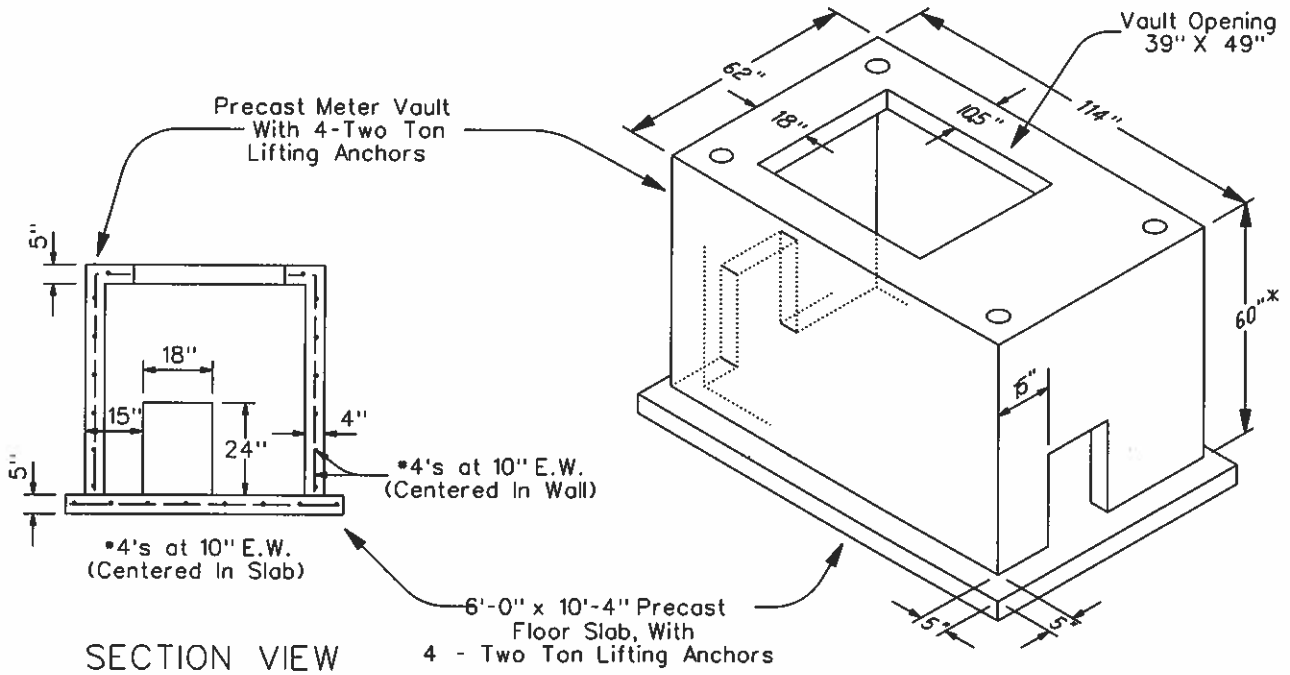
SECTION VIEW

D.C. VAULT

* Available Heights
36", 48", 60"

* Special Applications To Be Determined
By Engineer.

LARGE SERVICE INSTALLATION DETAILS PRECAST VAULTS		DWU	(Page No.) 504
		DATE JUNE 2002	



SECTION VIEW

* Available Heights
36", 48", 60"

10" VAULT

* Special Applications To Be Determined
By Engineer.

LARGE SERVICE INSTALLATION DETAILS PRECAST VAULTS		DWU	(Page No.) 505
		DATE JAN. '98	

GENERAL NOTES FOR 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 the NCTCOG specifications, the DWU Addendum to that specification, this manual and the latest edition of the approved materials list.

NOTE:

A.) Only full body gray or ductile iron fittings and glands will be 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).

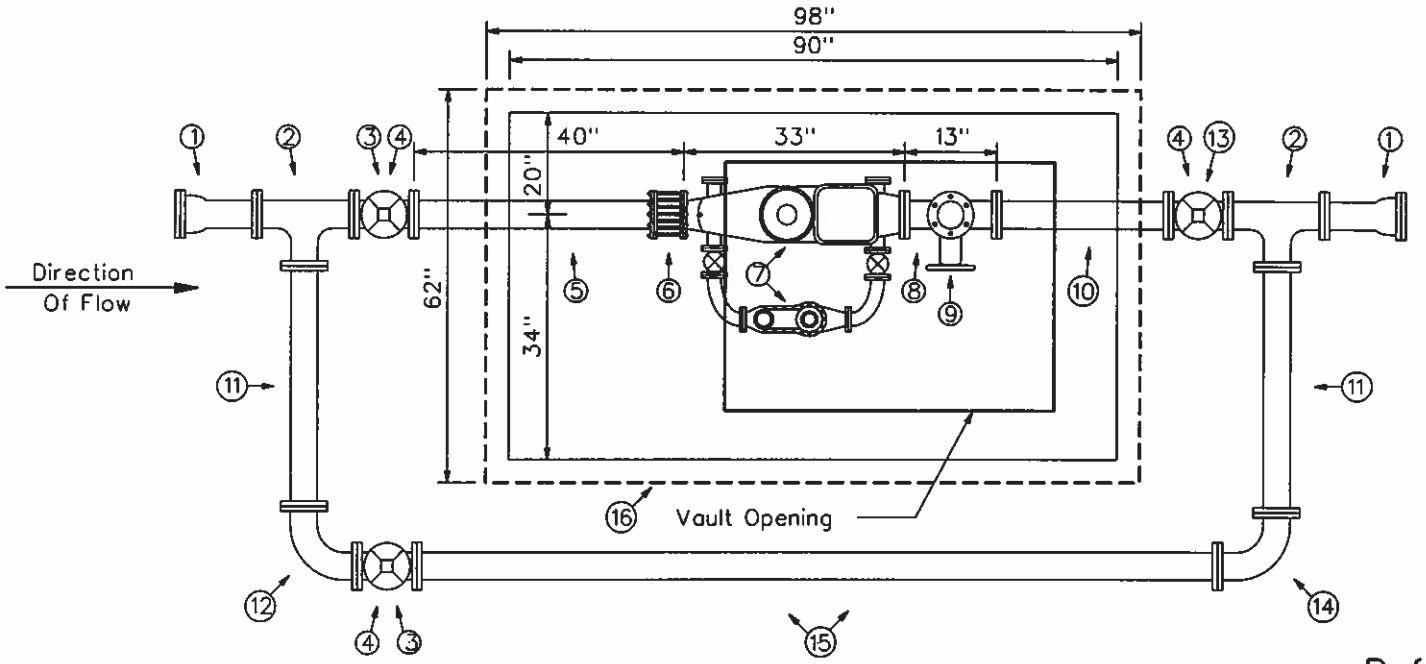
2.) All precast vaults and precast floors used in the installation of large water services will meet DWU specifications and must be on the approved materials list.

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.)

Material List		
Part No.	Quantity	Description
①	2 Ea.	4" x 8" Nipple M.J. x F.
②	2 Ea.	4" x 4" . Tee F. x F.
③	2 Ea.	4" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	4" x 40" Pipe S. x S.
⑥	1 Ea.	4" Flanged Coupling Adaptor
⑦	1 Ea.	4" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	4" x 4" Tee F. x F. (test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑩	1 Ea.	4" x 24" Nipple F. x F.
⑪	2 Ea.	4" x 36" Nipple F. x F.
⑫	1 Ea.	4" 90° Bend F. x F.
⑬	1 Ea.	4" Gate Valve F. x F.
⑭	1 Ea.	4" 90° Bend M.J. x F.
⑮	1 Ea.	4" Pipe
⑯	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

4" COMBINED SERVICE WITH 4" METER

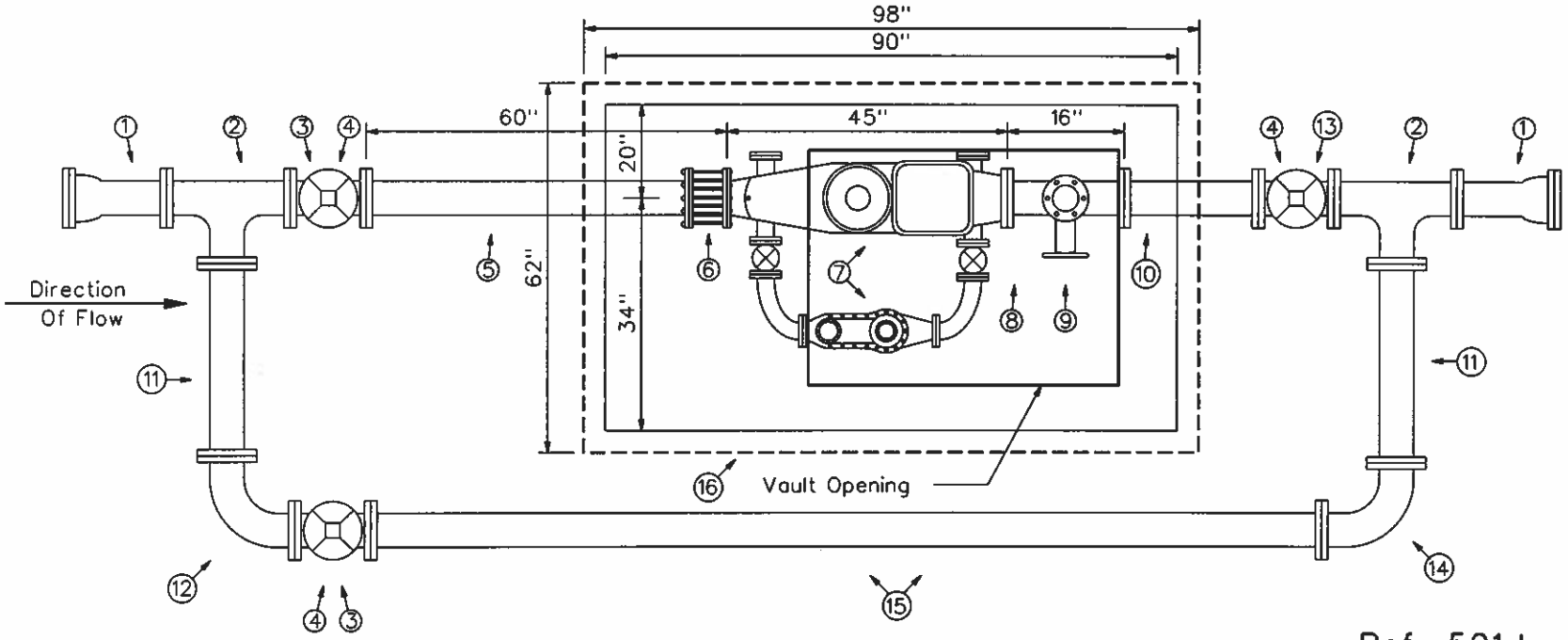
DWU

(Page No.) 507

DATE JUNE 2002

Material List		
Part No.	Quantity	Description
①	2 Ea.	6" x 8" Nipple M.J. x F.
②	2 Ea.	6" x 6" Tee F. x F.
③	2 Ea.	6" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	6" x 60" Pipe S. x S.
⑥	1 Ea.	6" Flanged Coupling Adaptor
⑦	1 Ea.	6" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	6" x 4" Tee F. x F. (test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑩	1 Ea.	6" x 24" Nipple F. x F.
⑪	2 Ea.	6" x 36" Nipple F. x F.
⑫	1 Ea.	6" 90° Bend F. x F.
⑬	1 Ea.	6" Gate Valve F. x F.
⑭	1 Ea.	6" 90° Bend M.J. x F.
⑮	1 Ea.	6" Pipe
⑯	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

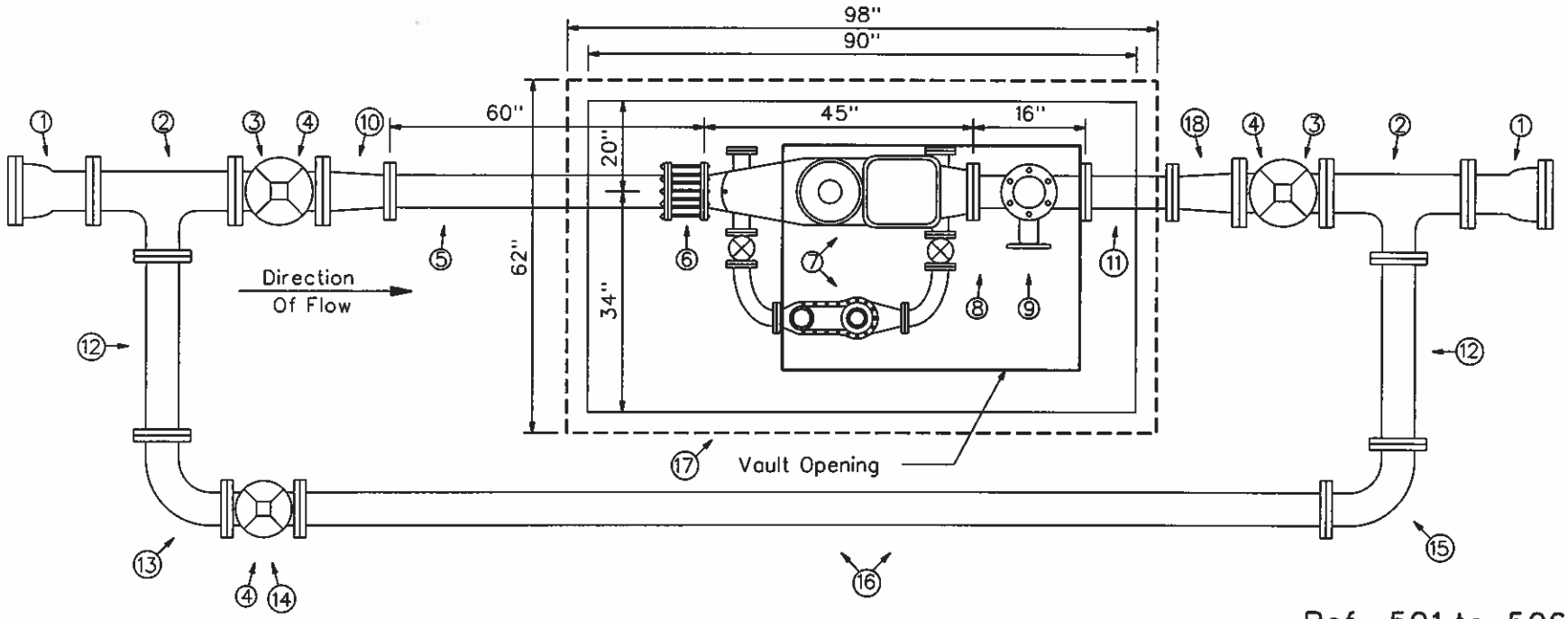
6" COMBINED SERVICE WITH 6" METER

DWU

DATE
JUNE 2002

Material List		
Part No.	Quantity	Description
①	2 Ea.	8" x 8" Nipple M.J. x F.
②	2 Ea.	8" x 6" Tee F. x F.
③	2 Ea.	8" Gate Valve F. x F.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	6" x 60" Pipe S. x S.
⑥	1 Ea.	6" Flanged Coupling Adaptor
⑦	1 Ea.	6" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	6" x 4" Tee F. x F. (Test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)
⑩	1 Ea.	8" x 6" Reducer F. x M. J.

Material List		
Part No.	Quantity	Description
⑪	1 Ea.	6" x 12" Nipple F. x F.
⑫	2 Ea.	6" x 36" Nipple F. x F.
⑬	1 Ea.	6" 90° Bend F. x F.
⑭	1 Ea.	6" Gate Valve F. x M.J.
⑮	1 Ea.	6" 90° Bend M.J. x F.
⑯	1 Ea.	6" Pipe
⑰	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑱	1 Ea.	8" x 6" Reducer F. x F.



Ref. 501 to 506

8" COMBINED SERVICE WITH 6" METER

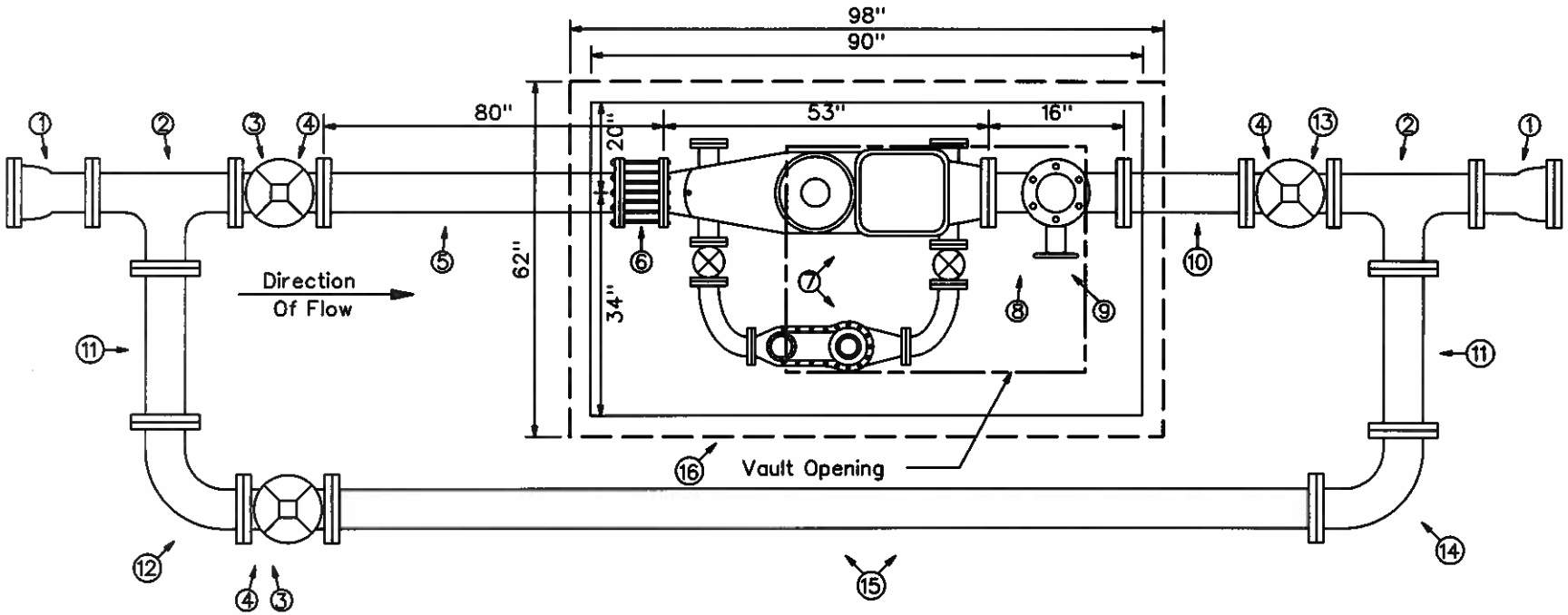
DWU

(Page No.) 509

DATE JUNE 2002

Material List		
Part No.	Quantity	Description
①	2 Ea.	8" x 8" Nipple M.J. x F.
②	2 Ea.	8" x 8" Tee F. x F.
③	2 Ea.	8" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	8" x 80" Pipe S. x S.
⑥	1 Ea.	8" Flanged Coupling Adaptor
⑦	1 Ea.	8" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	8" x 4" Tee F. x F. (Test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑩	1 Ea.	8" x 24" Nipple F. x F.
⑪	2 Ea.	8" x 36" Nipple F. x F.
⑫	1 Ea.	8" C.I. 90° Bend F. x F.
⑬	1 Ea.	8" Gate Valve F. x F.
⑭	1 Ea.	8" 90° Bend M.J. x F.
⑮	1 Ea.	8" Pipe
⑯	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

8" COMBINED SERVICE WITH 8" METER

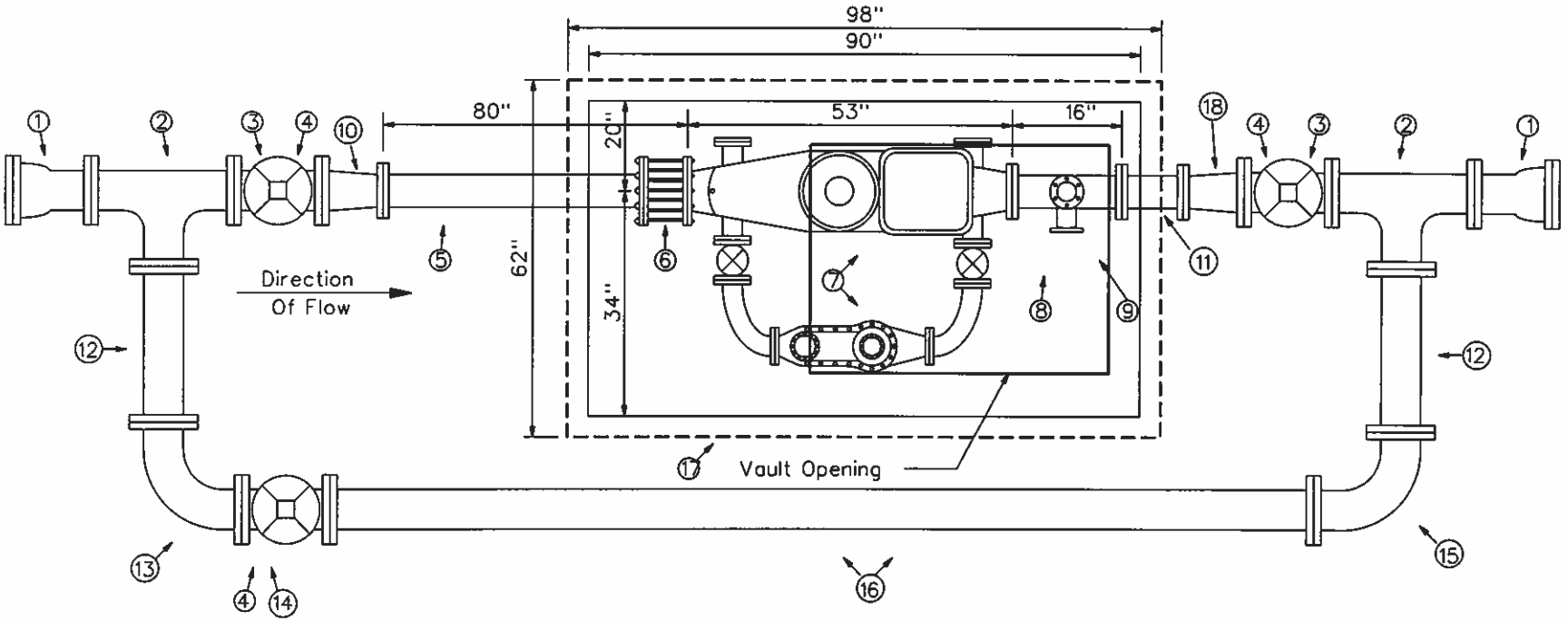
DWU

(Page No.) 510

DATE OCT 2011

Material List		
Part No.	Quantity	Description
①	2 Ea.	10" x 8" Nipple M.J. x F.
②	2 Ea.	10" x 8" Tee F. x F.
③	2 Ea.	10" Gate Valve F. x F.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	8" x 80" Pipe S. x S.
⑥	1 Ea.	8" Flanged Coupling Adaptor
⑦	1 Ea.	8" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	8" x 4" Tee F. x F. (Test Point)
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)
⑩	1 Ea.	10" x 8" Reducer F. x M. J.

Material List		
Part No.	Quantity	Description
⑪	1 Ea.	8" x 12" Nipple F. x F.
⑫	2 Ea.	8" x 36" Nipple F. x F.
⑬	1 Ea.	8" 90° Bend F. x F.
⑭	1 Ea.	8" Gate Valve F. x M.J.
⑮	1 Ea.	8" 90° Bend M.J. x F.
⑯	1 Ea.	8" Pipe
⑰	1 Ea.	Precast F.M. Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑱	1 Ea.	10" x 8" Reducer F. x F.



Ref. 501 to 506

10" COMBINED SERVICE WITH 8" METER

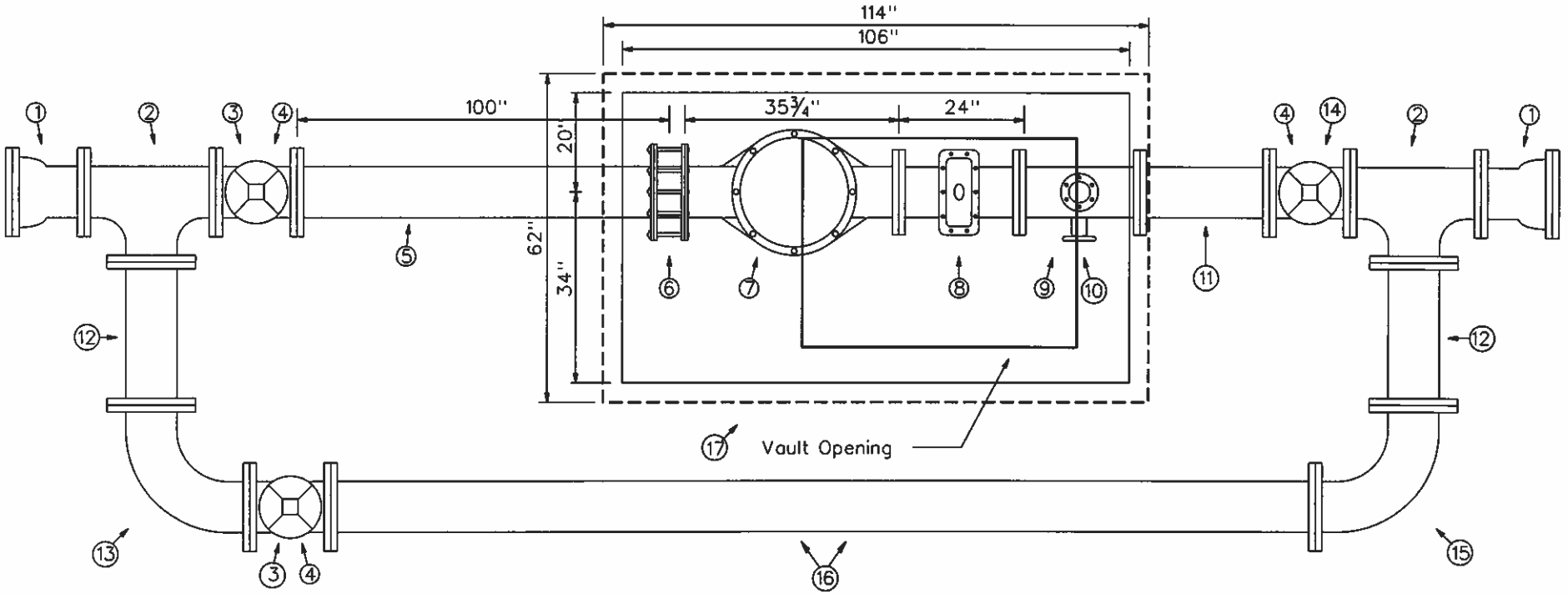
DWU

(Page No.) 511

DATE JUNE 2002

Material List		
Part No.	Quantity	Description
①	2 Ea.	10" x 8" Nipple M.J. x F.
②	2 Ea.	10" x 10" Tee F. x F.
③	2 Ea.	10" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	10" x 100" Pipe S. x S.
⑥	1 Ea.	10" Flanged Coupling Adaptor
⑦	1 Ea.	10" U.L. Approved Strainer (For Turbine)
⑧	1 Ea.	10" Meter As Specified (Type F.M. Shown)
⑨	1 Ea.	10" x 4" Tee F. x F. (Test Point)
⑩	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑪	1 Ea.	10" x 24" Nipple F. x F.
⑫	2 Ea.	10" x 72" Nipple F. x F.
⑬	1 Ea.	10" 90° Bend F. x F.
⑭	1 Ea.	10" Gate Valve F. x F.
⑮	1 Ea.	10" 90° Bend M.J. x F.
⑯	1 Ea.	10" Pipe
⑰	1 Ea.	Precast 10" Vault
	1 Ea.	F.M. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)



Ref. 501 to 506

10" COMBINED SERVICE WITH 10" METER

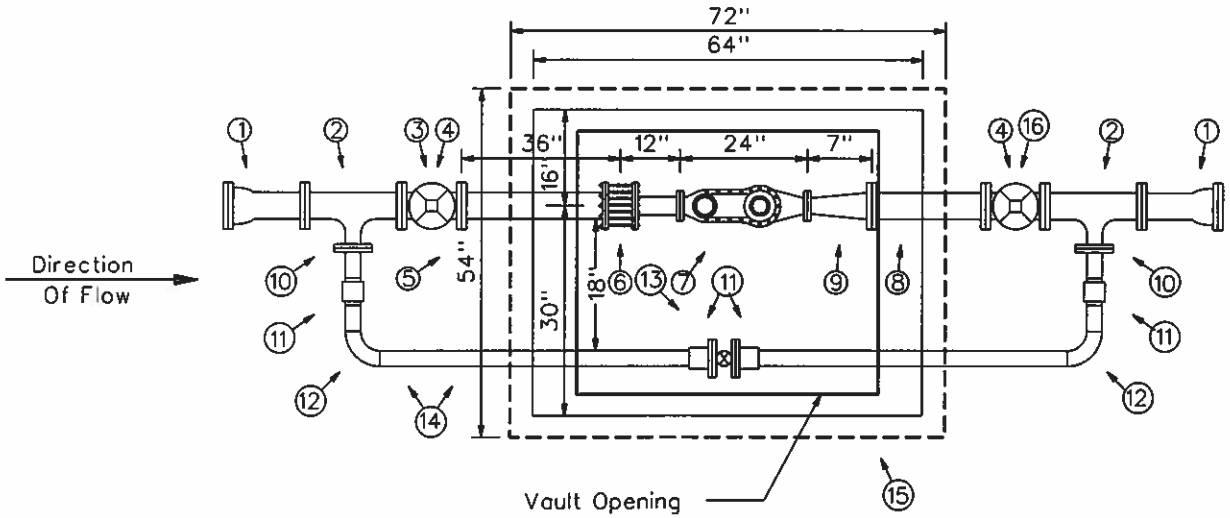
DWU

(Page No.) 512

DATE OCT 2011

Material List		
Part No.	Quantity	Description
①	2 Ea.	4" x 8" Nipple M.J. x F.
②	2 Ea.	4" x 2" Tee F. x F.
③	1 Ea.	4" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	4" x 36" Pipe S. x S.
⑥	1 Ea.	4" X 3" Reducing Flanged Coupling Adaptor
⑦	1 Ea.	3" Meter As Specified (Type Compound Shown)
⑧	1 Ea.	4" x 24" Nipple F. x F.
⑨	1 Ea.	4" x 3" Reducer F. x F.

Material List		
Part No.	Quantity	Description
⑩	2 Ea.	2" Companion Flange
⑪	4 Ea.	2" Comp X OSIP Adaptor
⑫	2 Ea.	2" Comp 90 Deg. Ell
⑬	1 Ea.	2" Ball Valve
⑭	1 Ea.	2" Copper Pipe
⑮	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑯	1 Ea.	4" Gate Valve F. x F.



Ref. 501 to 506

4" DOMESTIC SERVICE WITH 3" METER

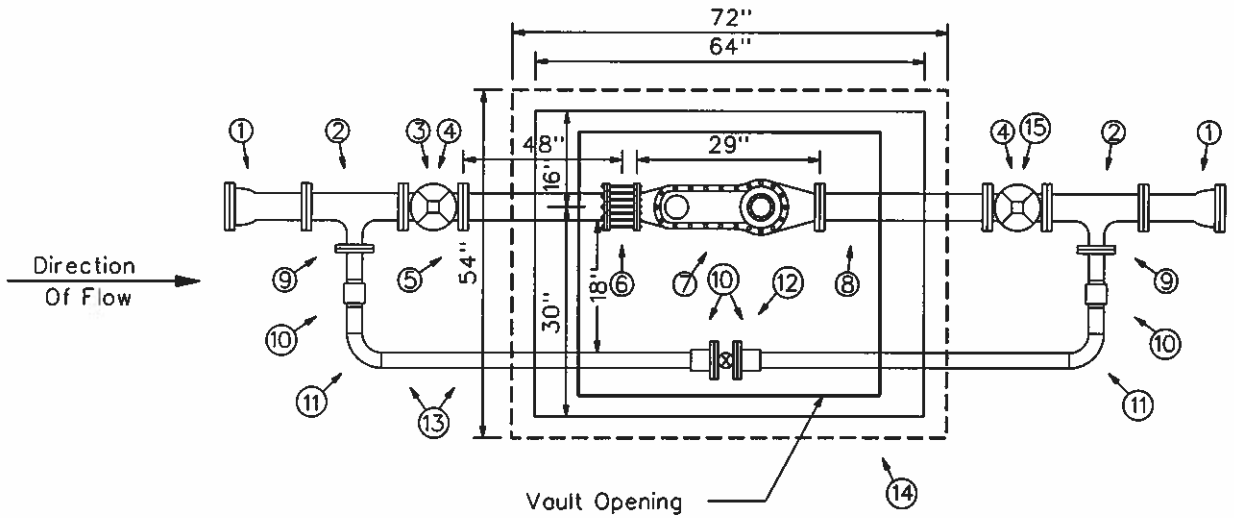
DWU

(Page No.) 513

DATE OCT 2010

Material List		
Part No.	Quantity	Description
①	2 Ea.	4" x 8" Nipple M.J. x F.
②	2 Ea.	4" x 2" Tee F. x F.
③	1 Ea.	4" Gate Valve F. x M.J.
④	2 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	4" x 36" Pipe S. x S.
⑥	1 Ea.	4" Flanged Coupling Adapter
⑦	1 Ea.	4" Meter As Specified (Type Compound Shown)
⑧	1 Ea.	4" x 36" Pipe F. x F.

Material List		
Part No.	Quantity	Description
⑨	2 Ea.	2" Companion Flange
⑩	4 Ea.	2" Comp X OSIP Adaptor
⑪	2 Ea.	2" Comp 90 Deg. Ell
⑫	1 Ea.	2" Ball Valve
⑬	1 Ea.	2" Copper Pipe
⑭	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑮	1 Ea.	4" Gate Valve F. x F.



Ref. 501 to 506

4" DOMESTIC SERVICE WITH 4" METER

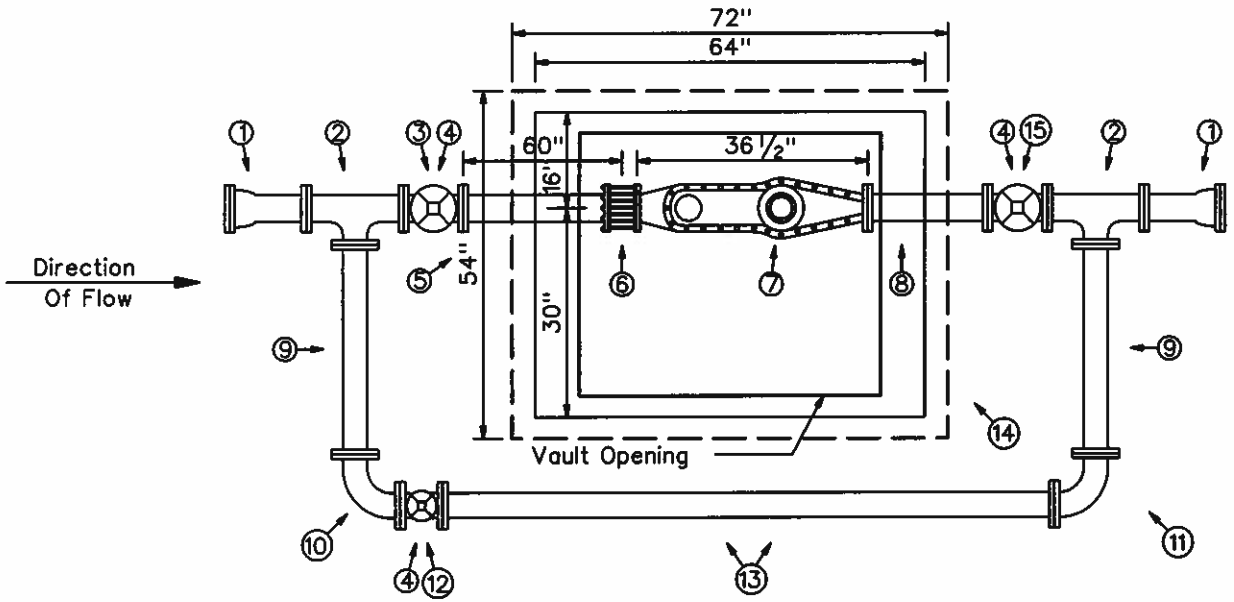
DWU

DATE
OCT 2010

(Page No.)
514

Material List		
Part No.	Quantity	Description
①	2 Ea.	6" x 8" Nipple M.J. x F.
②	2 Ea.	6" x 4" Tee F. x F.
③	1 Ea.	6" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	6" x 24" Pipe S. x S.
⑥	1 Ea.	6" Flanged Coupling Adapter
⑦	1 Ea.	6" Meter As Specified (Type Compound Shown)
⑧	1 Ea.	6" x 24" Pipe F. x F.

Material List		
Part No.	Quantity	Description
⑨	2 Ea.	4" x 36" Nipple F. x F.
⑩	1 Ea.	4" 90 Deg. Bend F.x F.
⑪	1 Ea.	4" 90 Deg. Bend M.J. x F.
⑫	1 Ea.	4" Gate Valve F. x M.J.
⑬	1 Ea.	4" Pipe
⑭	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑮	1 Ea.	6" Gate Valve F. x F.



Ref. 501 to 506

6" DOMESTIC SERVICE WITH 6" METER

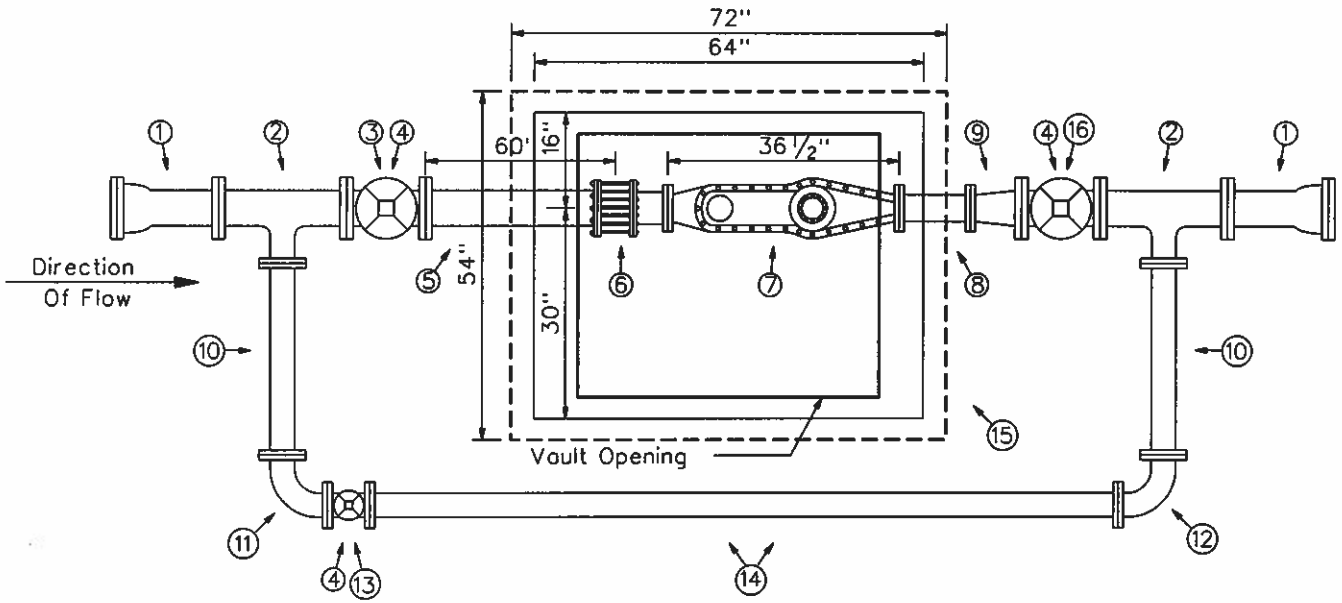
DWU

(Page No.) 515

DATE OCT 2011

Material List		
Part No.	Quantity	Description
①	2 Ea.	8" x 8" Nipple M.J. x F.
②	2 Ea.	8" x 4" Tee F. x F.
③	1 Ea.	8" Gate Valve F. x M.J.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	8" x 24" Pipe S. x S.
⑥	1 Ea.	8" x 6" Reducing Flanged Coupling Adaptor
⑦	1 Ea.	6" Meter As Specified (Type Compound Shown)
⑧	1 Ea.	6" x 24" Pipe F. x F.
⑨	1 Ea.	8" x 6" Reducer F. x F.

Material List		
Part No.	Quantity	Description
⑩	2 Ea.	4" x 36" Nipple F. x F.
⑪	1 Ea.	4" 90 Deg. Bend F.x F.
⑫	1 Ea.	4" 90 Deg. Bend M.J. x F.
⑬	1 Ea.	4" Gate Valve F. x M.J.
⑭	1 Ea.	4" Pipe
⑮	1 Ea.	Precast D.C. Vault
	1 Ea.	D.C. Vault Floor (Not Shown)
	1 Ea.	Access Hatch (Not Shown)
⑯	1 Ea.	8" Gate Valve F. x F.



Ref. 501 to 506

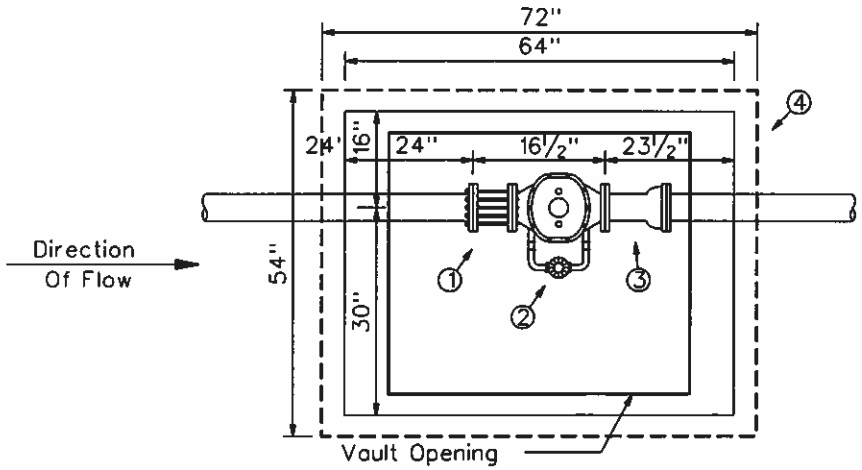
8" DOMESTIC SERVICE WITH 6" METER

DWU

DATE
OCT 2010

(Page No.)
516

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



Ref. 501 to 506

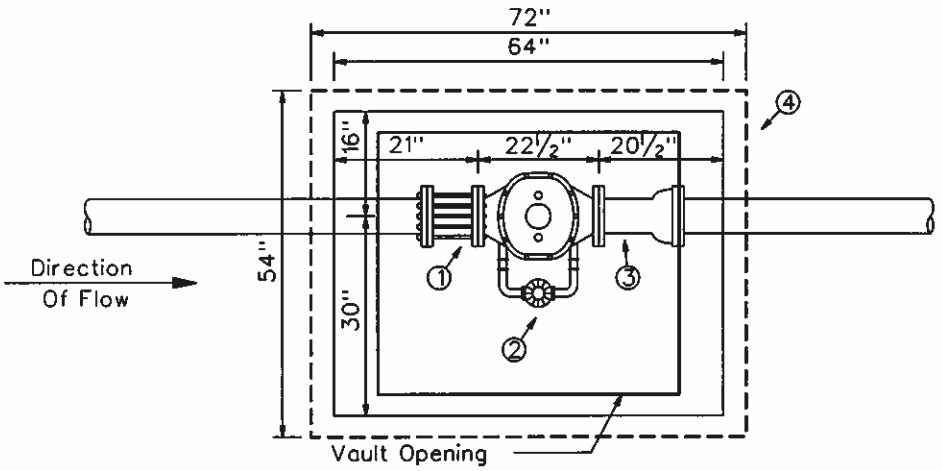
4" CLOSED FIRELINE SERVICE WITH 4" DETECTOR CHECK DEVICE

DWU

(Page No.) 517

DATE JUNE 2002

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



Ref. 501 to 506

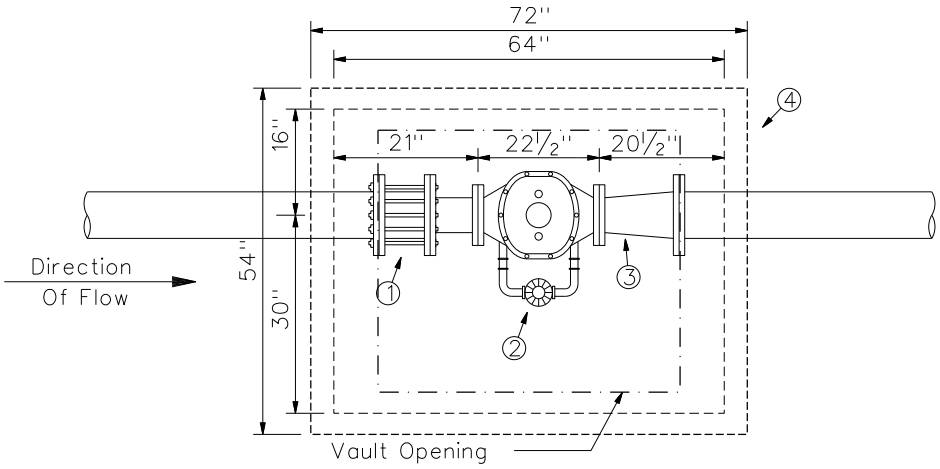
6" CLOSED FIRELINE SERVICE WITH 6" DETECTOR CHECK DEVICE

DWU

DATE
JUNE 2002

(Page No.)
518

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



Ref. 501 to 506

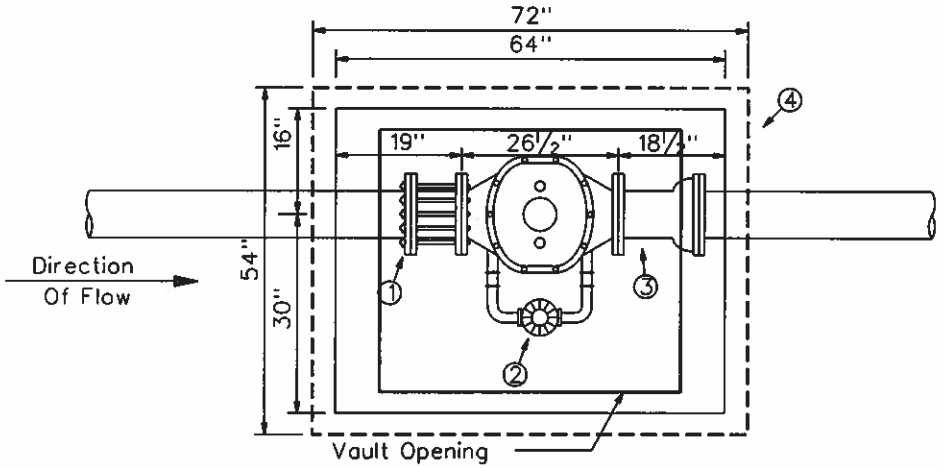
8" CLOSED FIRELINE SERVICE WITH 6" DETECTOR CHECK DEVICE

DWU

(Page No.) 519

DATE JUNE 2002

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



Ref. 501 to 506

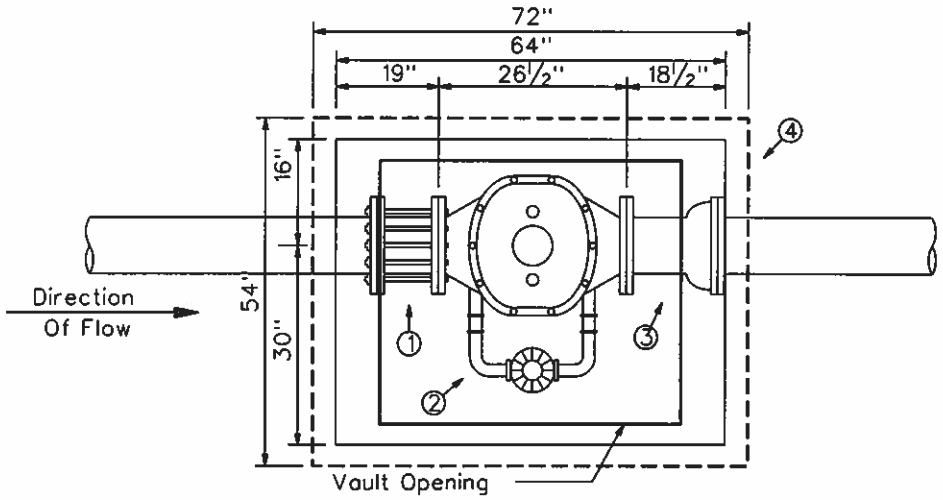
8" CLOSED FIRELINE SERVICE WITH 8" DETECTOR CHECK DEVICE

DWU

(Page No.) 520

DATE JUNE 2002

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



Ref. 501 to 506

10" CLOSED FIRELINE SERVICE WITH 10" DETECTOR CHECK DEVICE

DWU

(Page No.) 521

DATE JUNE 2002

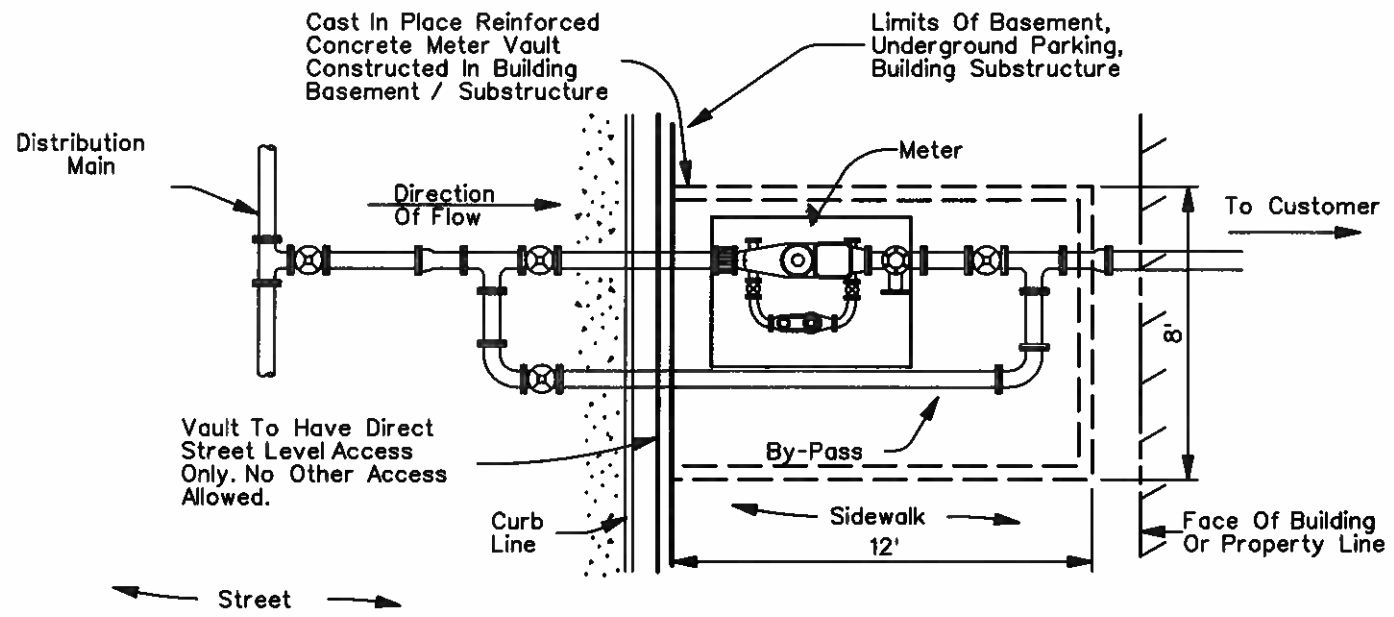
GENERAL DESCRIPTIONS AND NOTES FOR SUSPENDED VAULT INSTALLATION

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.

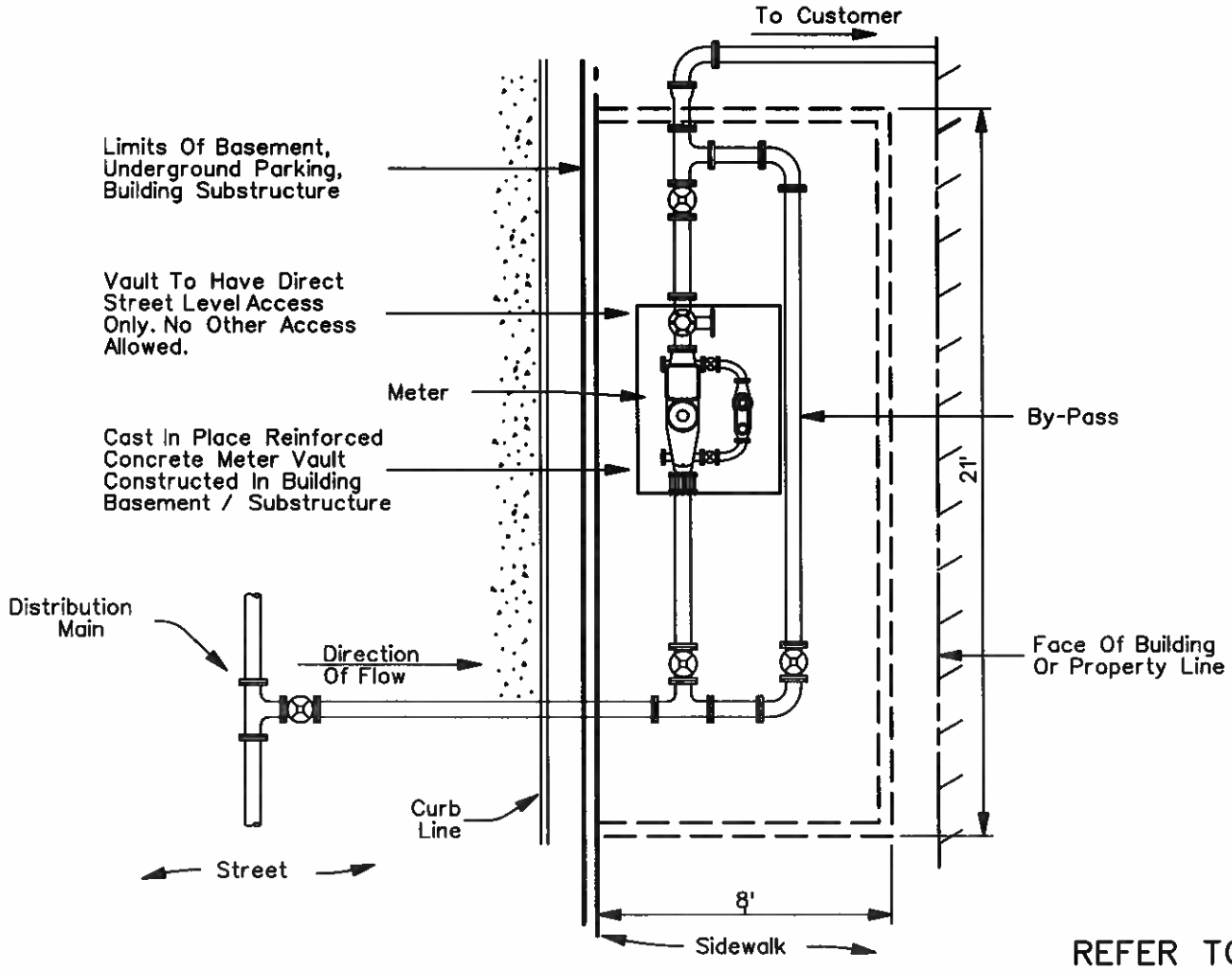
2.) The design of the cast-in-place reinforced concrete vault piping configuration and vault support system for the suspended vault installation is to be performed and sealed by a registered Professional Engineer at the expense of the Contractor or Developer. All plans are to be approved by Dallas Water Utilities.

3.) Refer to "General Notes" Page No. 506 for additional information on large water service installations.

SUSPENDED VAULT INSTALLATION DETAIL DESCRIPTION AND GENERAL NOTES		DWU	(Page No.) 522
		DATE JAN. 2010	



ALIGNED PERPENDICULAR TO DISTRIBUTION MAIN

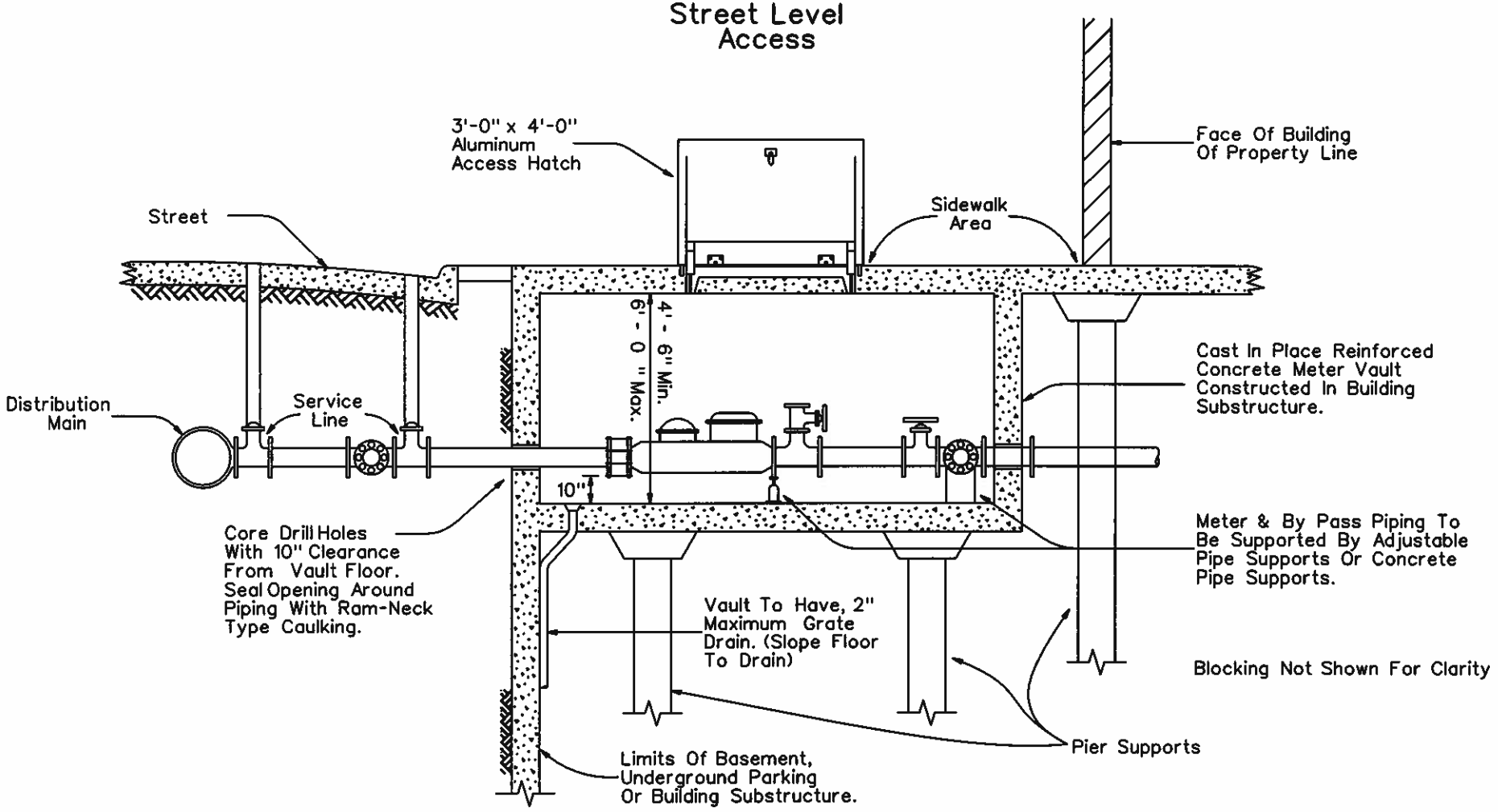


ALIGNED PARALLEL TO DISTRIBUTION MAIN

REFER TO 522 & 524

SUSPENDED VAULT INSTALLATION DETAILS PLAN VIEWS		DWU	(Page No.) 523
		DATE JAN. 2010	

Meter Vault To Have Direct Street Level Access



TYPICAL FOR ALL SUSPENDED VAULTS
(Combined Service, Perpendicular To Distribution Main Shown)

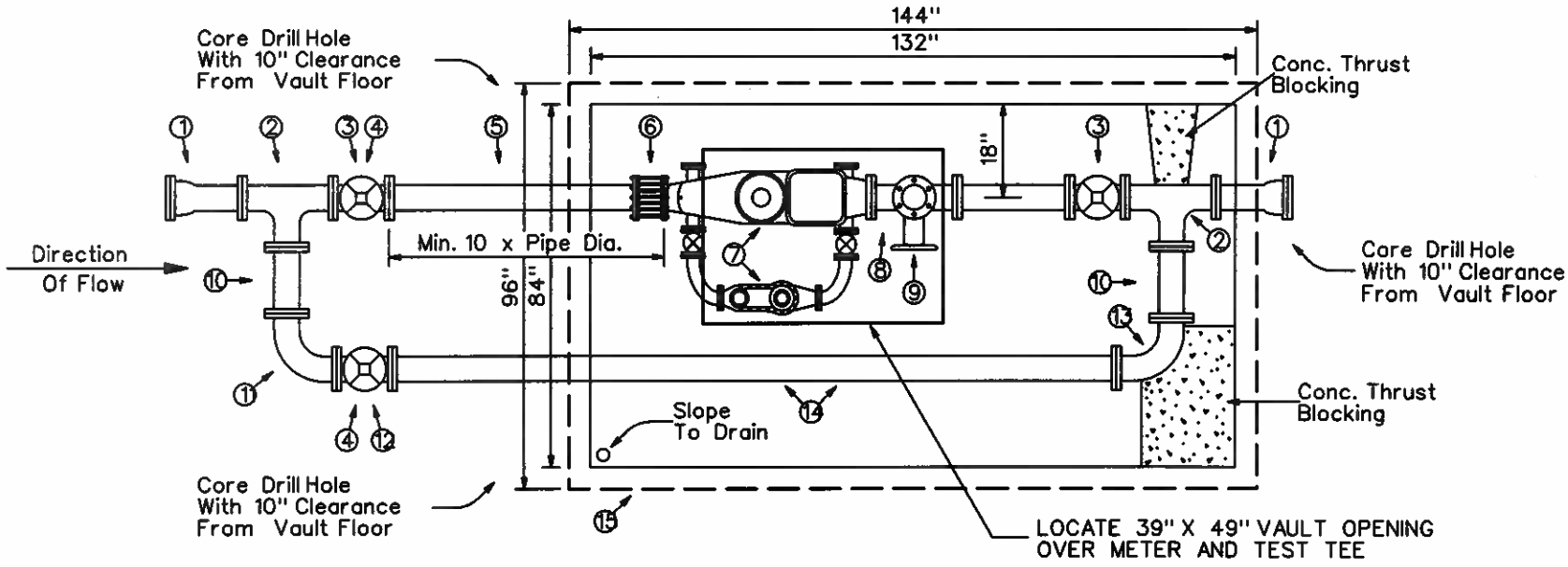
REFER TO 522 & 523

SUSPENDED VAULT INSTALLATION DETAIL ELEVATION VIEW		DWU	(Page No.) 524
		DATE OCT. 2011	

Material List		
Part No.	Quantity	Description
①	2 Ea.	?" x 12" C.I. Nipple M.J. x F.
②	2 Ea.	?" x ?" C.I. Tee F. x F.
③	2 Ea.	?" Gate Valve F. x F.
④	3 Ea.	Valve Stack Riser Cover & Lid
⑤	1 Ea.	?" x ?" C.I. Nipple F. x S.
⑥	1 Ea.	?" Flanged Coupling Adaptor
⑦	1 Ea.	?" Meter As Specified (Type F.M. Shown)
⑧	1 Ea.	?" x 4" C.I. Tee F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑨	1 Ea.	4" Gate Valve F. x F. (Test Point)
⑩	3 Ea.	4" x 24" C.I. Nipple F. x F.
⑪	1 Ea.	?" C.I. 90° Bend F. x F.
⑫	1 Ea.	?" Gate Valve F. x M.J.
⑬	1 Ea.	?" C.I. 90° Bend M.J. x F.
⑭	1 Ea.	?" D.I. Pipe, Class 52, Approx. 10'
⑮	1 Ea.	Cast In Place Concrete Vault
	1 Ea.	Access Hatch (Not Shown)

?" = Size As Specified



Ref. 522

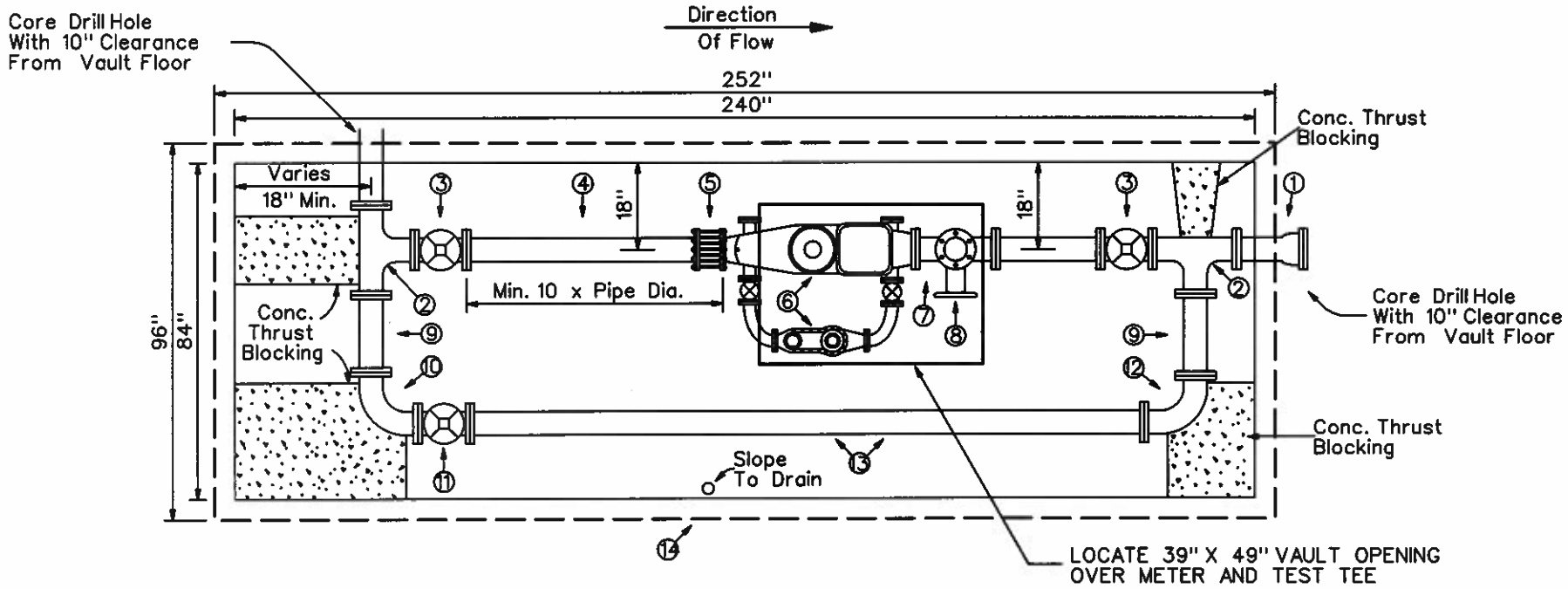
TYPICAL SUSPENDED VAULT DETAIL METER PERPENDICULAR TO MAIN

	DWU	(Page No.) 525
	DATE JAN. 2011	

Material List		
Part No.	Quantity	Description
①	2 Ea.	?" x 12" C.I. Nipple M.J. x F.
②	2 Ea.	?"x 6" C.I. Tee F. x F.
③	2 Ea.	?" Gate Valve F. x F.
④	3 Ea.	?" x ?" C.I. Nipple F. x S.
⑤	1 Ea.	?" Flanged Coupling Adaptor
⑥	1 Ea.	?" Meter As Specified (Type F.M. Shown)
⑦	1 Ea.	?" x 4" C.I. Tee F. x F. (Test Point)
⑧	1 Ea.	4" Gate Valve F. x F. (Test Point)

Material List		
Part No.	Quantity	Description
⑨	1 Ea.	?" x 24" C.I. Nipple F. x F.
⑩	3 Ea.	?" C.I. 90° Bend F. x F.
⑪	1 Ea.	?" Gate Valve F. x M.J.
⑫	1 Ea.	?" C.I. 90° Bend M.J. x F.
⑬	1 Ea.	?" D.I. Pipe, Class 52, Approx. 10'
⑭	1 Ea.	Cast In Place Concrete Vault
	1 Ea.	Access Hatch (Not Shown)

?" = Size As Specified



Ref. 522

TYPICAL SUSPENDED VAULT DETAIL METER PARALLEL TO MAIN

DWU

(Page No.) 526

DATE OCT. 2011