

SANITARY SEWER STANDARD DETAILS MANUAL



SEWER UTILITY
9850 64TH STREET WEST
UNIVERSITY PLACE, WASHINGTON 98467-1078
(253) 798-4050

REVISED 12/26/2012

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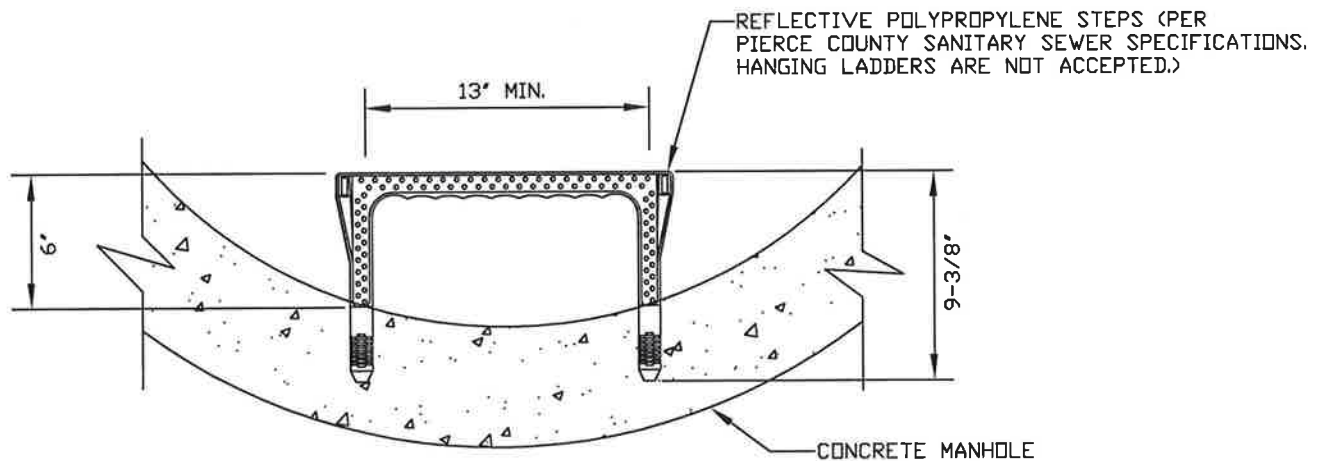
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ABBREVIATIONS

PVC	POLYVINYL CHLORIDE
DIP	DUCTILE IRON PIPE
HDPE	HIGH DENSITY POLYETHYLENE
SS	STAINLESS STEEL
CL	CLASS
CL	CENTERLINE
CONC	CONCRETE
TYP	TYPICAL
I.D.	INSIDE DIAMETER
O.D.	OUTSIDE DIAMETER
NOM	NOMINAL
ø, DIA, DIAM	DIAMETER
SCH	SCHEDULE
MH	MANHOLE
GFP	GLASS FIBER SUPPORTED PLASTIC
C/C	ON CENTER
IPF	INDUSTRIAL PIPE FITTINGS, INC.
O.C.	ON CENTER
GU	"GU" IS PRODUCT NAME OF SEALCON INTERNATIONAL
R/W	RIGHT-OF-WAY
I.E.	INVERT ELEVATION
H-20	"H-20" IS A LOADING SPECIFICATION
P/L	PROPERTY LINE
NPT	NATIONAL PIPE THREAD
FL	FLANGED
A.R.I.	BRAND NAME



NOTES:

1. LEGS MAY BE PARALLEL OR APPROXIMATELY RADIAL AT OPTION OF MANUFACTURER EXCEPT THAT ALL STEPS IN ANY MANHOLE SHALL BE IDENTICAL.
2. LAST STEP SHALL BE NO MORE THAN 18" FROM BOTTOM OF MANHOLE.
3. FIRST STEP SHALL BE NO MORE THAN 24" FROM RIM/FINISH GRADE.
4. STEPS SHALL NOT INTERFERE WITH CHIMNEY SEAL (SEE DETAIL 1002).



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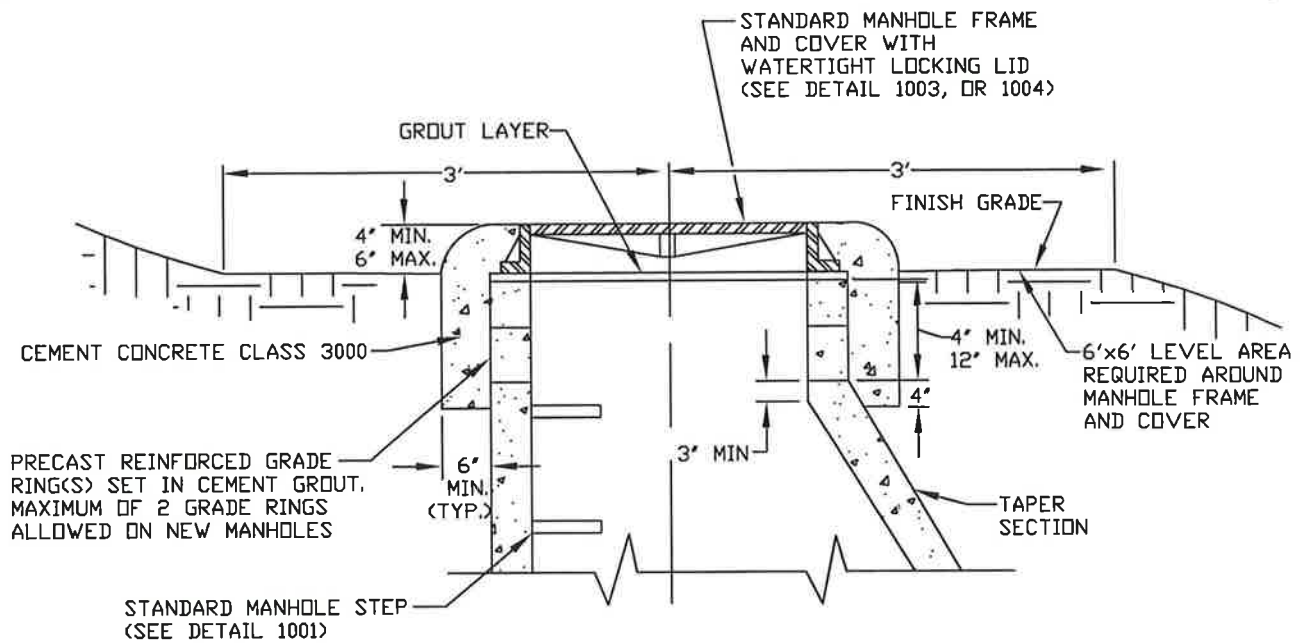
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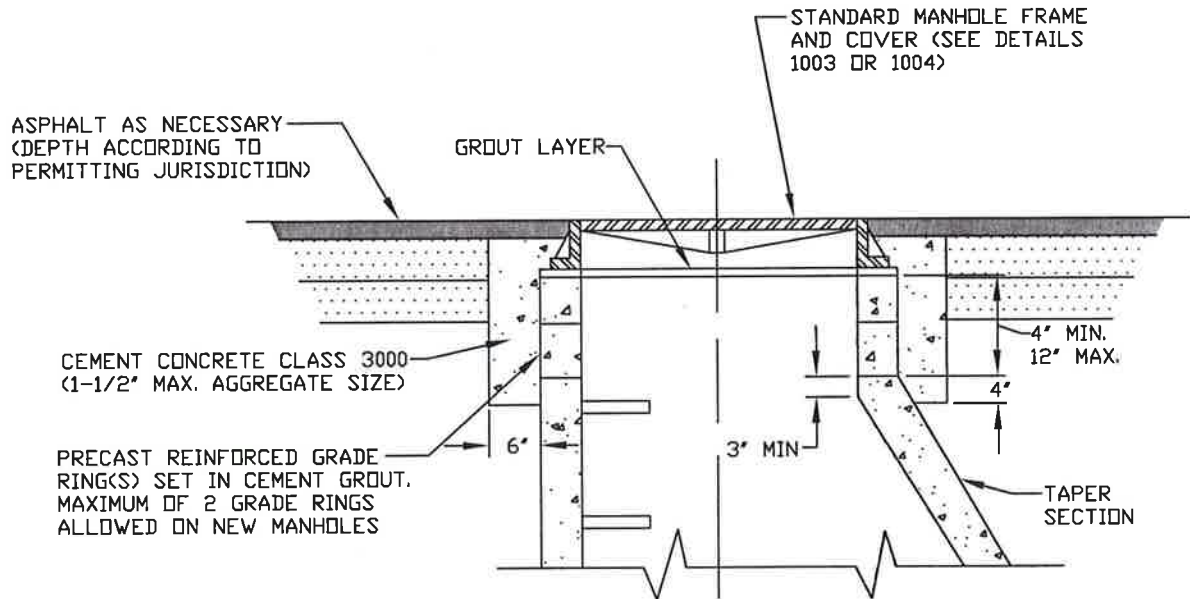
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NON-PAVED AREA



PAVED AREA



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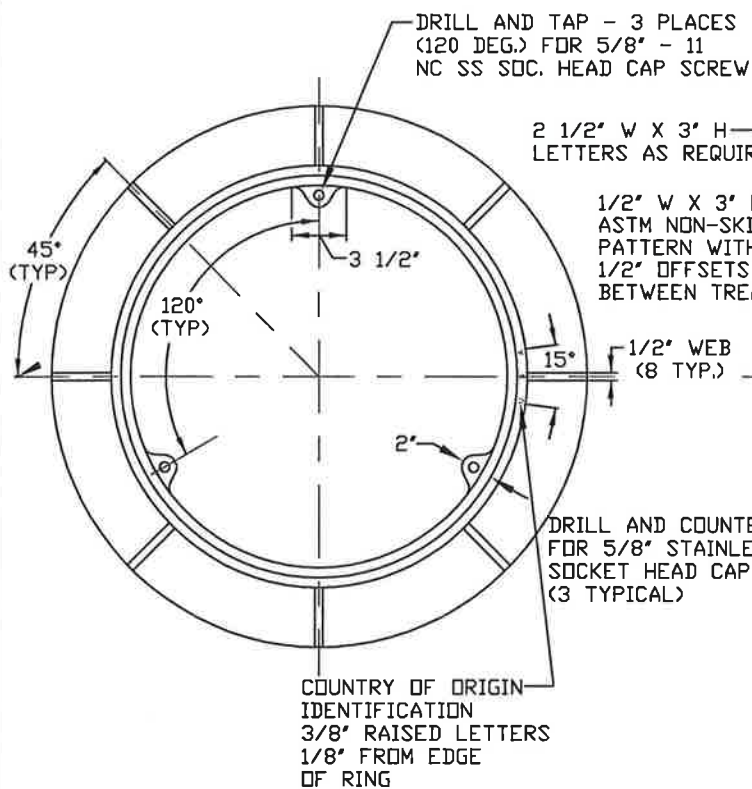
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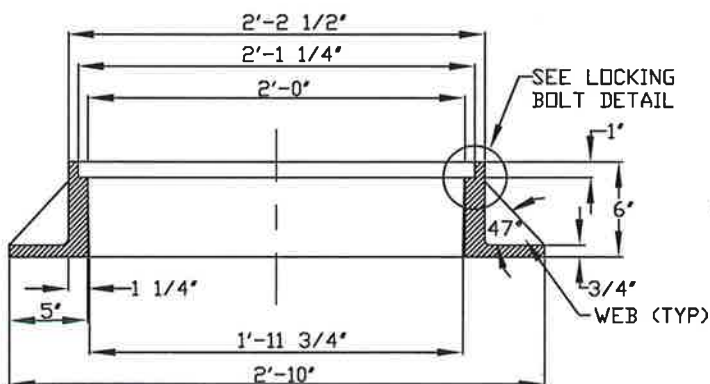
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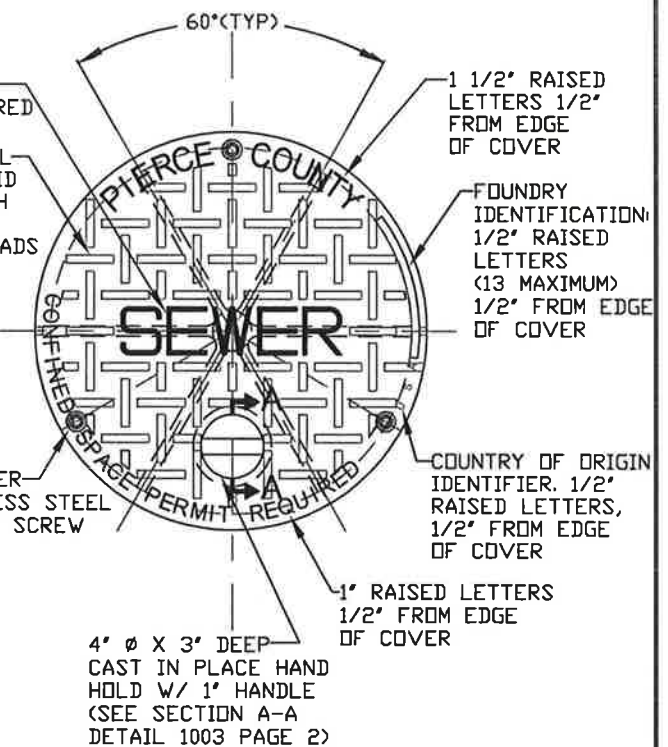
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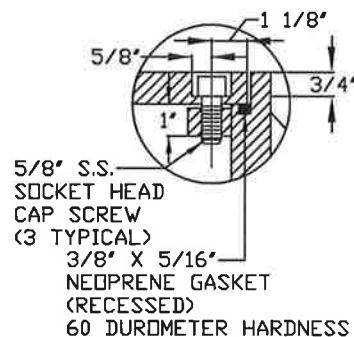
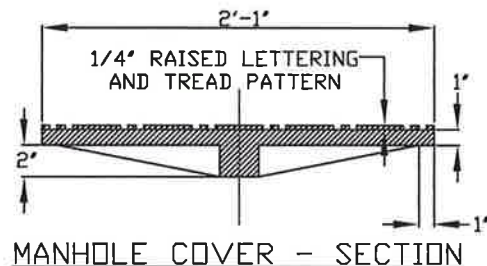
MANHOLE RING - PLAN



MANHOLE RING - SECTION



MANHOLE COVER - PLAN



LOCKING BOLT - DETAIL
NTS



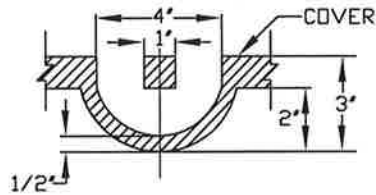
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PUBLIC MANHOLE FRAME AND LOCKING LID

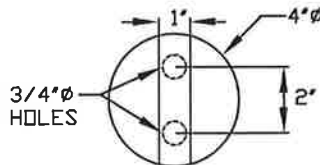
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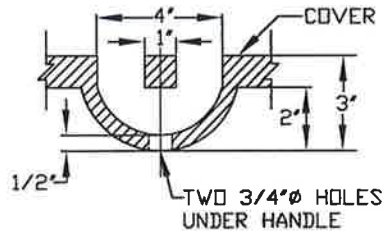


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NTS

WATERTIGHT LID HAND HOLD



TOP VIEW



SECTION A-A FROM 1003 PAGE 1 OF 2
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VENTED LID HAND HOLD



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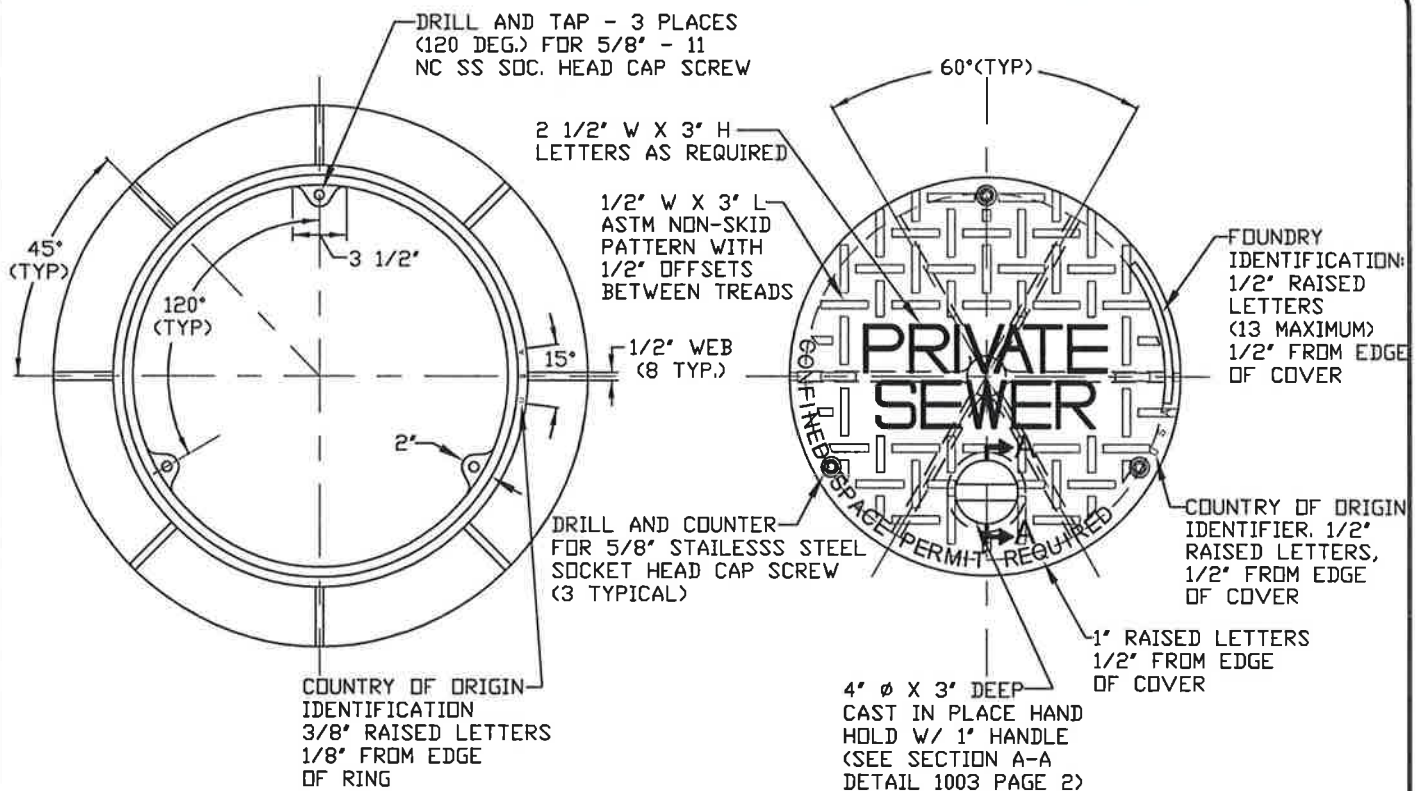
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PUBLIC MANHOLE FRAME
AND LOCKING LID
HAND HOLD DETAIL

STANDARD DETAIL NO.

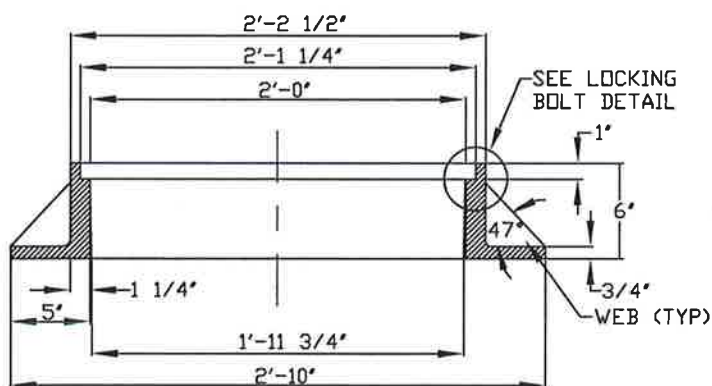
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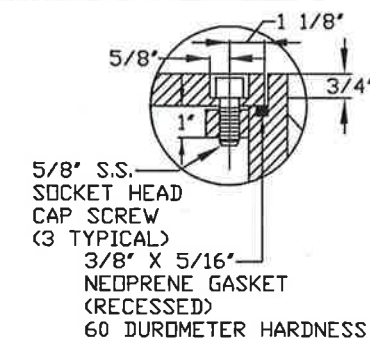
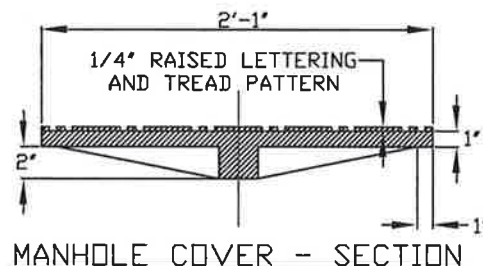


MANHOLE RING - PLAN

MANHOLE COVER - PLAN



MANHOLE RING - SECTION



LOCKING BOLT - DETAIL
NTS



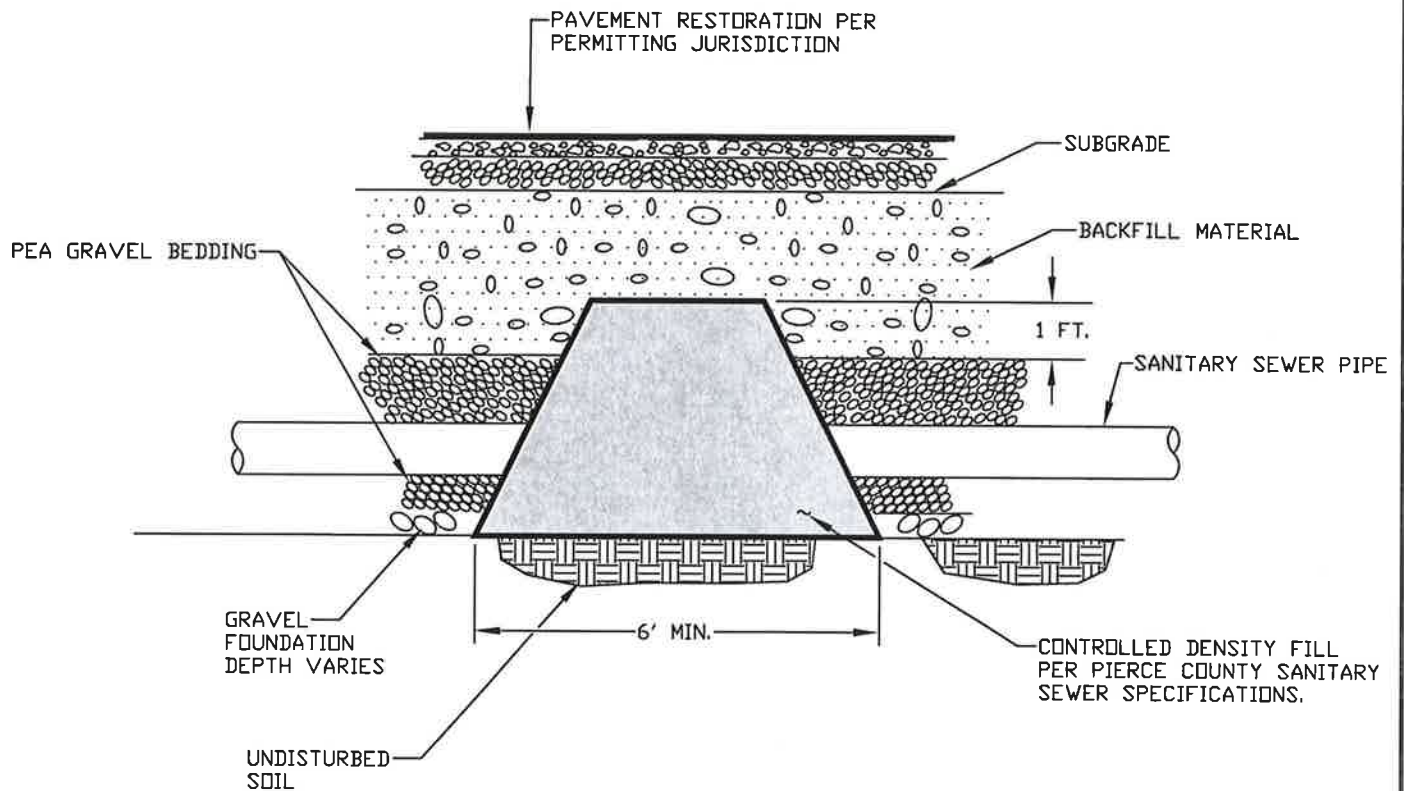
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PRIVATE MANHOLE FRAME & LOCKING LID

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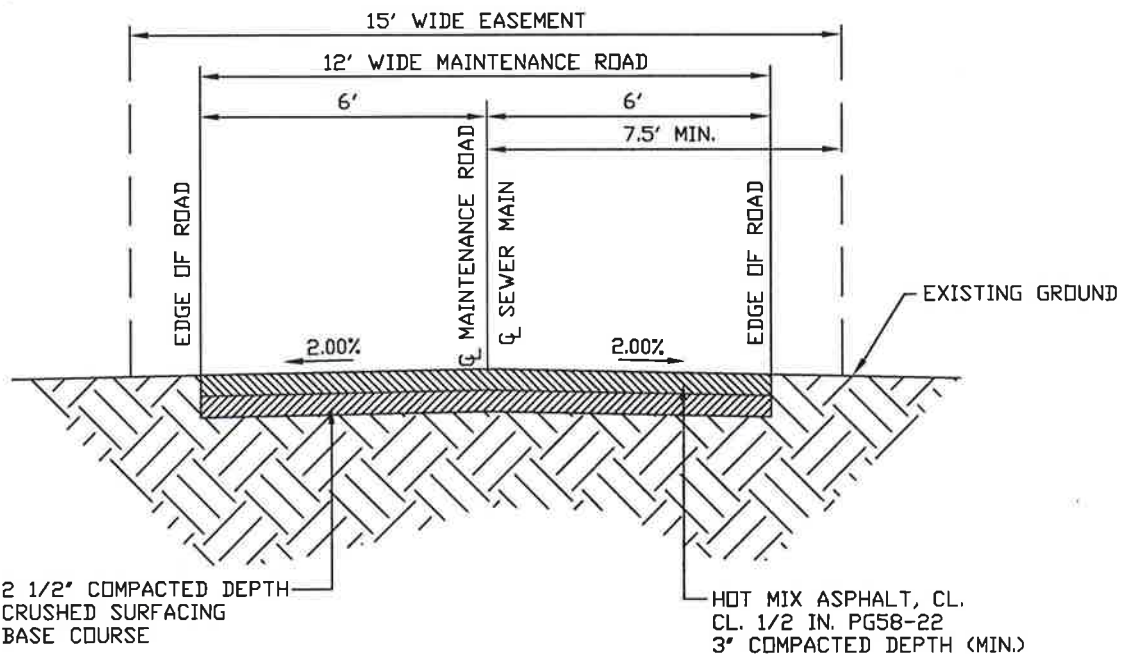
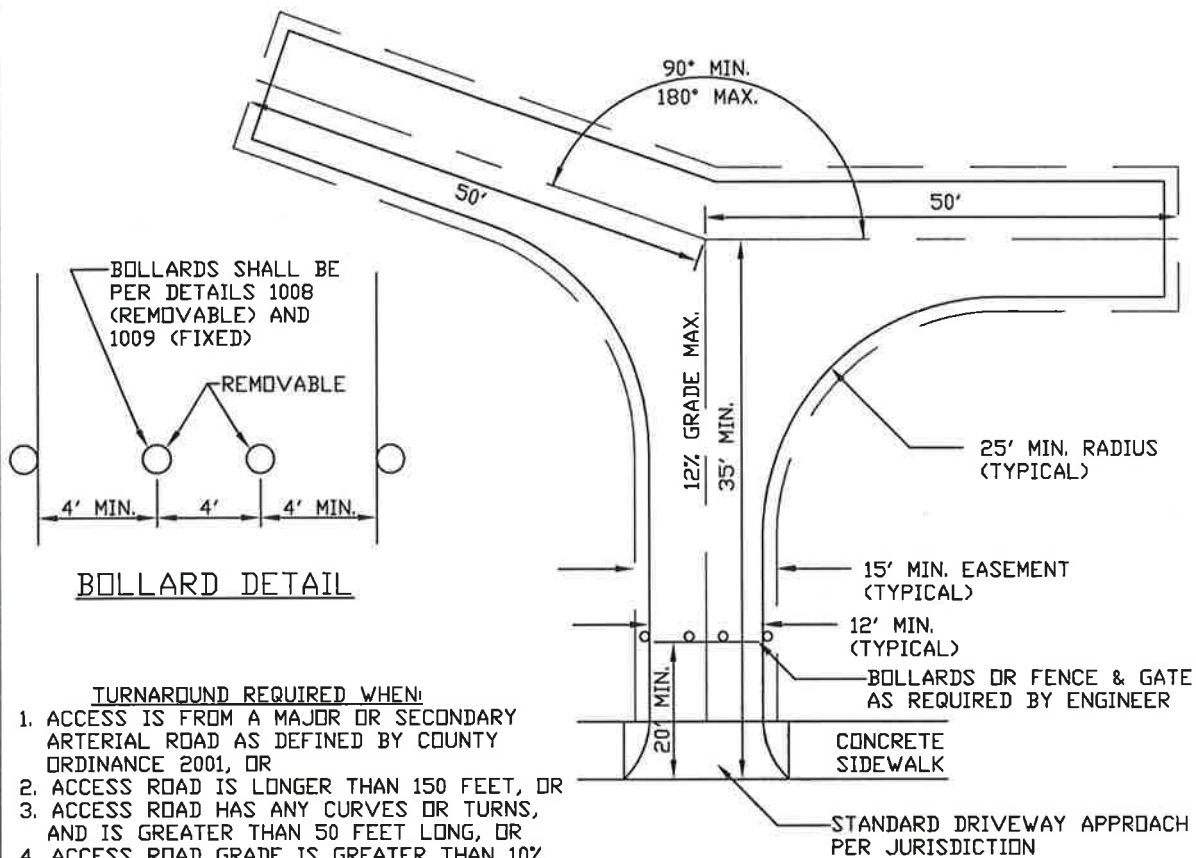
TRENCH DAM

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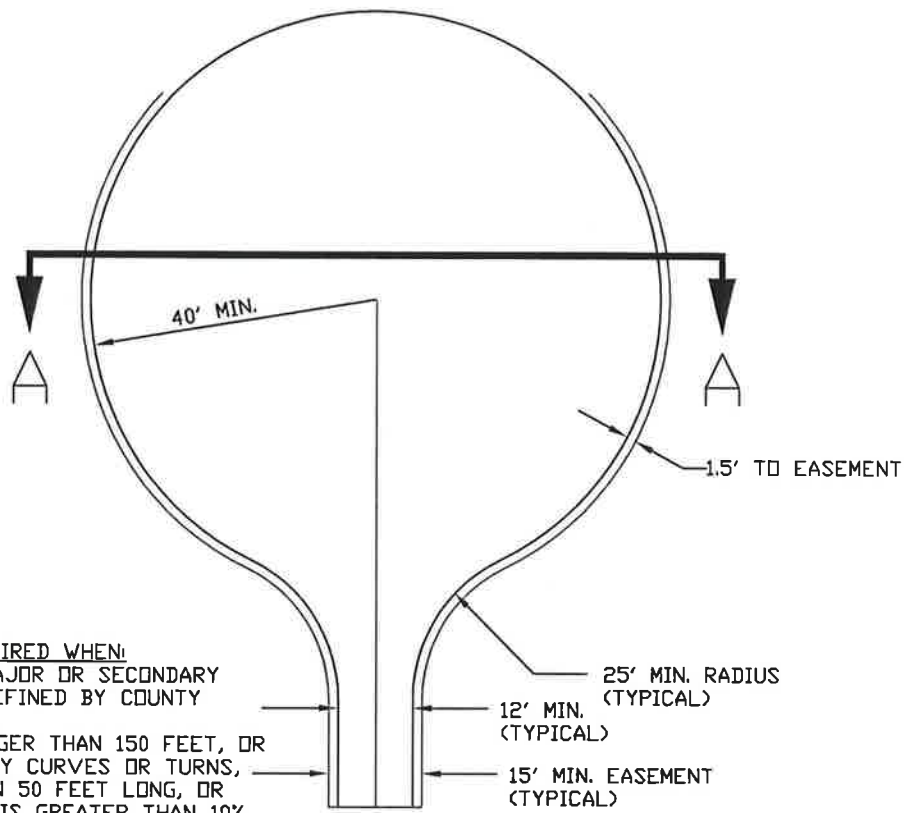
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STANDARD DETAILS

PAVED ACCESS MAINTENANCE
ROAD DETAIL WITH
HAMMERHEAD

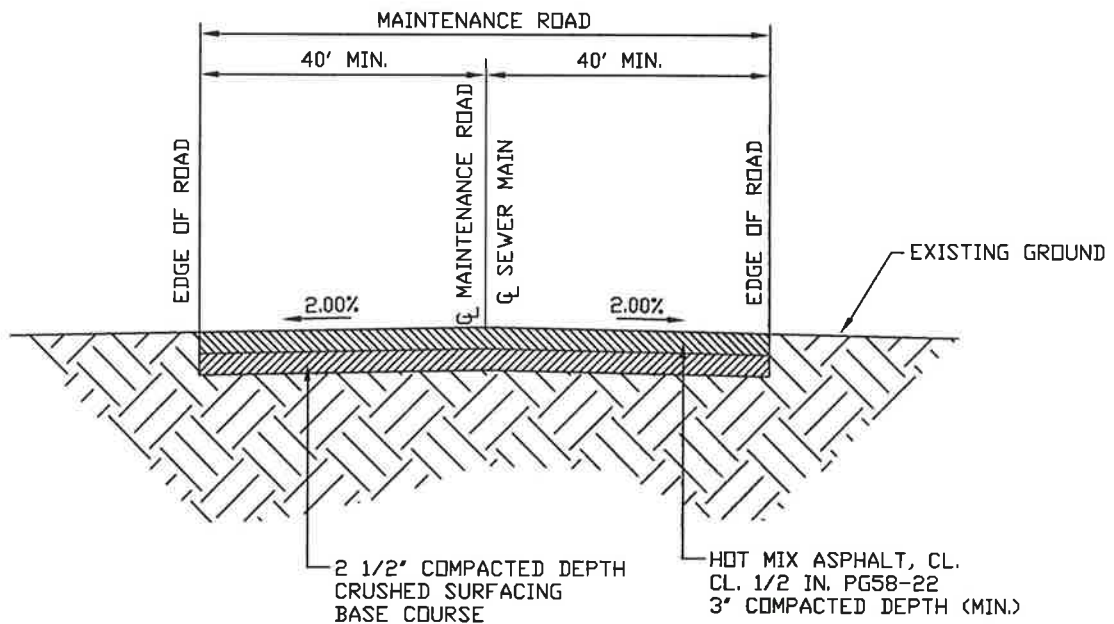
DATE
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TURNAROUND REQUIRED WHEN:

1. ACCESS IS FROM A MAJOR OR SECONDARY ARTERIAL ROAD AS DEFINED BY COUNTY ORDINANCE 2001, OR
2. ACCESS ROAD IS LONGER THAN 150 FEET, OR
3. ACCESS ROAD HAS ANY CURVES OR TURNS, AND IS GREATER THAN 50 FEET LONG, OR
4. ACCESS ROAD GRADE IS GREATER THAN 10%.



SECTION A-A



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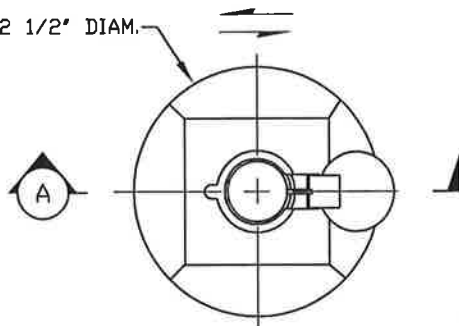
**PAVED ACCESS MAINTENANCE
ROAD DETAIL WITH
CUL-DE-SAC**

DATE
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SCALE
NTS

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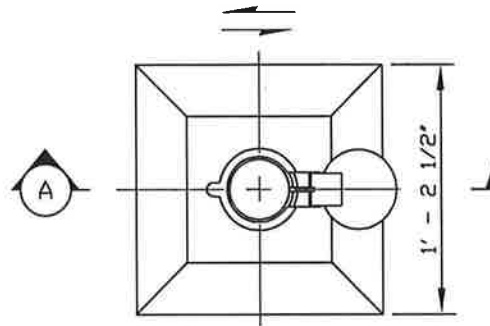
DIRECTION OF PEDESTRIAN/
BICYCLE TRAFFIC

1' - 2 1/2" DIAM.



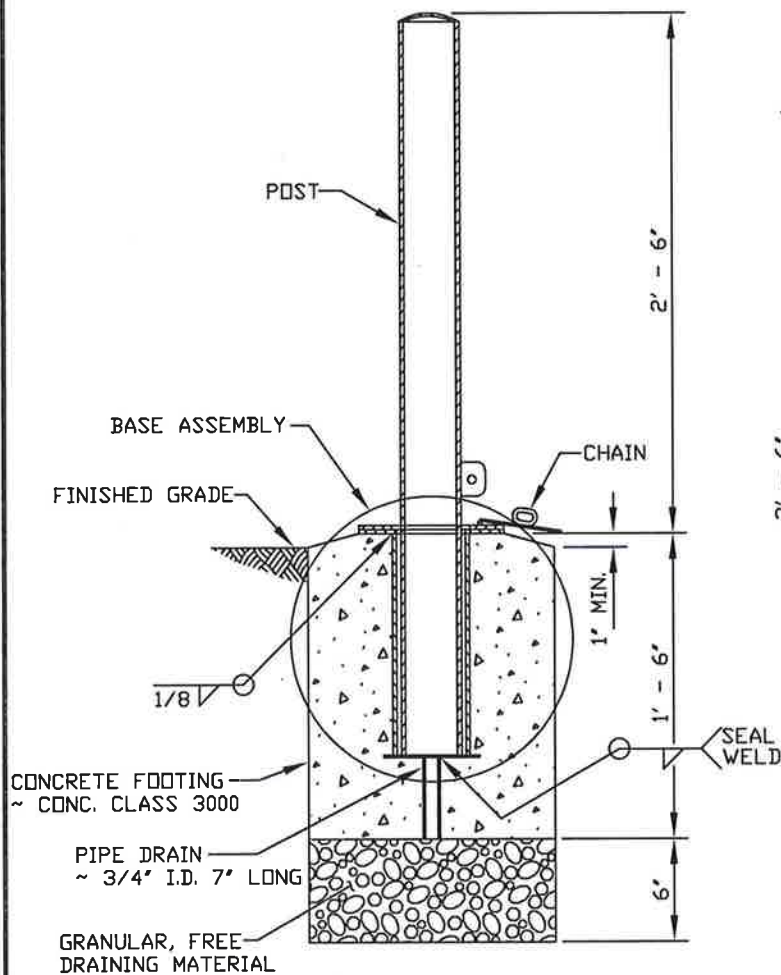
ROUND FOOTING

DIRECTION OF PEDESTRIAN/
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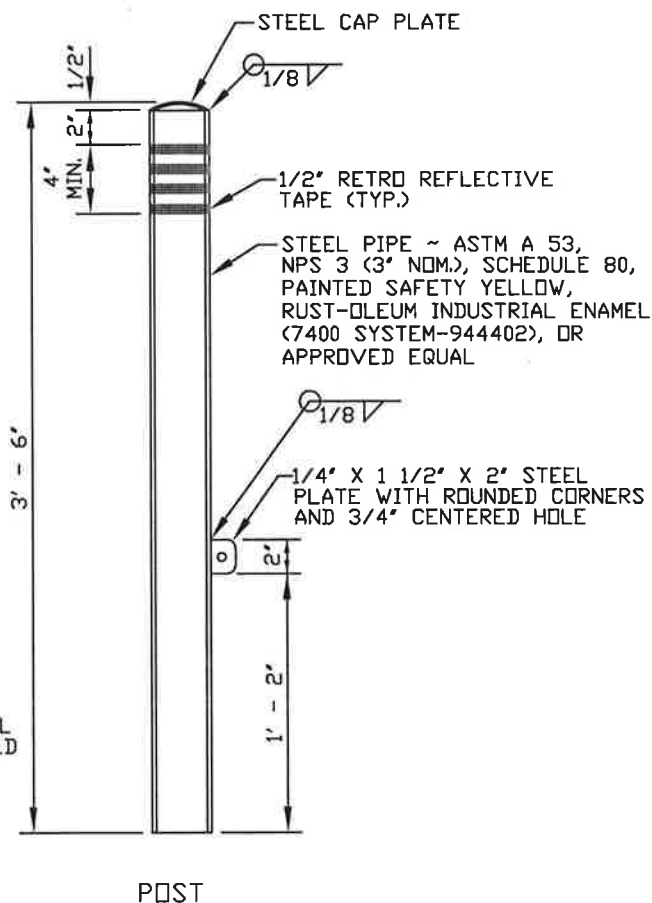


SQUARE FOOTING

PLAN VIEW



SECTION A



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REMOVABLE BOLLARD DETAIL

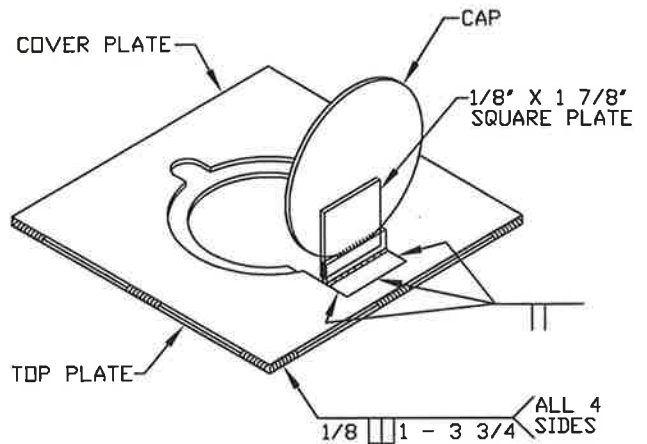
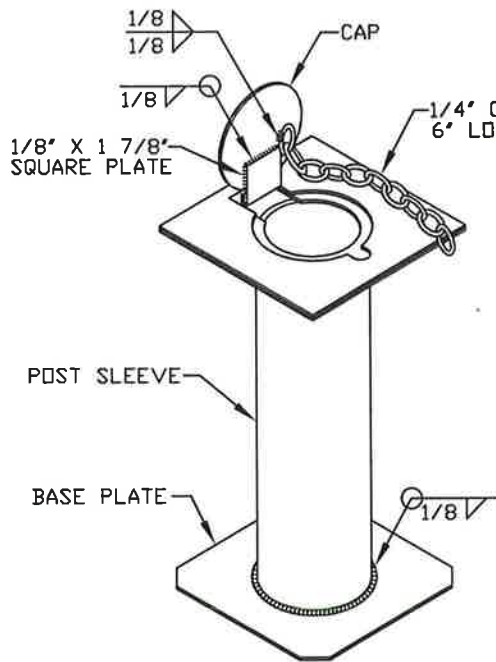
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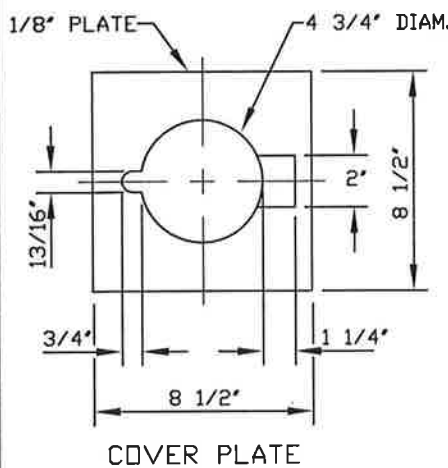
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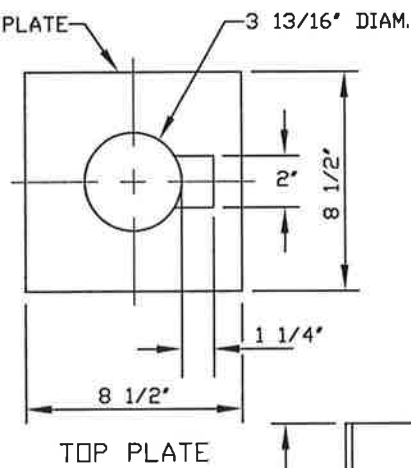
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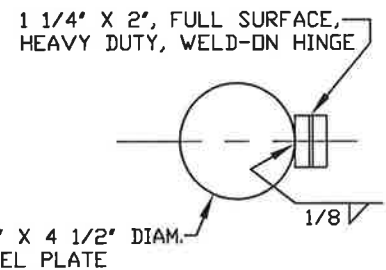
BASE ASSEMBLY



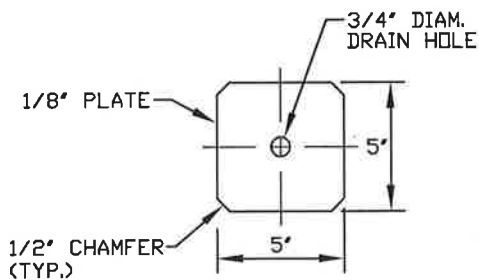
COVER PLATE



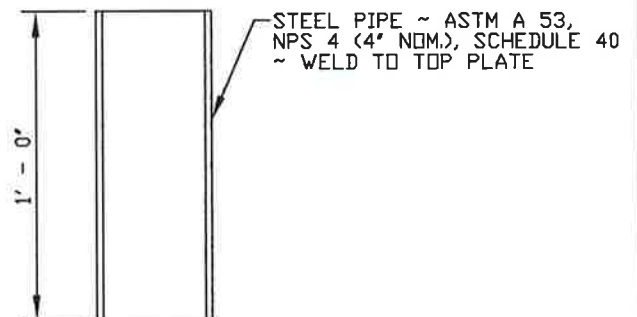
TOP PLATE



CAP AND HINGE



BASE PLATE



POST SLEEVE



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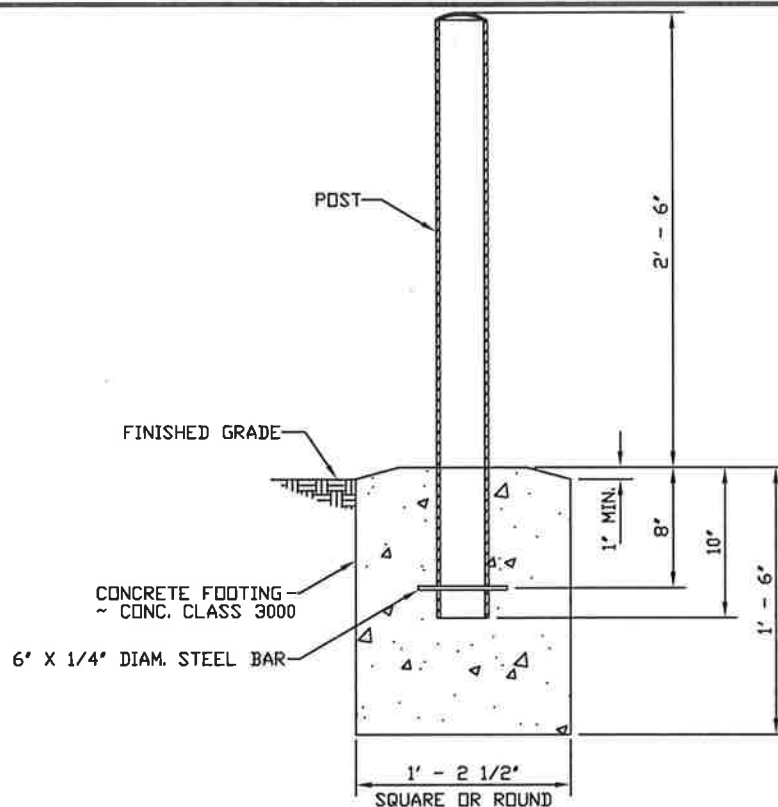
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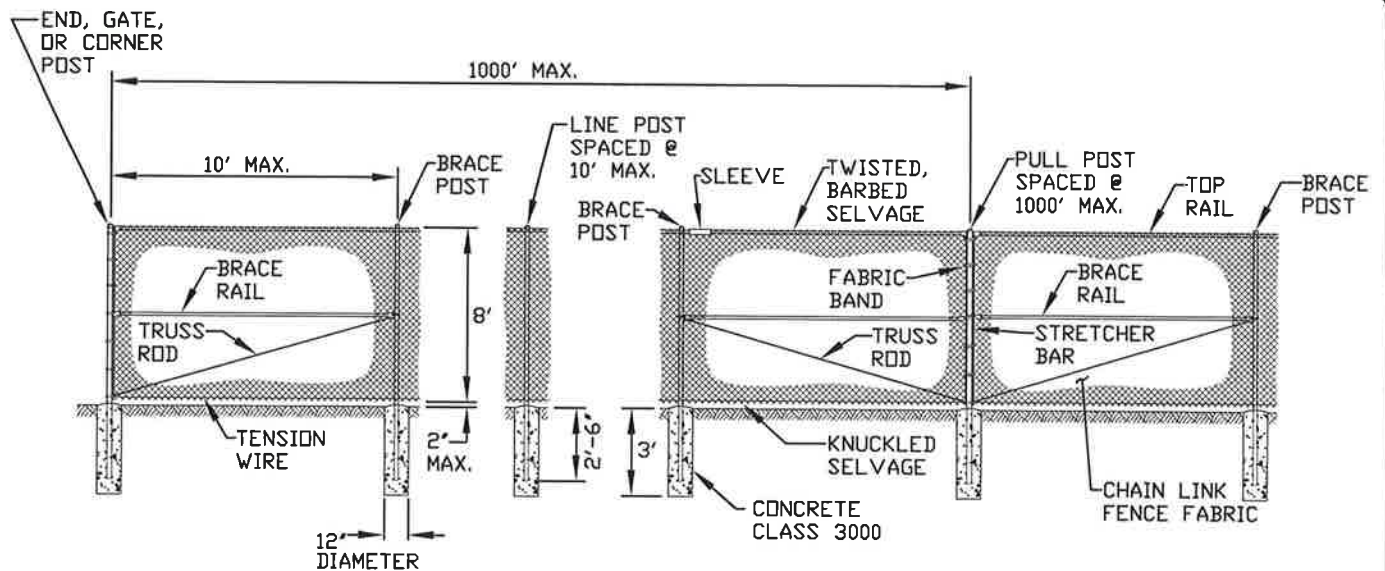
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FIXED BOLLARD DETAIL

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NOTES:

1. CHAIN LINK FENCING SHALL BE 9 GAUGE WIRE WOVEN IN A TWO (2) INCH MESH COATED WITH 15 MILS OF BLACK PVC WITH BLACK PVC SLATS.
2. POSTS, RAILS, AND GATE FRAMES SHALL BE SCHEDULE 40 STEEL PIPE, GALVANIZED AND PVC COATED (15 MILS).
3. FENCING AROUND PUMP STATIONS SHALL HAVE BLACK PVC SLATS.

MEMBER									
BRACE RAIL & TOP RAIL			LINE & BRACE POST			END, CORNER, & PULL POST		GATE POST	ALL POSTS
ROUND	H-COLUMN	ROLL FORMED	ROUND	H-COLUMN	ROLL FORMED	ROUND	ROLL FORMED	ROUND	LENGTH
NOM I.D. PIPE (INCHES)	SIZE (INCHES)	SIZE (INCHES)	NOM I.D. PIPE (INCHES)	SIZE (INCHES)	SIZE (INCHES)	NOM I.D. PIPE (INCHES)	SIZE (INCHES)	NOM I.D. PIPE (INCHES)	
1 1/4	1 1/4x1 5/8	1 5/8x1 1/4	2	2 1/4	1 5/8x1 7/8	2 1/2	3 1/2x3 1/2	3 1/2	10'-8'



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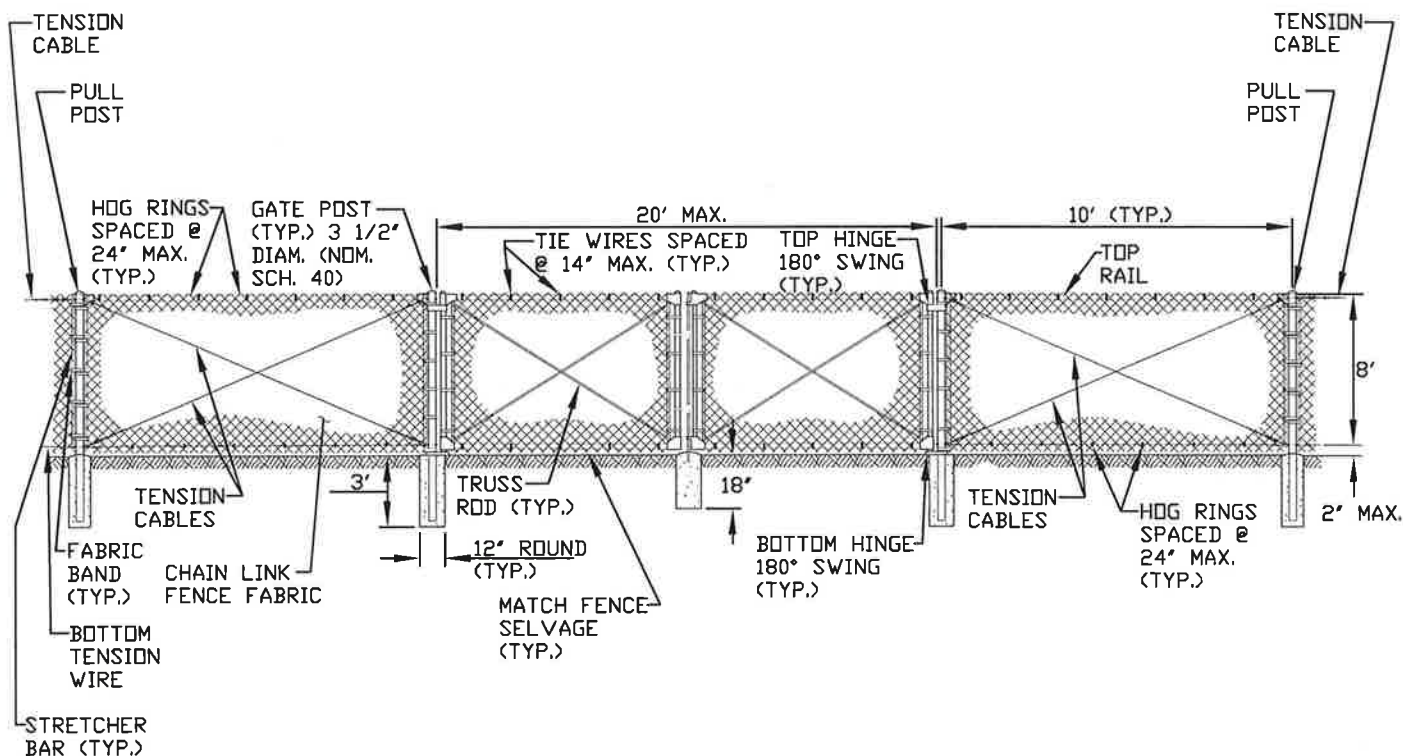
CHAIN LINK FENCE

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NOTE:
GATE SHALL BE CONSTRUCTED TO OPEN IN, AWAY FROM THE RIGHT-OF-WAY AND ABLE TO FULLY OPEN WITHOUT INTERFERENCE FROM THE PAVEMENT OR OTHER STRUCTURES.



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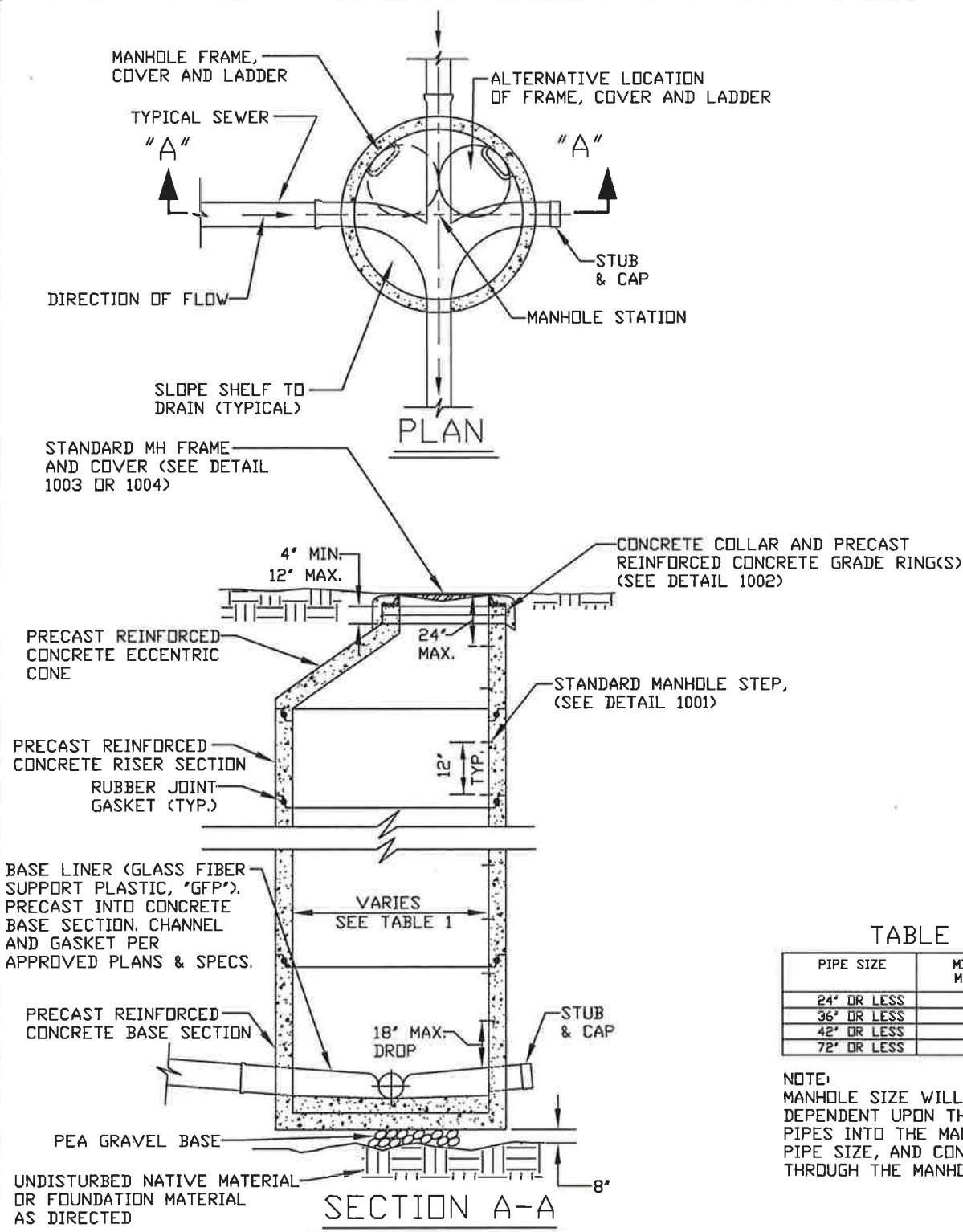
CHAIN LINK DOUBLE GATE

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CONCRETE MANHOLE

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1. ALL NEWLY CONSTRUCTED MANHOLES SHALL HAVE PREDL LINERS WITH GU-MANHOLE PIPE CONNECTORS. LINER SYSTEM SHALL BE MANUFACTURED BY PREDL SYSTEMS NORTH AMERICA, INC.
2. ALL MANHOLE RISER JOINTS SHALL HAVE BOTH BUTYL RUBBER GASKETS AND PREFORMED (ROPE TYPE) JOINT SEALANT, PER PIERCE COUNTY SPECIFICATIONS.
3. THE INTERIOR WALLS OF ALL MANHOLES WITH PIPES 15" NOMINAL INSIDE DIAMETER OR LARGER AND/OR WITH FORCE MAIN CONNECTIONS) SHALL BE COATED PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.
4. ALL MANHOLES LOCATED IN NON-PAVED AREAS SHALL HAVE WATERTIGHT LIDS AND CONCRETE COLLARS (SEE DETAILS 1002, 1003, AND 1004)
5. NO MORE THAN 5 SIDE SEWERS CAN BE INSTALLED AT A TERMINAL MANHOLE. THE SIDE SEWERS MUST BE INSTALLED AT 90° OR GREATER FROM THE OUTLET MAIN.
6. EXTERIOR OF ALL CONCRETE MANHOLES SHALL BE COATED WITH BITUMINOUS COAL TAR EPOXY AT A MIN. DRY THICKNESS OF 30 MILS.
7. MANHOLES SHALL BE VACUUM TESTED PER PIERCE COUNTY SPECIFICATIONS.
8. PRECAST MANHOLE SECTIONS SHALL BE CONSTRUCTED PER ASTM C478.
9. MANHOLES WITH 72" OR GREATER DIAMETER MAY USE A REINFORCED CONCRETE TOP SLAB TO TRANSITION TO A 48" RISER. BASE SECTIONS MUST PROVIDE A MINIMUM OF 8 FEET FROM MANHOLE BENCH TO TOP SLAB.



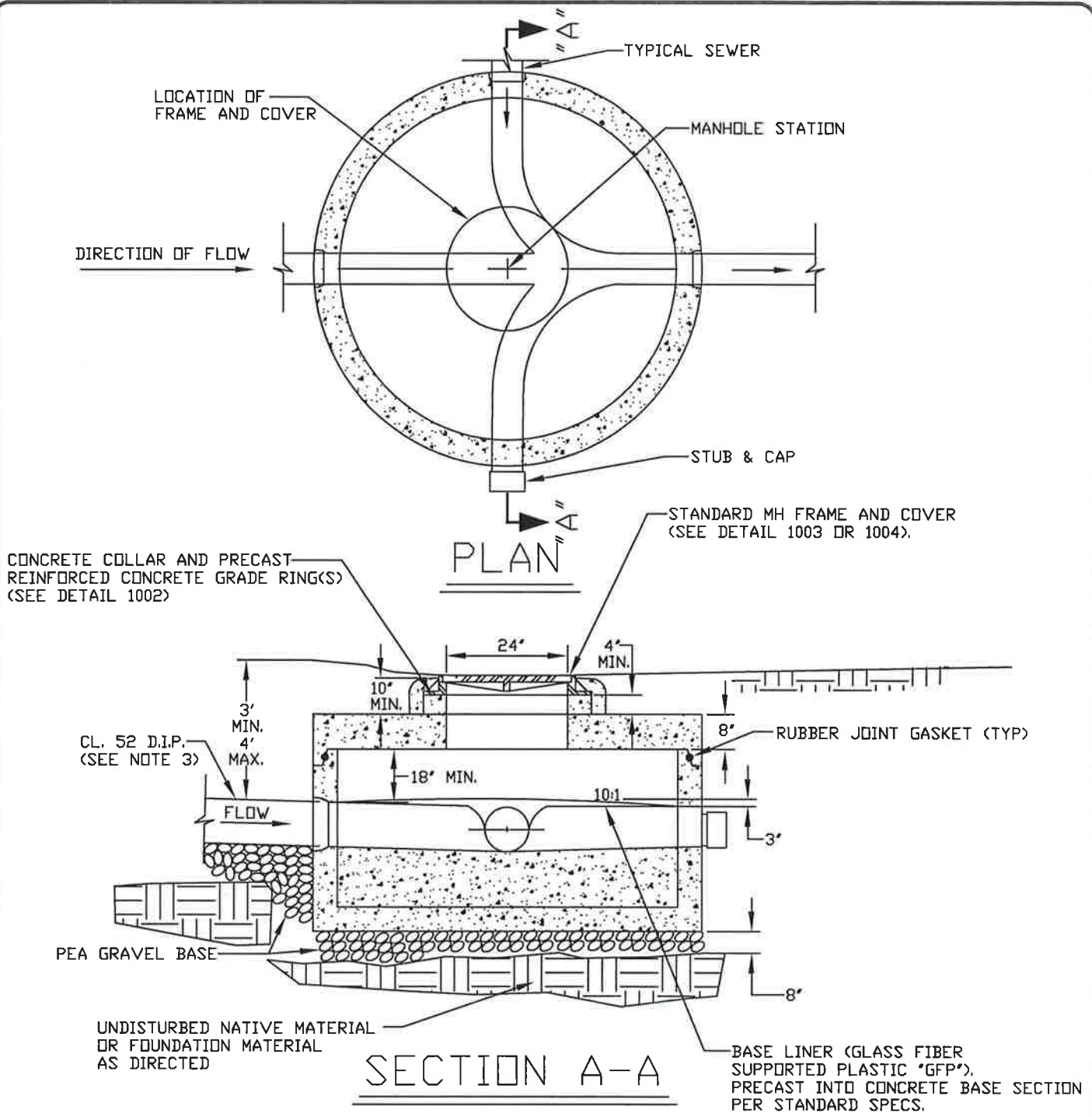
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CONCRETE MANHOLE NOTES

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2001
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- NOTE: 1.) ALL NOTES ON 2001 PAGES 1 AND 2 APPLY ON SHALLOW MANHOLE INSTALLATION.
 2.) THE MINIMUM COVER OVER A PVC PIPE SHALL BE 5 FEET UNDER DRIVING SURFACES AND 3 FEET IN NON-PAVED AREAS. THE MINIMUM COVER OVER CLASS 52 DUCTILE IRON PIPE SHALL BE 3 FEET UNDER DRIVING SURFACES AND NON-PAVED AREAS.



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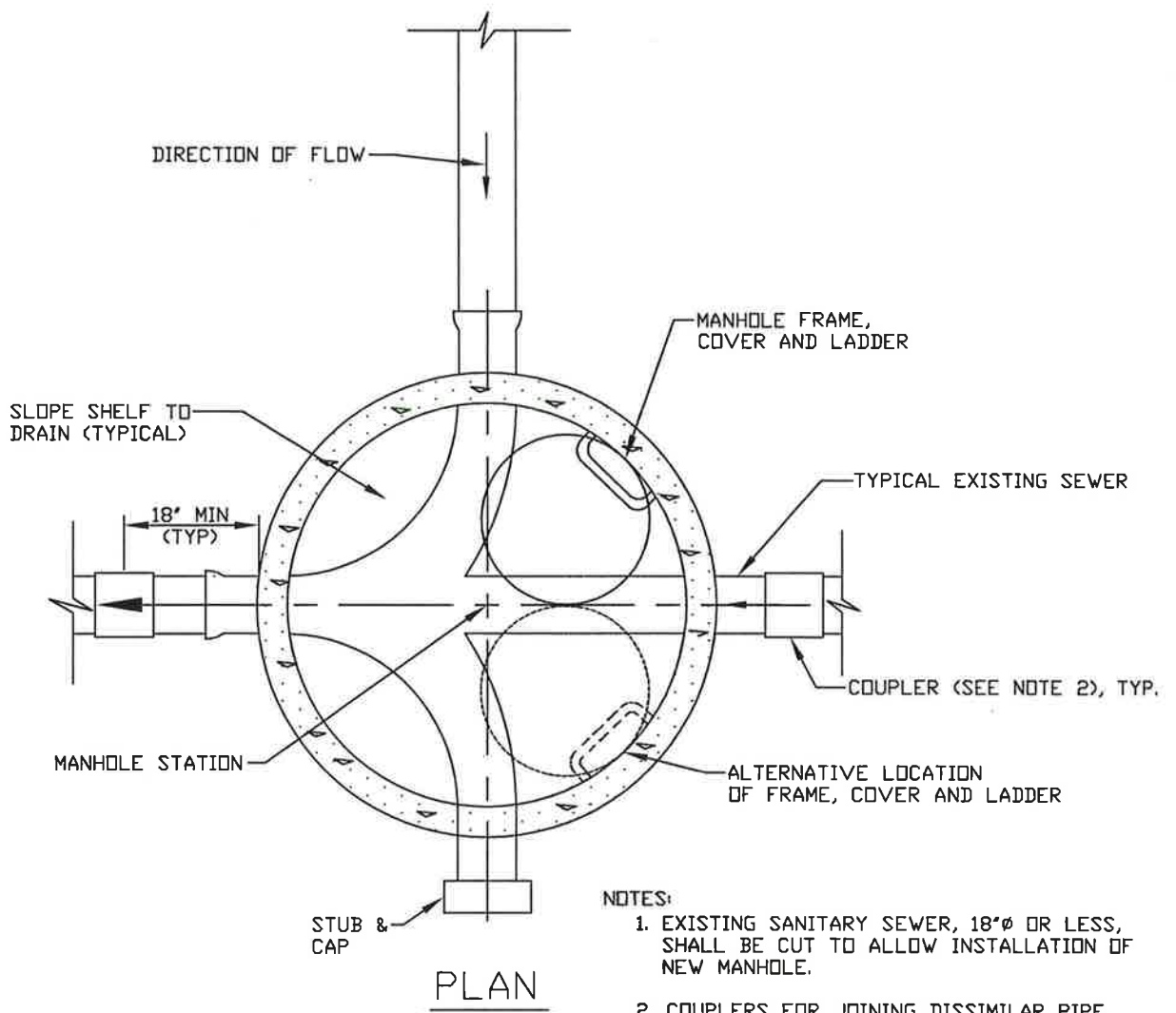
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SHALLOW CONCRETE MANHOLE

STANDARD DETAIL NO.

2002

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NOTES:

1. EXISTING SANITARY SEWER, 18"Ø OR LESS, SHALL BE CUT TO ALLOW INSTALLATION OF NEW MANHOLE.
2. COUPLERS FOR JOINING DISSIMILAR PIPE TYPES SHALL BE MANUFACTURED BY SPECIFIED FITTINGS. ALL OTHERS SHALL BE ROMAC OR APPROVED EQUAL.
3. ALL NOTES ON DETAIL 2001 PAGES 1 AND 2 SHALL APPLY.
4. SLOPE OF MANHOLE CHANNEL SHALL MATCH EXISTING PIPE SLOPE.
5. MANHOLE SIZE WILL BE DEPENDENT UPON THE NUMBER OF PIPES INTO THE MANHOLE, PIPE SIZE, AND CONFIGURATION THROUGH THE MANHOLE.



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STANDARD DETAILS

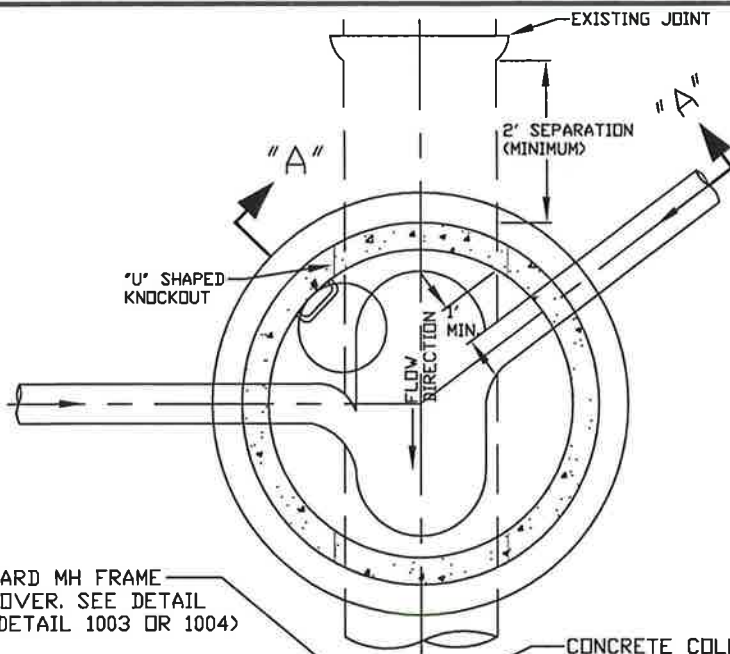
DATE
05/01/2011
SCALE
NTS

NEW CONCRETE MANHOLE
CUT INTO EXISTING MAIN

STANDARD DETAIL NO.

2003

PAGE 1 OF 1



NOTES:

1. MANHOLE SIZE WILL BE DEPENDENT UPON THE NUMBER OF PIPES INTO THE THE MANHOLE, PIPE SIZE, AND CONFIGURATION THROUGH THE MANHOLE.
2. ALL MANHOLE RISER JOINTS SHALL HAVE BOTH BUTYL RUBBER GASKETS AND PREFORMED (ROPE TYPE) JOINT SEALANT, PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.

TABLE 1

PIPE SIZE	MINIMUM MH DIA.
24" OR LESS	48"
36" OR LESS	60"
42" OR LESS	72"
72" OR LESS	96"

STANDARD MH FRAME AND COVER. SEE DETAIL (SEE DETAIL 1003 OR 1004)

CONCRETE COLLAR AND PRECAST REINFORCED GRADE RING(S) (SEE DETAIL 1002)

RUBBER JOINT GASKET (TYP.) (SEE NOTE 2)

REINFORCED CONCRETE ECCENTRIC CONE

REINFORCED CONCRETE RISER SECTION, IF NECESSARY

STANDARD MANHOLE STEP (SEE DETAIL 1001)

IF DIAMETER OF LOWER SECTION REQUIRES 72"Ø OR GREATER, THE CONTRACTOR MAY USE REINFORCED CONCRETE TOP FLAT SLAB WITH OFFSET HOLE FOR RISER SECTION.

SEC. A-A

CUT AND REMOVE TOP HALF OF EXISTING PIPE. BOTTOM HALF TO REMAIN AS MANHOLE CHANNEL. SLOPE BENCH 1:10

VARIES, SEE TABLE 1

COAT INTERIOR/EXTERIOR OF MANHOLE, INCLUDING BENCH, PER PIERCE COUNTY STANDARD SPECIFICATIONS.

PRECAST REINFORCED CONCRETE SECTION

CORE DRILL AND LINK SEAL OR KOR-N-SEAL BOOT

DO NOT SET OVER EXISTING JOINT.

CONCRETE SLAB MAY BE PRECAST OR CAST IN PLACE

U" SHAPED MANHOLE KNOCKOUT TO INSTALL MANHOLE OVER EXISTING PIPE. PROVIDE 2" CLEARANCE (MIN.) AROUND PIPE AND GROUT.

8" PEA GRAVEL BASE

FORM CONCRETE BASE AND CHANNEL IN FIELD.

PRECAST SECTION TO BE PLACED OVER MAIN AFTER REINFORCED CONCRETE SLAB HAS BEEN POURED AND MUST HAVE MINIMUM 2" EMBEDMENT IN CONCRETE SLAB.

UNDISTURBED NATIVE MATERIAL

#4 @ 12" C/C EACH WAY



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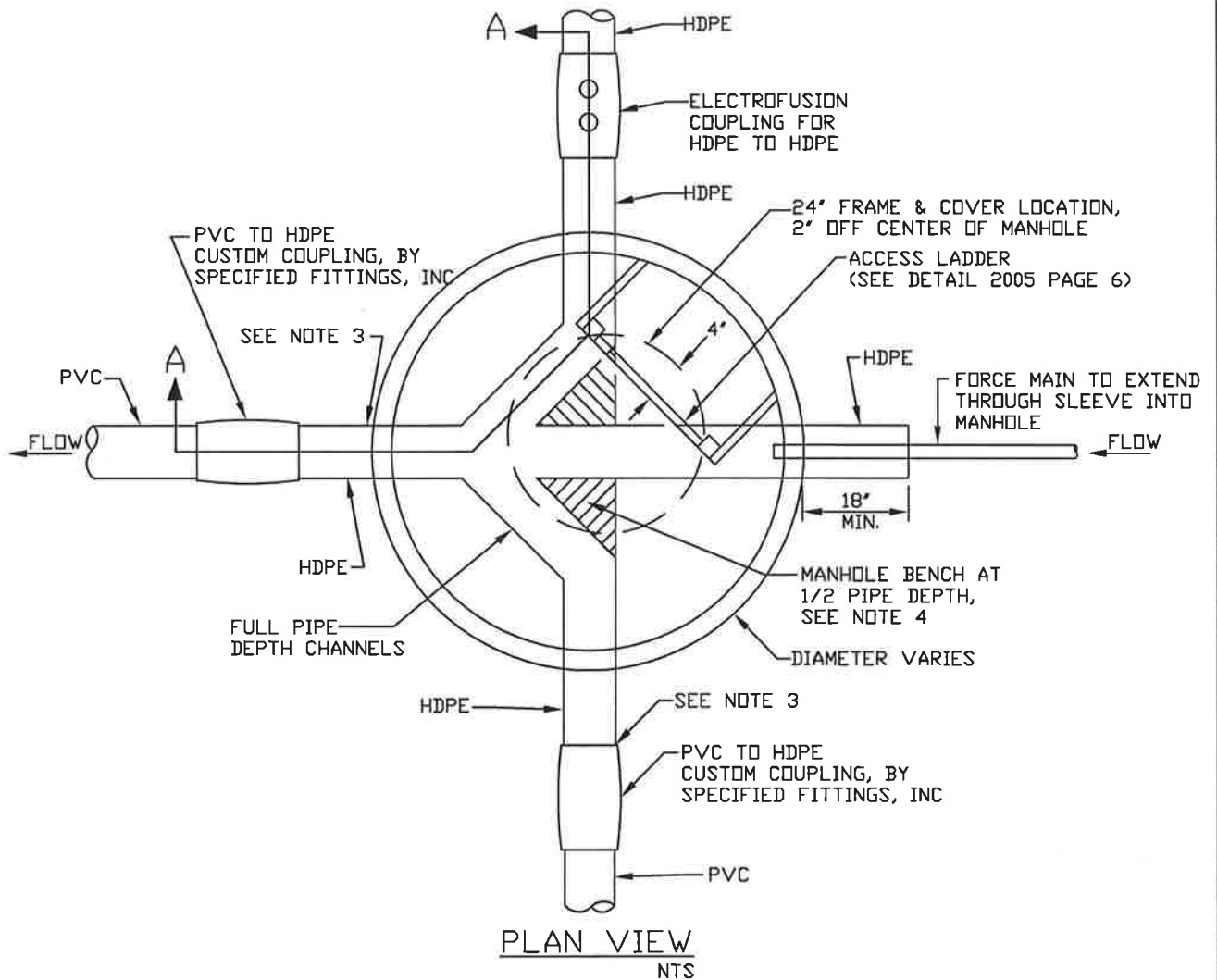
DATE
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CONCRETE SADDLE MANHOLE

STANDARD DETAIL NO.

2004

PAGE 1 OF 1



NOTES:

1. BACKFILL SHALL BE PLACED AROUND THE MANHOLE RISER FOR THE FULL HEIGHT OF THE MANHOLE.
2. BACKFILL SHALL EXTEND A MINIMUM OF 3.5' FEET FROM THE RISER OR TO THE TRENCH WALL, WHICHEVER DISTANCE IS GREATER.
3. PIPE STUB THICKNESS SHALL CONFORM TO SPECIFIED SIZES SHOWN ON DETAIL 2005 PAGE 3.
4. BENCH AND PIPE TO BE AT FULL PIPE DEPTH IN NON-HATCHED AREAS, HATCH LOCATIONS TO BE HALF PIPE DEPTH.



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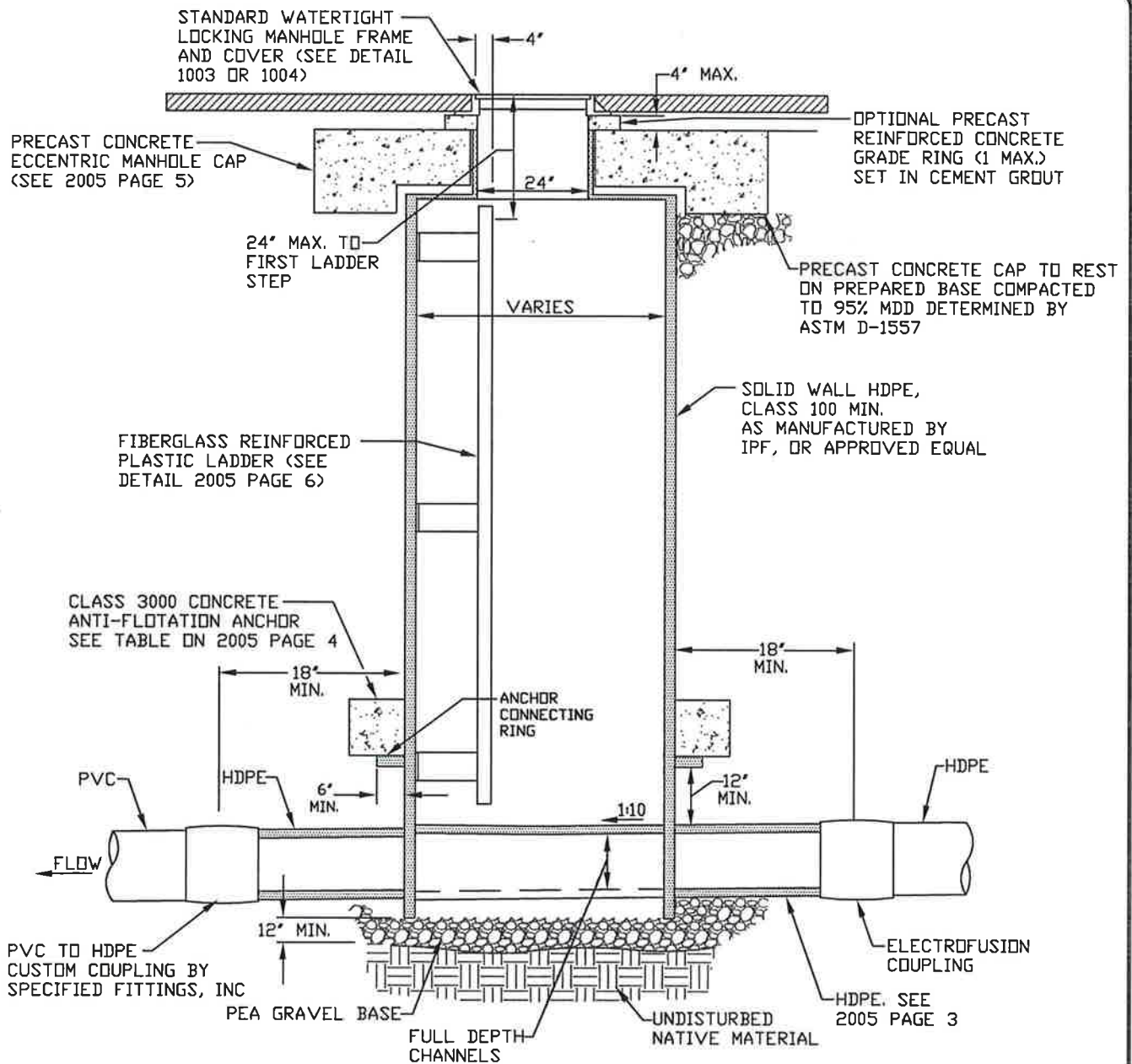
HDPE MANHOLE PLAN VIEW

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SCALE
NTS

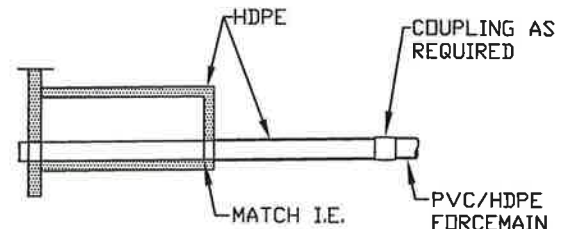
STANDARD DETAIL NO.

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SECTION A-A
NTS



FORCE MAIN CONNECTION DETAIL



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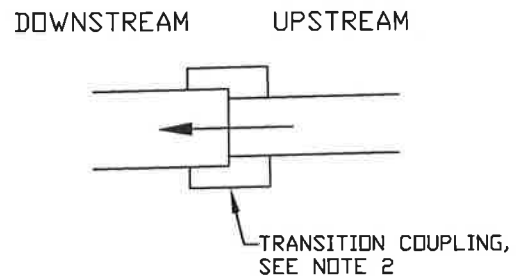
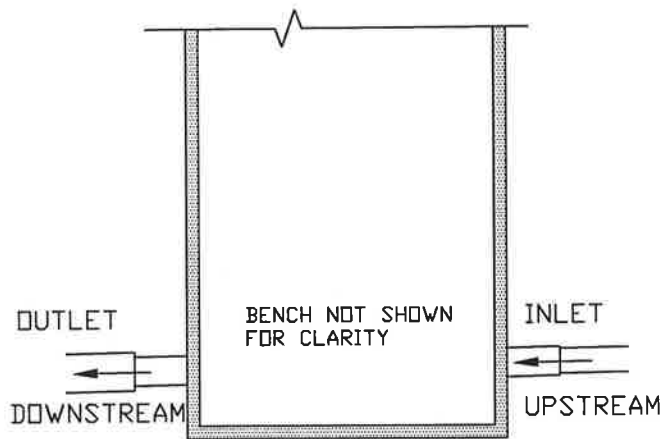
HDPE MANHOLE SECTION VIEW

DATE
12/26/2012
SCALE
NTS

STANDARD DETAIL NO.

2005

PAGE 2 OF 7



PIPE	HDPE MANHOLE INLET STUB	HDPE MANHOLE OUTLET STUB
6" PVC SDR35	8" DR11	N/A
8" PVC SDR35	10" DR11	8" DR17
10" PVC SDR35	12" DR11	10" DR17
12" PVC SDR35	16" DR11	12" DR17
15" PVC SDR35	18" DR11	16" DR17
18" PVC SDR35	22" DR11	20" DR13.5
21" PVC SDR35	24" DR17	22" DR17
24" PVC SDR35	28" DR 13.5	28" DR11
8" PVC SDR21	10" DR11	8" DR17
10" PVC SDR21	12" DR11	10" DR17
12" PVC SDR21	14" DR13.5	12" DR17
8" C900 DR14	10" DR11	8" DR17
10" C900 DR14	12" DR11	10" DR17
12" C900 DR14	14" DR11	12" DR17
14" C905 DR18	16" DR13.5	16" DR13.5
16" C905 DR18	18" DR17	18" DR13.5
18" C905 DR18	22" DR11	20" DR13.5
20" C905 DR18	24" DR11	22" DR13.5

NOTES:

- 1.) REGARDLESS OF PIPE TYPE THE INSIDE DIAMETER OF DOWNSTREAM PIPE SHALL BE EQUAL TO OR LARGER THAN UPSTREAM PIPE.
- 2.) PVC TO HDPE GRAVITY CONNECTIONS SHALL BE MADE USING COUPLINGS MADE BY SPECIFIED FITTINGS, INC OF BELLINGHAM, WA.



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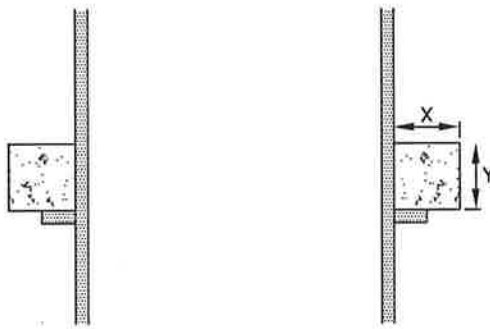
STANDARD DETAILS

HDPE MANHOLE STUB TABLE

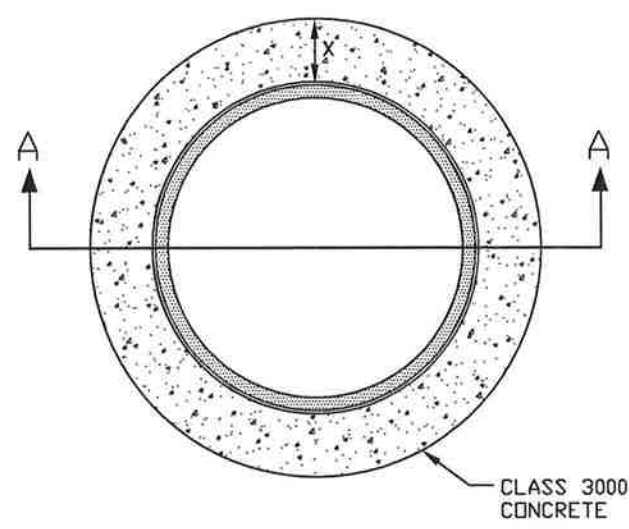
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STANDARD DETAIL NO.

2005
PAGE 3 OF 7



SECTION A-A



DEPTH, RIM TO INVERT (FT)	MANHOLE DIAMETER							
	48"		54"		60"		72"	
	X (IN)	Y (IN)	X (IN)	Y (IN)	X (IN)	Y (IN)	X (IN)	Y (IN)
6	20	12	26	13				
8	20	10	26	13	26	13	32	16
10	18	9	22	11	24	12	28	14
12	18	9	20	10	24	12	26	13
14	16	8	20	10	22	11	26	13
16	16	8	18	9	20	10	24	12
18	16	8	18	9	20	10	24	12
20	16	8	18	9	20	10	24	12
22	16	8	18	9	20	10	24	12
24	16	8	18	9	20	10	24	12
26	16	8	18	9	20	10	24	12
28	16	8	18	9	20	10	22	11
30	16	8	18	9	20	10	22	11

NOTES:

1. THIS TABLE IS TO BE USED WITH 16" OR SMALLER THROUGH PIPES.
2. FOR PIPES OF LARGER DIAMETER OR FOR GREATER DEPTHS THE ENGINEER SHALL BE REQUIRED TO SUBMIT CALCULATIONS AND SUBMITTALS FOR APPROVAL.



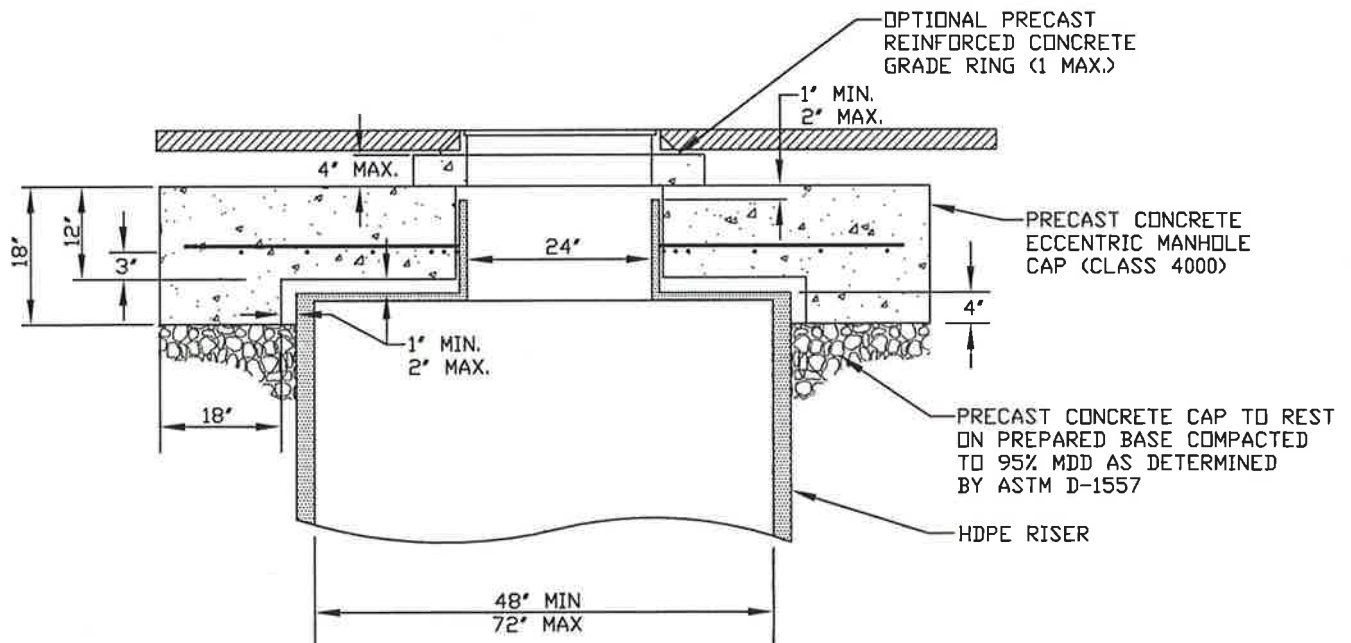
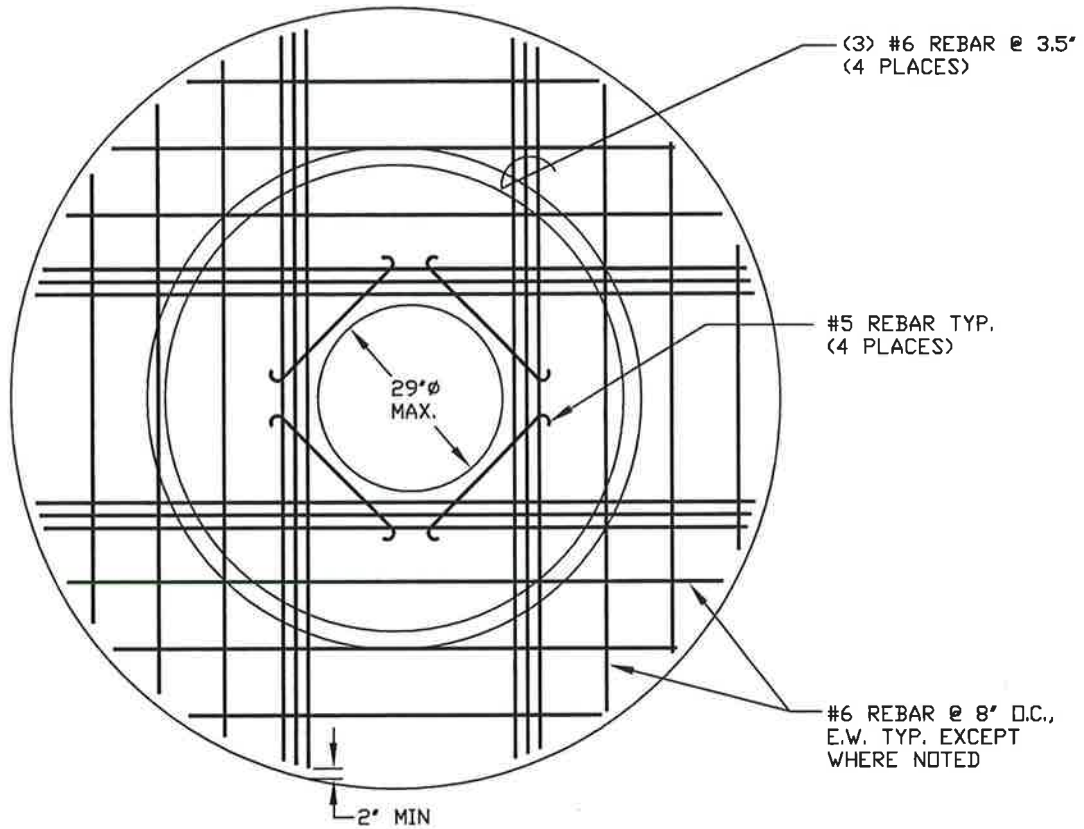
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STANDARD DETAILS

HDPE MANHOLE ANTI-FLOTATION ANCHOR TABLE

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SCALE
NTS

STANDARD DETAIL NO.
2005
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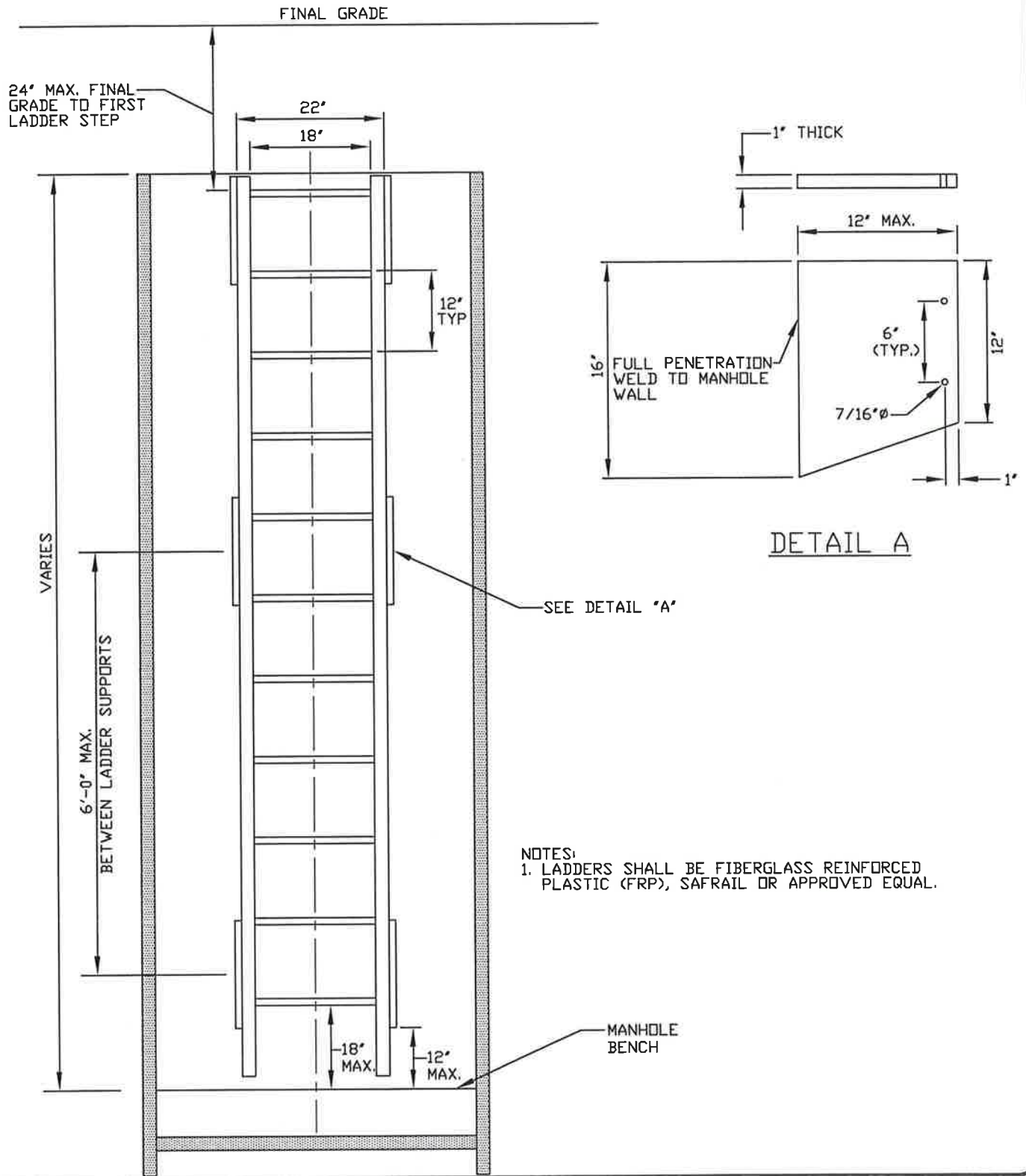
HDPE MANHOLE
PRECAST CONCRETE CAP

DATE
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SCALE
NTS

STANDARD DETAIL NO.

2005

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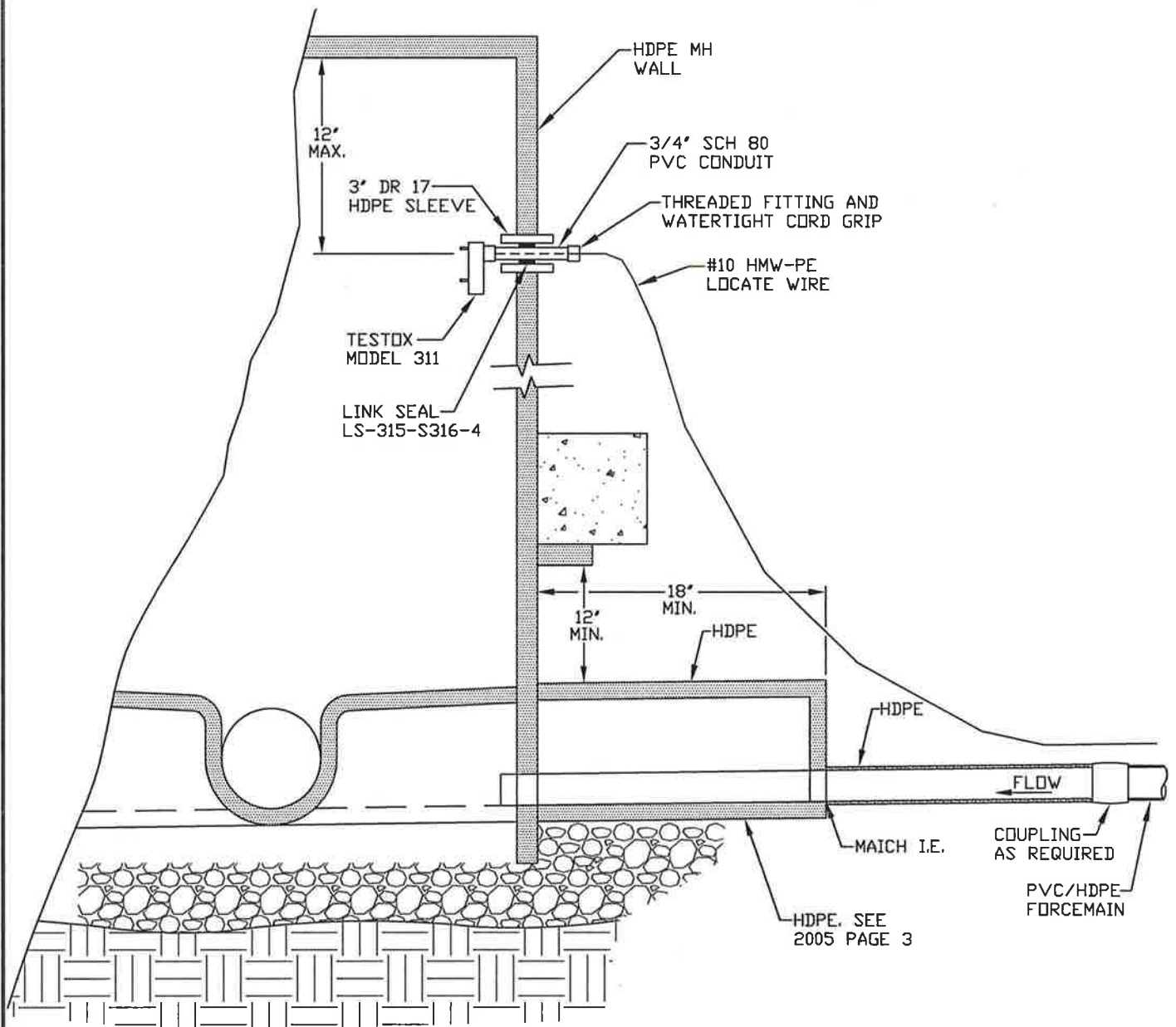
HDPE MANHOLE LADDER

DATE
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NTS

STANDARD DETAIL NO.

2005

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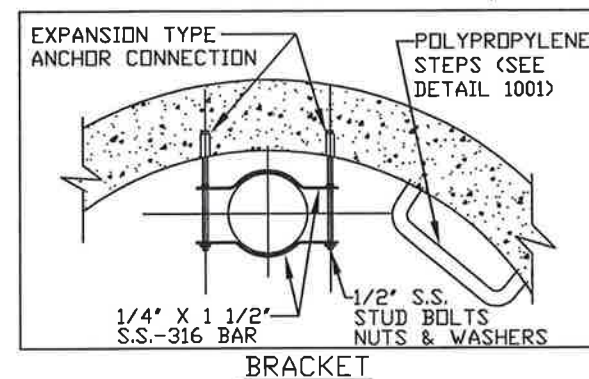
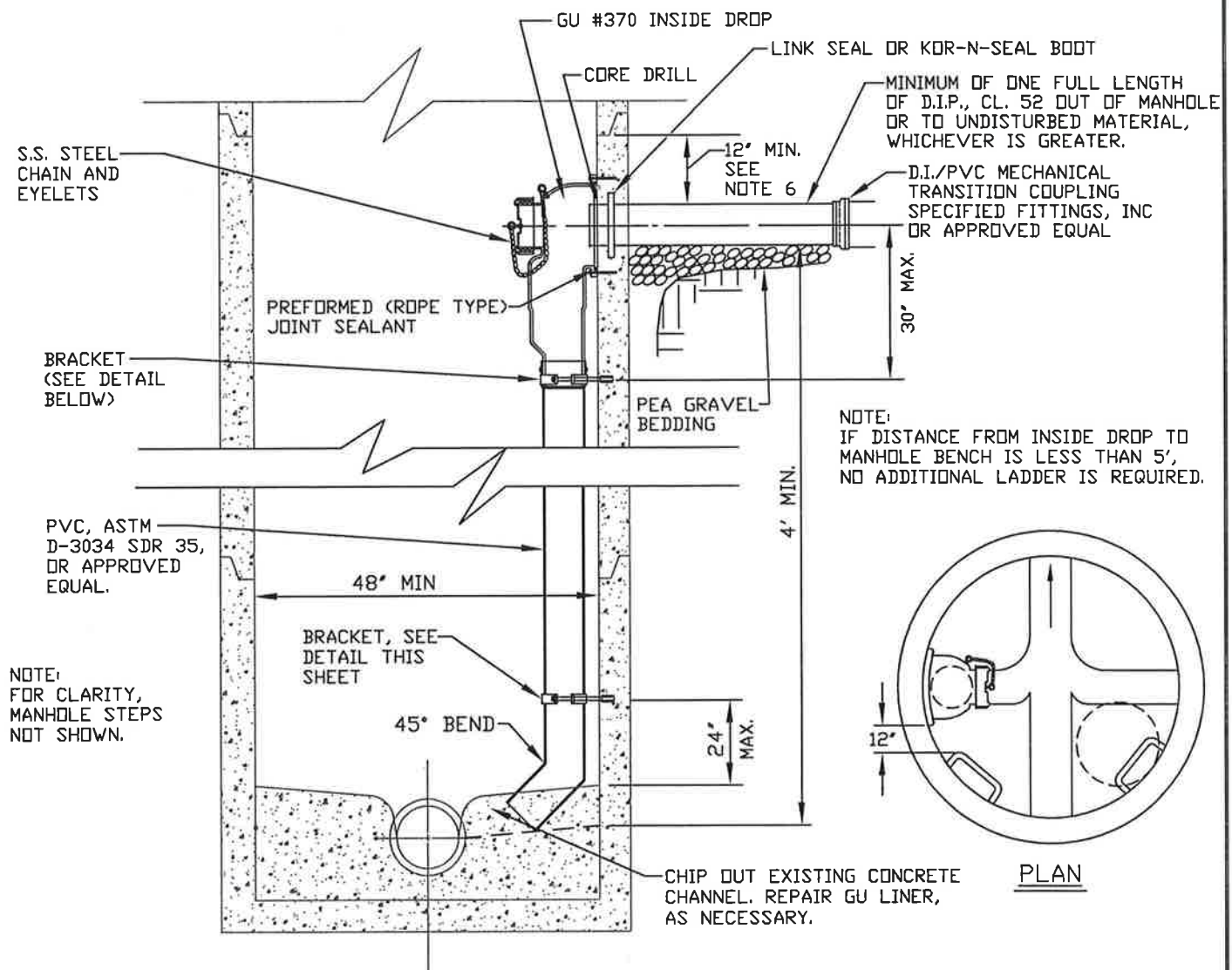
STANDARD DETAILS

HDPE MANHOLE FORCE MAIN CONNECTION

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.

2005
PAGE 7 OF 7



NOTES

1. MINIMUM OF TWO (2) BRACKETS SHALL BE PLACED A MAXIMUM OF 10' APART VERTICAL, DROP SHALL BE 8" DIA. MIN. FOR MAIN LINES & 6" DIA. FOR SIDE SEWERS.
2. MANHOLE BASE TO BE RECHANNELED AS REQUIRED.
3. USE DEAD-END CHANNEL FOR MANHOLES WITH INVERT LINERS.
4. ONLY ONE INSIDE DROP STRUCTURE PER 48"Ø MANHOLE, UNLESS WRITTEN PERMISSION IS GIVEN BY THE COUNTY.
5. ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE COATED PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.
6. CORE DRILL TO BE 1 FOOT ABOVE OR BELOW MANHOLE JOINT.
7. ADAPTER BY GU REQUIRED FOR MANHOLES 72" DIA. AND LARGER.



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STANDARD DETAILS

CONCRETE MANHOLE WITH
SINGLE INSIDE DROP STRUCTURE
FOR GRAVITY CONNECTION

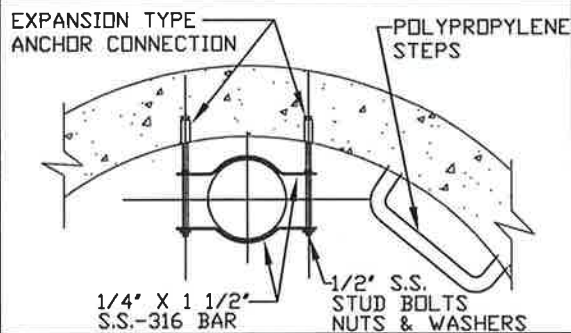
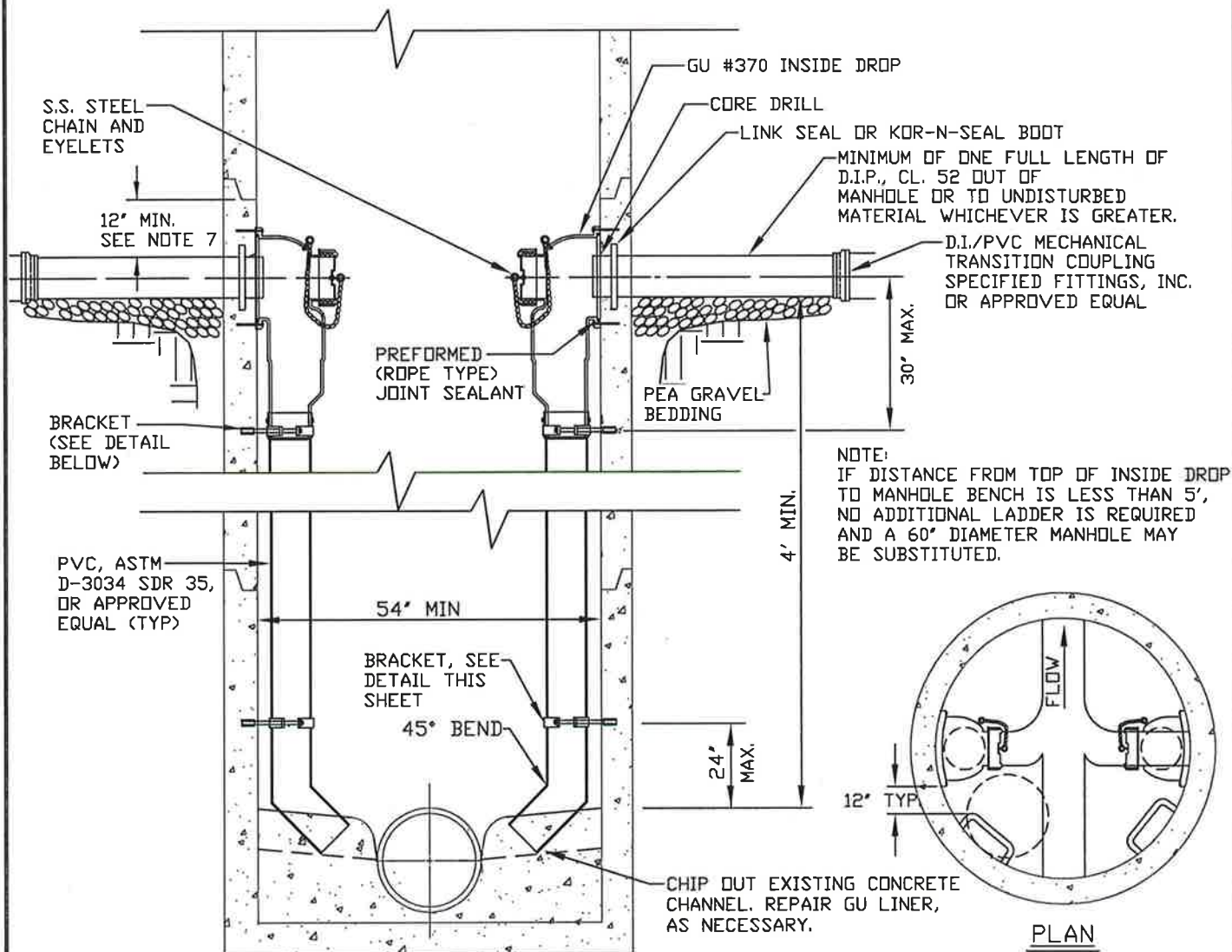
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NTS

STANDARD DETAIL, NO.

2006

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NOTE: FOR CLARITY, MANHOLE STEPS NOT SHOWN.



BRACKET

NOTES

1. MINIMUM OF TWO (2) BRACKETS SHALL BE PLACED A MAXIMUM OF 10' APART VERTICAL, DROP SHALL BE 8" DIA. MIN. FOR MAIN LINES & 6" DIA. FOR SIDE SEWERS.
2. MANHOLE BASE TO BE RECHANNELED AS REQUIRED.
3. USE DEAD-END CHANNEL FOR MANHOLES WITH INVERT LINERS.
4. TWO INSIDE DROP STRUCTURES REQUIRE A 54"Ø MANHOLE, UNLESS WRITTEN PERMISSION IS GIVEN BY THE COUNTY.
5. ADDITIONAL LADDER MUST BE INSTALLED ONE FOOT FROM THE DROP STRUCTURE (MEASURED EDGE TO EDGE) AND BUILT FROM THE MANHOLE SHELF UP TO THE GU370 DROP.
6. ALL DUCTILE IRON PIPE AND FITTINGS SHALL BE COATED PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.
7. CORE DRILL TO BE 1 FOOT ABOVE OR BELOW MANHOLE JOINT.
8. ADAPTER BY GU REQUIRED FOR MANHOLES 72" DIA. AND LARGER.



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STANDARD DETAILS

CONCRETE MANHOLE WITH TWO
INSIDE DROP STRUCTURES
FOR GRAVITY CONNECTION

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SCALE
NTS

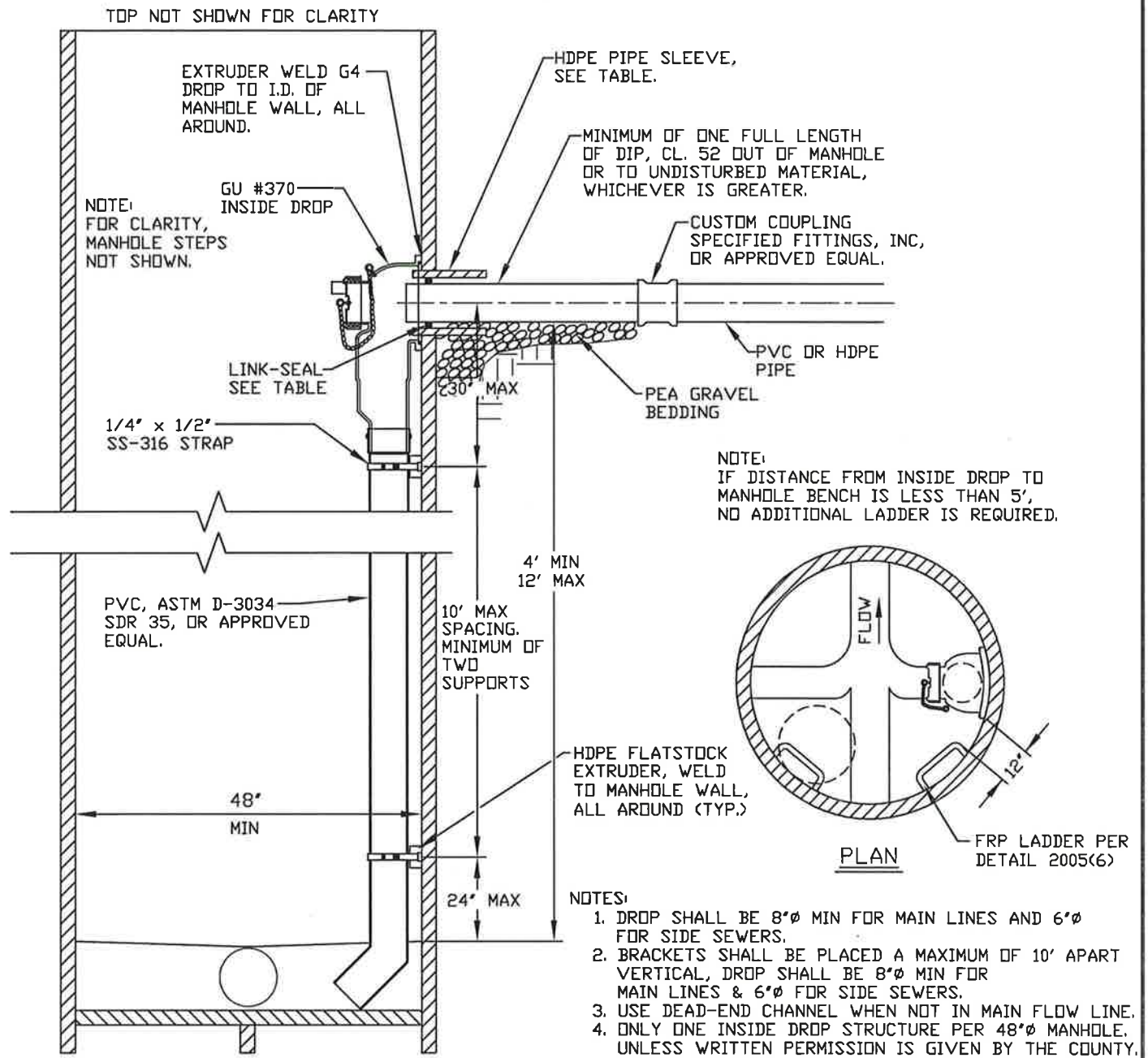
STANDARD DETAIL NO.

2007

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INLET PIPE	HDPE SLEEVE	LINK-SEAL
6" DIP	12" DR11	LS-400-7
8" DIP	14" DR17	LS-400-9
10" DIP	16" DR17	LS-360-18

ENGINEER SHALL SPECIFY HDPE SLEEVE AND LINK-SEAL SIZING IF INLET PIPE IS OTHER THAN THOSE SHOWN IN TABLE.



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STANDARD DETAILS

HDPE MANHOLE WITH SINGLE
INSIDE DROP STRUCTURE
FOR GRAVITY CONNECTION

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL. NO.

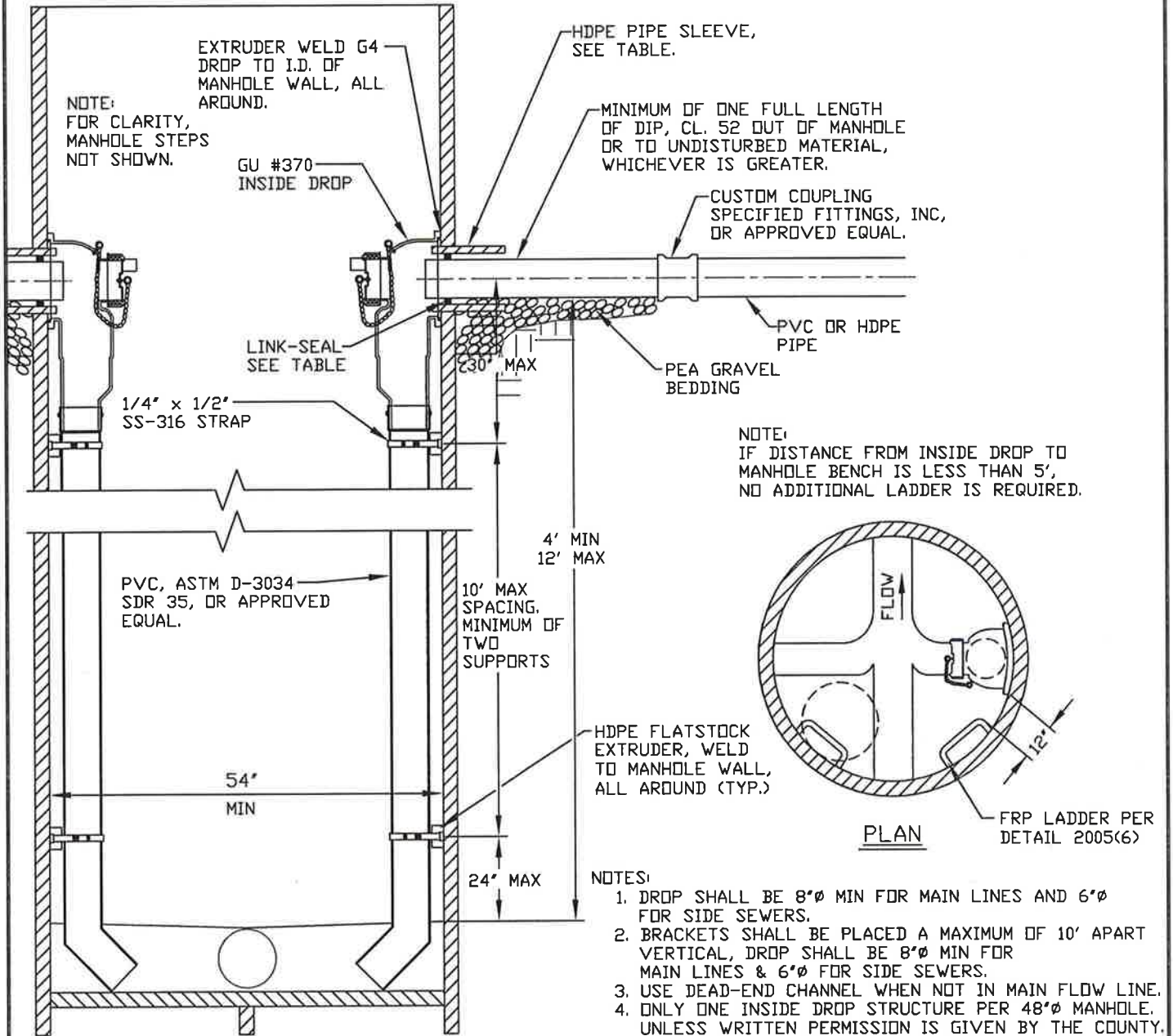
2008

PAGE 1 OF 1

INLET PIPE	HDPE SLEEVE	LINK-SEAL
6" DIP	12" DR11	LS-400-7
8" DIP	14" DR17	LS-400-9
10" DIP	16" DR17	LS-360-18

ENGINEER SHALL SPECIFY HDPE SLEEVE AND LINK-SEAL SIZING IF INLET PIPE IS OTHER THAN THOSE SHOWN IN TABLE.

TOP NOT SHOWN FOR CLARITY



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STANDARD DETAILS

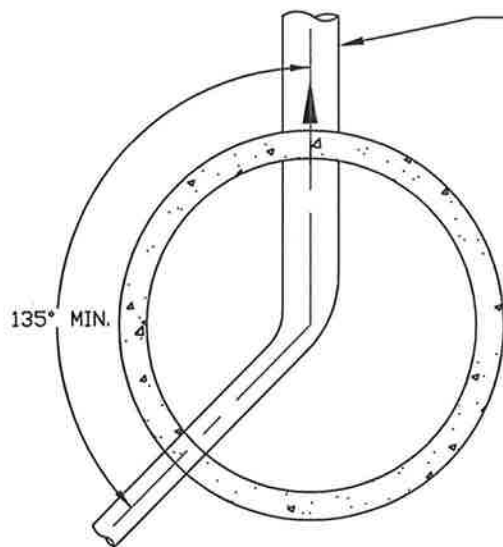
HDPE MANHOLE WITH TWO
INSIDE DROP STRUCTURES
FOR GRAVITY CONNECTION

DATE
05/01/2011
SCALE
NTS

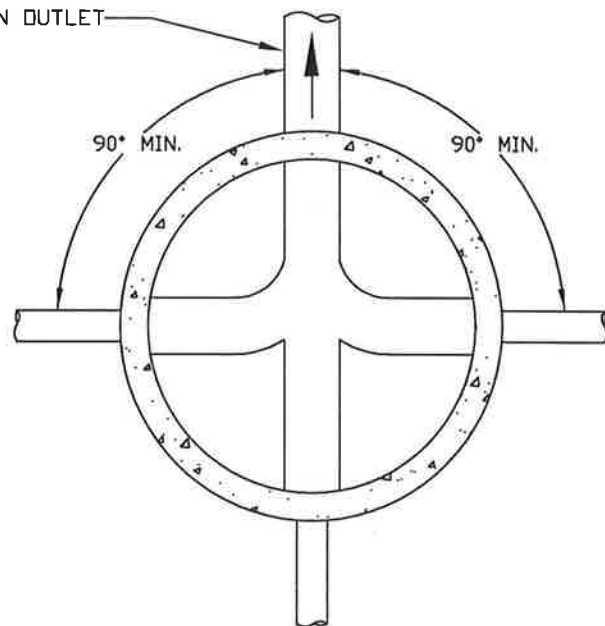
STANDARD DETAIL, NO.

2009

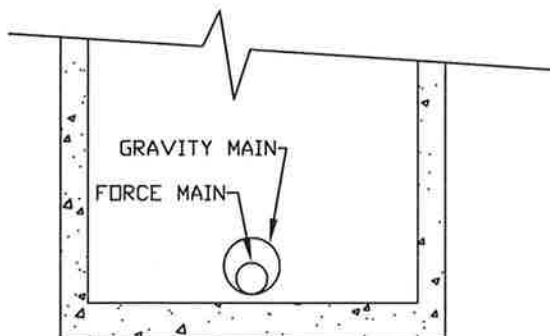
PAGE 1 OF 1



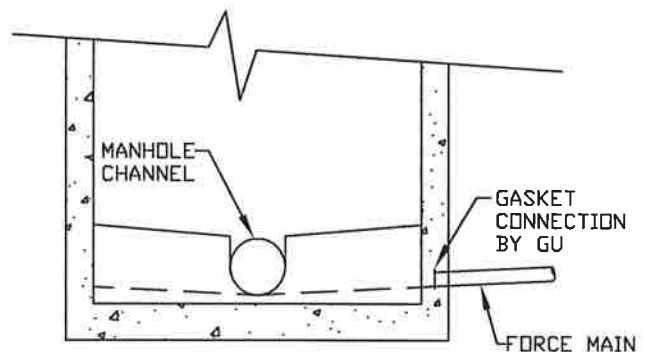
IF FORCE MAIN IS 6"Ø OR GREATER,
FORCE MAIN MUST ENTER AT 135° MIN.
TO THE OUTLET PIPE.



IF FORCE MAIN IS LESS THAN 6"Ø,
FORCE MAIN MAY ENTER AT 90°
OR GREATER TO THE OUTLET PIPE.



FORCE MAIN INVERT ELEVATION TO MATCH
GRAVITY PIPE INVERT ELEVATION.



FORCE MAIN CONNECTED DIRECTLY
INTO MANHOLE

- NOTES:
1. RE-CHANNEL BENCH, AS NECESSARY IN EXISTING CONCRETE MANHOLES.
 2. THE INTERIOR WALLS OF EXISTING CONCRETE MANHOLES WITH FORCE MAIN CONNECTIONS SHALL BE COATED PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.
 3. NEW MANHOLES WITH FORCEMAIN CONNECTIONS SHALL BE HDPE.



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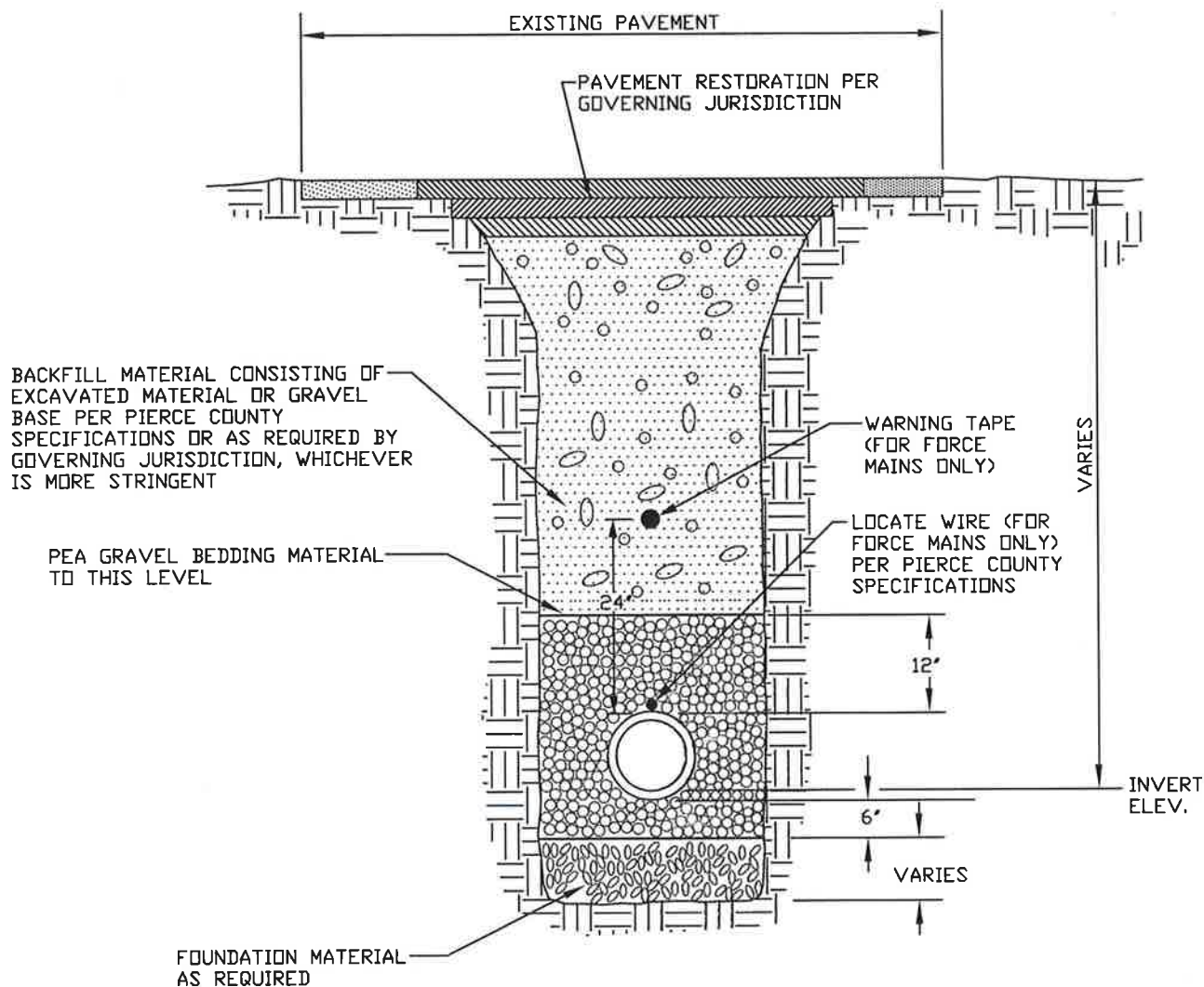
FORCE MAIN CONNECTION TO EXISTING CONCRETE MANHOLE

DATE
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SCALE
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STANDARD DETAIL, NO.

2010

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STANDARD DETAILS

TYPICAL TRENCH SECTION

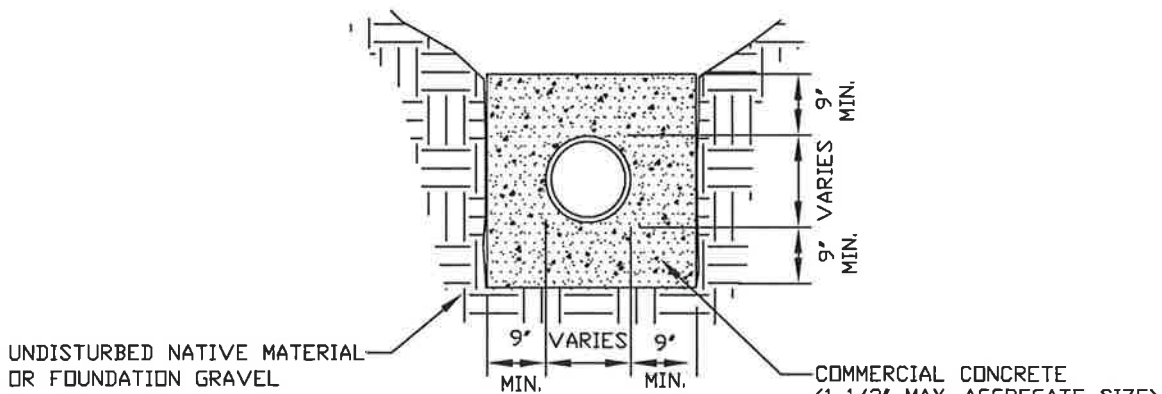
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SCALE
NTS

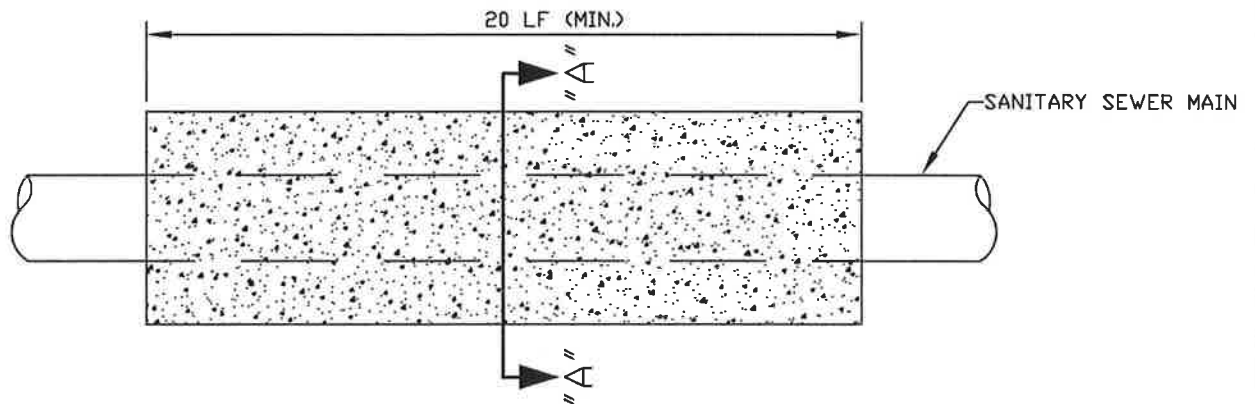
STANDARD DETAIL NO.

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CONCRETE
ENCASEMENT
SECTION A-A



NOTE: CONCRETE ENCASEMENT USED FOR REDUCED VERTICAL SEPARATION FROM OTHER UTILITIES SHALL EXTEND 10' BEYOND EACH SIDE OF THE CROSSING.

PLAN VIEW



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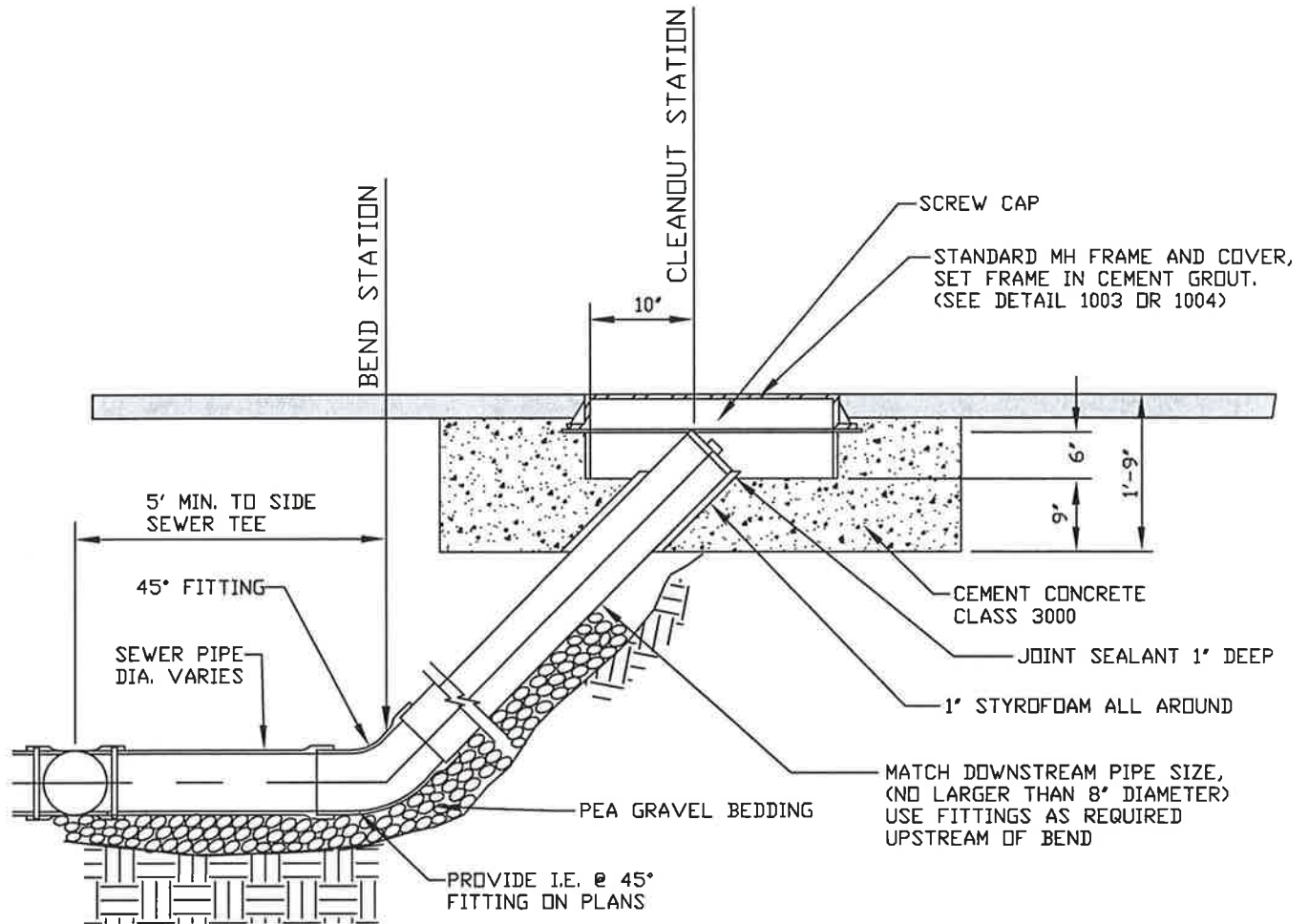
CONCRETE ENCASEMENT

DATE
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SCALE
NTS

STANDARD DETAIL NO.

3002

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NOTE: NOT ALLOWED UNLESS APPROVED OTHERWISE.



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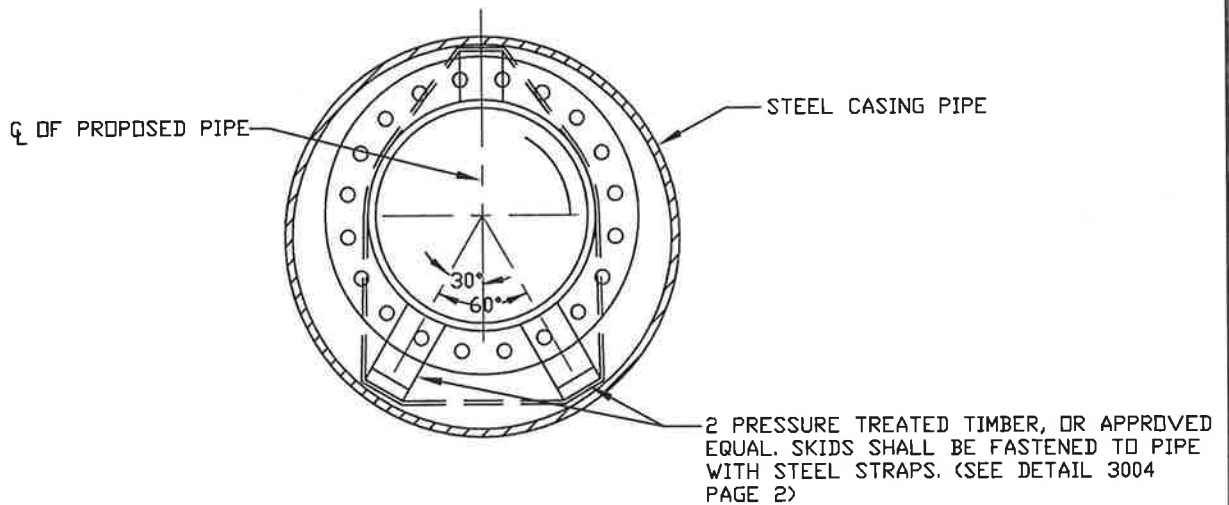
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CLEANOUT

DATE
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SCALE
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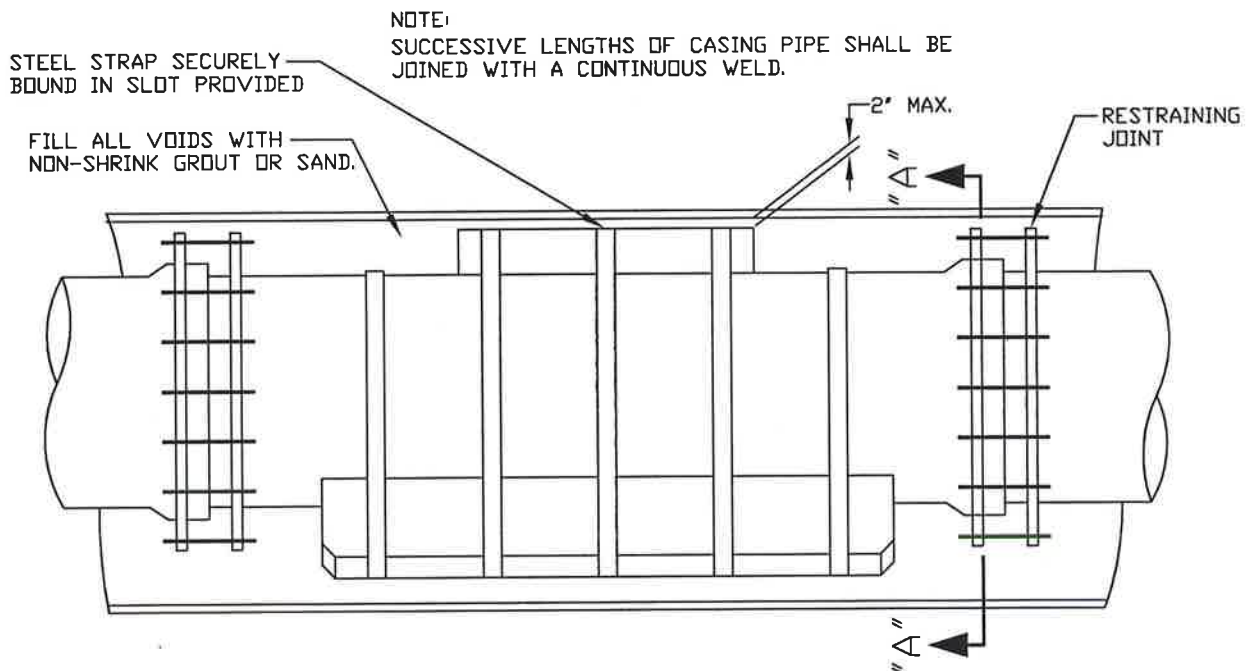
STANDARD DETAIL NO.

3003

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SECTION A-A



NOTE:
USE RESTRAINED JOINTS FOR
CARRIER PIPE IF BOTTOM IS AT
OR BELOW THE NORMAL GROUND
WATER ELEVATION AT THE
PARTICULAR INSTALLATION LOCATION.

SIDE VIEW

NOTE:
SEAL END OF CASING PIPE TO
SANITARY SEWER PIPE PER
PIERCE COUNTY SANITARY
SEWER SPECIFICATIONS.



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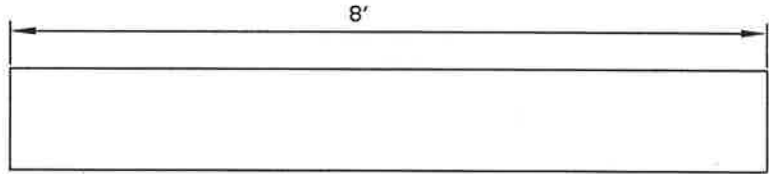
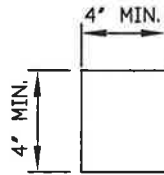
SUPPORT FOR CARRIER
PIPE INSIDE CASING

DATE
05/01/2011
SCALE
NTS

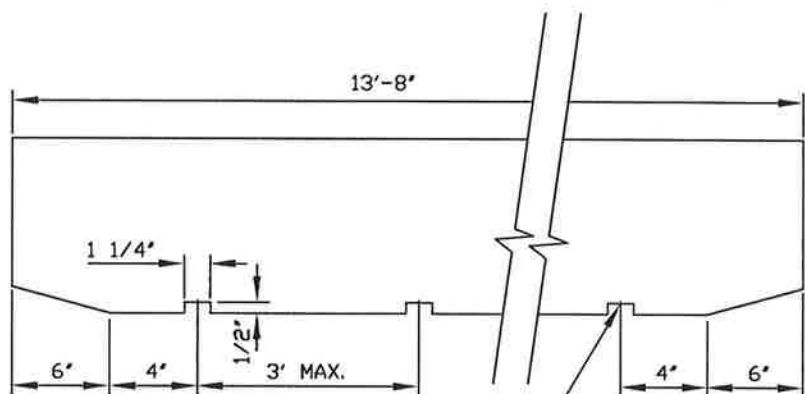
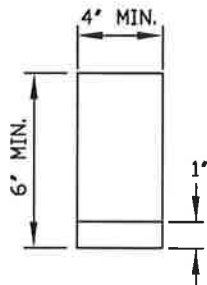
STANDARD DETAIL NO.

3004

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TOP BLOCK DETAIL



STEEL STRAP,
5 PER SKID (TYP.)

SKID DETAIL

NOTE:

SKIDS ARE TO BE THOROUGHLY SEASONED WESTERN RED CEDAR
OR PRESSURE TREATED DOUGLAS/HEMLOCK FIR. PREFABRICATED STEEL
PIPE SUPPORTS MAY BE USED INSTEAD OF TIMBERS.
SEE PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.



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STANDARD DETAILS

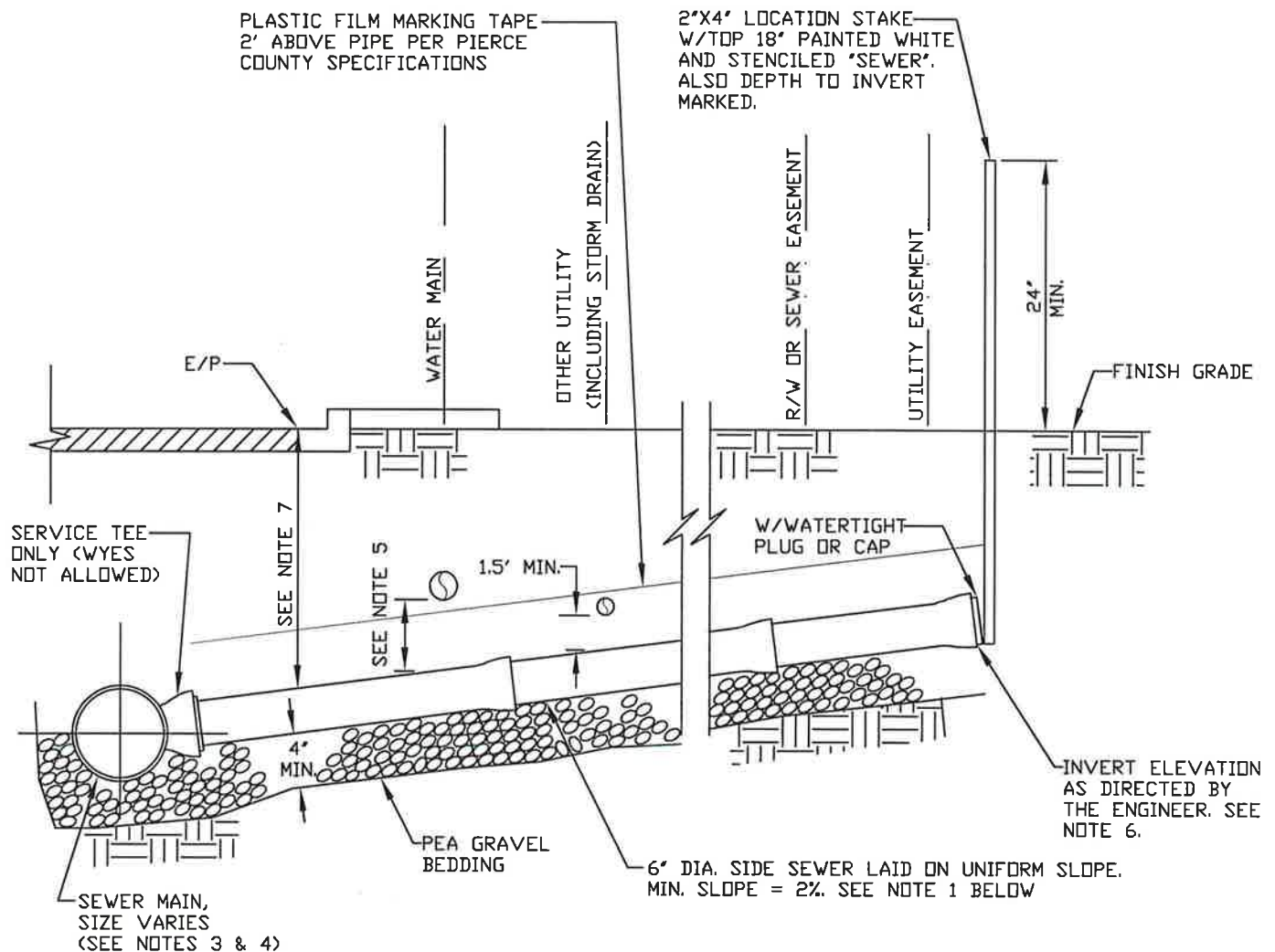
WOOD BLOCK DETAIL
FOR CARRIER PIPE

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.

3004

PAGE 2 OF 2



- NOTES:
1. ACCEPTABLE PIPE TYPES FOR SIDE SEWERS ARE POLYVINYL CHLORIDE ASTM 3034 SDR 35 OR DUCTILE IRON PIPE CL. 52.
 2. BEDDING FOR POLYVINYL CHLORIDE AND CLASS 52 DUCTILE IRON PIPE SHALL BE PEA GRAVEL ONLY.
 3. TEES SHALL BE INSTALLED ON ALL NEW CONSTRUCTION OF SEWER MAINS LESS THAN 18" IN DIAMETER.
 4. NO SIDE SEWER TAPS PERMITTED ON 18-INCH DIAMETER AND GREATER PIPELINES.
 5. THE STANDARD VERTICAL SEPARATION FOR WATER LINES IS 3 FEET ABOVE THE SEWER LINE AND 1.5 FEET FOR ALL OTHER UTILITIES (SEPARATION SHALL BE MEASURED FROM THE OUTER WALL OF THE PIPES). CONCRETE ENCASEMENT WILL BE ALLOWED FOR WATER MAINS CROSSING AT LESS THAN 3 FEET BUT NO CLOSER THAN 1.5 FEET. FOR OTHER UTILITIES A 0.75 FOOT CLEARANCE WILL BE ALLOWED. IF STANDARD CLEARANCES CAN NOT BE OBTAINED, THEN EITHER THE SANITARY SEWER SHALL BE CONCRETE ENCASED OR CLASS 52 DUCTILE IRON PIPE SHALL BE USED.
 6. SIDE SEWER DEPTH AT PROPERTY LINE SHALL NOT EXCEED 8 FEET UNLESS APPROVED BY SEWER UTILITY.
 7. MINIMUM COVER SHALL BE 5' IN R/W, MINIMUM COVER OUTSIDE OF R/W SHALL BE 5' UNDER DRIVING SURFACES AND 3' UNDER NON-DRIVING SURFACES.
 8. NO HORIZONTAL BENDS IN R/W.



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STANDARD DETAILS

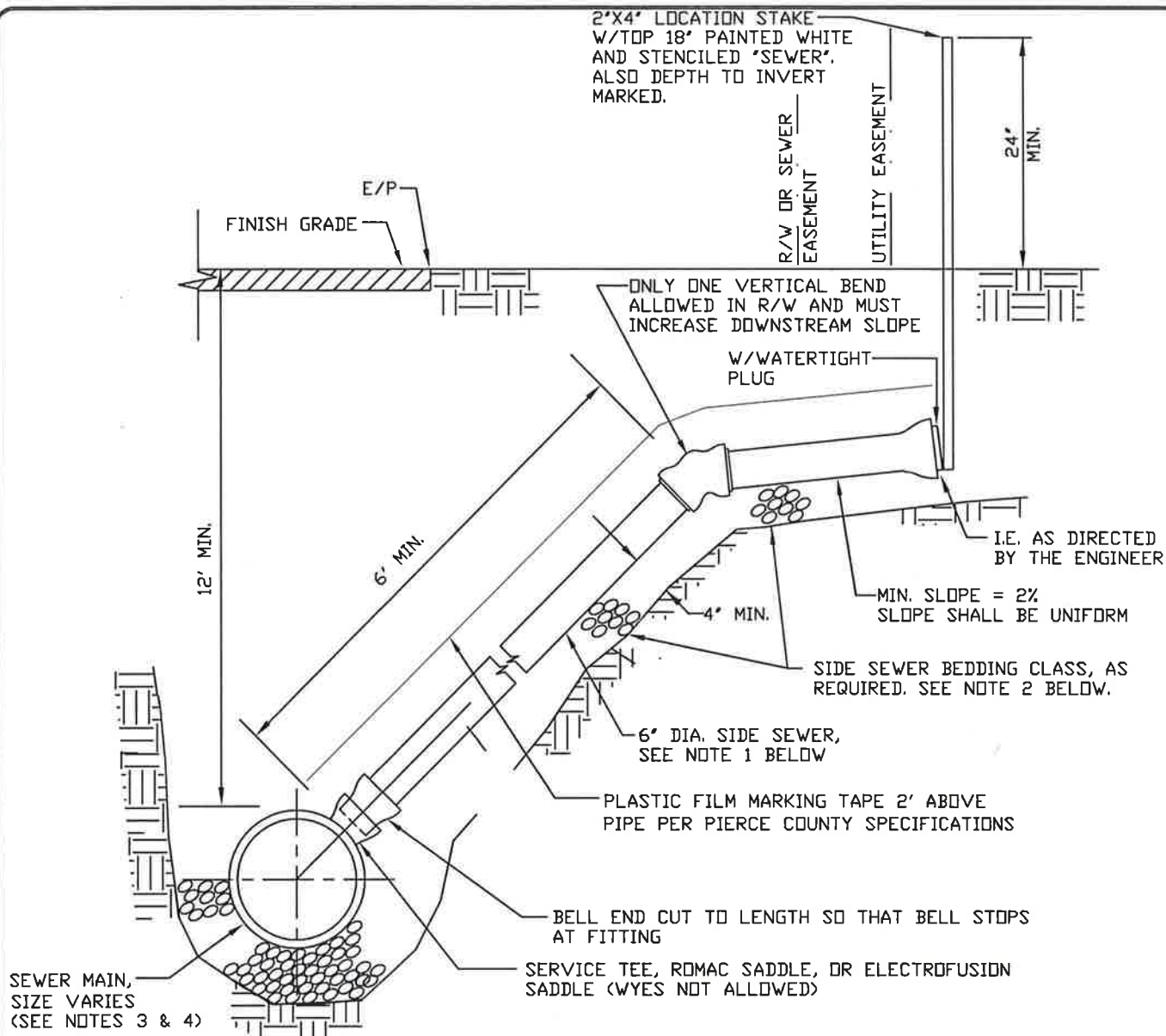
PVC AND DIP SIDE SEWER
STUB INSTALLATION
FOR NEW MAINS

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.

3005

PAGE 1 OF 1



- NOTES:
1. ACCEPTABLE PIPE TYPES FOR SIDE SEWERS ARE POLYVINYL CHLORIDE ASTM 3034 SDR 35 OR DUCTILE IRON PIPE CL. 52, OR HDPE DR17 MIN.
 2. BEDDING FOR POLYVINYL CHLORIDE, CLASS 52 DUCTILE IRON PIPE, AND HDPE DR17 SHALL BE PEA GRAVEL ONLY.
 3. TEES SHALL BE INSTALLED ON ALL NEW CONSTRUCTION OF SEWER MAINS LESS THAN 18" IN DIAMETER.
 4. NO SIDE SEWER TAPS PERMITTED ON 18-INCH DIAMETER AND GREATER PIPELINES.
 5. TEES SHALL BE DUCTILE IRON WHEN SIDE SEWER IS 45 DEGREES OR GREATER, AND TEE SHALL BE ENCASED IN CONCRETE UP TO BOTTOM OF BELL.
 6. THE STANDARD VERTICAL SEPARATION FOR WATER LINES IS 3 FEET ABOVE THE SEWER LINE AND 1.5 FEET FOR ALL OTHER UTILITIES (SEPARATION SHALL BE MEASURED FROM THE OUTER WALL OF THE PIPES). CONCRETE ENCASEMENT WILL BE ALLOWED FOR WATER MAINS CROSSING AT LESS THAN 3 FEET BUT NO CLOSER THAN 1.5 FEET. FOR OTHER UTILITIES A 0.75 FOOT CLEARANCE WILL BE ALLOWED. IF STANDARD CLEARANCES CAN NOT BE OBTAINED, THEN EITHER THE SANITARY SEWER SHALL BE CONCRETE ENCASED OR CLASS 52 DUCTILE IRON PIPE SHALL BE USED.
 7. SIDE SEWER DEPTH SHALL NOT EXCEED 8 FEET UNLESS APPROVED BY SEWER UTILITY.
 8. MINIMUM COVER SHALL BE 5' IN R/W. MINIMUM COVER OUTSIDE OF R/W SHALL BE 5' UNDER DRIVING SURFACES AND 3' UNDER NON-DRIVING SURFACES.
 9. NO HORIZONTAL BENDS IN R/W.



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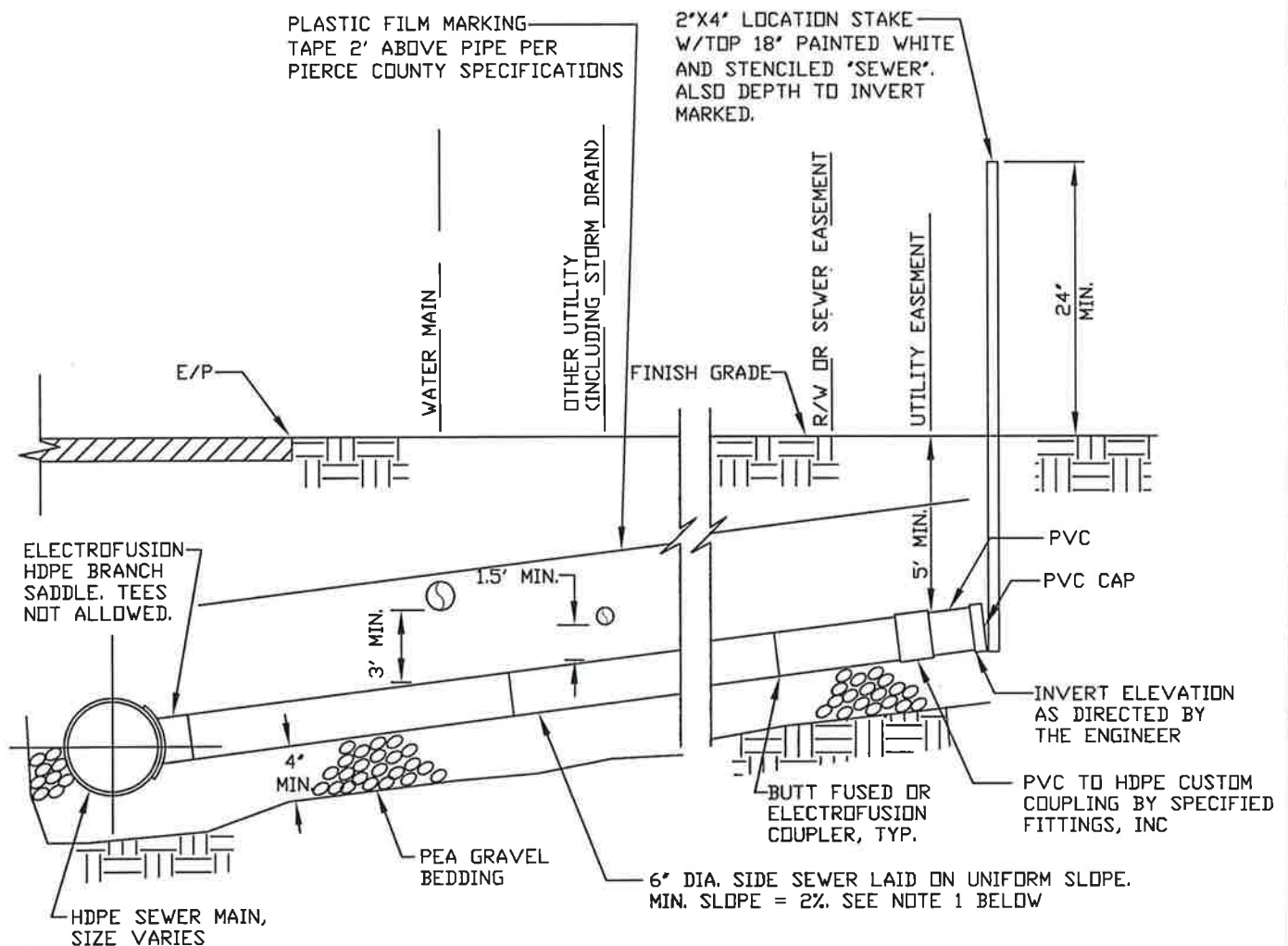
ALTERNATE SIDE SEWER STUB INSTALLATION FOR NEW MAINS

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SCALE
NTS

STANDARD DETAIL NO.

3006

PAGE 1 OF 1



- NOTES:
1. SIDE SEWERS SHALL BE HDPE DR17 MIN., IPS.
 2. BEDDING SHALL BE PEA GRAVEL ONLY.
 3. MINIMUM COVER SHALL BE 3 FEET IN NON-DRIVING SURFACES.
 4. NO SIDE SEWER TAPS PERMITTED ON 18-INCH DIAMETER AND GREATER PIPELINES.
 5. THE STANDARD VERTICAL SEPARATION FOR WATER LINES IS 3 FEET ABOVE THE SEWER LINE AND 1.5 FEET FOR ALL OTHER UTILITIES (SEPARATION SHALL BE MEASURED FROM THE OUTER WALL OF THE PIPES). CONCRETE ENCASEMENT WILL BE ALLOWED FOR WATER MAINS CROSSING AT LESS THAN 3 FEET BUT NO CLOSER THAN 1.5 FEET. FOR OTHER UTILITIES A 0.75 FOOT CLEARANCE WILL BE ALLOWED. IF STANDARD CLEARANCES CAN NOT BE OBTAINED, THEN EITHER THE SANITARY SEWER SHALL BE CONCRETE ENCASED OR CLASS 52 DUCTILE IRON PIPE SHALL BE USED.
 6. SIDE SEWER DEPTH SHALL NOT EXCEED 8 FEET UNLESS APPROVED BY SEWER UTILITY.
 7. MINIMUM COVER SHALL BE 5' IN R/W. MINIMUM COVER OUTSIDE OF R/W SHALL BE 5' UNDER DRIVING SURFACES AND 3' UNDER NON-DRIVING SURFACES.
 8. NO HORIZONTAL BENDS IN R/W.



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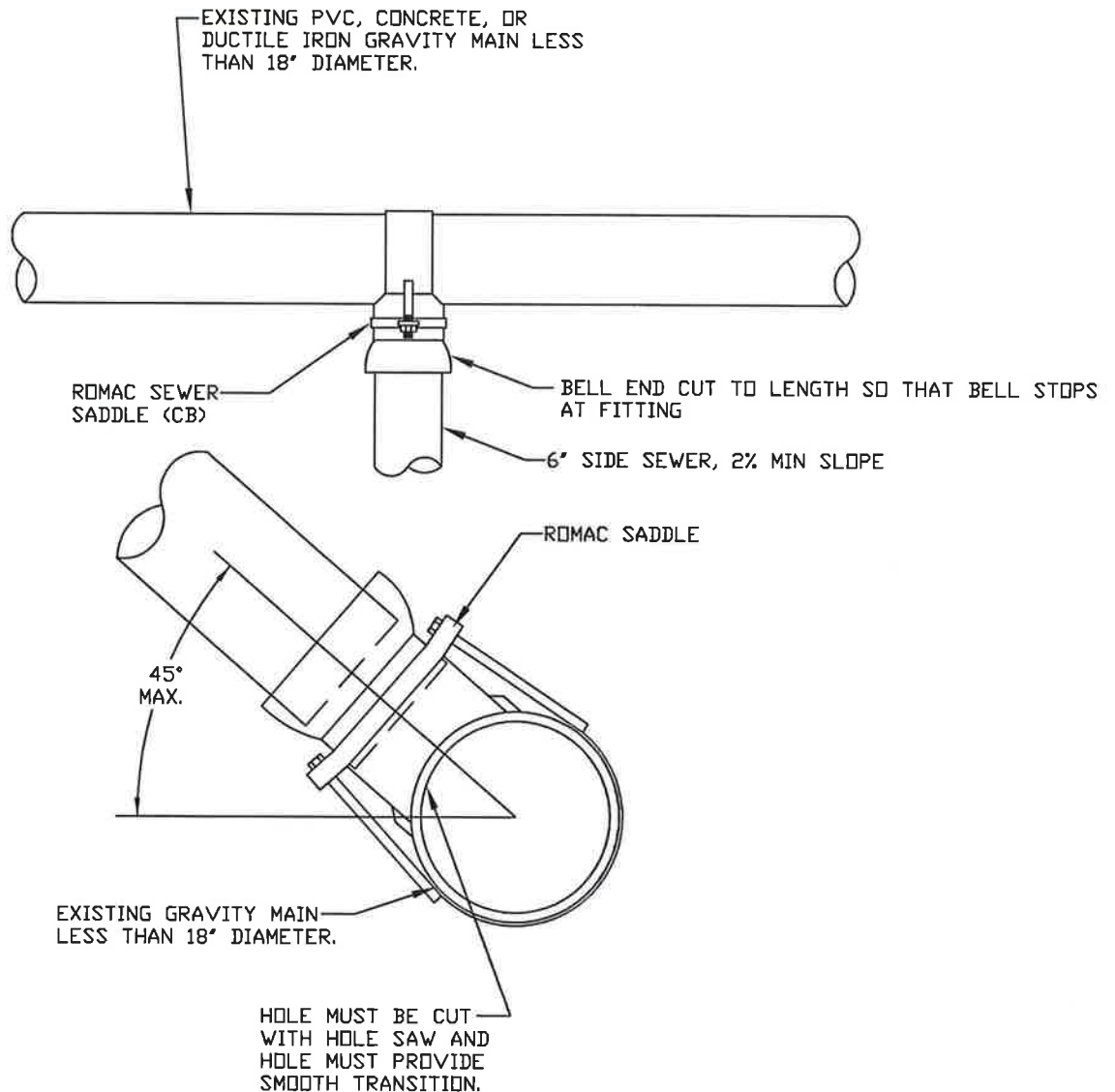
HDPE SIDE SEWER STUB INSTALLATION FOR NEW MAINS

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.

3007

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NOTES:

1. FOR EXISTING PVC, CONCRETE, AND DUCTILE IRON MAINS ONLY.
2. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL.
3. NO SIDE SEWER TAPS PERMITTED ON 18-INCH DIAMETER AND GREATER PIPELINES.
4. WET TAPS INTO EXISTING HDPE GRAVITY MAINS SHALL USE ELECTROFUSION SADDLES.
5. BOLTS SHALL BE TIGHTENED IN ACCORDANCE WITH THE SADDLE MANUFACTURER'S INSTALLATION INSTRUCTIONS.



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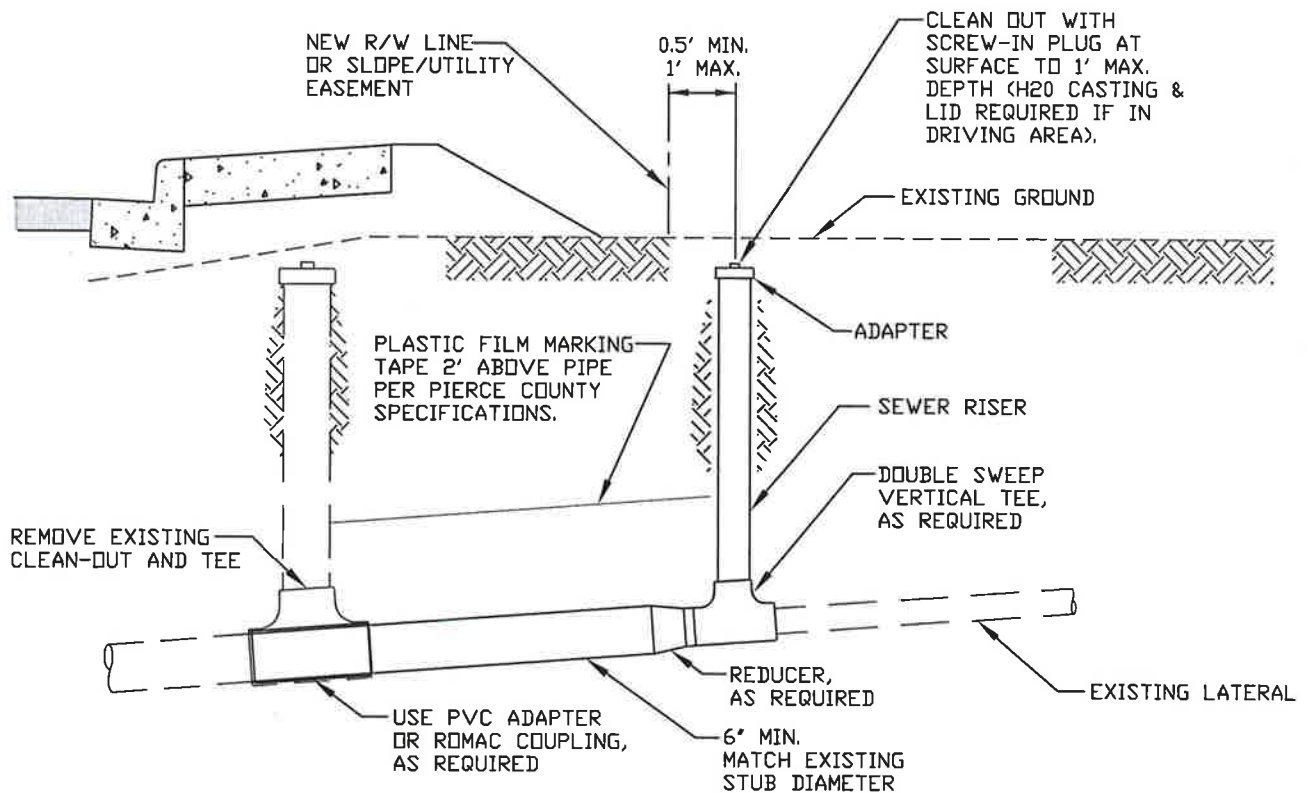
WET TAP FOR GRAVITY
SIDE SEWER STUB

DATE
05/18/2010
SCALE
NTS

STANDARD DETAIL NO.

3008

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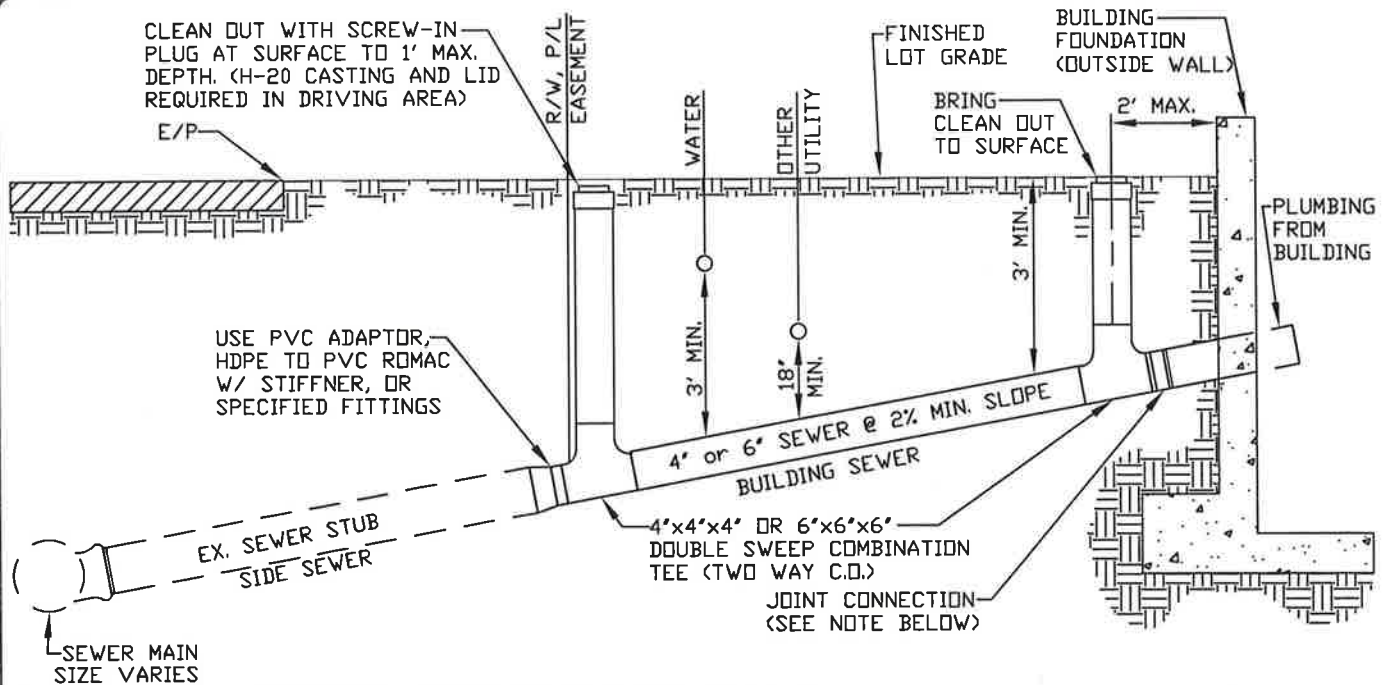
CLEANOUT RELOCATION DETAIL

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.

3009

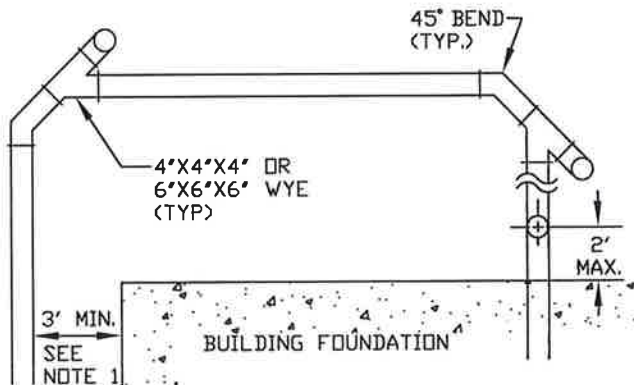
PAGE 1 OF 1



TYPICAL SIDE/BUILDING SEWER PROFILE

NOTE 1
BOTTOM OF PIPE MUST BE ABOVE 1:1 ZONE OF INFLUENCE FROM BUILDING FOUNDATION

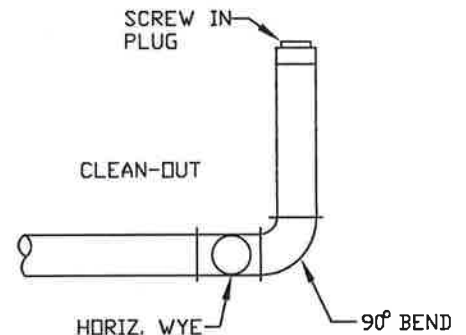
NOTE:
100' MAX. BETWEEN CLEAN-OUTS.



TYPICAL BUILDING SEWER PLAN

NOTES:

- 1.) ABS TO PVC USE PVC ADAPTOR, OR APPROVED EQUAL.
- 2.) PVC TO D.I.P. OR CONC. USE ROMAC COUPLING, OR EQUAL
- 3.) NO FERNCO TYPE COUPLINGS WILL BE ALLOWED, EXCEPT AT PLUMBING OUTLET.



CLEAN-OUT CONNECTION PROFILE

BEDDING MATERIAL SHALL BE PEA GRAVEL.

INITIAL TRENCH BACKFILL

THESE DETAILS PLUS THE PIERCE COUNTY ADMINISTRATION CODE, CURRENT ISSUE, CONSTITUTE TOTAL DESIGN AND CONSTRUCTION REQUIREMENTS.



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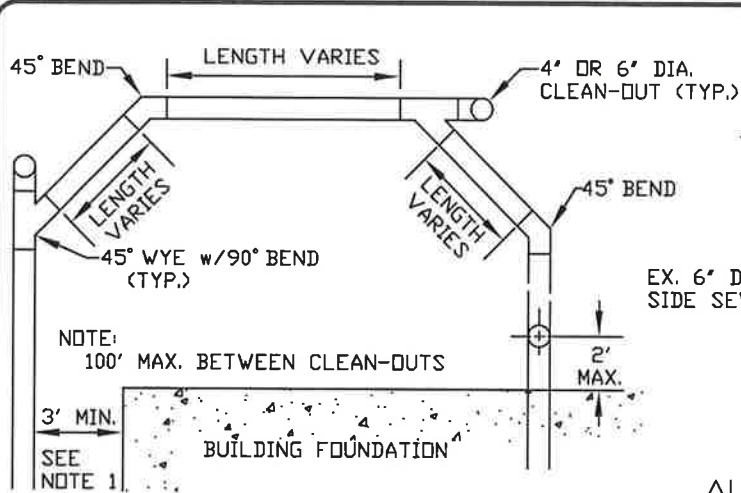
BUILDING SEWER
LAYOUT

DATE
05/01/2011
SCALE
NTS

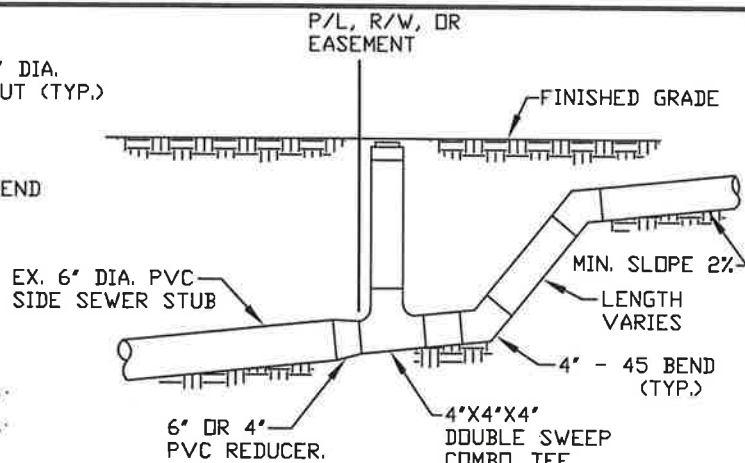
STANDARD DETAIL NO.

4001

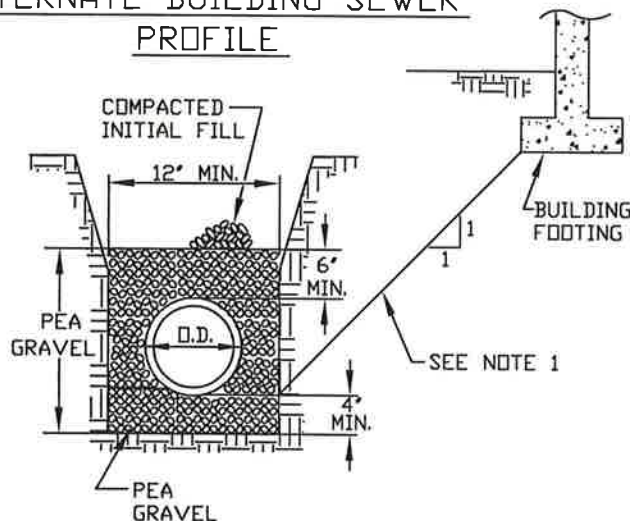
PAGE 1 OF 2



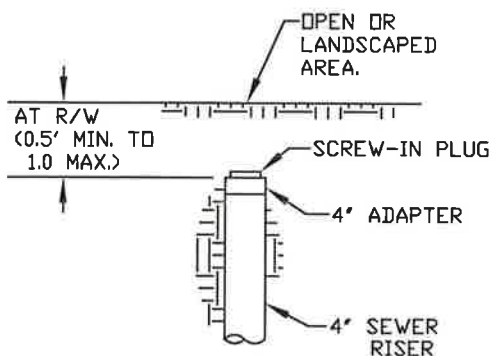
ALTERNATE BUILDING SEWER PLAN



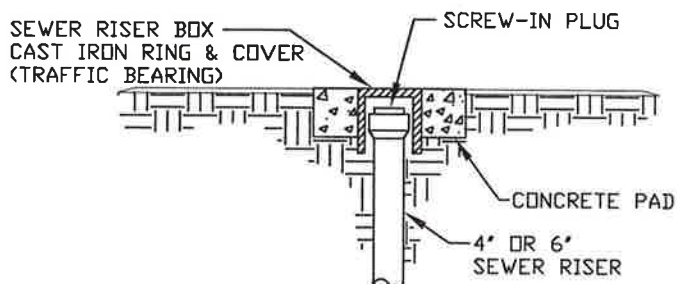
ALTERNATE BUILDING SEWER
PROFILE



INSTALLATION BEDDING
CROSS-SECTION



CLEAN-OUT
COVER DETAIL
IN OPEN AREA



CLEAN-OUT
COVER DETAIL
IN PAVEMENT
OR DRIVING AREA



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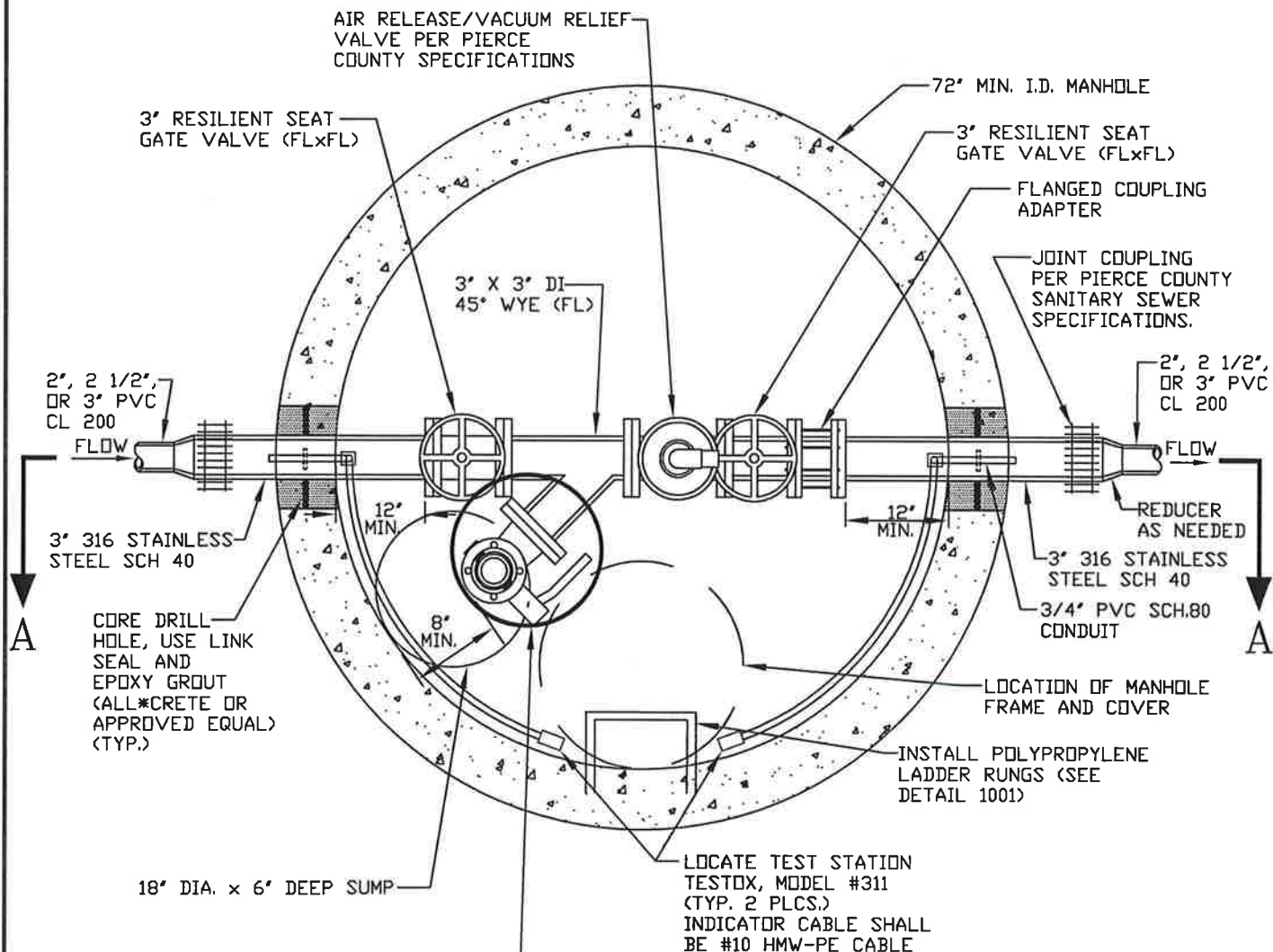
BUILDING SEWER LAYOUT

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.

4001

PAGE 2 OF 2



NOTES: 1.) FLOOR TO BE SLOPED AT 2% TOWARDS SUMP.

2.) COAT PIPE AND FITTINGS (INTERIOR AND EXTERIOR) PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.

3.) COAT VALVE VAULT INTERIOR WITH RAVEN 405 AND EXTERIOR WITH COAL TAR EPOXY PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.

4.) MANHOLES SHALL BE VACUUM TESTED PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.

- 1.) 3" SHORT RADIUS 90° BEND (FLxFL), POINTING UP.
- 2.) 3" PLUG VALVE (DEZURIK, FLxFL).
- 3.) 3" TAPPED BLIND FLANGE (FLxNPT).
- 4.) 3" CAM-LOCK, MALE NPT, STAINLESS STEEL, PT COUPLING, PART NO. 30F.
- 5.) 3" CAM-LOCK DUST CAP, STAINLESS STEEL, PT COUPLING, PART NO. 30V.

PLAN



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STANDARD DETAILS

3" FORCE MAIN AIR/VACUUM
RELIEF VALVE, CLEANOUT AND
PIG LAUNCH MANHOLE
(PLAN VIEW)

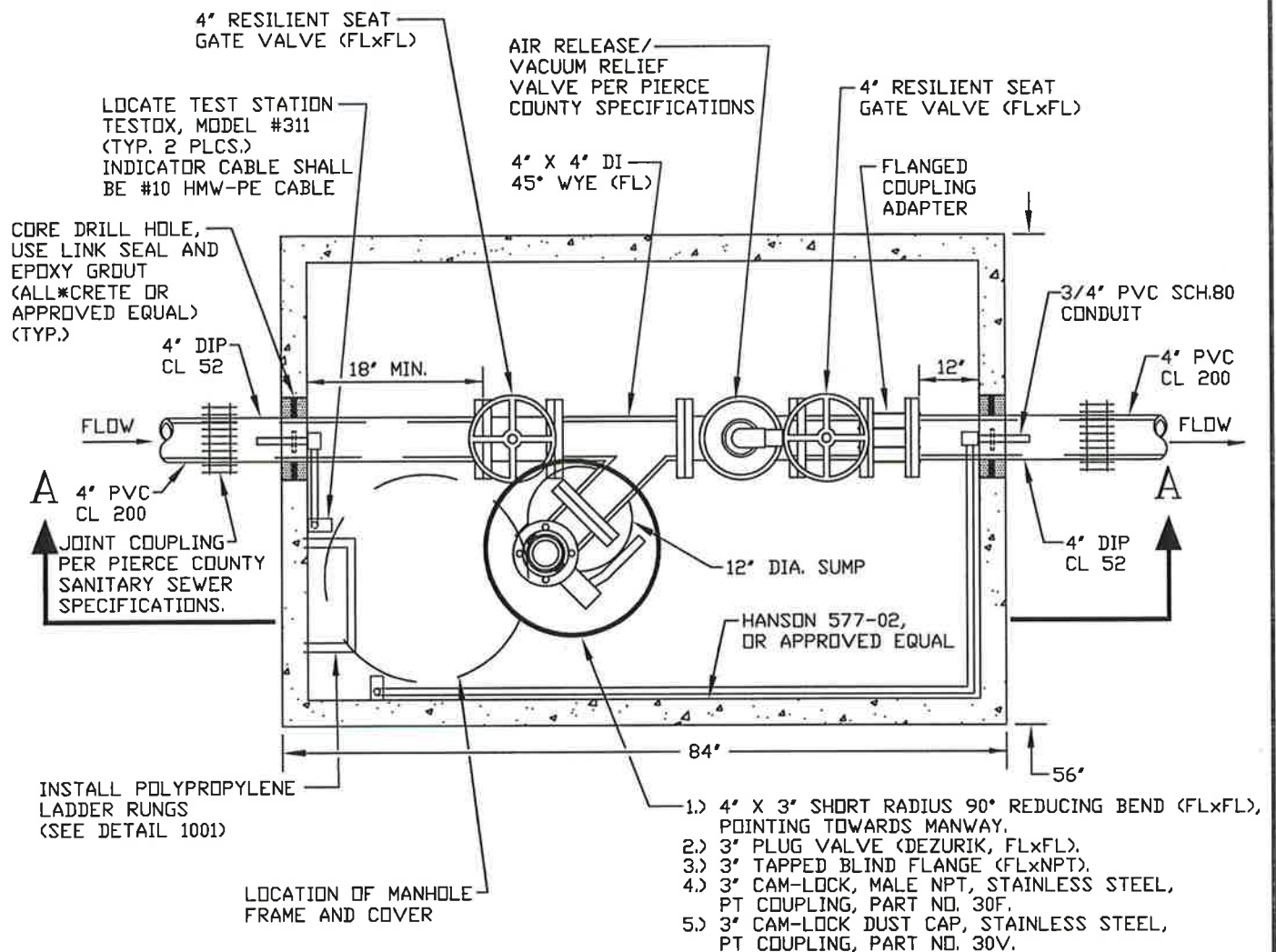
DATE
05/01/2011

SCALE
NTS

STANDARD DETAIL NO.

5001

PAGE 1 OF 2



- NOTES: 1) COAT PIPE AND FITTINGS (INTERIOR AND EXTERIOR) PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.
- 2) COAT VALVE VAULT INTERIOR WITH RAVEN 405 AND EXTERIOR WITH COAL TAR EPOXY PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.
- 3) VAULTS SHALL BE VACUUM TESTED PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.

PLAN



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STANDARD DETAILS

4" FORCE MAIN AIR/VACUUM
RELIEF VALVE, CLEANOUT AND
PIG LAUNCH VAULT
(PLAN VIEW)

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.
5002
PAGE 1 OF 2



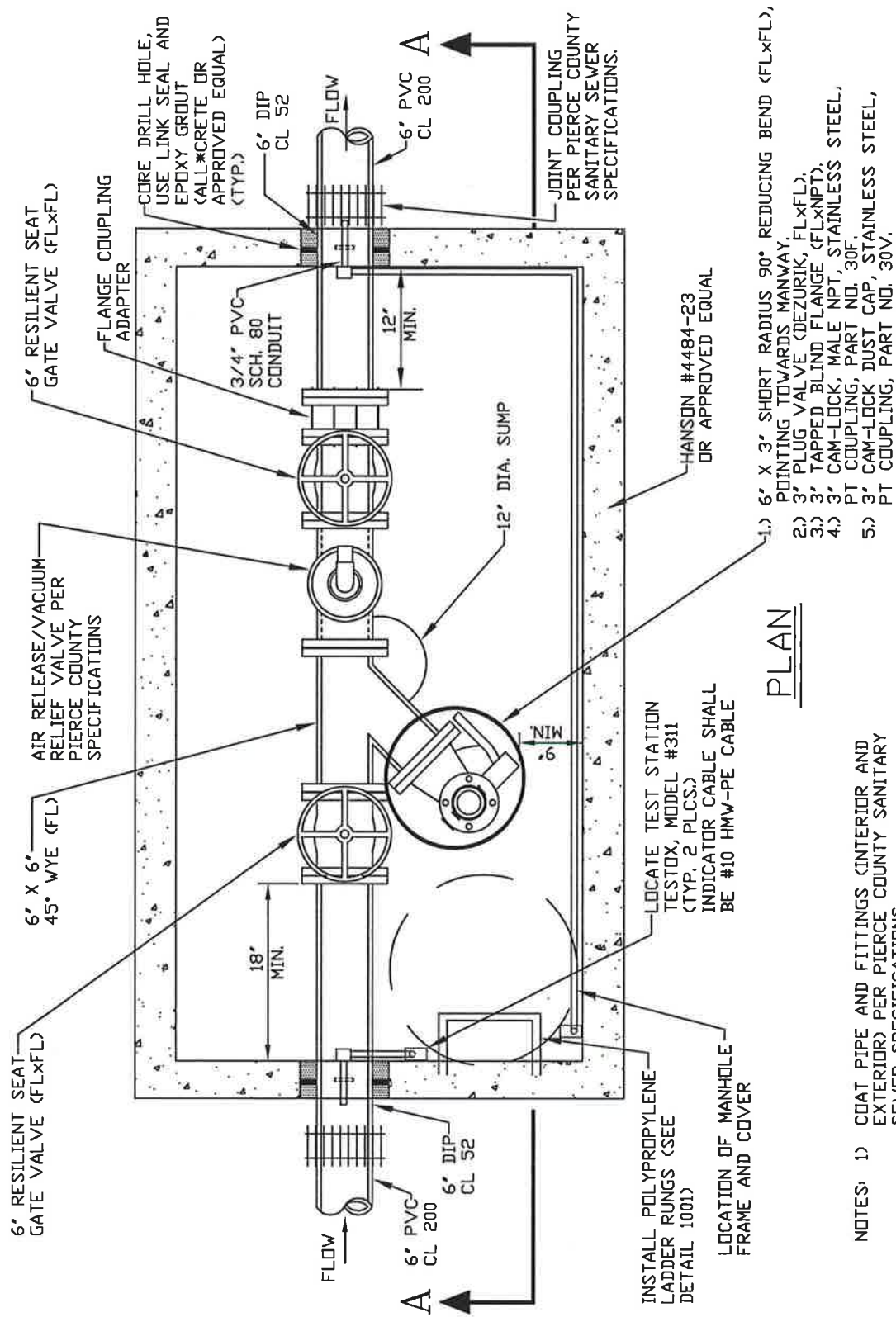
PIERCE COUNTY PUBLIC WORKS & UTILITIES DEPARTMENT
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STANDARD DETAILS

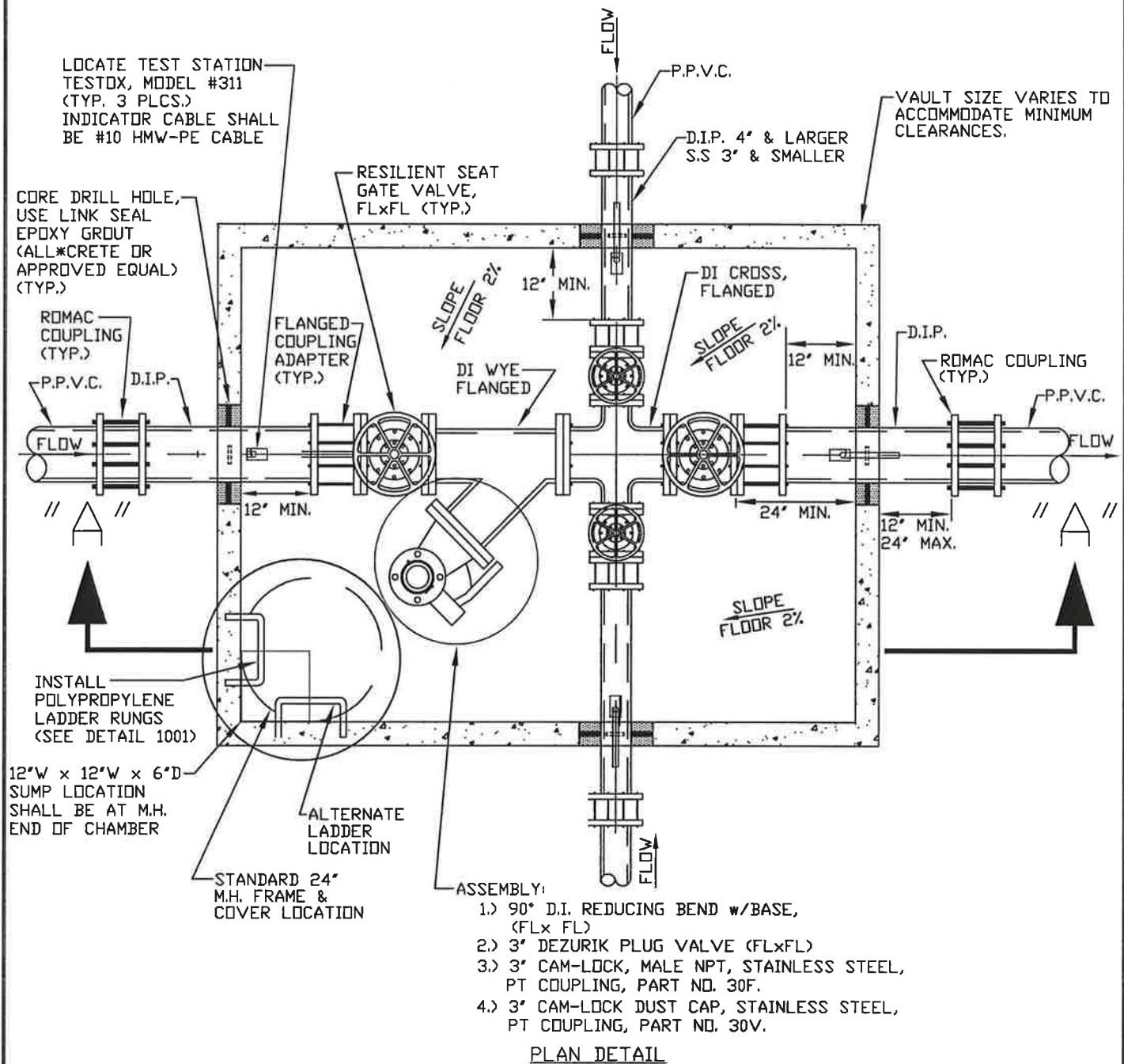
6" FORCE MAIN AIR/VACUUM
RELIEF VALVE, CLEANOUT AND
PIG LAUNCH VAULT
(PLAN VIEW)

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.
5003
PAGE 1 OF 2







NOTES:

- 1.) FLOOR TO BE SLOPED AT 2% TOWARDS SUMP.
- 2.) COAT PIPE AND FITTINGS (INTERIOR AND EXTERIOR) PER PIERCE COUNTY SEWER SPECIFICATIONS.
- 3.) COAT VALVE VAULT INTERIOR WITH RAVEN 405 AND EXTERIOR WITH COAL TAR EPOXY PER PIERCE COUNTY SEWER SPECIFICATIONS.
- 4.) SIZES MAY VARY DUE TO FORCE MAIN CRITERIA.
- 5.) INSTALL D.I. REDUCING BEND SO THAT CAMLOCK CONNECTION IS POINTING TOWARD MANWAY.
- 6.) VAULTS SHALL BE VACUUM TESTED PER PIERCE COUNTY SANITARY SEWER SPECIFICATIONS.



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STANDARD DETAILS

LOW PRESSURE FORCE MAIN
CLEANOUT VALVE VAULT
(PLAN VIEW)

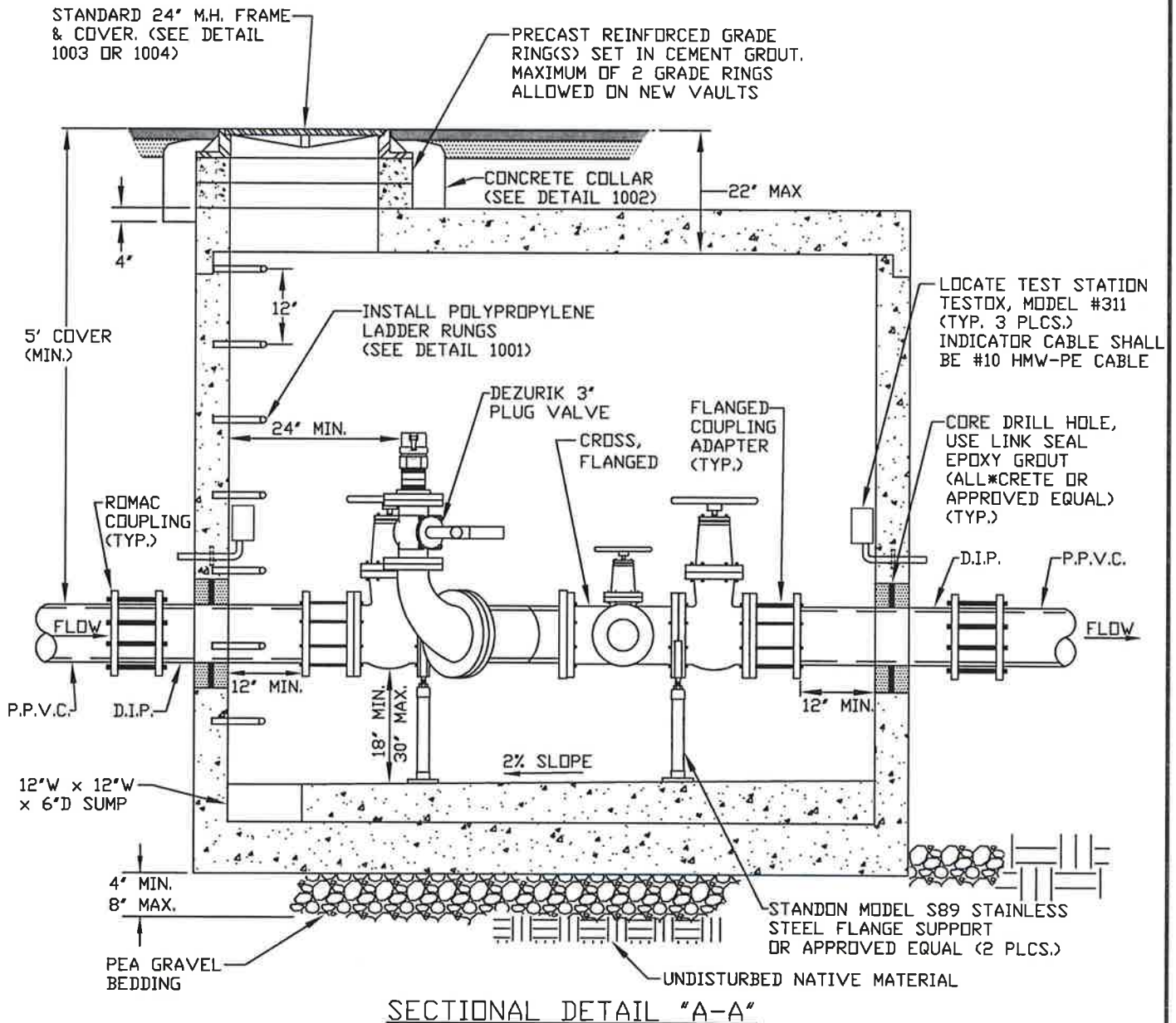
DATE
05/01/2011

SCALE
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STANDARD DETAIL NO.

5004

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STANDARD DETAILS

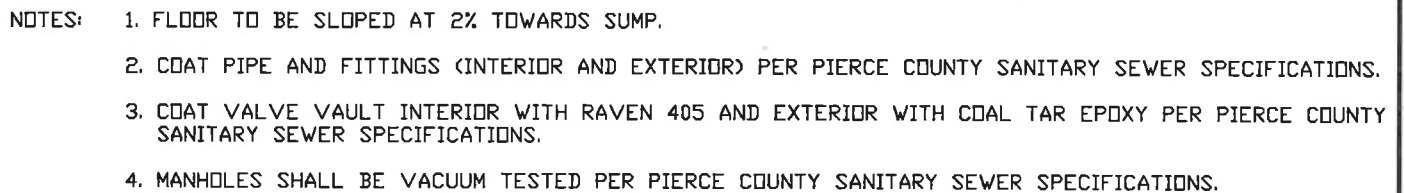
LOW PRESSURE FORCE MAIN
CLEANOUT VALVE VAULT
(SECTION VIEW)

DATE
12/26/2012
SCALE
NTS

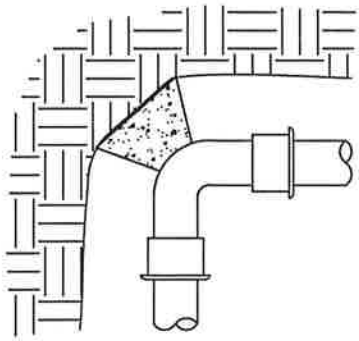
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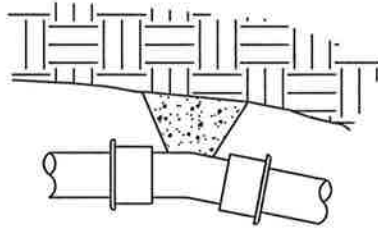
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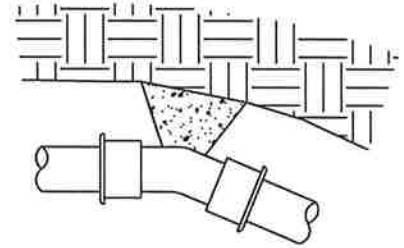
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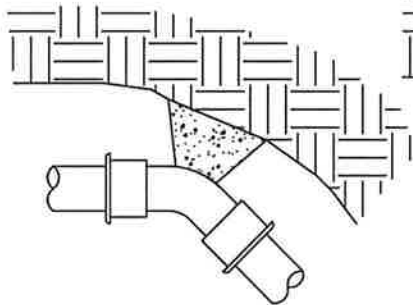
90° BEND



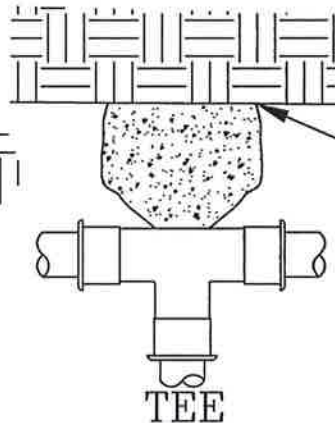
11 1/4° BEND



22 1/2° BEND



45° BEND



TEE

SEE 6001 PAGE 2 FOR MIN.
THRUST BLOCK AREA, TYP.
ALL BENDS.

THRUST BLOCK DETAIL



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STANDARD DETAILS

CONCRETE THRUST BLOCK DETAIL

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05/01/2011
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STANDARD DETAIL NO.

6001

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THRUST DEVELOPED BY FITTINGS IN PRESSURE PIPE

NOMINAL PIPE SIZE (IN)	TEST PRESSURE (PSI)	DEAD END, TEE, VALVE	BENDS			
			90	45	22.5	11.25
3	100	1,845	2,625	1,410	720	360
4	100	2,715	3,840	2,085	1,065	540
6	100	5,610	7,935	4,290	2,190	1,095
8	100	9,645	13,650	7,380	3,765	1,890
10	100	14,520	20,535	11,115	5,670	2,850
12	100	20,535	29,025	15,720	8,010	4,020
14	100	27,585	39,000	21,105	10,770	5,400
16	100	35,670	50,445	27,300	13,920	6,990
18	100	44,835	63,360	34,290	17,475	8,790
20	100	54,960	77,730	42,075	21,450	10,770
24	100	78,420	110,895	60,015	30,600	15,375

SOIL TYPE	APPROX. BEARING CAPACITY (LBS/SQ FT)
MUCK, PEAT, ETC.	0
SOFT CLAY	500
SAND, SILT	1000
SAND AND GRAVEL, SANDY SILT	1500
SAND AND GRAVEL WITH CLAY	2000
SAND AND GRAVEL CEMENTED WITH CLAY	4000
SANDY CLAY	6000
HARD CLAY, HARD SHALE	9000

- SOIL BEARING CAPACITIES SHOWN ARE APPROXIMATE. ACTUAL SOIL AND BEARING CAPACITY ADJACENT TO THRUST BLOCK MUST BE DETERMINED BY A LICENSED ENGINEER OR OTHER SOILS PROFESSIONAL.
- TO DETERMINE MINIMUM THRUST BLOCK AREA REQUIRED, DIVIDE THE THRUST BY THE SOIL BEARING CAPACITY
- FOR TEST PRESSURES OTHER THAN 100 PSI, MULTIPLY THE THRUST BY THE RATIO OF ACTUAL PRESSURE TO 100 PSI
- EXAMPLE: 4" 45° BEND WITH TEST PRESSURE OF 250 PSI, AND SOIL BEARING CAPACITY OF 2000 LBS/SQ FT
 FROM CHART, THRUST = 2085 LBS × (250/100) = 5213 LBS
 MIN. THRUST BLOCK AREA = 5213 LBS/(2000LBS/SQ FT) = 2.6 SQ FT

NOTES:

- 1) THRUST BLOCKS ARE REQUIRED ON ALL BENDS FOR PRESSURE PIPE WITH PUSH-ON OR MECHANICAL TYPE JOINTS.
- 2) ALL CONCRETE BLOCKING SHALL BE POURED AGAINST DRY, UNDISTURBED SOIL.
- 3) THRUST BLOCKS SHALL BE SIZED USING THE TEST PRESSURE OF THE PIPE.
- 4) THRUST BLOCKS SHALL BE POURED IN THE PRESENCE OF THE INSPECTOR.
- 5) ALL VERTICAL BENDS AND VALVES SHALL UTILIZE GRAVITY THRUST BLOCKS.
- 6) THE CONCRETE SHALL BE COMMERCIAL CLASS.
- 7) THE CONTRACTOR MAY MAKE A SUBMITTAL FOR ENGINEERS APPROVAL TO USE RESTRAINED JOINTS IN LIEU OF THRUST BLOCKS. SUBMITTAL SHALL INCLUDE CALCULATIONS OF RESTRAINED LENGTHS.
- 8) THRUST BLOCK SIZING CALCULATIONS SHALL BE SUBMITTED BY THE ENGINEER FOR APPROVAL.



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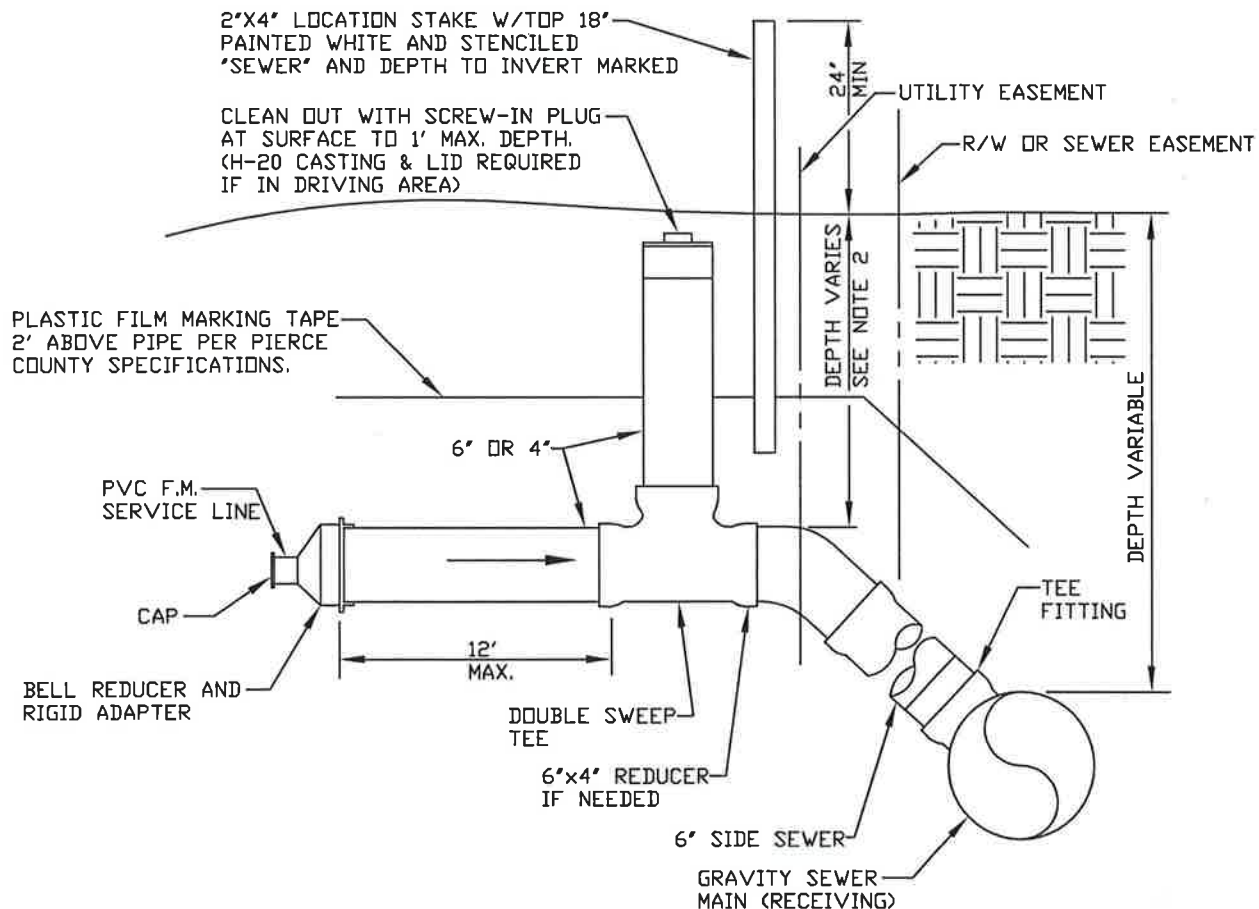
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SCALE
NTS

CONCRETE THRUST BLOCK
NOTES

STANDARD DETAIL NO.

6001

PAGE 2 OF 2



NOTES

1. SERVICE LINE SHALL BE INSTALLED, SO AS TO PROVIDE A POSITIVE SLOPE UPWARD TOWARD ITS TERMINUS.
2. MINIMUM COVER SHALL BE 5' IN R/W. MINIMUM COVER OUTSIDE OF R/W SHALL BE 5' UNDER DRIVING SURFACES AND 3' UNDER NON-DRIVING SURFACES.



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STANDARD DETAILS

PRESSURE TO GRAVITY SIDE SEWER STUB

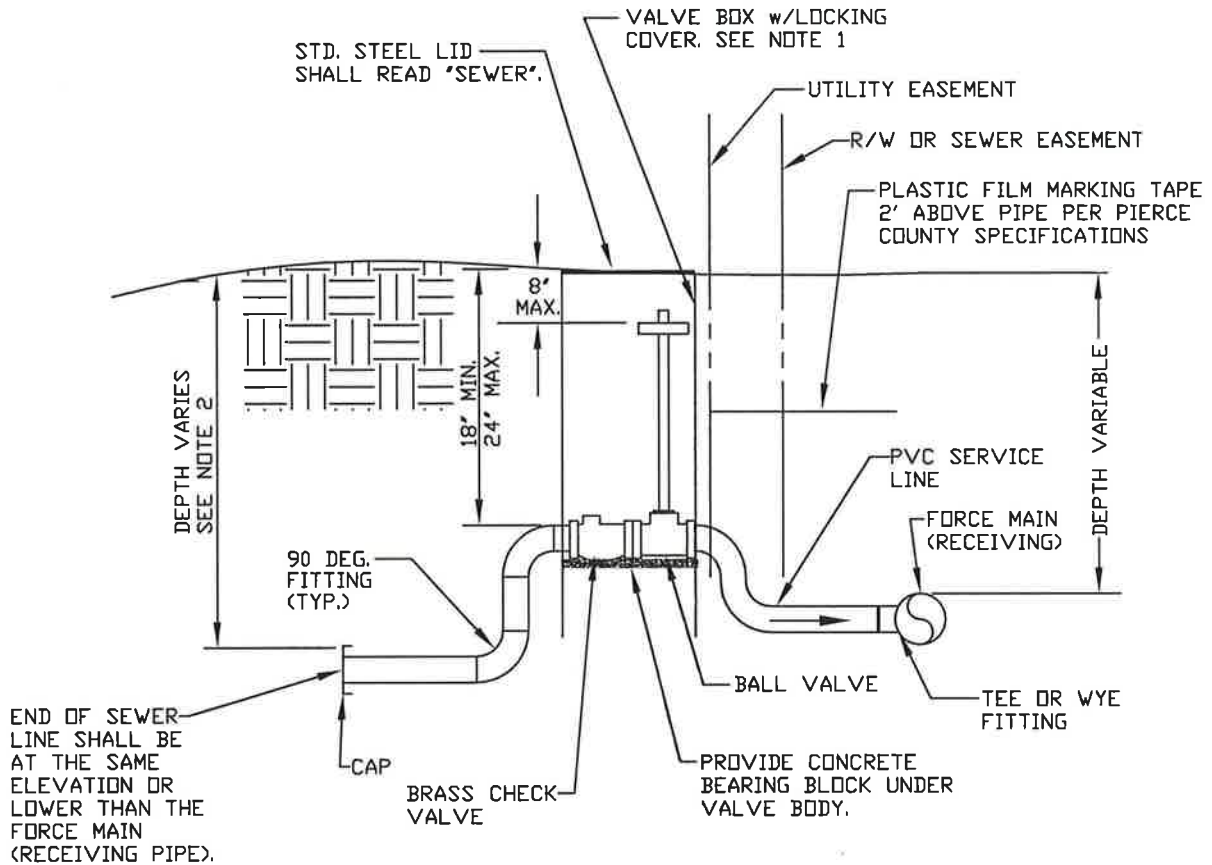
DATE
05/01/2011

SCALE
NTS

STANDARD DETAIL NO.

6002

PAGE 1 OF 1



- NOTES: 1. VALVE BOXES IN NON-DRIVING SURFACES SHALL BE CARSON 1220-12 W/ EXTENSION OR APPROVED EQUAL. VALVE BOXES IN DRIVING SURFACE SHALL BE HANSON 3030 OR APPROVED EQUAL.
2. MINIMUM COVER SHALL BE 5' IN R/W. MINIMUM COVER OUTSIDE R/W SHALL BE 5' UNDER DRIVING SURFACES AND 3' UNDER NON-DRIVING SURFACES.



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STANDARD DETAILS

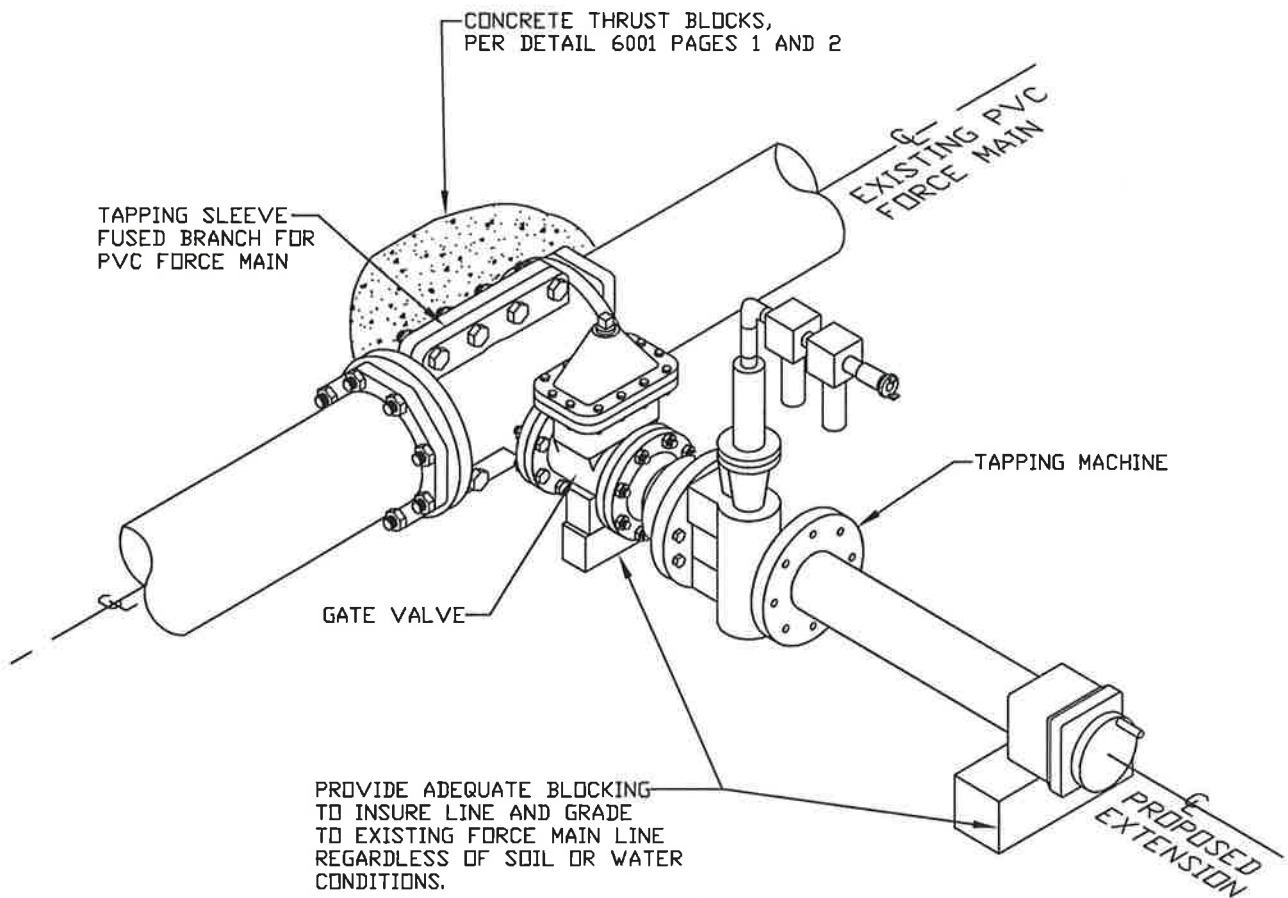
PRESSURE SIDE SEWER
TO LOW PRESSURE MAIN

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.

6003

PAGE 1 OF 1



NOTES:

1. CONTRACTOR TO INSTALL AND TEST TAPPING SLEEVE AND VALVE, WITNESSED BY PIERCE COUNTY SEWER INSPECTOR.
2. CONTRACTOR TO SUPPLY EQUIPMENT TO HANDLE TAPPING MACHINE AND DEWATERING EQUIPMENT.
3. SIZE OF FITTINGS AS PER CONTRACT DRAWINGS.
4. TAPPING ASSEMBLY SHALL BE PRESSURE TESTED PRIOR TO TAPPING MAIN.



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SEWER UTILITY DIVISION
9850 64TH STREET WEST
UNIVERSITY PLACE, WASHINGTON 98467-1078
(253) 798-4050

STANDARD DETAILS

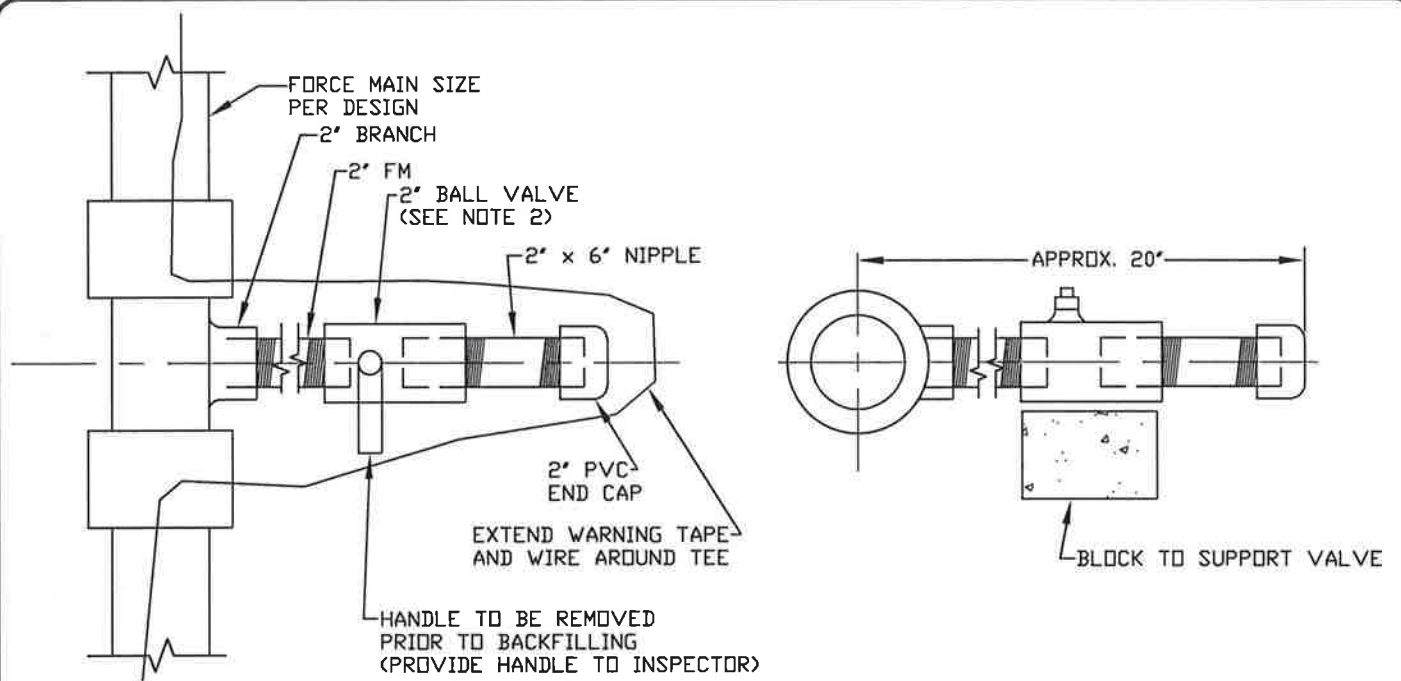
LOW PRESSURE SIDE SEWER
FORCE MAIN
TAPPING SLEEVE

DATE
05/01/2011
SCALE
NTS

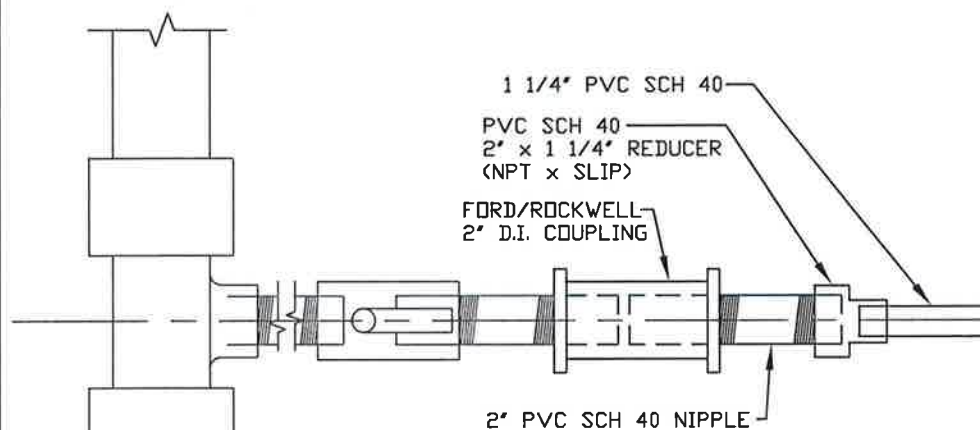
STANDARD DETAIL NO.

6004

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BEFORE CONNECT



NOTES:

1. AS-BUILT LOCATION MUST BE STATIONED ON AS-BUILT DRAWINGS.
2. VALVE SHALL BE LOCATED IN A NON-DRIVING AREA, 5' MIN. DISTANCE FROM ANY DRIVING SURFACE.

AFTER CONNECT



PIERCE COUNTY PUBLIC WORKS & UTILITIES DEPARTMENT
SEWER UTILITY DIVISION
9850 64TH STREET WEST
UNIVERSITY PLACE, WASHINGTON 98467-1078
(253) 798-4050

STANDARD DETAILS

FORCE MAIN STUBS
FOR FUTURE CONNECTIONS

DATE
05/01/2011
SCALE
NTS

STANDARD DETAIL NO.

6005

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