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.


**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.


**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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http://www.dallascityhall.com/dwu/dwu_design_standards.html
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PART 1
(Series 100)

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

NOTE:
On "Bore Pit" Side,
The Minimum Length
Must Be At Least
One Joint.

Limits Of By Other Than Open Cut—See Plans
This Portion To Be Installed By Boring, Jacking, Or Tunneling

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/TunnelLiner (If Used), And The Earthen Bore Are To Be Filled With Grout.
5. Hold-Down Jacks Or Pipe Spacers (If Required By Design) Shall Conform To Page 109. Additionally, Grout Will Be Applied To All Voids Between The Carrier Pipe And Encasement Pipe.
6. When Main Is Installed With An Encasement Pipe Or TunnelLiner 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)

Page No. 1

DWU
101

DATE
OCT. 2011
TYPICAL FOR HIGHWAY CROSSING FOR ALL WASTEWATER MAINS & FOR WATER MAINS 12 in. & UNDER IN DIAMETER

Required Safety Distances
Service Rd. (w/o Curb) 10 ft.
Service Rd. (w/Curb) 5 ft.
Ramp 20 ft.

Existing High Volume Roads
(Interstate Highways)
Pavement Structure
Including Sub-Base

Normal Face Of
Bore Pit

30 ft. Min.
See Note 6 & 7

30 ft. min.
See Note 6 & 7

Existing High
Volume Or
Secondary Roads
Pavement Structure
Including Sub-Base

Tunnel Approach
(See 108)

PLACE BY OTHER THAN OPEN CUT
ENCASMENT PIPE SPECIFICATIONS (See 104 & 105)

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.


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 Restored 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: 103 104
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HIGHWAY CROSSING
FOR ALL WASTEWATER MAINS & FOR
WATER MAINS 12" & UNDER IN DIAMETER.

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

DWU

DATE
OCT. 2011
TYPICAL FOR HIGHWAY CROSSING FOR WATER MAINS OVER 12in. (30.5cm.) DIAMETER

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.


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.

REFERENCES:
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

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OCT. 2011
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**NOTE:** ∞ = infinity

HIGHWAY CROSSING
ENCASEMENT PIPE,
GAUGE, CLASS, COVER

DWU
DATE
OCT. 2009

105
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 sодding. 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.
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".
**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.

**WOODEN SKIDS**

**HOLD-DOWN-JACK**

- Hold-Down-Jacks Minimum 2 Per Pipe Joint (See Fabrication Detail Pg.109A)
- Carrier Pipe Is to Rest On Bottom Of Encasement Pipe
- Carrier Pipe Is To Rest On A 6" Thick Concrete Pad.

**Concrete Cradle**

- 1/4 O.D. Of Carrier Pipe

**FOR STEEL ENCASEMENT PIPE**

**FOR FLANGED LINER PLATE**

**CARRIER PIPE SUPPORT (TUNNEL)**

**DWU**

**DATE**

**OCT. 2011**

**PAGE No.**

109
$\frac{1}{4}''$ Steel Plate
(Fabricate To Match I.D. Radius Of Encasement Pipe)

$1\frac{1}{4}''$ X 8'' Std. Machine Bolt

$1\frac{1}{4}''$ Std. Nut
(Adjusting Point For Hold-Down-Jack)

$1\frac{1}{4}''$ Heavy Steel Washer

2'' Galv. Iron Pipe
(Hold-Down-Jack Spacer, Length As Required For Installation Of Carrier Pipe In Encasement Pipe)

$1\frac{1}{2}''$ X 1'' Galv. Iron Pipe
(Centering Plug Welded To Base Plate To Secure Hold-Down-Jack Spacer)

$\frac{1}{4}''$ Steel Plate
(Fabricate To Match O.D. Radius Of Carrier Pipe)

ALL MATERIALS TO BE HOT DIPPED GALVANIZED AFTER FABRICATION

HOLD-DOWN-JACK
FABRICATION DETAIL

DWU 109A

DATE DEC. 2001
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
SEAL THE SPACE BETWEEN THE ENCASEMENT PIPE AND THE CARRIER PIPE AT EACH END WITH NON-SHRINK CEMENT GROUT OR WITH A MANUFACTURED SEAL TO PREVENT SOIL MIGRATION INTO THE ENCASEMENT PIPE OR FULLY GROUT THE SPACE BETWEEN THE ENCASEMENT PIPE AND THE CARRIER PIPE PER THE DISCRETION OF THE PROJECT ENGINEER.

CARRIER PIPE TO BE SUPPORTED WITHIN ENCASEMENT PIPE AT FIVE FEET INTERVALS WITH CASING SPACERS

ENCASEMENT PIPE TO BE MIN. 150 P.S.I. PRESSURE RATED AND TWO (2) NOMINAL SIZES LARGER THAN CARRIER PIPE

EMBEDMENT AND BACKFILL AS SPECIFIED ON PLANS

ENCASEMENT PIPE TO BE MIN. 150 P.S.I. PRESSURE RATED AND TWO (2) NOMINAL SIZES LARGER THAN CARRIER PIPE

CARRIER PIPE TO BE SUPPORTED WITHIN ENCASEMENT PIPE AT FIVE FEET INTERVALS WITH CASING SPACERS

SECTION A-A

ENCASEMENT DETAIL FOR NON-PRESSURE RATED WASTEWATER MAINS ABOVE WATER MAINS
SEAL THE SPACE BETWEEN THE ENCASEMENT PIPE AND THE CARRIER PIPE AT EACH END WITH NON-SHRINK CEMENT GROUT OR WITH A MANUFACTURED SEAL TO PREVENT SOIL MIGRATION INTO THE ENCASEMENT PIPE OR FULLY GROUT THE SPACE BETWEEN THE ENCASEMENT PIPE AND THE CARRIER PIPE PER THE DISCRETION OF THE PROJECT ENGINEER.

CARRIER PIPE TO BE SUPPORTED WITHIN ENCASEMENT PIPE AT FIVE FEET INTERVALS WITH CASING SPACERS

ENCASMENT PIPE TO BE MIN. 150 P.S.I. PRESSURE RATED AND TWO (2) NOMINAL SIZES LARGER THAN CARRIER PIPE

EMBEDMENT AND BACKFILL AS SPECIFIED ON PLANS

CARRIER PIPE TO BE SUPPORTED WITHIN ENCASEMENT PIPE AT FIVE FEET INTERVALS WITH CASING SPACERS

SECTION A-A

ENCASEMENT DETAIL FOR PROPOSED WATER MAINS BELOW WASTEWATER MAINS

DWU

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")
SELECT OR GRANULAR MATERIAL COMPACTED TO 90% OF STD. PROCTOR DENSITY.

CONCRETE CRADLE (CLASS "B" CONC.)

12" MIN. ABOVE PIPE BELL

6" MIN. BELOW PIPE BELL

CLASS "A"

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

CLASS "A-1"

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

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")
SELECT OR GRANULAR MATERIAL COMPACTED TO 90% OF STD. PROCTOR DENSITY

GRANULAR MATERIAL COMPACTED TO 90% OF STD. PROCTOR DENSITY

COMPACTED CRUSHED STONE, STD. GRADATION

V ARIES

6" MIN. BELOW PIPE BELL

12" MIN. ABOVE PIPE BELL

CLASS "B"

N.T.S.

L.F. = 1.9

E' = 700

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. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

CLASS "B+"

N.T.S.

BEDDING ANGLE 150°

L.F. = 1.9

E' = 700

CLASS "B-1"

N.T.S.

12" MIN. ABOVE PIPE BELL

V ARIES

6" MIN. BELOW PIPE BELL

COMPACTED CRUSHED STONE, FINE GRADATION

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

EMBEDMENT

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

DWU (PAGE NO. 114)

DATE

OCT. 2011
COMPACTED SELECT OR GRANULAR MATERIAL COMPACTED TO 90% OF STD. PROCTOR DENSITY

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

[SAND COMPACTED TO 90% OF STD. PROCTOR DENSITY]

12" MIN. ABOVE PIPE BELL

6" MIN. BELOW PIPE BELL

VARES

COMPACTED CRUSHED STONE FINE GRADATION

Bc

6" MIN. BELOW PIPE BELL

SAND, FINE GRADATION

Bd

SAND, STD. GRADATION

Bd

12" MIN. ABOVE PIPE BELL

Bc

6" MIN. BELOW PIPE BELL

VARES

REFER TO PAGE 112 FOR CALCULATION OF "Bd"

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

*SAND, FINE GRADATION*

---

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. 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"
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. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL

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

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

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. FREE-FALL OF CONCRETE NOT TO EXCEED 5 FT. MAXIMUM.
5. MIN. EMBEDMENT PLACEMENT TO BE MEASURED FROM EDGE OF PIPE BELL
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

CLAY DAM (MIN. IMPERVIOUSNESS $10^{-6}$ CM/S)
BENTONITE OR OTHER TYPES OF MONTMORILLONITE ARE ACCEPTABLE CLAYS. OTHER TYPES OF CLAY MUST BE APPROVED BY OWNER.

CLAY TO EXTEND TO TOP OF TRENCH

EMBEDMENT

COMPACTED CRUSHED STONE PER EMBEDMENT SPECIFICATIONS

1' (UNLESS IMPERVIOUS ROCK IS ENCOUNTERED)

BOTTOM OF TRENCH

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

CLEAN COMPACTED BACKFILL (95% OF STANDARD PROCTOR DENSITY MINIMUM)

CEMENT STABILIZED SAND EMBEDMENT PER NOTE 1

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

CLEAN COMPACTED BACKFILL (95% OF STANDARD PROCTOR DENSITY MINIMUM)

CEMENT STABILIZED SAND EMBEDMENT PER NOTE 1

DIMENSIONS NOTES:
1. D = Inside Diameter Of 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).
NON-AQUEOUS PHASE LIQUID (NAPL) CONTAMINATED MATERIAL MUST BE HAULED TO A LICENSED LANDFILL. NON-NAPL MATERIAL SHALL BE PLACED BACK INTO THE TRENCH. (95% OF STD. PROCTOR DENSITY MIN.)

DUCTILE IRON PIPE WITH NITRILE (NBR) GASKETS

DUAL "VIRGIN" POLYWRAP LINERS 8 MIL INSIDE & 4 MIL OUTSIDE

CEMENT STABILIZED SAND EMBEDMENT PER NOTE 1

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

Limits as Indicated on Design Plans

Contour To Match Creek Channel
(Or Slope of Embankment)

* Dry Rip-Rap, Type "A"
NCTCOG Spec: 803.3

STABILIZED BACKFILL & RIP-RAP DETAIL
FOR EMBANKMENT SLOPE PROTECTION
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

DWU 121
DATE OCT. 2009
PART 2
(Series 200)

WATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department
## PART 2
### WATER MAIN CONSTRUCTION

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METER ALIGNMENT CRITERIA

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

NOTE:

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

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.

Taps On Mains As Per NCTCOG Spec: 502.10.3.1
Location Of Tap To Be At 45°. All Taps To Be Made With A.W.W.A Tapered Threads.

1” Compression Corp. Cock

WATER MAIN IN STREET

METER ALIGNMENT CRITERIA

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

NOTE:

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

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.

Taps On Mains As Per NCTCOG Spec: 502.10.3.1
Location Of Tap To Be At 45°. All Taps To Be Made With A.W.W.A Tapered Threads.

1” Compression Corp. Cock

WATER MAIN IN PARKWAY

1” WATER SERVICE INSTALLATIONS
(SIDEWALK 5’ FROM CURB)
WATER MAIN IN STREET

WATER MAIN IN PARKWAY

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

NOTE:
1 1/2" & 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 - Procedures For
Transferring 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.

1) 3/4" & 1" Service Lines To Have A Minimum Of 3' Separation.
2) 1 1/2" & 2" Service Lines To Have A Minimum Of 4' Separation.
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
AMI Meter Installation Details
For 2" Or Smaller Meters

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

100W Endpoint

12" Or 20" AMI Lid

Spring & Plunger Keyhole

Plan View

Fixed Network
(200W Endpoint Or Approved Equal)

200W Endpoint With External Mounting Cradle

Spring & Plunger Keyhole

12" Or 20" AMI Lid

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

Finished Installation With 100W Endpoint Configuration

Finished Installation With 200W Endpoint Configuration

Refer To Pages 206B & 206D

AMI Meter Installation Details
For 2" Or Smaller Meters
AMI Meter Installation Details
For 3" And Larger Meters

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

Hinge (Typ.)

Optional
(Multiple Registers)

2 1/2" Diameter
Mounting Bracket
(Plastic)

12" Max

8" Min

4'x3' Access Hatch
Per DWU Spec.

Mounting Bracket (Plastic)

2" Dia. Hole

12" Max

25' Inline Connector Cable

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

Bolted Or
Mounted On
The Side Wall

100W Endpoint

Plan View

Fixed Network
(200W Endpoint Or Approved Equal)

Hinge (Typ.)

Optional
(Multiple Registers)

4 1/4" Diameter
Antenna (Rubber)

12" Max

8" Min

Antenna

12" Max

5/8" Dia. Hole

2 Types Of
200W Endpoint

200W With
Single Endpoint

200W With
Dual Endpoint

5' Inline Connector

25' Inline Connector Cable

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

PROFILE VIEW

Refer to Pages 206B & 206C

DWU

PAGE NO.

DATE

MAY 2012
MANUAL FLUSH POINT

2" COPPER SERVICE PIPE
SOFT COPPER (TYPE-K)

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

MIN. 12"

SMALL PLASTIC METER BOX WITH LID

* 3 Bars @ 24" O.C. (E.W.)
& 4-*3 Bars Diagonal @ Meter Box

CONCRETE SIDEWALK

PAVEMENT

2" BALL VALVE CURB STOP

2" CORPORATION COCK (COMPRESSION)

RISING GRADE

WATER MAIN
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 IMMERSIBLE 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 BELLOWS 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
DATE
OCT 2012
AUTOMATIC FLUSHING DEVICE DIMENSION

UV RESISTANT LOW LINEAR POLYTHENE HARD PLASTIC LOCKING LID (GREEN)
LID WIDTH 16.0"

33.0"

5.5"

UV RESISTANT LOW LINEAR POLYTHENE HARD PLASTIC BASE (BLACK)
BASE WIDTH 22.0"

9.7"

40.0"

AUTO FLUSH POINT STREET LOCATION

2' TYPICAL

1' TYPICAL

4' MIN.

2' MIN:

40.0"

22.0"

STEEL GUARD POST

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
**NOTES:**

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

**TEMPORARY FLUSH POINT WITH SAMPLE POINT**

**N.T.S.**

**FLUSH POINT WITH SAMPLE POINT**

**INSTALLATION**
This riser shall be as near as practical to R.O.W. lines, at least 6' beyond shoulder of road.

Warning sign with telephone number attached by straps. Warning sign will be purple for non-potable water.

1/4" x 3/4" galvanized straps drilled to D.I. pipe.

3'-6" large plastic meter box.

Ground line.

Threaded galvanized ell.

Brass wheel valve.

Brass - Osip brass ell.

Combined air and vacuum release valve.

Copper pipe hard copper (type K).

Solder - Osip brass ell.

Brick & mortar coarse as required to enclose combination air valve.

Insulated flanged connection assembly.

Water main.

8" blind flange-drilled and tapped for 2" I.P. threads.

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.

N.T.S.

Refer to pages 210 & 211.

AIR RELEASE VALVE
TYPE "1"

DWU 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.

WARNING SIGN WITH TELEPHONE NUMBER ATTACHED BY STRAPS WARNING SIGN WILL BE PURPLE FOR NON-POTABLE WATER

1/4" x 3/8" GALVANIZED STRAPS DRILLED TO D.I. PIPE

THIS RISER SHALL BE AS NEAR AS PRACTICAL TO R.O.W.LINES, AT LEAST 6" BEYOND SHOULDER OF ROAD

PRECAST GRADE RINGS
PRECAST TOP

STD. 40" C.I. FRAME AND COVER

FINISHED GRADE WHEN NOT IN EX. OR PROP. STREET

2-PIECE VALVES MAY BE USED ON 4" AND LARGER COMBINATION AIR VALVE

BLIND FLANGE, BORED-DRILLED AND TAPPED FOR VALVE ABOVE

UNION

SUMP

GALVANIZED IRON AIR VENT PIPE

6" D.I. PIPE FILLED WITH CONCRETE, 5' MIN. BURY DEPTH

BOLTED CAST COUPLING ROCKWELL 4410 OR EqUAl

COMBINED AIR AND VACUUM AIR RELEASE VALVE FLANGE MOUNTING ON INLET SIDE

GATE VALVE WITH HAND WHEEL, FLG.x FLG.

INSULATED FLANGE CONN. ASSEMBLY.

FLANGED OUTLET, STEEL BOLTS

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

DATE
OCT. 2011
## Air Vent

**N.T.S.**

<table>
<thead>
<tr>
<th>Air Valve</th>
<th>Gate Valve</th>
<th>Flange Outlet</th>
<th>Minimum Fitting Height</th>
<th>Vent Pipe Diameter</th>
<th>Manhole Diameter</th>
<th>Vent Pipe Material</th>
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### Plan View

**N.T.S.**

Refer to Pages 208, 209, & 211

## Air Release Valve

**Type "2"**

**DWU**

**Date**

Oct. 2009
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 manufacturer'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>
<thead>
<tr>
<th>AIR VALVE SIZE</th>
<th>VALVE FITTING ASSEMBLY MIN. HEIGHT</th>
<th>MINIMUM REQUIRED DEPTH OF COVER</th>
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<td>11.7'</td>
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Refer to pages 209 & 210
ECCENTRIC REDUCERS, IF REQUIRED, ARE TO BE INSTALLED W/ STRAIGHT SIDE UP

CLASS "F" REINFORCED CONCRETE BASE

1" FLARED CURB STOPS (TEST POINTS)

VALVE BONNET & BOLTS SHALL BE INSIDE MANHOLE

CLASS "F" CONCRETE SUPPORT BLOCK

1" I.P. THD. OUTLET
1" CORP. COCK
1" COPPER PIPE (TEST POINTS EACH SIDE)

PAD EXTENSION FOR BLOCKING UNDER BY-PASS VALVE

INSTALL VALVES W/ INSULATION FLANGE KITS SEE PG.223

CLASS "F" CONCRETE SUPPORT BLOCK

SEAL BROKEN OUT PORTION OF MANHOLE W/ BRICK AND MORTAR, COAT INSIDE & OUTSIDE W/ NON-SHRINK GROUT

PLAN

HORIZONTAL GATE VALVE
WITH MANHOLE INSTALLATION

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

DWU

212

DATE

OCT.2009
HORIZONTAL GATE VALVE WITH MANHOLE INSTALLATION

ELEVATION

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

DATE
OCT. 2010

DWU
213
OPTIONAL BLOWOFF WITH MANHOLE (AS SPECIFIED ON DESIGN PLANS)

REVIEW DOCUMENT FOR SPECIFIC REQUIREMENTS.
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)
Remove Valve Cover Lid

Remove Valve Cover

Remove Valve Stack

BackFill Valve Stack
With Min. 2 Sack Conc. Mix Or Sand

Existing Wood Block Spacers

Top Of Existing Pavement, Soil, Or Prop. Pavement

12" Min.

Remove Valve Stem Extension If Equipped

Valve Stack

Existing Valve (To Remain)

NOT IN PAVEMENT
Match Existing Soil & Compact As Needed Or As Required By Construction Inspector.

IN PAVEMENT

4" to 16" GATE VALVE ABANDONMENT
Install Valve Cover Assembly Centered Over Valve Stack And Flush With Grade Surface.

Valve Stack To Be Set 3" Below Grade Surface

Existing Ground Surface

Existing Pavement

Extension Stem to Be Fabricated So That It's Operating Nut is Set 12" Below Finished Surface Grade.


6" Valve Stack To Be One Continuous Pipe Joint

Valve Extension Stem To Be Centered in Valve Stack.

If Valve Operating Nut Is More Than 7' Below Surface Level, Then Extension Stem Must Be Installed.

Install 2" Thick Wooden Blocks Or Neoprene Bonnet To Valve Stack Spacers (VALVE STACK IS NOT TO REST DIRECTLY ON VALVE BODY OR VALVE BONNET)

Gate Valve
40" Std. C.I.M.H. Frame & Cover
See Page 221

Precast Grade Rings
* 7 @ 12" O.C.
  - E.W. Top
* 6 @ 12" O.C.
  - E.W. Bottom

5' Dia. M.H.
(See Note*2)

2" Corp. - I.P. Thread
To Mueller Thread
No.H9995 - 1" Pitot
Outlet-Straight Up

END VIEW
Undisturbed Earth Or Rock
As Directed By Construction
Inspector.

SECTION A-A

PIPE C

12" Min.

CLASS F
CONC.

A

8'-0" Min.
8"

30"

8'-0" Min.

Sump

30"

4.4 Min.

30"

1'

Max.

Max. Joint Length 10'-0"

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.

TOP VIEW

5'-0" Dia.
Manhole

Pitot
Outlet

4- 7 Diagonals
(Top)

* 7 @ 12" O.C.
  - E.W. Top
* 6 @ 12" O.C.
  - E.W. Bottom

4- 6 Diagonals
(Bottom)

Class F
Conc. Base

PITOT OUTLET

DWU
(220)

DATE
OCT. 2011
SECTION THRU COVER

1\(\frac{1}{2}\)" Letters \(\frac{3}{4}\)" Raised

PLAN

SECTION THRU FRAME

Galvanized Lock-Nuts

\(\frac{5}{8}\)" Galvanized U-Bolt

Machined Bearing Surfaces

Ring & Cover Material per ASTM A48 Class 358 Min.
Gray Iron Castings.
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

R.C.C.P., FLANGED PIPE JOINT

FLANGED VALVE OR OTHER FLANGED FITTING

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)

REINFORCED CONCRETE CYLINDER PIPE

SEE DETAIL "A"

BY-PASS ASSEMBLY

TYPICAL INSTALLATION POINTS OF INSULATION KITS FOR CATHODIC ISOLATION ON LARGE WATER MAINS

BUTTERFLY VALVE ASSEMBLY W./M.H.

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

REINFORCED CONCRETE CYLINDER PIPE

EXTERIOR CEMENT MORTAR APPLIED WITHIN STEEL BANDED AND FABRIC WRAPPER (DIAPER). THE WET MORTAR MIX IS TO BE POURED INTO TOP SIDE OF WRAPPER OPENING UNTIL MORTAR HAS ADVANCED COMPLETELY AROUND PIPE JOINT.

PIPE BONDING STRAP TO BE TUCKED INTO JOINT AND COMPLETELY COVERED WITH MIN. 1" THICK MORTAR COAT

SEE DETAIL "B"

FABRIC STEEL BANDS

MORTAR MIX
1 Part Portland Cement
3 Parts Sharp Sand

INTERIOR MORTAR TO BE HAND APPLIED AND SMOOTHED TO FLUSH WITH INTERIOR PIPE WALL.

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.
ELEVATION VIEW OF FIRE HYDRANT

GENERAL NOTES
1. C of F.H. Barrel Shall Not Be Less Than 7.5 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.
45° Bend With Retainer Glands And Class "B" Concrete Thrust Blocking As Required.

Embedment As Specified In Plans

Ex. Water

Abandon In Place

Prop. Main

I.D.

2

Min.

I.D. + 10 ft.

Min.

Solid Sleeve

Nipple

45° Bend With Retainer Glands And Class "B" Concrete Thrust Blocking As Required.

Ex. Water

Abandon In Place

Pipe Material As Specified On Plans

STANDARD WATER MAIN LOWERING

DWU 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.
TEST STATION INSIDE MANHOLE TYPE I

Leave Slack 2ft. Of Conductor Coiled
In Enclosure. (8"x8"x4" N.E.M.A. TwncY3R
Enclosure) With Screw Fasting Cover.
Mount To Post.

No. 10 Conn. Wire
1-1/2" PVC.
Conduit

No. 10 A.W.G. Single Strand
Conductor Type R.H.W. Insulation
With Neoprene Jacket. Connect
To Nearest Spigot. See Page 228
For Connection Detail.

No. 10 A.W.G. Single Strand
Conductor Type R.H.W. Insulation
With Neoprene Jacket. Connect
To Nearest Spigot. See Page 228
For Connection Detail.

RCCP. Water Pipe
Conc. Cradle

NOTE: Contract To Provide
Drainage At Manhole
3/8" 10 Chat Pocket On corner
4" PVC. Drain Pipe At
Construction Engineer Option

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

Leave Slack 2ft. Of Conductor Coiled
In Enclosure. (8"x8"x4" N.E.M.A. TwncY3R
Enclosure) With Screw Fasting Cover.
Mount To Post.

Receptacle W/W.P. Cover
Bolt To Pull Box

Ex. Ground

Pavement

Small Plastic Meter
Box & D/Lid

1-1/2" PVC.
Conduit

Crushed Rock
3 cu. ft.

2"x6" Treated
Wood Post

No. 10 Conn. Wire

RCCP.
Water Main

PIEPipe-TO-SoIL POTENTIAL
TEST STATION (BURIED CONFIGURATION)

DWU
(Page No.1)

DATE
DEC.2001

227
Applying 2 Layers of 600V Electrical Heat Shrink Tape from the Base of the Weld of Spigot to a 6"
Overlap of Conductor Insulation and Jacket.

**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**
# Tables of Dimensions and Quantities

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<th>I.D. (IN.)</th>
<th>C (\Delta = 11.25^\circ) (FT.)</th>
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**Horizontal Thrust Block**

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Note: Refer to general notes for thrust blocking - Page 234

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**Date:** Dec. 2001
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<td>96</td>
<td>106.0</td>
<td>53.0</td>
<td>208.0</td>
<td>104.0</td>
<td>272.0</td>
<td>136.0</td>
<td>384.0</td>
</tr>
</tbody>
</table>

Refer to General Notes for Thrust Blocking - Page 234
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

THRU BOARD
GENERAL NOTES

DWU 234

DATE OCT. 2012
<table>
<thead>
<tr>
<th>Size and Material Type of Water Mains</th>
<th>Embedment Type Per Depth in Earth</th>
<th>Embedment Type Per Depth in Rock</th>
</tr>
</thead>
<tbody>
<tr>
<td>16&quot; and Smaller Ductile Iron</td>
<td>D+</td>
<td>C</td>
</tr>
<tr>
<td>18&quot; and Larger Ductile Iron</td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>16&quot; and Smaller Pretensioned</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>18&quot; and Larger Pretensioned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All Prestressed</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>All Steel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All P.V.C. Water Pipe</td>
<td>C+</td>
<td></td>
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</table>

Embedment Types-Specified for Water Mains

<table>
<thead>
<tr>
<th>Date</th>
<th>DWU</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN 2010</td>
<td>235</td>
</tr>
</tbody>
</table>
STEEL GUARD POST

Slope To Drain

Ex. Grade

3'-0"

2"

12" Dia. Class "B" Concrete Base

Install Expansion Joint Sealing Compound At Concrete Penetrations

Fill With Class "B" Concrete W/ Domed Top

6" D.I. Pipe
Clean Metal And Apply
1 Coat Of Rustoleum
7582 Gray Primer
And Two Coats Of
DevGuard 4308 Silver
Point To Visible Surfaces

4" To 6" As Directed By The Construction Inspector

SIZE DESIGNATED ON PLANS
N.T.S.

STEEL GUARD POST DETAIL

DWU 236
DATE OCT. 2010
Install 4 - 6" Dia. Steel Guard Posts Spaced 4'-6" Apart (Equal Distance From F.H.) See Page No. 236

Fire Hydrant

Conc. Curb

Water Main
DETAIL FOR METER VAULTS

Install: 4-6" Diameter D.I. Guard Posts. See Page 236

DETAIL FOR METERS 2" AND SMALLER

Install: 2-6" Diameter D.I. Guard Posts. See Page 236

GUARD POST PROTECTION FOR WATER METERS
NOTE: Single PRV Assemblies Require Special Approval by DWU.

Refer To Pages 242, 243, 244, 245 & 504
<table>
<thead>
<tr>
<th>Tag No.</th>
<th>Description</th>
<th>Fitting/Pipe Type</th>
<th>MAIN SIZE</th>
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<tbody>
<tr>
<td>1</td>
<td>Reducing Tee</td>
<td>Flange x Flange</td>
<td>8&quot; x 8&quot; x 6&quot; (Max) 12&quot; x 12&quot; x 8&quot; (Max) 16&quot; x 16&quot; x 12&quot; (Max)</td>
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<tr>
<td>2</td>
<td>1&quot; Flush Point</td>
<td>Copper</td>
<td>1&quot;</td>
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<tr>
<td>3</td>
<td>Hi/Low Valve</td>
<td>Flange x Flange</td>
<td>8&quot;</td>
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<tr>
<td>4</td>
<td>Pipe</td>
<td>Ductile Iron</td>
<td>8&quot;</td>
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<tr>
<td>5</td>
<td>Tee</td>
<td>Flange x Flange</td>
<td>6&quot; x 6&quot; x 6&quot; 8&quot; x 8&quot; x 8&quot; 12&quot; x 12&quot; x 12&quot;</td>
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<tr>
<td>6</td>
<td>Gate Valve</td>
<td>Flange x Flange</td>
<td>6&quot;</td>
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<tr>
<td>7</td>
<td>Precast Vault</td>
<td>Precast</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>90° Bend</td>
<td>Flange x Flange</td>
<td>6&quot;</td>
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<tr>
<td>9</td>
<td>Pressure Reducing Valve</td>
<td>Flange x Flange</td>
<td>4&quot; - 8&quot; 6&quot; - 10&quot; 10&quot; - 16&quot;</td>
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<tr>
<td>10</td>
<td>45° Bend</td>
<td>Flange x Flange</td>
<td>6&quot;</td>
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<tr>
<td>11</td>
<td>45° Wye</td>
<td>Flange x Flange</td>
<td>6&quot;</td>
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<tr>
<td>12</td>
<td>Flange Coupling Adaptor</td>
<td>Flange x Flange</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>

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

PRV PARTS LIST

DWU
DATE
OCT. 2011
When Outside Of Pavement, A Concrete Pad Shall Be Constructed Extending A Minimum Of 2 ft Beyond The Perimeter Of The Hatch And Be A Minimum of 6 in Thick.

Vault Lid:
BILCO Hatch or Approved Equal with Hasp & Pad Lock
Single-Leaf Hatch - 3ft. x 4ft.
Double-Leaf Hatch - 6ft. x 4ft.

1" Flush Point with Stand Meter Box

1.5" P.V.C. Drain From Access Hatch Along Wall To Rock Embedment (Off The Front Right Or Left).

1" Pressure Gauge

Cast In Place Floor Slab Or Precast Floor Slab (See DWU Std. Dwg. 504)

Sump (1' x 1' x 6'"

Crushed Rock, Std. Gradation

4" Min. Thick in Rock

6" Min. Thick in Earth

NCTCOS Spec. 504.2.2

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

Flanged Coupling Adaptor
Smith Blair Model 912 Or Approved Equal

AMS Pressure Reducing Valve Flange x Flange or Approved Equal

Refer To Page 504

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

PRV VAULT
ELEVATION & SECTIONAL PLAN

DWU
PAGE NO. 243
DATE OCT. 2011
Vault Size
(NTS)

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

Bollard Location Plan
(NTS)
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 Token". 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 NCTCOC 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.
PART 3
(Series 300)

WASTEWATER MAIN CONSTRUCTION

City of Dallas
Water Utilities Department
# PART 3
### WASTEWATER MAIN CONSTRUCTION

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<th>Pg.</th>
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<td>302</td>
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<td>309</td>
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<td>309A</td>
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<td>Wastewater Manhole--False Bottom</td>
<td>311</td>
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<td>32&quot; Standard Cast Iron Manhole Frame and Cover</td>
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<td>24&quot; Standard Cast Iron Manhole Frame and Cover (Not For New Construction)</td>
<td>312A</td>
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<td>32&quot; Pressure Type Cast Iron Manhole Frame and Cover</td>
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<td>40&quot; Standard Cast Iron Manhole Frame and Cover</td>
<td>315</td>
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<tr>
<td>Abandonment of Manhole In or Out of Pavement</td>
<td>316</td>
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<tr>
<td>Wastewater Main Cleanout</td>
<td>317</td>
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<tr>
<td>Cast-Iron Clean Out Casting For Wastewater Mainline</td>
<td>318</td>
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<tr>
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<td>319</td>
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<td>Wastewater Lateral Wye Connection to the Existing Mainline</td>
<td>320</td>
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<td>Wastewater Lateral Cleanout Frame and Cover</td>
<td>321</td>
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<tr>
<td>Wastewater Lateral Connections in Earth and in Rock</td>
<td>322</td>
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<tr>
<td>Laterals Types</td>
<td>323</td>
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<td>324</td>
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<td>326</td>
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<td>Wastewater Manhole with Internal Chimney Seal</td>
<td>327</td>
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<td>328</td>
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<tr>
<td>Wastewater Sample Site – Concrete Platform Detail</td>
<td>329</td>
</tr>
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</table>
MANHOLE UNDER PROPOSED PAVING WITHIN STREET R.O.W.
(IN ADVANCE OF PROPOSED PAVING IMPROVEMENT PROJECTS)

* SET IN ADVANCE OF PROPOSED PAVING
*.Prop. Top of curb
*.Prop. P.V.M.T.
* M.H. NECK IS NOT TO EXCEED 30" WHEN RAISING TO FINISHED GRADE

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)

MANNHOLE DETAIL

CAST-IN-PLACE
OPTIONAL BASE DETAIL

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE PRECAST

DWU
301

DATE
OCT. 2011
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 constructed 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
FOR CONSTRUCTION OF MANHOLES IN ADVANCE OF PROPOSED PAVING PROJECTS, See Detail On Pg. 301 & General Note *4 On Pg. 302.

STD. M.H. FRAME & COVER AS SPECIFIED

FINISHED GRADE

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

PRESSURE-TYPE-MANHOLE TO HAVE M.H. FRAME CAST IN ROOF

FRAME & COVER AS SPECIFIED ON PLANS

"3"S AT 6" O.C.E.W.

CONSTRUCTION JOINT WITH KEY WAY WATERSTOP, AND "3"S AT 12" O.C. EXTENDING 9" INTO WALL (NOT REQ'D FOR CONTINUOUS POUR)

1/2" NON SHRINK GROUT COATING

INTERNAL CHIMNEY SEAL

CLASS "F" CONCRETE MONOLITHIC POUR

MANHOLE FRAME TO BE CENTERED

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

GEOTEXTILE LINER MATERIAL

12" ROCK FOUNDATION ROCK FOUNDATION

MANHOLE DETAIL

APPROVED RESILIENT PIPE-TO-MANHOLE CONNECTOR OR GASKET

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
CONCRETE CONE ⇔ ROOF OPTIONS ⇔ REINFORCED CONCRETE SLAB

PRESSURE-TYPE-MANHOLE: TO HAVE M.H. FRAME CAST IN ROOF WITH CONTINUOUS POUR FROM BASE
FRAME & COVER AS SPECIFIED ON PLANS
PRESSURE-TYPE-MANHOLE: TO HAVE M.H. FRAME CAST IN ROOF
CONSTRUCTION JOINT WITH KEY WAY WATERSTOP, AND +3'S AT 12" O.C. EXTENDING 9" INTO WALL (NOT REQ'D FOR CONTINUOUS POUR)
MANHOLE FRAME TO BE CENTERED

SECTION A - A

VARES
6" MIN.
8" MIN.
12" MIN.
12" COMPACTED ROCK FOUNDATION
CLASS "F" CONCRETE MONOLITHIC POUR
GEOTEXTILE LINER MATERIAL

MANHOLE DETAIL

APPROVED RESILIENT PIPE-TO-MANHOLE CONNECTOR OR GASKET
FIRST MAIN LINE JOINT TO BE A MIN. OF 5' LONG, WITH CONC. CRADLE (POURED CONTIGUOUS WITH CONC. BASE) AND UNDER ENTRE JOINT
See General Note "5 On Pg. 302"

CONNECTION DETAIL

REFER TO GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

WASTEWATER MANHOLE PRESSURE-TYPE

DWU
304
DATE
OCT. 2010
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
TURBINE VENTILATOR-FIBERGLASS
OR ALUMINUM WITH NYLON BUSHINGS
APPLY RUSTOLEUM 7582 GRAY PRIMER
AND DEVGUARD 4308 SILVER PAINT

12 GAUGE STAINLESS STEEL STRAPS

6" P.V.C. SDR-35 PIPE

HEIGHT TO BE 2' ABOVE 100 YEAR FLOODPLN OR 6', WHICHEVER IS GREATER

90° BEND

6" DIAMETER TREATED SUPPORT POLE.

APPROVED RESILIENT PIPE-TO-
MANHOLE CONNECTOR OR GASKET.
WASTEWATER MANHOLE
OUTSIDE DROP CONNECTIONS

MANHOLE TYPE AS SPECIFIED ON PLANS

GAS SEALED DROP CONNECTION
N.T.S.

STANDARD DROP CONNECTION
N.T.S.

REVERSE 45°
WYE ONLY

45° BEND

GRANULAR MATERIAL

6" MIN.

CLASS "F" CONCRETE

90° LONG RADIUS BEND

12" COMPACTED ROCK FOUNDATION

CLASS "F" CONCRETE BASE 12" THICK

FLAP GATE OR REMOVABLE CAP AS SPECIFIED ON PLANS

REVERSE 45°
WYE ONLY

45° BEND

GRANULAR MATERIAL

6" MIN.

90° LONG RADIUS BEND

12" MIN.

CLASS "F" CONCRETE

GEOTEXTILE LINER MATERIAL

12" MIN.

SEE GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302

DWU 307
DATE OCT. 2010
MANHOLE TYPE AS SPECIFIED ON PLANS

INSIDE DROP CONNECTOR "RELINER-DURAN "A" DROP BOWL" OR APPROVED EQUAL

STAINLESS STEEL WITH GASKET COUPLING BAND CONNECTOR

APPROVED RESILIENT PIPE TO MANHOLE CONNECTOR OR GASKET

1/2" WIDE STAINLESS STEEL PIPE STRAPS ANCHORED IN CONCRETE WALL AT 4' MAX. SPACING WITH MIN. OF 2 PER PIPE JOINT

90° LONG RADIUS BEND

TOP OF 90° BEND TO BE PLACED LEVEL WITH TOP OF MANHOLE DISCHARGE LINE, UNLESS NOTED OTHER WISE ON PLANS.

12" COMPACTED ROCK FOUNDATION

GEOTEXTILE LINER MATERIAL

12" MIN.

12" MIN.

ELEVATION

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

PLAN

SEE GENERAL NOTES FOR WASTEWATER MANHOLE CONSTRUCTION - PAGE 302
FORM MANHOLE BOTTOM TO SLOPE
SEE INVERT DETAIL PAGE 309A

1:12 (TYP.)

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

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

SEE INVERT BENCH DETAILS PAGE 309A

SECTION A-A

WASTEWATER MANHOLE
INVERT INTERSECTION DETAIL

DWU 309
DEC. 2001
FOR PIPE SMALLER THAN 15" IN DIAMETER

FOR PIPE FROM 15" TO 24" IN DIAMETER

FOR PIPE LARGER THAN 24" IN DIAMETER
MANHOLE PIPE CONNECTOR
(FOR CAST-IN-PLACE MANHOLES)

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

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<tr>
<td>4&quot; - 6&quot;</td>
<td>1 1/2</td>
<td>7/8&quot;</td>
<td>3/8&quot;</td>
<td>10°</td>
<td>1/4&quot; - 3/8&quot;</td>
</tr>
<tr>
<td>8&quot; - 21&quot;</td>
<td>2 1/8</td>
<td>1 3/8&quot;</td>
<td>5/8&quot;</td>
<td>10°</td>
<td>1/4&quot; - 3/8&quot;</td>
</tr>
<tr>
<td>24&quot; - 60&quot;</td>
<td>2 3/8&quot;</td>
<td>1 3/4&quot;</td>
<td>3/4&quot;</td>
<td>10°</td>
<td>1/4&quot; - 3/8&quot;</td>
</tr>
</tbody>
</table>

MANHOLE PIPE CONNECTOR CLAMP
FOR CAST-IN-PLACE MANHOLES

310
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.

PLAN VIEW

N.T.S.

D - INSIDE DIAMETER OF MANHOLE

5/8" HOLE FOR 1/2" NYLON ROPE HANDLES

5/8" HOLES FOR 1/2" NYLON ROPE HANDLES

METAL STRAP HINGES (MIN. 3" LONG) W/BOLTS

NYLON ROPE HANDLES

3/4" PLYWOOD

WASTEWATER MANHOLE FALSE BOTTOM

DATE
DEC.2001
LETTERS (RECESSED FLUSH)
1" Minimum
1½" Preferred

(6) 1" DIA HOLES ON A 37" DIA B.C.

1/2" LETTERS (RECESSED FLUSH)

(2) PICKBARS

PLAN VIEW

32"
1 1/2"
2 7/16"

31 13/16"

COVER SECTION

COVER - GRAY IRON
ASTM A48 CL35B
FRAME - GRAY IRON
ASTM A48 CL35B

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

STANDARD 32"
C.I. M.H. FRAME & COVER

WASTEWATER

DWU

DATE

OCT.2011

312
2 - 2" x 3\(\frac{3}{4}\)" Pick Slots
With 2 - 1" Dia. Steel Rods

PLAN

SECTION "A-A"

RING & COVER MATERIAL PER
ASTM A48 CLASS 35B MIN.
GRAY IRON CASTINGS.
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 ¾" DIA. BOLT HOLES ON 37" DIA. BOLT CIRCLE

COVER SECTION
1 ½"
1/4" DIA.
NEOPRENE GASKET

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

COVER - GRAY IRON ASTM A48 CL.35B
FRAME - GRAY IRON ASTM A48 CL.35B

32" PRESSURE TYPE
CAST-IRON MH. FRAME & COVER
WASTEWATER

DWU
313

DATE
OCT. 2011
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.

2 - 2" x 33/4" Pick Slots
With 2 - 1" Dia. Steel Rods

6-11/4" Dia. Cores
As Shown

Index Marks On Frame & Cover
Engraved Into Casting 3/8" Deep

PLAN

Machine Both Surfaces
6-3/8" Dia., 1/2" Long Stainless Steel Bolts

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 358 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 $\frac{3}{4}$" thick copper gasket or $\frac{1}{2}$" 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"

1/2" Letters 1/4" Raised

3/8" Wide x 1/4" Deep Grooves @ 1 1/2" O.C.

2 - 2" x 3/2" Pick Slots with 1 - 1" Dia. Steel Rod Each

INDEX NOTCHES - Engraved INTO the Casting 1/8" Deep

PLAN

Drill and Tap 4 Holes
Furnish 4 - 5/8" x 2" Hex Head Stainless Steel Bolts

SECTION "A-A"

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

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

40" PRESSURE TYPE CAST IRON
M.H. FRAME & COVER

DWU 314
DATE JAN. 2010
SECTION THRU COVER

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

Machined Bearing Surface

1\(\frac{1}{2}\)" Letters 1\(\frac{1}{4}\)" Raised

(8) 1\(\frac{1}{4}\)" Dia. Anchor Holes

\(\frac{3}{8}\)" Wide x \(\frac{1}{4}\)" Deep Grooves @ 1\(\frac{1}{2}\)" O.C.

See Pickbar Detail

PLAN

42\(\frac{1}{4}\)"

40"

STANDARD 40" MANHOLE FRAME AND COVER

RING & COVER MATERIAL PER ASTM A48 CLASS 355 MIN. GRAY IRON CASTINGS

DATE
DEC. 2001
CLEANOUT CASTING OPENING TO BE INSTALLED CENTERED OVER THE CENTERLINE OF THE CLEANOUT STACK EXTENDED TO GROUND LEVEL.

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

PROFILE VIEW
N.T.S.

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

**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.
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.

ASSEMBLY VIEW

N.T.S.

WASTEWATER LATERAL CLEANOUT FRAME & COVER
TRENCH WITH SLOPING SIDES

NOTES:

1. WYE SHALL BE SUPPORTED AS SHOWN FOR WYE CONNECTION SUPPORT.

2. LATERALS ARE TO CLEAR ALL EXISTING UTILITIES. 11¼" OR 22 1/2° BEND, ONLY, MAY BE REQUIRED.

REFER TO PAGES 319, 320, 323, 324 & 325
Note! Clean out as per Page 319 to Ground Surface

SEC. "A-A"

Class "B" Conc.

Class "B" Conc.

Sewer Pipe

Capped

Wye, Or Double Wye As Req'd

Sand Backfill

Class "B" Conc.

Wye

Class "B" Conc.

Embed. As Per Plans

1 - Joint

24" Min.

Variable as per Plans

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

1/2" NON SHRINK GROUT COATING

MANHOLE FRAME AND COVER AS SPECIFIED ON PLANS

STAINLESS STEEL EXPANSION BANDS

RUBBER SLEEVE

STAINLESS STEEL EXPANSION BANDS

INTERNAL CHIMNEY SEAL

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
Cut as Required for 6, 8, 10, 12 inch Pipe Along Cutting Groove

Gasket Riser Pipe

Plugs

DETAIL A

15" P.V.C. SDR 35 Water Tight Adaptor P.E. to PVC

Water Tight Adapter PVC to PVC for PVC Pipe Clay to PVC for Clay Pipe

Alternate Connection May Be Made With A Manufacturer's Trapped Gasket

Cross Link High Density Polyethylene Access Fitting or Linear Low Density Polyethylene

DETAIL A

Pipe Embedment as Specified on Plans

SECTION A-A

UNDISTURBED SOIL

24" Standard Cast Iron M. H. Frame & Cover

Pavement

 DETAIL B

Clearance: 4" Min. 8" Max.

Water Tight Plug

Two Concrete Grade Rings (Minimum) and Non-Shrink Grout

15" P.V.C. PIPE ASTM D 3034 (SDR 35)

Undisturbed Soil

Sand or Stabilized Soil Compacted to 95% Std. Proctor Density and Placed in 6-inch Lifts Beginning at the Wastewater Access Device Working Outward to the Excavation Walls

Cross Link High Density Polyethylene Access Fitting or Linear Low Density Polyethylene

Compacted Crushed Stone, Fine Gradation

UNDISTURBED SOIL

Equal to Pipe Embedment

WASTEWATER ACCESS DEVICE

DWU 328

DATE OCT. 2011
SAMPLE SITE CONSTRUCTION NOTES

A. The 5'x5' 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.


E. 1/4" Threaded Female Anchor Bolts Shall Be Set In Each Corner 3" Inset From The Rear And Sides Of The Pod. The Front Bolts Need To Be 20" From The Rear Of The Pod. The Top Of The Female Anchor 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" Wide. 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 A 1/2" Round Bar Stock.

H. The Lid Is Attached To The Box By A Heavy Hinge With A Continuous Weld Along The 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 1/2" Lip.

I. Two Heavy-Duty Plated Steel Lids 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 Pre-Treatment And Laboratory Services.

Suggested Vendors for Security Boxes:
Company: The EMF Co. Model: DWU CAB-001 Tel: (214) 350-5648 or Approved Equal

Not To Scale
PART 4
(Series 400)

WATER & WASTEWATER ADJUSTMENTS

City of Dallas
Water Utilities Department
## PART 4
### WATER AND WASTEWATER ADJUSTMENTS

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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(s) 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 with non-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.

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 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.
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 requirements 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.
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.
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**

**DATE**

**DEC. 2001**
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 22-1/2 degrees are NOT permitted.
   C. The new pipe and embedment must be of the same type as the existing. (Unless the lateral is concrete pipe, in which case clay pipe is to be used.)
   D. Connections between the existing 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, ENCASEMNT 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.
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 embankment will match the embankment 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.
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 steelband 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.
NEW WALK IN AN AREA TO BE FILLED

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.

NEW WALK IN AN AREA TO BE CUT

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. THE NEW 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. Top the existing main a minimum of 1' from the existing top and install a new corporation cock and service. Remove the existing corporation cock and plug the top 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
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.
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.
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.
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"**

- Undisturbed Earth
- Class "B" Concrete Encasement

Flowable Backfill or Crushed Rock/Gravel at Wastewater Main Crossing over Proposed Storm Water Main

Where Pipe Has Been Undercut Backfill With Crushed Rock Or Gravel

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.
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.

Encaement Protection For Wastewater Main
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).

Encasement Pipe To Be A Minimum 150 P.S.I. Pressure Rated Steel, Ductile Iron or PVC Pipe And Two (2) Nominal Sizes Larger Than The Carrier Pipe

Seal The Space Between The Encasement Pipe And The Carrier Pipe At Each End With Non-Shrink Cement Grout Or With A Manufactured Seal To Prevent Soil Migration Into The Encasement Pipe Or Fully Grout The Space Between The Encasement Pipe And The Carrier Pipe Per The Discretion Of The Project Engineer.

Contractor Must Contact Wastewater Collection Two Working Days Prior To Construction.
WASTEWATER MAIN PASSING THROUGH STORM WATER MAIN

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.

((Page No.) 415)

DATE OCT. 2011
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

DWU
416
DATE
OCT. 2011
Proposed Pipe To Soil Potential Test Station Relocation
In Meter Box Type II

EX. 1 1/2" PVC Conduit

Bond Prop. Conduit To Existing Conduit At Point Of Cut

Ex. RCCP Water Main

Prop. 1 1/2" PVC Conduit

Small Plastic Meter Box & Ductile Iron Lid

No. 10 Conn. Wire

Crushed Rock 3 cu. ft.

2"x6" Treated Wood Post


Heat Shrink Tube

Bundy Crimp Copper Connector Type YC-C

Ex. No. 10 Conn. Wire

MECHANICAL CABLE SPLICE DETAIL

RELOCATION OF PIPE-TO-SOIL POTENTIAL TEST STATION (BURIED CONFIGURATION)
PART 5
(Series 500)

4" AND LARGER WATER SERVICE INSTALLATIONS

City of Dallas
Water Utilities Department
## PART 5
### LARGE WATER SERVICE INSTALLATIONS

<table>
<thead>
<tr>
<th>TITLE</th>
<th>Pg.</th>
</tr>
</thead>
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<td>501</td>
</tr>
<tr>
<td>Large Service Installation Details and Plan Views</td>
<td>502</td>
</tr>
<tr>
<td>Minimum Easement Sizes for Large Meter Installation</td>
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<tr>
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<td>Large Service Installation Details--Precast Vaults (F.M. &amp; D.C. Type)</td>
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</tr>
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<td>Large Service Installation Details--Precast Vaults (10&quot; or Larger Meter Size)</td>
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<td>507</td>
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<tr>
<td>6&quot; Combined Service with 6&quot; Meter</td>
<td>508</td>
</tr>
<tr>
<td>8&quot; Combined Service with 6&quot; Meter</td>
<td>509</td>
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<tr>
<td>8&quot; Combined Service with 8&quot; Meter</td>
<td>510</td>
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<td>10&quot; Combined Service with 8&quot; Meter</td>
<td>511</td>
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<tr>
<td>10&quot; Combined Service with 10&quot; Meter</td>
<td>512</td>
</tr>
<tr>
<td>4&quot; Domestic Service with 3&quot; Meter</td>
<td>513</td>
</tr>
<tr>
<td>4&quot; Domestic Service with 4&quot; Meter</td>
<td>514</td>
</tr>
<tr>
<td>6&quot; Domestic Service with 6&quot; Meter</td>
<td>515</td>
</tr>
<tr>
<td>8&quot; Domestic Service with 6&quot; Meter</td>
<td>516</td>
</tr>
<tr>
<td>4&quot; Closed Fireline Service with 4&quot; Detector Check Device</td>
<td>517</td>
</tr>
<tr>
<td>6&quot; Closed Fireline Service with 6&quot; Detector Check Device</td>
<td>518</td>
</tr>
<tr>
<td>8&quot; Closed Fireline Service with 6&quot; Detector Check Device</td>
<td>519</td>
</tr>
<tr>
<td>8&quot; Closed Fireline Service with 8&quot; Detector Check Device</td>
<td>520</td>
</tr>
<tr>
<td>10&quot; Closed Fireline Service with 10&quot; Detector Check Device</td>
<td>521</td>
</tr>
<tr>
<td>Suspended Vault Installation Detail Description And General Notes</td>
<td>522</td>
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<tr>
<td>Suspended Vault Installation Details--Plan View</td>
<td>523</td>
</tr>
<tr>
<td>Suspended Vault Installation Details--Elevation View</td>
<td>524</td>
</tr>
<tr>
<td>Typical Suspended Vault Detail - Meter Perpendicular to Main</td>
<td>525</td>
</tr>
<tr>
<td>Typical Suspended Vault Detail - Meter Parallel to Main</td>
<td>526</td>
</tr>
</tbody>
</table>
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.
TYPICAL METER ALIGNMENT
(Combined Service Shown)

ALTERNATE METER ALIGNMENT
FOR LIMITED SPACE INSTALLATION
(Combined Service Shown)
Outside Of Pavement Area,
A Reinforced Concrete Pad Shall Be
 Constructed And Extend 2 ft.
 Around Hatch And Be A
 Minimum Of 4 in. Thick.

Existing Or Proposed
Pavement

1 1/2" P.V.C. Drain
From Access Hatch
Long Wall To Rock
Embedment (Off The
Front Right Or Left).

Valve Riser
Stock

SERVICE LINE

Concrete Pipe
Support

MD/F/Device

5'-0" To Flow Line

Precast Meter Vault
Sized As Specified
For Each Meter
(See 504,505)

Vertical Fittings As
Necessary To Meet
Construction Elevation
With Mechanically
Restrained Joints
& Class B Concrete
Thrust Blocking

TYPICAL FOR ALL LARGE METER VAULTS

Gravel Std. Gradation
4" Min. Thick In Rock
6" Min. Thick In Earth
NCTCOG Spec: 504.2.2.1 - Crushed Stone Embedment

NCTCOG Spec: 504.2.2.1 - Crushed Stone Embedment

LARGE SERVICE INSTALLATION DETAIL
ELEVATION VIEW

DWU 503

DATE OCT.2009
Precast Meter Vault
With 4 - Two Ton Lifting Anchors

*4's at 10" E.W.
(Centered in Wall)

6'0" x 9'0" Precast
Floor Slab, With
4 - Two Ton Lifting Anchors

SECTION VIEW

F.M. VAULT

X Available Heights
36", 48", 60"

X Special Applications To Be Determined
By Engineer.

Precast Meter Vault
With 4 - Two Ton Lifting Anchors

*4's at 10" E.W.
(Centered in Wall)

5'6" x 7'0" Precast
Floor Slab, With
4 - Two Ton Lifting Anchors

SECTION VIEW

D.C. VAULT

X Available Heights
36", 48", 60"

X Special Applications To Be Determined
By Engineer.

LARGE SERVICE INSTALLATION DETAILS
PRECAST VAULTS

DWU

DATE
JUNE 2002
Precast Meter Vault
With 4 - Two Ton
Lifting Anchors

*4's at 10" E.W.
(Centered In Wall)

*4's at 10" E.W.
(Centered In Slab)

6'-0" x 10'-4" Precast
Floor Slab, With
4 - Two Ton Lifting Anchors

Vault Opening
39" X 49"

SECTION VIEW

10" VAULT

Available Heights
36", 48", 60"

Special Applications To Be Determined
By Engineer.

LARGE SERVICE INSTALLATION DETAILS
PRECAST VAULTS

DWU 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

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 Ea.</td>
<td>4&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>2</td>
<td>2 Ea.</td>
<td>4&quot; x 4&quot; Tee F. x F.</td>
</tr>
<tr>
<td>3</td>
<td>2 Ea.</td>
<td>4&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>4</td>
<td>3 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>4&quot; x 40&quot; Pipe S. x S.</td>
</tr>
<tr>
<td>6</td>
<td>1 Ea.</td>
<td>4&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>4&quot; Meter As Specified (Type F.M. Shown)</td>
</tr>
<tr>
<td>8</td>
<td>1 Ea.</td>
<td>4&quot; x 4&quot; Tee F. x F. (test Point)</td>
</tr>
<tr>
<td>9</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
</tr>
</tbody>
</table>

Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1 Ea.</td>
<td>4&quot; x 24&quot; Nipple F. x F.</td>
</tr>
<tr>
<td>11</td>
<td>2 Ea.</td>
<td>4&quot; x 36&quot; Nipple F. x F.</td>
</tr>
<tr>
<td>12</td>
<td>1 Ea.</td>
<td>4&quot; 90° Bend F. x F.</td>
</tr>
<tr>
<td>13</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F.</td>
</tr>
<tr>
<td>14</td>
<td>1 Ea.</td>
<td>4&quot; 90° Bend M.J. x F.</td>
</tr>
<tr>
<td>15</td>
<td>1 Ea.</td>
<td>4&quot; Pipe</td>
</tr>
<tr>
<td>16</td>
<td>1 Ea.</td>
<td>Precast F.M. Vault</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>F.M. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

Ref. 501 to 506

4" COMBINED SERVICE WITH 4" METER

JUNE 2002
8" COMBINED SERVICE WITH 6" METER

Ref. 501 to 506
### Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>2 Ea.</td>
<td>4&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>②</td>
<td>2 Ea.</td>
<td>4&quot; x 2&quot; Tee F. x F.</td>
</tr>
<tr>
<td>③</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>④</td>
<td>3 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>⑤</td>
<td>1 Ea.</td>
<td>4&quot; x 36&quot; Pipe S. x S.</td>
</tr>
<tr>
<td>⑥</td>
<td>1 Ea.</td>
<td>4&quot; X 3&quot; Reducing Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>⑦</td>
<td>1 Ea.</td>
<td>3&quot; Meter As Specified (Type Compound Shown)</td>
</tr>
<tr>
<td>⑧</td>
<td>1 Ea.</td>
<td>4&quot; x 24&quot; Nipple F. x F.</td>
</tr>
<tr>
<td>⑨</td>
<td>1 Ea.</td>
<td>4&quot; x 3&quot; Reducer F. x F.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>⑩</td>
<td>2 Ea.</td>
<td>2&quot; Companion Flange</td>
</tr>
<tr>
<td>⑪</td>
<td>4 Ea.</td>
<td>2&quot; Comp X OSIP Adaptor</td>
</tr>
<tr>
<td>⑫</td>
<td>2 Ea.</td>
<td>2&quot; Comp 90 Deg. Ell</td>
</tr>
<tr>
<td>⑬</td>
<td>1 Ea.</td>
<td>2&quot; Ball Valve</td>
</tr>
<tr>
<td>⑭</td>
<td>1 Ea.</td>
<td>2&quot; Copper Pipe</td>
</tr>
<tr>
<td>⑮</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td>⑯</td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>⑰</td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
<tr>
<td>⑱</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F.</td>
</tr>
</tbody>
</table>

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**Ref. 501 to 506**

### 4" Domestic Service with 3" Meter

- **Direction Of Flow**
- **Vault Opening**

**DWU** 513

**Date** OCT 2010
### Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 Ea.</td>
<td>4&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>2</td>
<td>2 Ea.</td>
<td>4&quot; x 2&quot; Tee F. x F.</td>
</tr>
<tr>
<td>4</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>5</td>
<td>2 Ea.</td>
<td>Valve Stack Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>6</td>
<td>1 Ea.</td>
<td>4&quot; x 36&quot; Pipe S. x S.</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>4&quot; Flanged Coupling Adapter</td>
</tr>
<tr>
<td>8</td>
<td>1 Ea.</td>
<td>4&quot; Meter As Specified (Type Compound Shown)</td>
</tr>
<tr>
<td>9</td>
<td>2 Ea.</td>
<td>2&quot; Companion Flange</td>
</tr>
<tr>
<td>10</td>
<td>4 Ea.</td>
<td>2&quot; Comp X OSI Pipe Adapter</td>
</tr>
<tr>
<td>11</td>
<td>2 Ea.</td>
<td>2&quot; Comp 90 Deg. Eli</td>
</tr>
<tr>
<td>12</td>
<td>1 Ea.</td>
<td>2&quot; Ball Valve</td>
</tr>
<tr>
<td>13</td>
<td>1 Ea.</td>
<td>2&quot; Copper Pipe</td>
</tr>
<tr>
<td>14</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td>15</td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F.</td>
</tr>
</tbody>
</table>

---

**4" Domestic Service with 4" Meter**

Ref. 501 to 506

---

Direction of Flow

Vault Opening
### Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>2 Ea.</td>
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</tr>
<tr>
<td>②</td>
<td>2 Ea.</td>
<td>8&quot; x 4&quot; Tee F. x F.</td>
</tr>
<tr>
<td>③</td>
<td>1 Ea.</td>
<td>8&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>④</td>
<td>3 Ea.</td>
<td>Valve Stock Riser Cover &amp; Lid</td>
</tr>
<tr>
<td>⑤</td>
<td>1 Ea.</td>
<td>8&quot; x 24&quot; Pipe S. x S.</td>
</tr>
<tr>
<td>⑥</td>
<td>1 Ea.</td>
<td>8&quot; x 6&quot; Reducing Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>⑦</td>
<td>1 Ea.</td>
<td>6&quot; Meter As Specified (Type Compound Shown)</td>
</tr>
<tr>
<td>⑧</td>
<td>1 Ea.</td>
<td>6&quot; x 24&quot; Pipe F. x F.</td>
</tr>
<tr>
<td>⑨</td>
<td>1 Ea.</td>
<td>8&quot; x 6&quot; Reducer F. x F.</td>
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<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>⑩</td>
<td>2 Ea.</td>
<td>4&quot; x 36&quot; Nipple F. x F.</td>
</tr>
<tr>
<td>⑪</td>
<td>1 Ea.</td>
<td>4&quot; 90 Deg. Bend F. x F.</td>
</tr>
<tr>
<td>⑫</td>
<td>1 Ea.</td>
<td>4&quot; 90 Deg. Bend M.J. x F.</td>
</tr>
<tr>
<td>⑬</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x M.J.</td>
</tr>
<tr>
<td>⑭</td>
<td>1 Ea.</td>
<td>4&quot; Pipe</td>
</tr>
<tr>
<td>⑮</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td>⑯</td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>⑰</td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
<tr>
<td>⑱</td>
<td>1 Ea.</td>
<td>8&quot; Gate Valve F. x F.</td>
</tr>
</tbody>
</table>

---

**8" DOMESTIC SERVICE WITH 6" METER**

Ref. 501 to 506
Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 Ea.</td>
<td>6&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>2</td>
<td>1 Ea.</td>
<td>6&quot; Detector Check Device W/ By-Pass Meter</td>
</tr>
<tr>
<td>3</td>
<td>1 Ea.</td>
<td>6&quot; x 8&quot; Nipple M.J. x F.</td>
</tr>
<tr>
<td>4</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td></td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

Ref. 501 to 506

6" CLOSED FIRELINE SERVICE
WITH 6" DETECTOR CHECK DEVICE

DWU 518
JUNE 2002
Material List:

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>1 Ea.</td>
<td>8&quot; X 6&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>②</td>
<td>1 Ea.</td>
<td>6&quot; Detector Check Device w/ By-Pass Meter</td>
</tr>
<tr>
<td>③</td>
<td>1 Ea.</td>
<td>8&quot; X 6&quot; Reducer M.J. X F.</td>
</tr>
<tr>
<td>④</td>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td>⑤</td>
<td>1 Ea.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td>⑥</td>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

8" CLOSED FIRELINE SERVICE WITH 6" DETECTOR CHECK DEVICE
Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 Eq.</td>
<td>8&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>2</td>
<td>1 Eq.</td>
<td>8&quot; Detector Check Device W/ By-Pass Meter</td>
</tr>
<tr>
<td>3</td>
<td>1 Eq.</td>
<td>8&quot; X 8&quot; Nipple M.J. X F.</td>
</tr>
<tr>
<td>4</td>
<td>1 Eq.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td></td>
<td>1 Eq.</td>
<td>D.C. Vault Floor (Not Shown)</td>
</tr>
<tr>
<td></td>
<td>1 Eq.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

8" CLOSED FIRELINE SERVICE WITH 8" DETECTOR CHECK DEVICE

Ref. 501 to 506

DWU  520
JUNE 2002
10" CLOSED FIRELINE SERVICE WITH 10" DETECTOR CHECK DEVICE

Ref. 501 to 506

DWU

DATE
JUNE 2002

Material List

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ea.</td>
<td>10&quot; Flanged Coupling Adaptor</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>10&quot; Detector Check Device W/ By-Pass Meter</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>10&quot; X 8&quot; Nipple D.C. Vault</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Precast D.C. Vault</td>
</tr>
<tr>
<td>1 Ea.</td>
<td>Access Hatch (Not Shown)</td>
</tr>
</tbody>
</table>

Vault Opening

Direction of Flow

Dimensions:
- 72"
- 64"
- 26 1/2"
- 19"
- 16
- 30 3/4"
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.
ALIGNED PERPENDICULAR TO DISTRIBUTION MAIN

ALIGNED PARALLEL TO DISTRIBUTION MAIN

SUSPENDED VAULT INSTALLATION DETAILS
PLAN VIEWS

DWU 523
DATE JAN. 2010
Meter Vault To Have Direct Street Level Access

3'-0" x 4'-0"
Aluminum Access Hatch

Face Of Building Of Property Line

Sidewalk Area

Cast In Place Reinforced Concrete Meter Vault Constructed In Building Substructure.

4'-6" Min.
8'-0" Max.

Meter & By Pass Piping To Be Supported By Adjustable Pipe Supports Or Concrete Pipe Supports.

Core Drill Holes With 10" Clearance From Vault Floor. Seal Opening Around Piping With Ram-Neck Type Caulking.

 Vault To Have, 2" Maximum Grate Drain. (Slope Floor To Drain)

Limits Of Basement, Underground Parking Or Building Substructure.

Pier Supports

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

REFER TO 522 & 523

SUSPENDED VAULT INSTALLATION DETAIL
ELEVATION VIEW

DWU 524
OCT. 2011
TYPICAL SUSPENDED VAULT DETAIL
METER PERPENDICULAR TO MAIN

Ref. 522

525
JAN. 2011

LOCATE 39" X 49" VAULT OPENING OVER METER AND TEST TEE

Core Drill Hole With 10" Clearance From Vault Floor

Slope To Drain

Core Drill Hole With 10" Clearance From Vault Floor

Min. 10 x Pipe Dia.
<table>
<thead>
<tr>
<th>Part No.</th>
<th>Quantity</th>
<th>Description</th>
<th>Material List</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2 Ea.</td>
<td>3/4&quot; x 12&quot; C.I. Nipple M.J. x F.</td>
<td>Part No.</td>
</tr>
<tr>
<td>2</td>
<td>2 Ea.</td>
<td>3/4&quot; x 6&quot; C.I. Tee F. x F.</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>2 Ea.</td>
<td>3/4&quot; Gate Valve F. x F.</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>3 Ea.</td>
<td>3/4&quot; x 3/4&quot; C.I. Nipple F. x S.</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>1 Ea.</td>
<td>3/4&quot; Flanged Coupling Adaptor</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>1 Ea.</td>
<td>3/4&quot; Meter As Specified (Type F.M. Shown)</td>
<td>13</td>
</tr>
<tr>
<td>7</td>
<td>1 Ea.</td>
<td>3/4&quot; x 4&quot; C.I. Tee F. x F. (Test Point)</td>
<td>14</td>
</tr>
<tr>
<td>8</td>
<td>1 Ea.</td>
<td>4&quot; Gate Valve F. x F. (Test Point)</td>
<td></td>
</tr>
</tbody>
</table>

?" = Size As Specified

Core Drill Hole With 10" Clearance From Vault Floor

LOCATE 39" x 48" VAULT OPENING OVER METER AND TEST TEE

TYPICAL SUSPENDED VAULT DETAIL
METER PARALLEL TO MAIN

Ref. 522

DWU
526
OCT. 2011