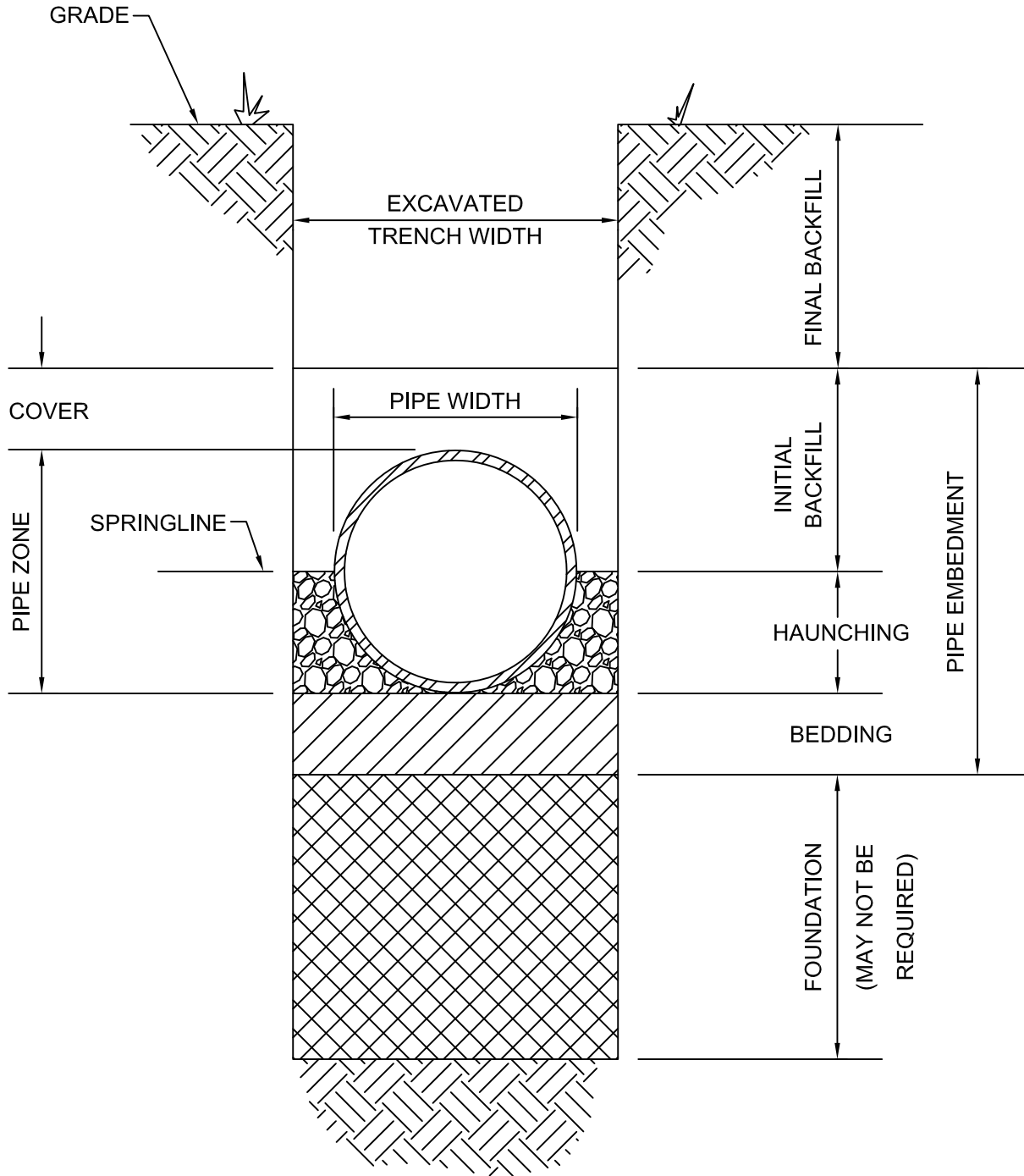




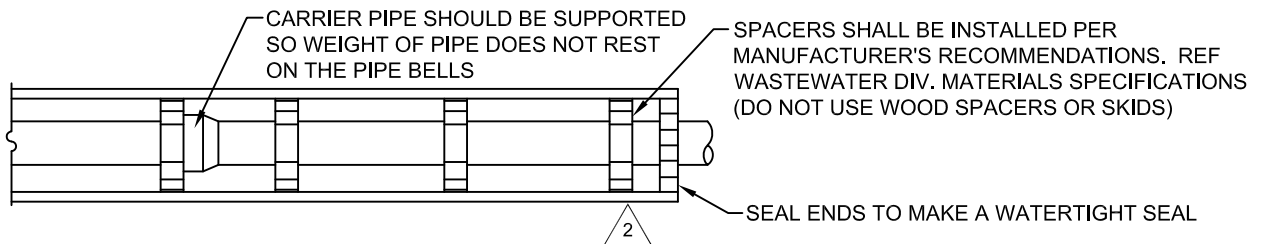
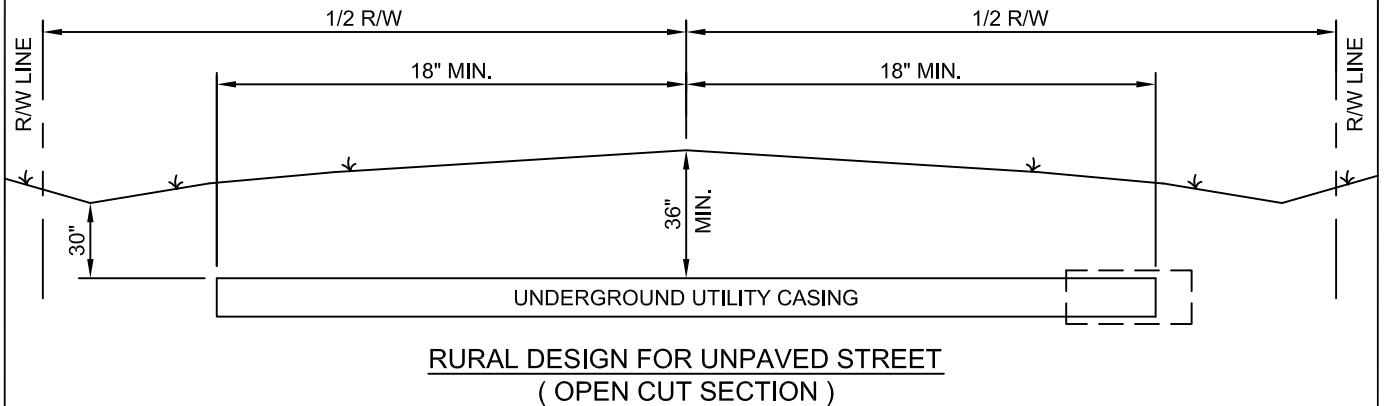
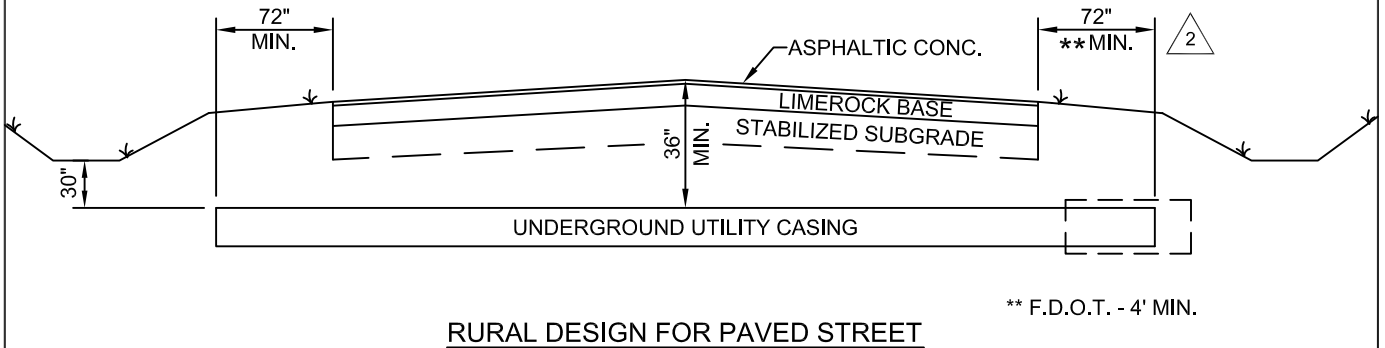
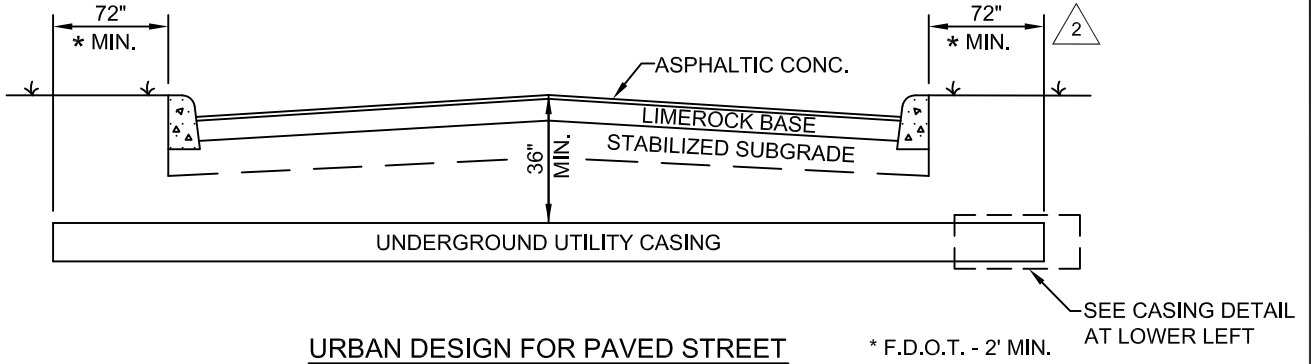
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01_TRNSEC.DWG

APPROVED	DATE	PREPARED BY GEG	DATE 11/21/00	REVISION	
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE	NO. 0



CASING DETAIL
N.T.S.

NOTE: ALL CARRIER PIPE THRU CASING SHALL HAVE RESTRAINED JOINTS

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION 2
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 09/29/03 NO. 2



WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

DETAIL NO.: WWS-003

UNDERGROUND UTILITY
CROSSING OF STREETS

SHT. 2 OF 3

PAVED STREET INSTALLATION

1. The following methods shall be the only approved methods of installing a gravity main or a forcemain under an existing paved street:
 Gravity Main - Jack and Bore (Push) method
 Forcemain - Jack and Bore or Directional Bore method
 Neither "Air Jetting" nor "Water Jetting" methods will be allowed. Where extraordinary circumstances preclude the aforementioned methods of crossing, the Director of Public Works may authorize an "open-cut" trench across the paved street. The Contractor shall then be required to backfill the trench and patch the pavement as indicated on City of Lakeland Index No. 205 A. In certain instances a "feathering-in" of the asphalt patch, overlay, or milling & resurfacing may be required, as deemed appropriate by the Director of Public Works.
2. The casing of the underground utility crossing shall maintain a minimum of thirty six (36) inches of cover from the crown of the roadway pavement to the outside diameter of the casing.
3. The casing shall extend a minimum of six (6) feet from the back of curb on both sides of the road on an urban design section and a minimum of six (6) feet from the outside edge of pavement of both sides of the road on a rural design section.
4. Where the actual location of a potential conflict may exist between the proposed casing and an existing utility, a "window" in the asphalt pavement may be authorized by the City in order to verify the exact depth and location of the utility. This window must be patched as soon as it has served its purpose and shall not remain unpatched overnight under any circumstance. The window shall not exceed an area of one (1) square foot.
5. All methods of installation are subject to the review, approval, and inspection by the City of Lakeland. Such installations will require the issuance of a City of Lakeland Utility Permit. Operations deemed as potentially damaging or unsafe will not be permitted. Road crossings shall be completed on the same day whenever possible.
6. Traffic control at the project site shall conform to FDOT Standards. Traffic control, as approved by the City of Lakeland, shall be maintained during all stages of the underground utility installation.

UNPAVED STREET INSTALLATION

The crossing of an unpaved street may be accomplished by open-cutting of the street. The depth of cover of the underground installation shall be a minimum of thirty six (36) inches. The material removed is to be replaced in layers and compacted. The last six (6) inches of backfill material will be replaced with limerock or shell material (as deemed appropriate) and compacted. This will serve to provide a traffic bearing material and as an indication that there is a utility crossing at the location. A City of Lakeland or Polk County Utility Permit shall be required and adequate traffic control shall be maintained at all stages of the operation.

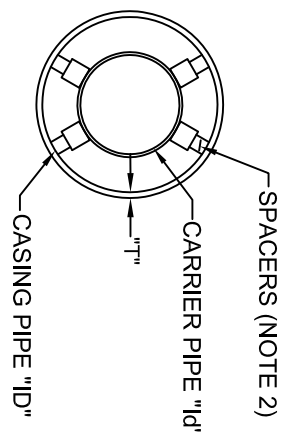
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APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 09/29/03	NO. 1

MINIMUM CASING PIPE SIZE

CARRIER PIPE	INSIDE DIAMETER 'ID'														
	8"	10"	12"	16"	16"	18"	20"	24"	30"	30"	30"	36"	42"	48"	54"
DIP MECHANICAL JOINT	--	--	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"		
DIP PUSH-ON JOINT	--	--	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"		
PVC	--	4"	6"	8"	--	10"	12"	14"	16"	18"	20"	24"	--		
CONCRETE	--	--	--	--	--	--	--	--	--	--	15"	18"	24"		

CASING PIPE	INSIDE DIAMETER 'ID'														
	8"	10"	12"	16"	16"	18"	20"	24"	30"	30"	30"	36"	42"	48"	54"
STEEL CASING PIPE SIZE	8"	10"	12"	16"	16"	18"	20"	24"	30"	30"	30"	36"	42"	48"	54"

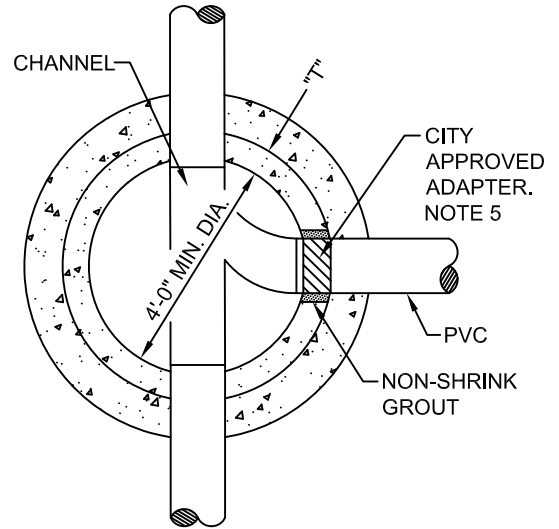
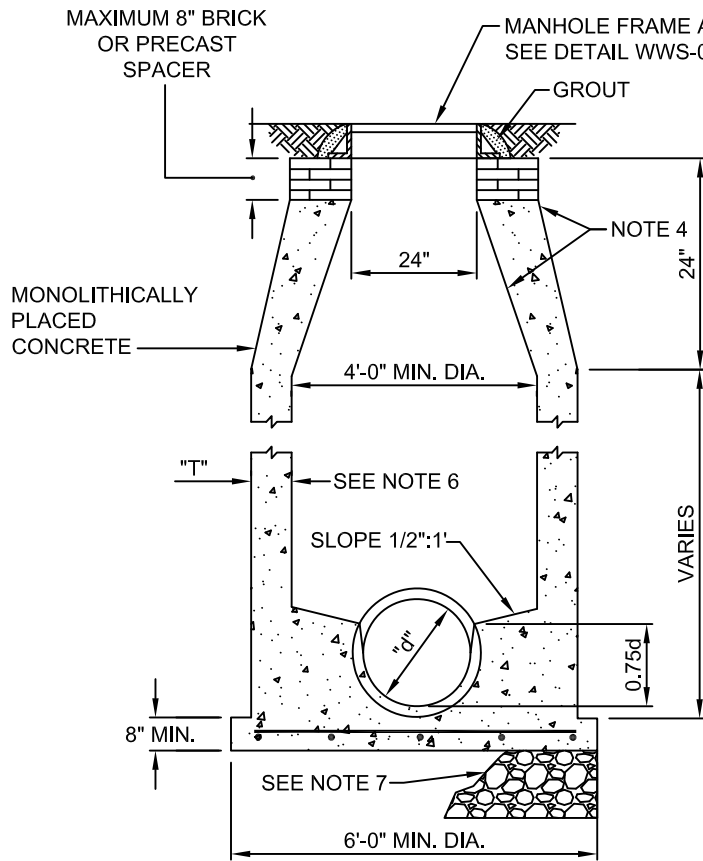
AGENCIES	MINIMUM WALL THICKNESS 'T'														
C.O.L.	.188"	.188"	.250"	.281"	.281"	.312"	.344"	.375"	.469"	.469"	.469"	.532"	.625"	.688"	.781"
F.D.O.T.															
RAILROAD															



NOTES:

1. MINIMUM STEEL CASING PIPE SIZES ARE BASED ON USING "UNI-FLANGE" SERIES 1390-C BELL-JOINT RESTRAINERS FOR 4" THRU 24"
2. REFERENCE WASTEWATER DIVISION MATERIAL SPECIFICATIONS. USE OF WOOD SKIDS ARE NOT PERMITTED.

APPROVED	DATE	PREPARED BY	DATE	REVISION
APPROVED		GEG	09/29/03	
APPROVED		CHECKED BY	ISSUE DATE	REVISION DATE
			10/15/07	10/20/04



CONNECTION DETAIL

CAST IN PLACE

NOTES:

1. CONCRETE SHALL BE 4000 PSI, USING ASTM C150 CEMENT, TYPE 2 OR 5.
2. CONE SECTION SHALL BE EITHER CONCENTRIC (PREFERRED) OR ECCENTRIC.
3. FLOOR SHALL CONTAIN #4 REINFORCEMENT AT 6" CENTERS WITHIN THE CENTER 1/3, AS A MINIMUM.
4. THREE COATS OF 4 DRY MILS, FOR A MINIMUM OF 12 MILS TOTAL DRY THICKNESS, INSIDE AND OUTSIDE OF CON-SEAL CS-55 BLACK CONCRETE COATING, OR APPROVED EQUAL.
5. MANHOLE CONNECTIONS TO DUCTILE IRON AND CLAY PIPE MAY BE DIRECTLY CAST IN PLACE. CITY APPROVED ADAPTER RINGS MUST BE USED WITH PVC PIPE.
6. MINIMUM WALL THICKNESS "T" OF 6". FOR INSIDE DIAMETER (ID) GREATER THAN 4', INCREASE "T" 1" PER FOOT OF INCREASE IN ID.
7. 8" BEDDING (CLASS 2 OR 3) COMPACTED TO 98% AASHTO T180.
8. ALL PROVISIONS OF THE CITY'S "STANDARDS FOR WASTEWATER SYSTEM CONSTRUCTION" SHALL APPLY.
9. FOR MANHOLES OF DEPTH GREATER THAN 15' A CERTIFIED CONSTRUCTION DRAWING SHOWING DETAILED DESIGN FEATURES WILL BE REQUIRED.
10. MANHOLES CONSTRUCTED IN UNPAVED AREAS SHALL PROVIDE RIM ELEVATION AT FINAL GRADE AFTER SODDING. GRADE VIA SMOOTH TRANSITION.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	2
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 05/12/05	

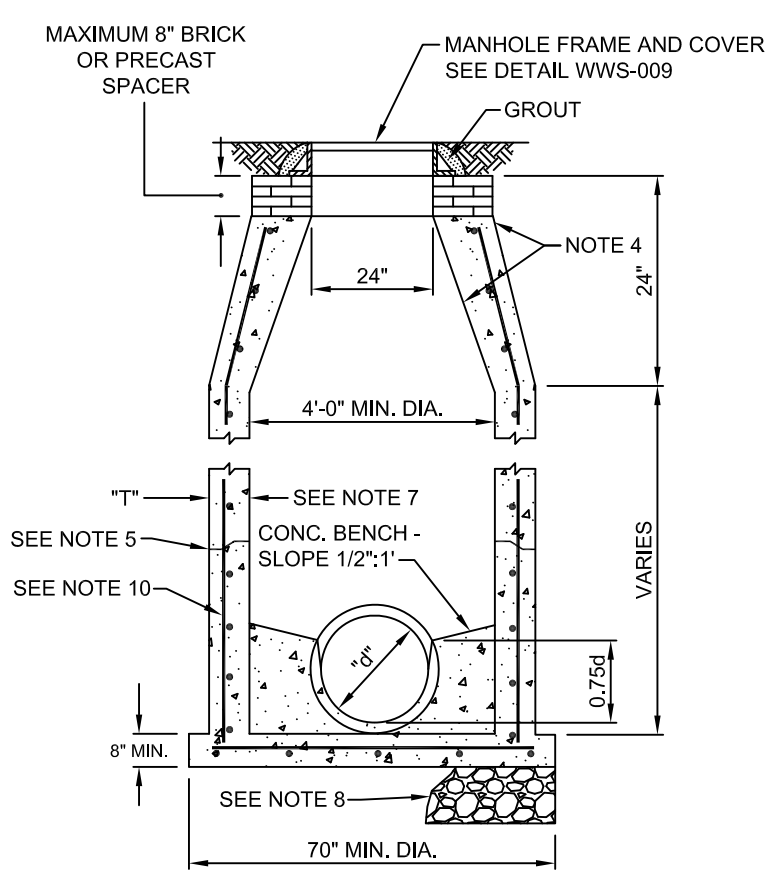


WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

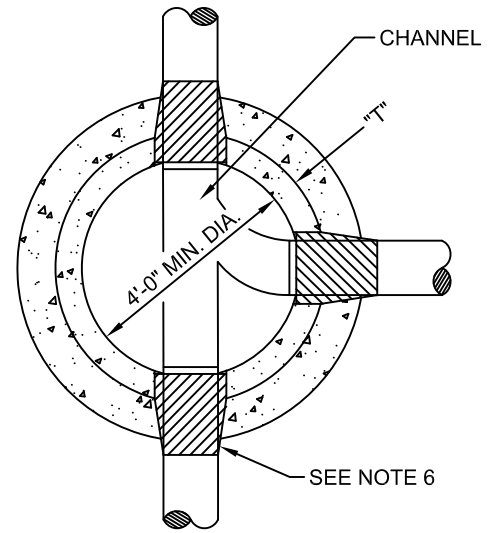
DETAIL NO.: WWS-005

SANITARY SEWER MANHOLE
PRE-CAST

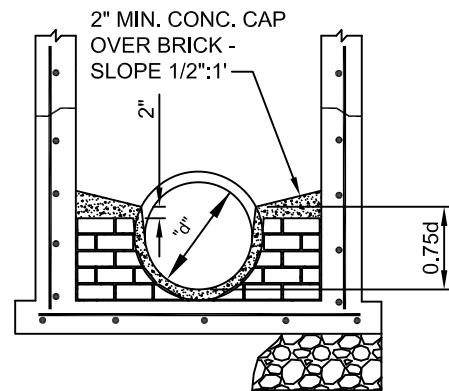
SHT. 1 OF 1



PRECAST MANHOLE
N.T.S.



CONNECTION DETAIL
N.T.S.

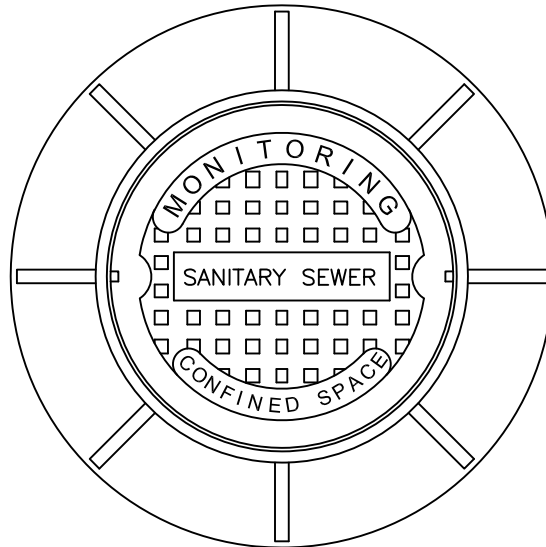
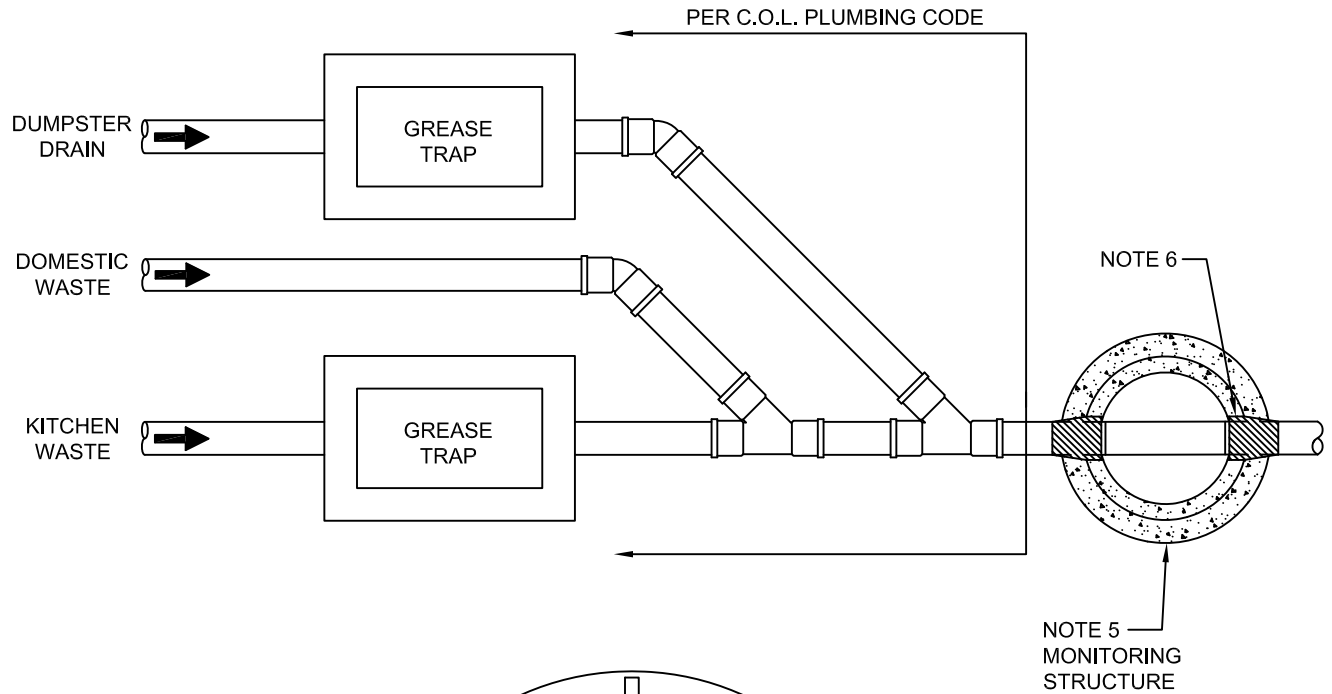


BENCH ALTERNATE
N.T.S.

NOTES:

1. MANHOLE SHALL CONFORM TO ASTM C478 WITH 4000 PSI TYPE 2 CONCRETE.
2. CONE SECTION SHALL BE EITHER CONCENTRIC (PREFERRED) OR ECCENTRIC.
3. BASE THICKNESS SHALL BE A MINIMUM OF 8" AND PRECAST WITH BOTTOM RISER SECTION.
4. THREE COATS OF 4 DRY MILS, FOR A MINIMUM 12 MILS TOTAL DRY THICKNESS INSIDE AND OUTSIDE OF CON-SEAL CS-55 BLACK CONCRETE COATING, OR APPROVED EQUAL. REFERENCE "WASTEWATER OPERATIONS MATERIALS SPECIFICATIONS" SECTION 30.
5. RUB'R-NEK EXTERNAL CONCRETE JOINT WRAP SHALL BE USED IN COMBINATION WITH RAM-NEK FLEXIBLE JOINT SEALANT OR 'D'-LOK RUBBER GASKET AT ALL SECTION JOINTS OF PRECAST MANHOLES. REFERENCE "WASTEWATER OPERATIONS MATERIALS SPECIFICATIONS" SECTION 33.
6. REFERENCE STANDARD DETAIL WWS-005B, "RESILIENT BOOT OR PVC SLEEVE CONNECTION" AND "WASTEWATER OPERATIONS MATERIALS SPECIFICATIONS" SECTION 34.
7. MINIMUM WALL THICKNESS "T" OF 5". FOR INSIDE DIAMETER (ID) GREATER THAN 4', INCREASE "T" 1" PER FOOT OF INCREASE IN ID.
8. 8" BEDDING (CLASS 2 OR 3) COMPACTED TO 98% AASHTO T180.
9. ALL PROVISIONS OF THE CITY'S "STANDARDS FOR WASTEWATER SYSTEM CONSTRUCTION" SHALL APPLY.
10. ONE CAGE #5 @ 12" CENTERS, BOTH WAYS, IN THE CENTER 1/3 OF MANHOLE WALL.
11. FOR MANHOLES OF DEPTH GREATER THAN 15' A CERTIFIED CONSTRUCTION DRAWING SHOWING DETAILED DESIGN FEATURES WILL BE REQUIRED.
12. MANHOLES CONSTRUCTED IN UNPAVED AREAS SHALL PROVIDE RIM ELEVATIONS AT FINAL GRADE AFTER SODDING. GRADE VIA SMOOTH TRANSITION.
13. REFERENCE STANDARD DETAIL WWS-005A FOR MONITORING MANHOLE FRAME AND COVER.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	3
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 07-01-05	NO. 3

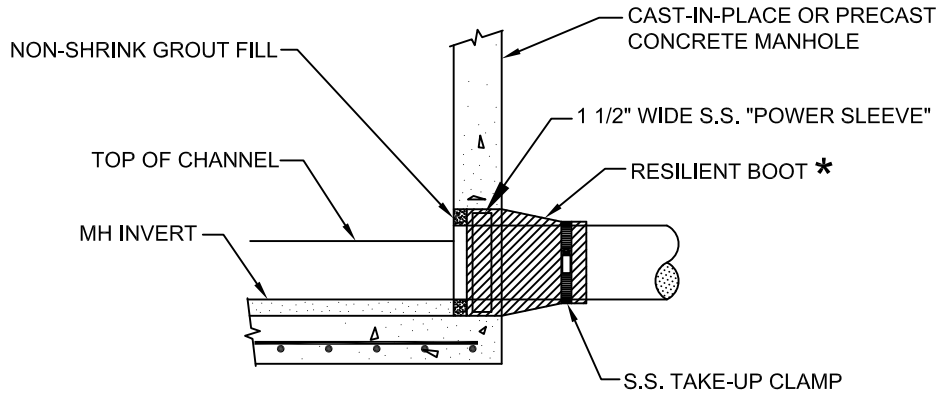


COVER IMPRINTING

NOTES:

1. APPLICABLE FOR FOOD PROCESSORS, KITCHENS, AND INDUSTRIAL AND/OR CATEGORICAL SITES AND USERS.
2. STRUCTURE SHALL BE LOCATED OUTSIDE OF TRAFFIC AREAS WHERE DAYTIME ACCESS IS POSSIBLE.
3. FLOW THROUGH STRUCTURE SHALL BE FROM A SINGLE USER.
4. CONE SECTION SHALL BE CONCENTRIC.
5. REFERENCE STANDARD DETAIL WWS-005 FOR MANHOLE CONSTRUCTION SPECIFICS.
6. REFERENCE STANDARD DETAIL WWS-005B FOR RESILIENT BOOT CONNECTION.
7. MANHOLE COVER SHALL BE IMPRINTED AS DEPICTED ABOVE. REFERENCE STANDARD DETAIL WWS-009 FOR FRAME AND COVER DETAILS.
8. WASTE FLOW SYSTEM SHALL BE DESIGNED TO ADEQUATELY ACCOMMODATE ALL COMBINED FLOWS, INCLUDING RAINWATER.

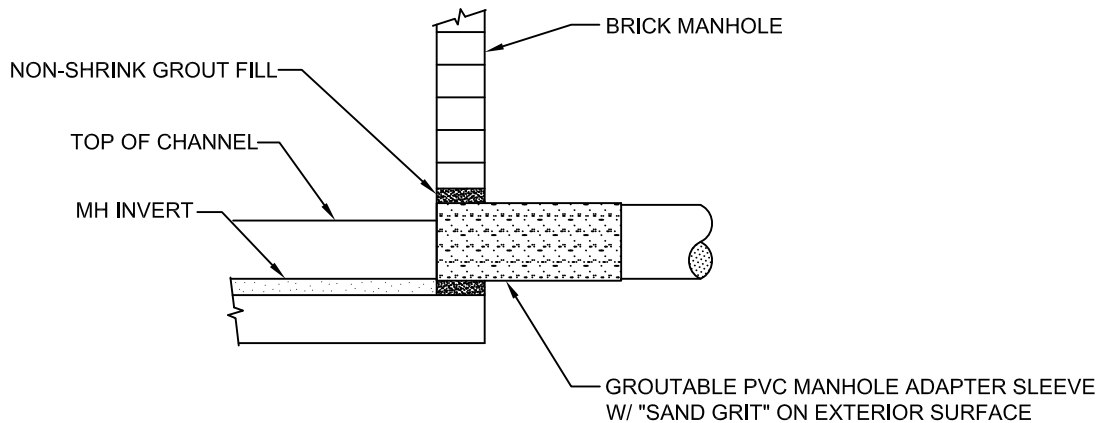
APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	4
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	



* RESILIENT BOOT SHALL BE PSX MANUFACTURED BY PRESS SEAL GASKET CORP., 6935 LINCOLN PARKWAY, FT. WAYNE, IN., OR CITY APPROVED EQUAL, MEETING ASTM C923. REF. WASTEWATER OPERATIONS MAT'L SPECIFICATIONS SECTION 34

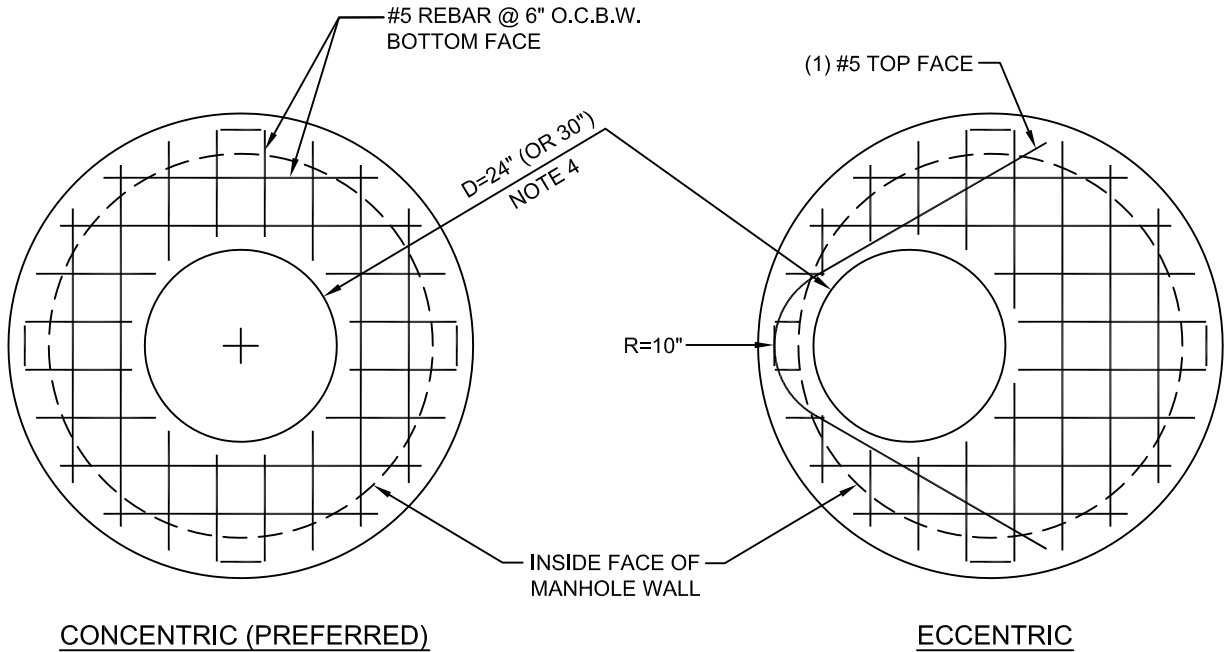
1. RESILIENT BOOT SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S DIRECTIONS.
2. FOR USE ON PRECAST MANHOLES. ALSO APPLICABLE ON CAST-IN-PLACE MANHOLES WHEN USED WITH A HOLE FORMER.
3. THE VOID BETWEEN BOOT AND PIPE SHALL BE FILLED WITH GROUT AND COATED AS SPECIFIED FOR THE MANHOLE.

RESILIENT BOOT CONNECTION

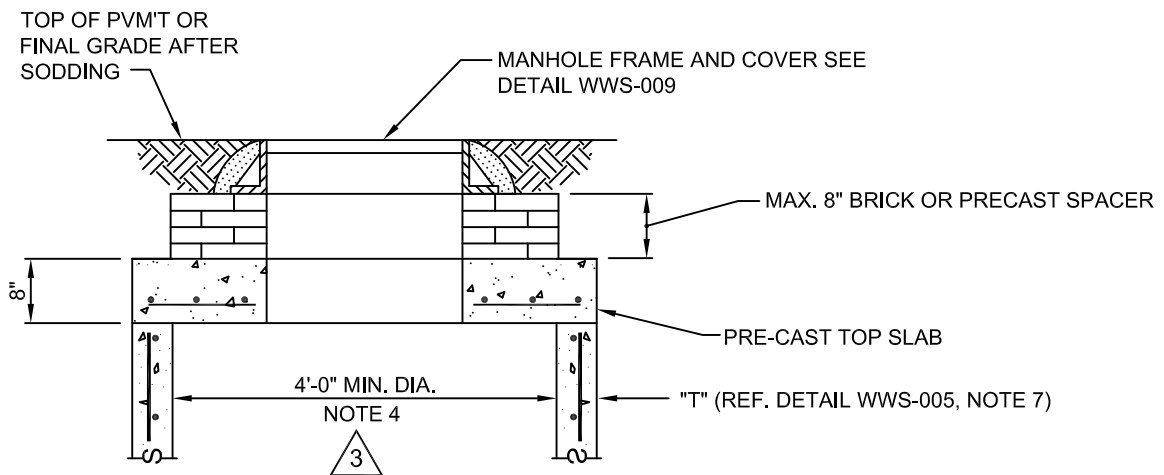


PVC SLEEVE CONNECTION

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE	NO. 0



SHALLOW MANHOLE TOP SLAB

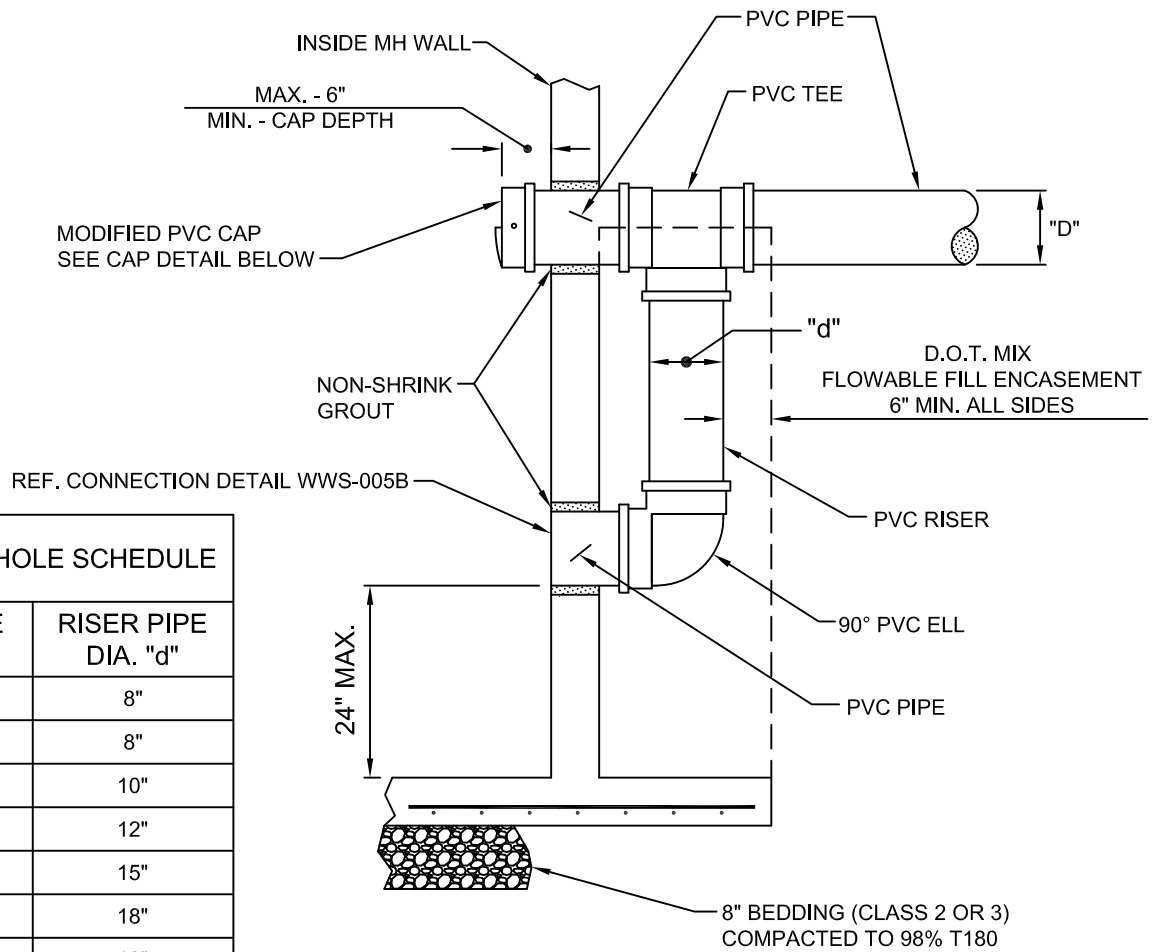


TOP DETAIL

NOTE:

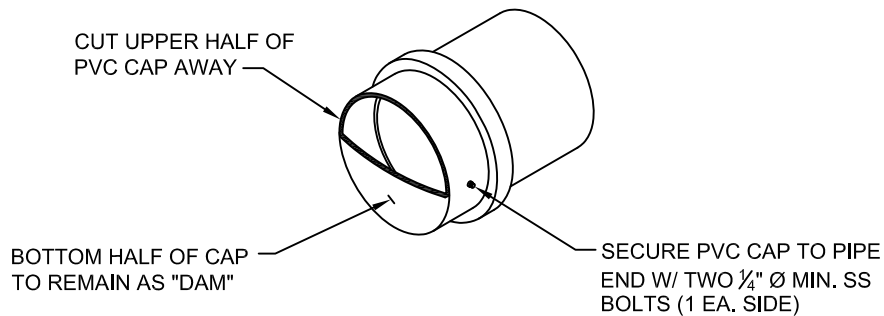
1. STANDARD MANHOLE SPECIFICATIONS APPLY EXCEPT WHERE OTHERWISE NOTED.
2. PRECAST TOP SLAB SHALL CONFORM TO DETAIL AND D.O.T. MINIMUM STANDARDS. REF. D.O.T. INDEX #200. OPENING MAY BE CONCENTRIC (PREFERRED) OR ECCENTRIC.
3. SHALLOW DESIGN MANHOLE SHALL BE LIMITED TO DEPTHS NOT GREATER THAN 6 FEET. SEE ALSO STANDARD DETAIL WWS-008.
4. IF DEPTH OF MANHOLE IS 42 INCHES OR LESS, DIAMETER SHALL EQUAL 5'-0" AND MANHOLE RING AND COVER SHALL BE 30 INCH MINIMUM DIAMETER, HINGED, USF FOUNDRY USF 324, OR APPROVED EQUAL. REFERENCE STANDARD DETAIL WWS-009A.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	3
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	NO.



DROP MANHOLE SCHEDULE	
INLET PIPE DIA. "D"	RISER PIPE DIA. "d"
8"	8"
10"	8"
12"	10"
15"	12"
18"	15"
21"	18"
24"	18"

MANHOLE OUTSIDE DROP CONNECTION



PVC CAP DETAIL

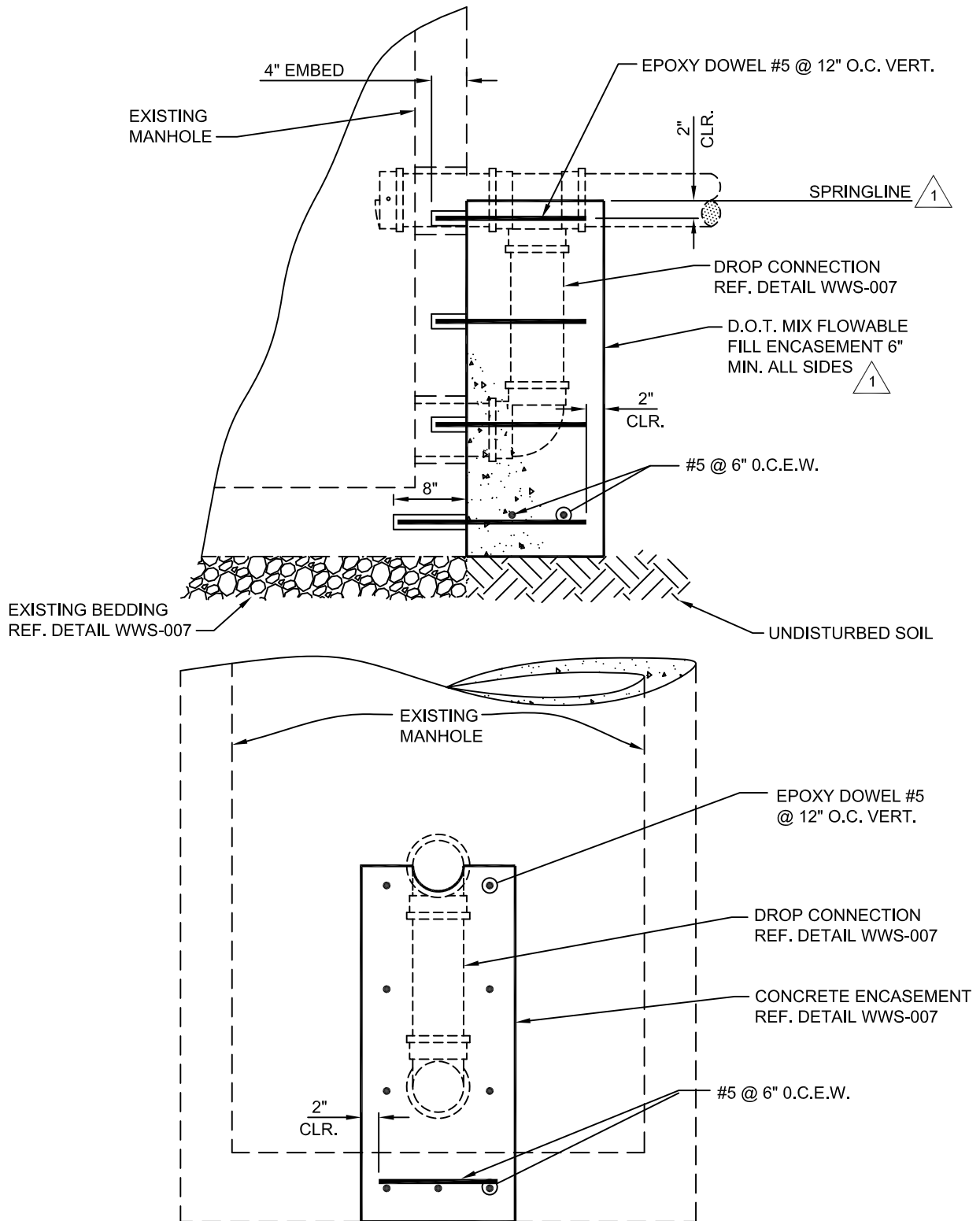
NOTE:

- OUTSIDE DROP CONNECTION AT MANHOLE REQUIRED ON ALL NEW CONSTRUCTION WHERE INVERT DROP EXCEEDS 2.0 FEET.

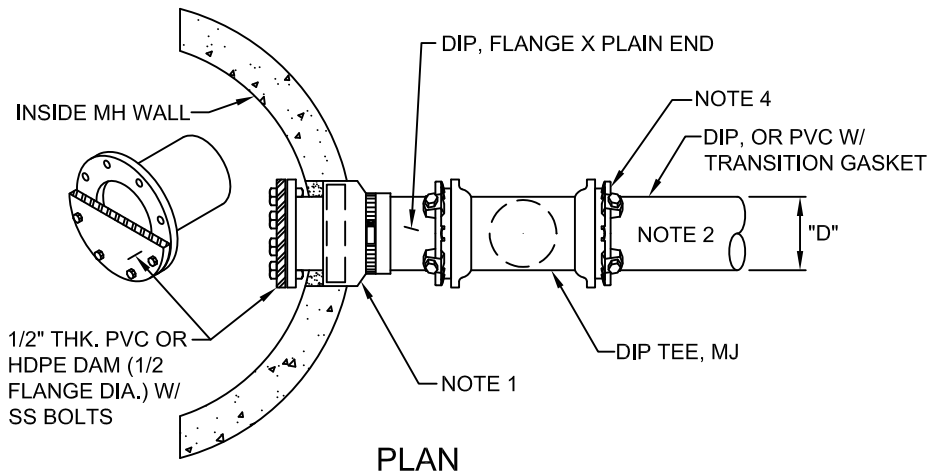
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APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 09/29/03	NO. 1



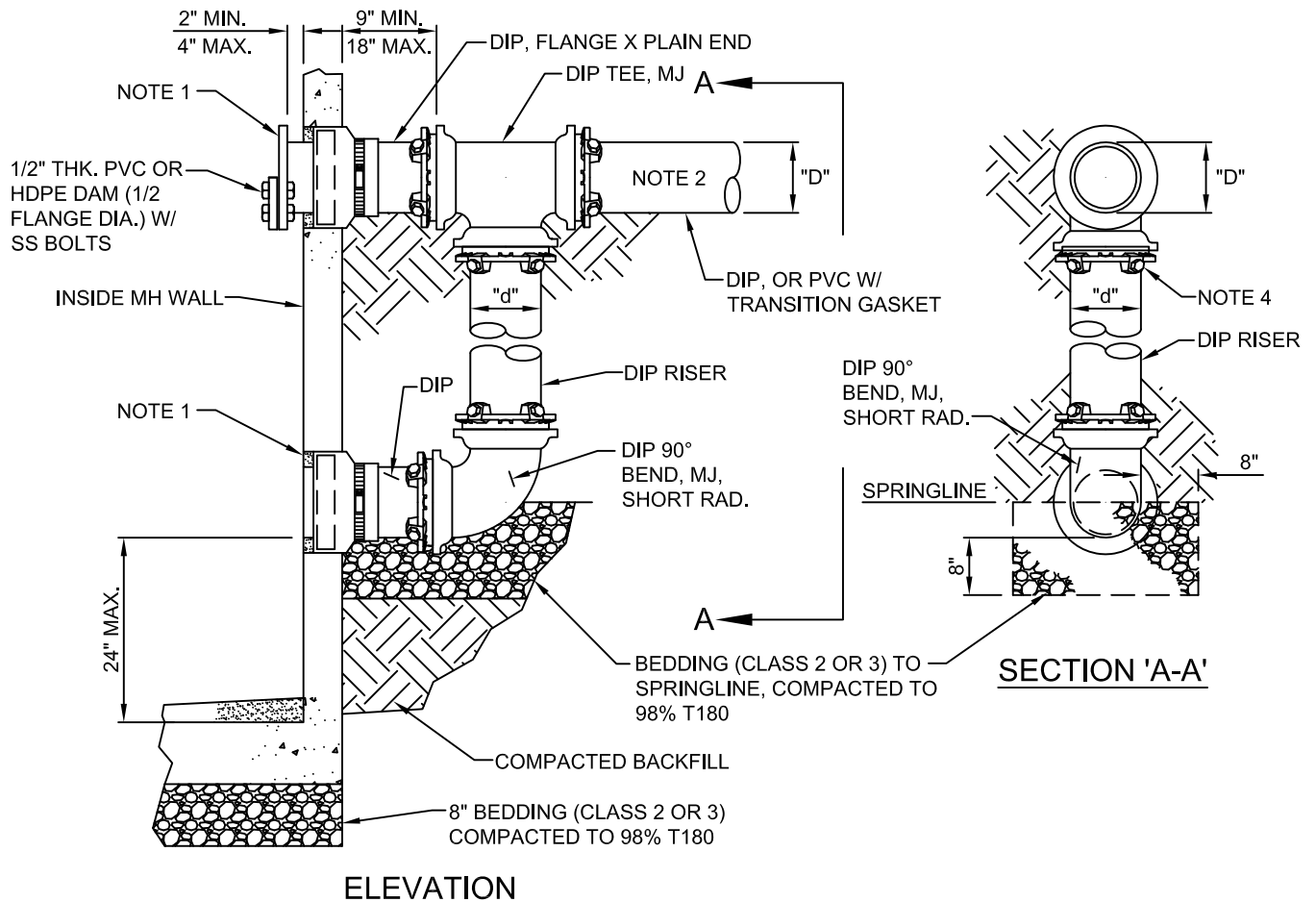
SANITARY SEWER - EXISTING MANHOLE
DROP CONNECTION CONCRETE ENCASUREMENT



APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION 1
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE NO. 1



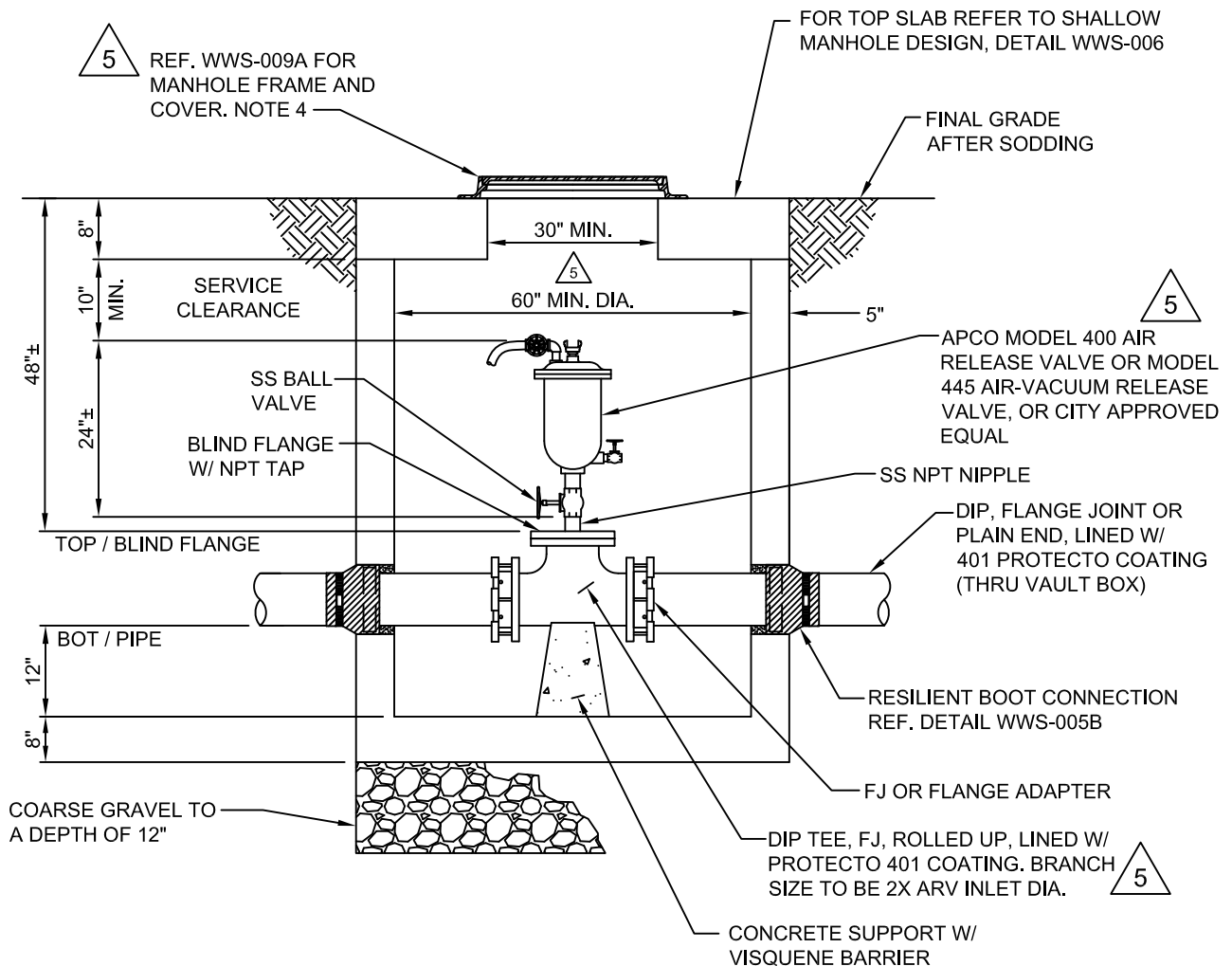
DROP MANHOLE SCHEDULE	
INLET PIPE DIA. "D"	RISER PIPE DIA. "d"
8"	8"
10"	8"
12"	10"
15"	12"
18"	15"
21"	18"
24"	18"



GENERAL NOTES:

1. REFERENCE CONNECTION DETAIL WWS-005B.
2. NO JOINTS BETWEEN TEE AND WITHIN 5 FEET OF MANHOLE EXCAVATION.
3. ALL DUCTILE IRON PIPE AND FITTINGS TO BE LINED WITH PROTECTO 401.
4. RESTRAIN ALL PIPE AND FITTINGS WITH EBAA IRON MECHANICAL JOINT RESTRAINTS, OR CITY APPROVED EQUAL.

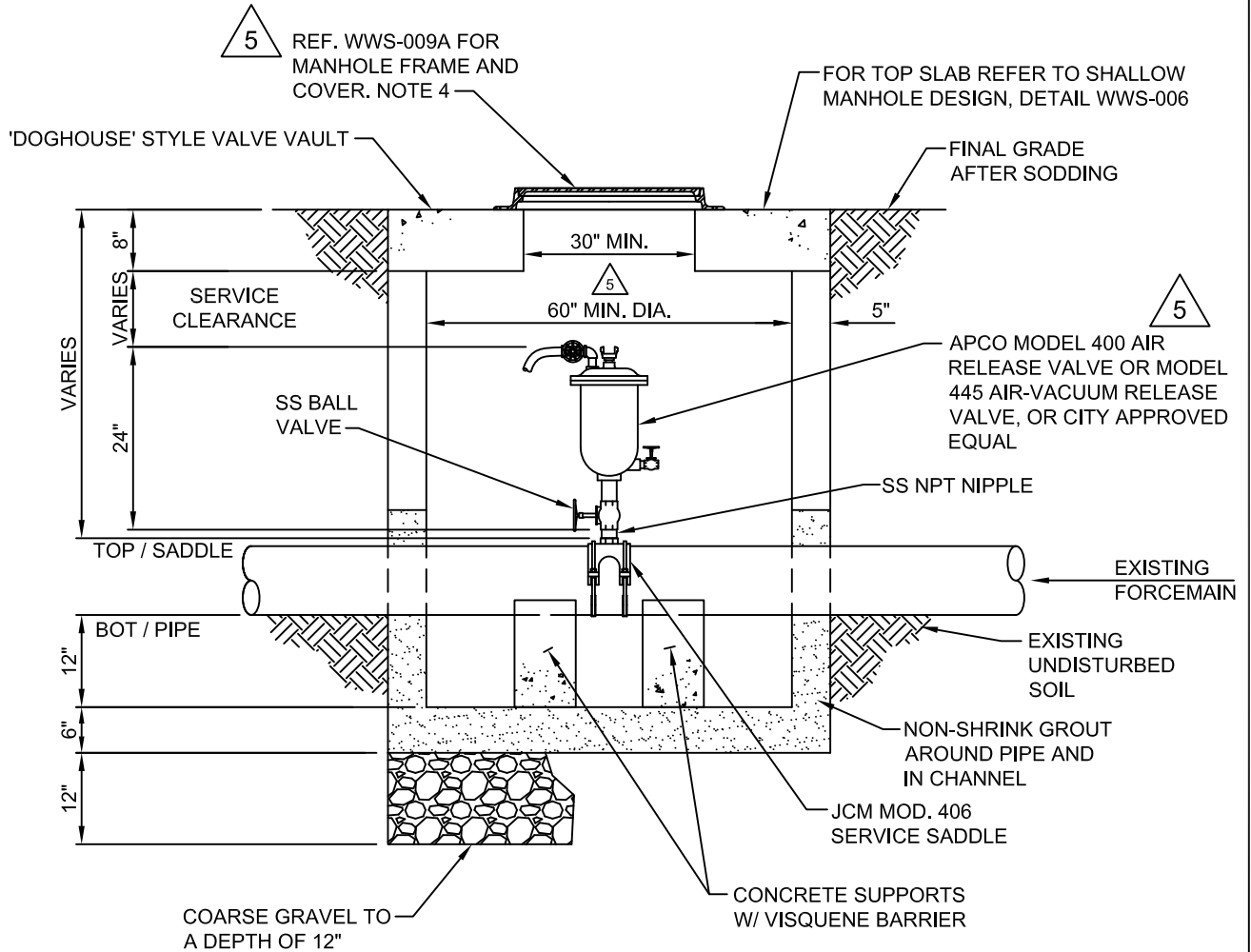
APPROVED	DATE	PREPARED BY GEG	DATE 02/10/15	REVISION	
APPROVED	DATE	CHECKED BY	ISSUE DATE 02/10/15	REVISION DATE	NO.



NOTES:

1. STANDARD MANHOLE SPECIFICATIONS APPLY EXCEPT WHERE OTHERWISE NOTED.
2. INSTALL AIR RELEASE VALVE TO MANUFACTURER'S SPECIFICATIONS.
3. COARSE GRAVEL BEDDING REQUIRED REGARDLESS OF SOIL TYPE.
4. NOT INTENDED FOR USE IN ROADWAYS. BRICK OR PRECAST SPACER RING IS REQUIRED IF STRUCTURE IS LOCATED UNDER PAVEMENT. REFERENCE DETAIL WWS-009A.
5. ADJUST DEPTH OF FORCEMAIN VIA SMOOTH TRANSITION TO ACCOMMODATE DEPTH TO TOP OF BLIND FLANGE LOCATED IN ARV VAULT.
6. ALL NUTS AND BOLTS TO BE STAINLESS STEEL. DO NOT PAINT.
7. DO NOT PAINT STAINLESS STEEL NIPPLES OR STAINLESS ISOLATION VALVE.
8. PAINT THE FOLLOWING EXTERNAL SURFACES WITH PROTECTO 401: DUCTILE IRON PIPE, DUCTILE IRON FITTINGS, DUCTILE IRON BLIND FLANGE, AND ARV BODY.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	5
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	NO.



5

NOTES:

1. STANDARD MANHOLE SPECIFICATIONS APPLY EXCEPT WHERE OTHERWISE NOTED.
2. INSTALL AIR RELEASE VALVE TO MANUFACTURER'S SPECIFICATIONS.
3. COARSE GRAVEL BEDDING REQUIRED REGARDLESS OF SOIL TYPE.
4. NOT INTENDED FOR USE IN ROADWAYS. BRICK OR PRECAST SPACER RING IS REQUIRED IF STRUCTURE IS LOCATED UNDER PAVEMENT. REFERENCE DETAIL WWS-009A.
5. ADJUST DEPTH OF FORCEMAIN VIA SMOOTH TRANSITION TO ACCOMMODATE DEPTH TO TOP OF SADDLE LOCATED IN ARV VAULT.
6. ALL NUTS AND BOLTS TO BE STAINLESS STEEL. DO NOT PAINT.
7. DO NOT PAINT STAINLESS STEEL NIPPLES OR STAINLESS ISOLATION VALVE.
8. PAINT THE FOLLOWING WITH PROTECTO 401: DUCTILE IRON PIPE, DUCTILE IRON FITTINGS, AND ARV BODY.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	5
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	NO.

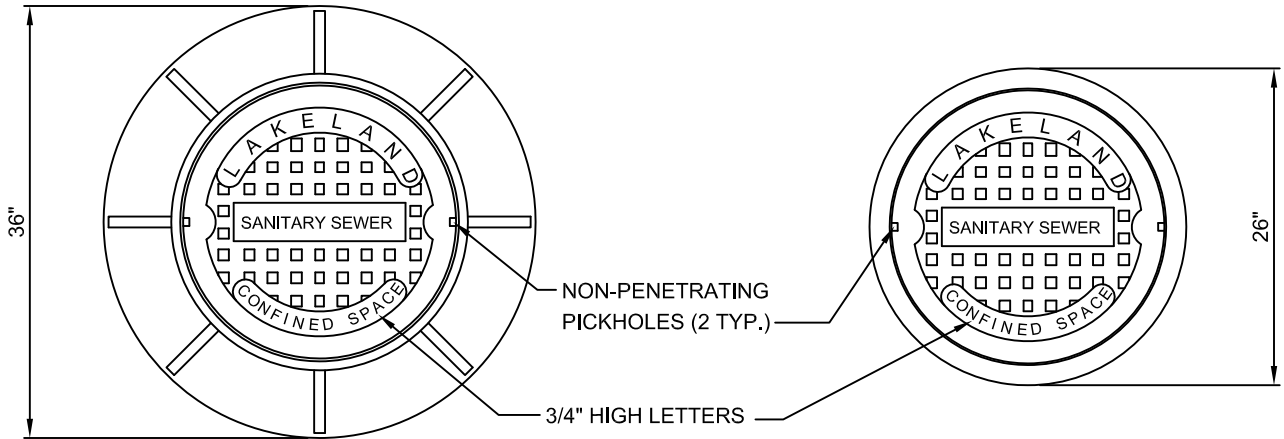


WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

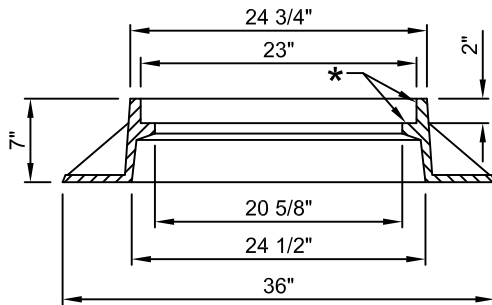
DETAIL NO.: WWS-009

SANITARY SEWER MANHOLE
FRAME AND COVER

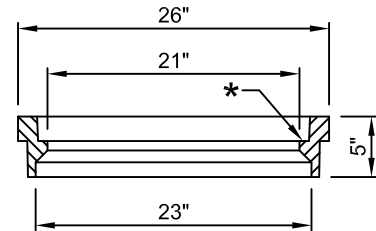
SHT. 1 OF 1



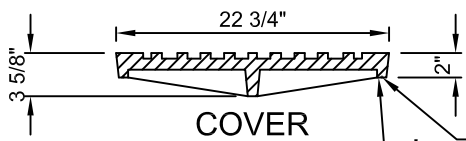
FRAME & COVER - PLAN



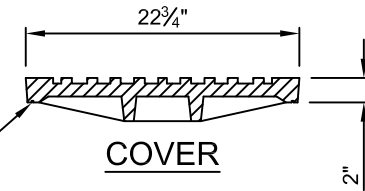
FRAME



FRAME



COVER



COVER

'O' RING

* MACHINED SURFACES

U.S. FOUNDARY & MFG. CORP.
REF. CAT. NO. 420-G-ORS
FRAME WT. 240 LBS. ±
COVER WT. 130 LBS. ±
MAT'L - CAST IRON, ONE COAT OF ASPHALTIC PAINT (OR CITY APPROVED EQUAL)

ALTERNATE FRAMES

U.S.F. CAT. NO.	HEIGHT
525	9"
465	4"
440	3"

(AS REQ'D. FOR HEIGHT ADJUSTMENTS)

U.S. FOUNDARY & MFG. CORP.
REF. CAT. NO. 1125-G-ORS
FRAME WT. 155 LBS. ±
COVER WT. 130 LBS. ±
MAT'L - CAST IRON, ONE COAT OF ASPHALTIC PAINT (OR CITY APPROVED EQUAL)

MANHOLE ASSEMBLY

WITH MUD RING

MANHOLE ASSEMBLY

SLAB TYPE

NOTES:

- MANHOLE COVER SHALL BE IMPRINTED WITH "LAKELAND" AND "SANITARY SEWER" AND WITH NOTE "CONFINED SPACE".
- PAVED AREAS - SET FRAMES AT FINAL GRADE. UNPAVED AREAS - SET FRAMES AT FINAL GRADE AFTER SODDING.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	3
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	

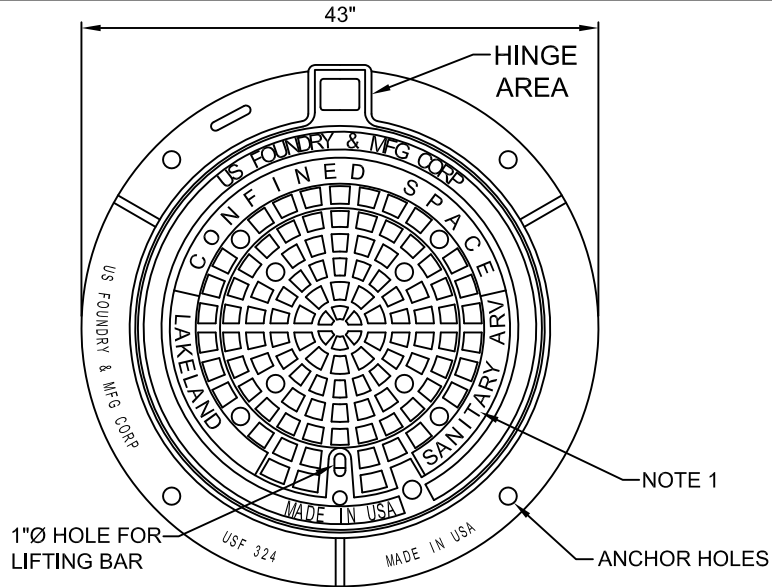


WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

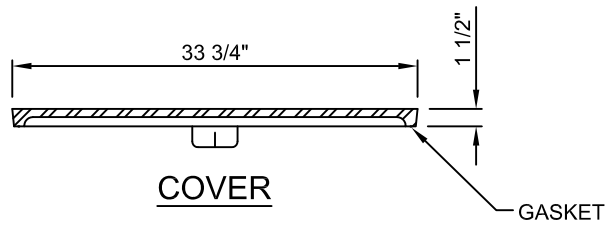
DETAIL NO.: WWS-009A

SANITARY SEWER MANHOLE - ARV &
SHALLOW MANHOLE FRAME AND COVER

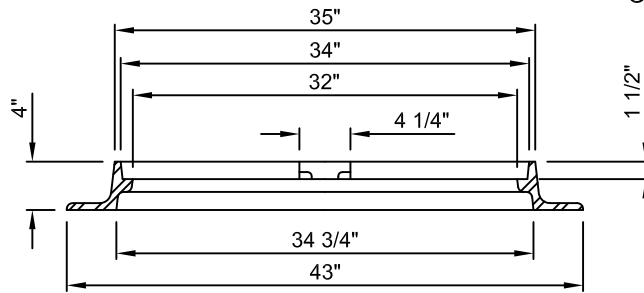
SHT. 1 OF 1



FRAME & COVER - PLAN



COVER



FRAME

U.S. FOUNDRY & MFG. CORP.
REF. CAT. NO. 324
FRAME WT. 165 LBS. ±
COVER WT. 180 LBS. ±
MAT'L - CAST IRON, ONE COAT OF
ASPHALTIC PAINT
(OR CITY APPROVED EQUAL)

NOTE:

- MANHOLE COVER SHALL BE IMPRINTED WITH "LAKELAND" AND "SANITARY SEWER" OR "SANITARY ARV", AND WITH NOTE "CONFINED SPACE"

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	4
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	

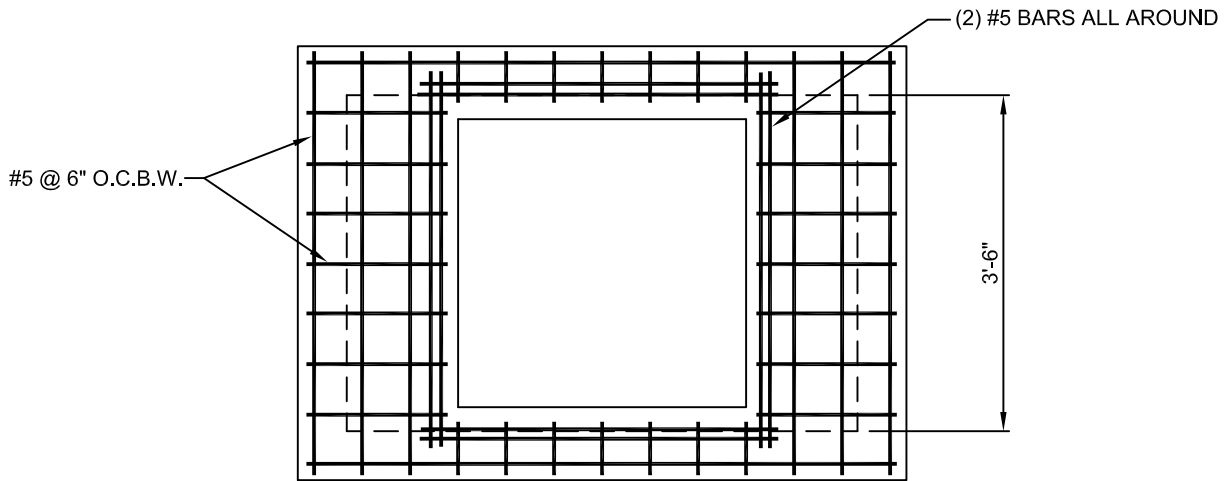


WASTEWATER STANDARDS
 WATER ENGINEERING DIVISION

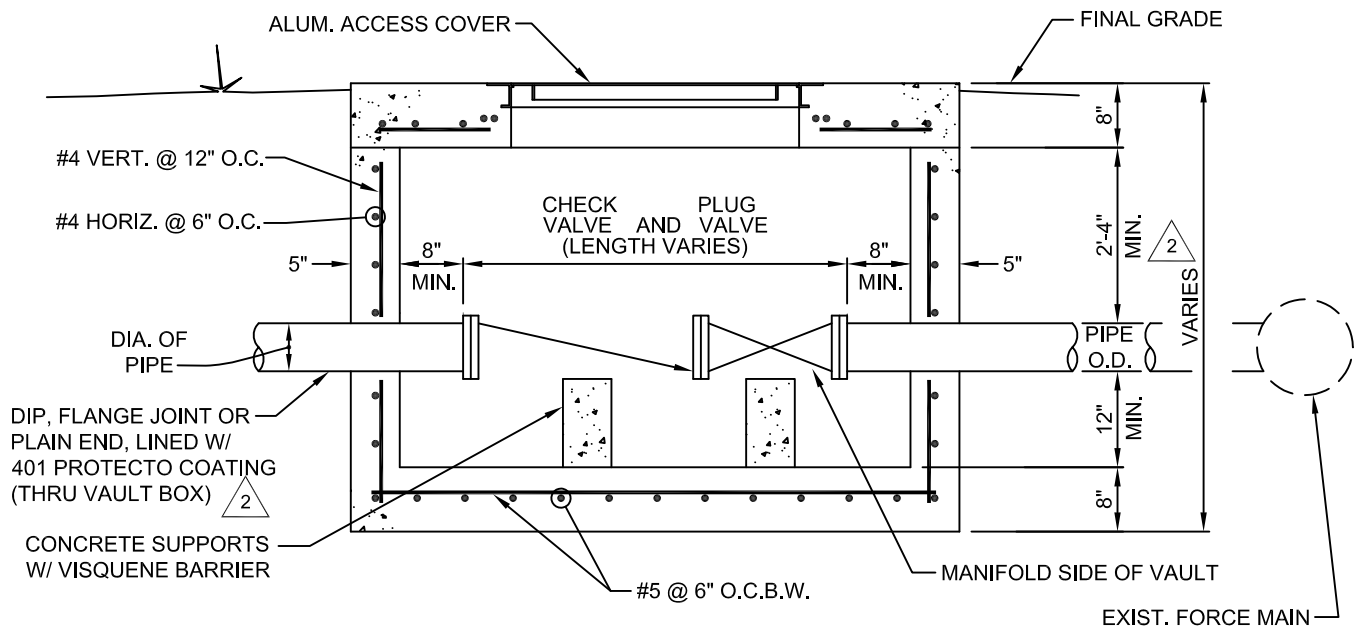
DETAIL NO.: WWS-010

SANITARY SEWER FORCEMAIN
 MANIFOLD VAULT

SHT. 1 OF 1



TOP SLAB REINFORCING

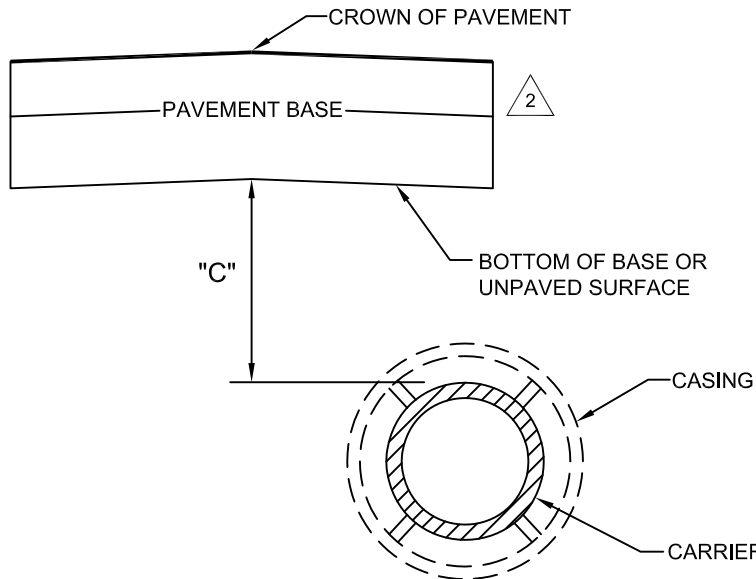


FORCE MAIN MANIFOLD VAULT

NOTE:

1. ALUM. FRAME AND COVER W/ 36" X 36" CLEAR OPENING.
2. LOAD RATINGS:
 WITHIN ROADWAY: NOT PERMITTED
 ALL OTHER AREAS: H-20

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	2
APPROVED	DATE	CHECKED BY	DATE 10/15/07	DATE	NO. 02/10/15

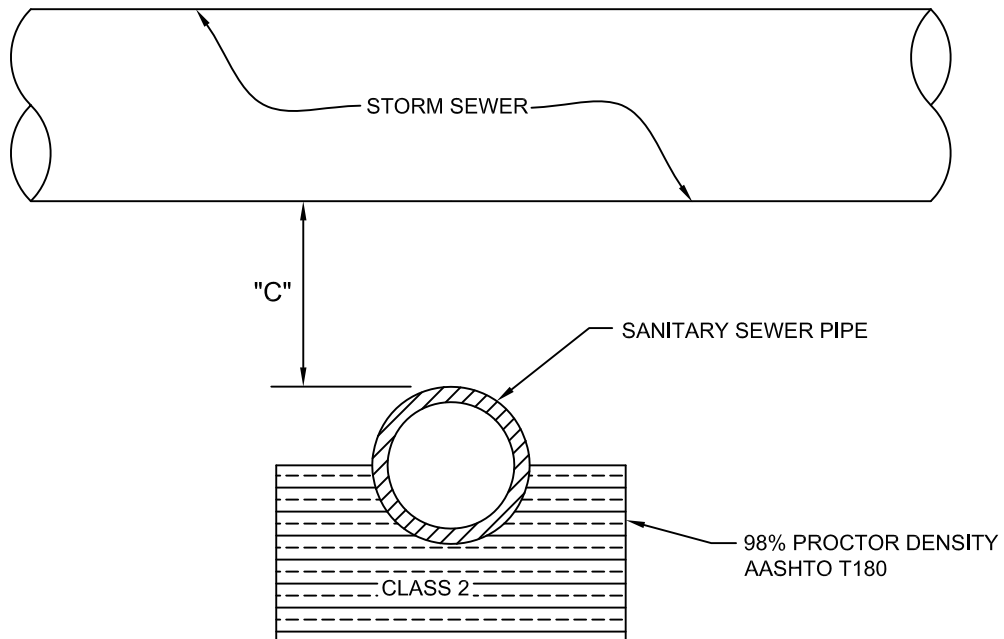


2

"C"	SANITARY SEWER PIPE
>= 36"	PVC, DIP, HDPE SDR11
>= 24"-35"	PVC DR18 (FM), DIP
>= 14"-23"	DIP, STEEL CASING
< 14"	NOT PERMITTED

FOR SANITARY SEWER CROSSINGS
OF PAVED OR UNPAVED STREETS
REF. DETAIL WWS-003

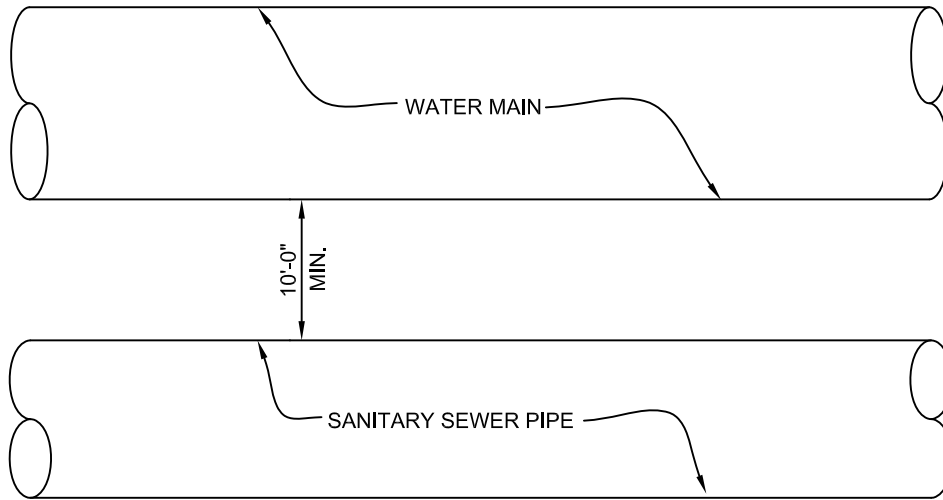
CLEARANCES-STRUCTURAL REQUIREMENTS



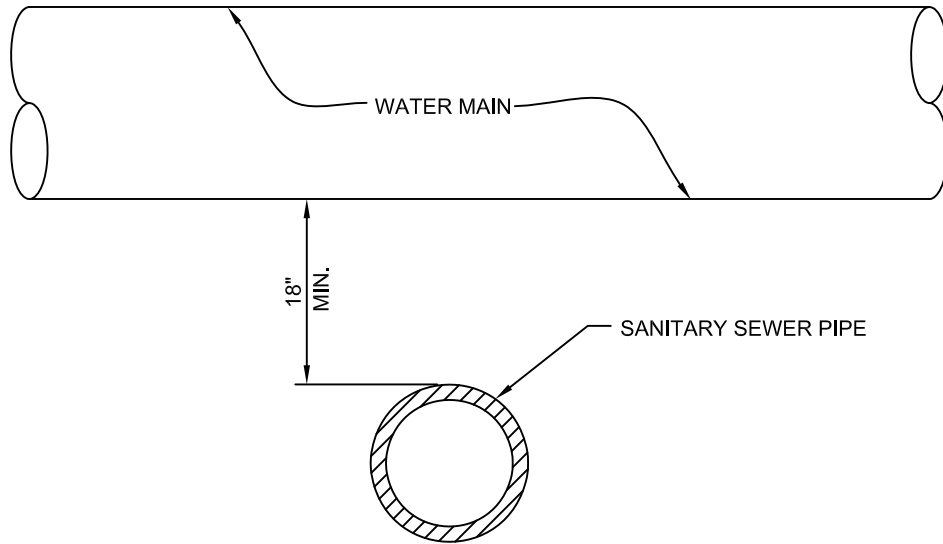
"C"	SANITARY SEWER PIPE
>= 12"	PVC, DIP
>= 3"-11"	DIP, PVC DR18 & CLASS 2 BEDDING
< 3"	CONFLICT STRUCTURE, STEEL CASING

CLEARANCES-VERTICAL SEPARATION

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	2
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 04/05/04	NO. 2



CLEARANCES-HORIZONTAL SEPARATION

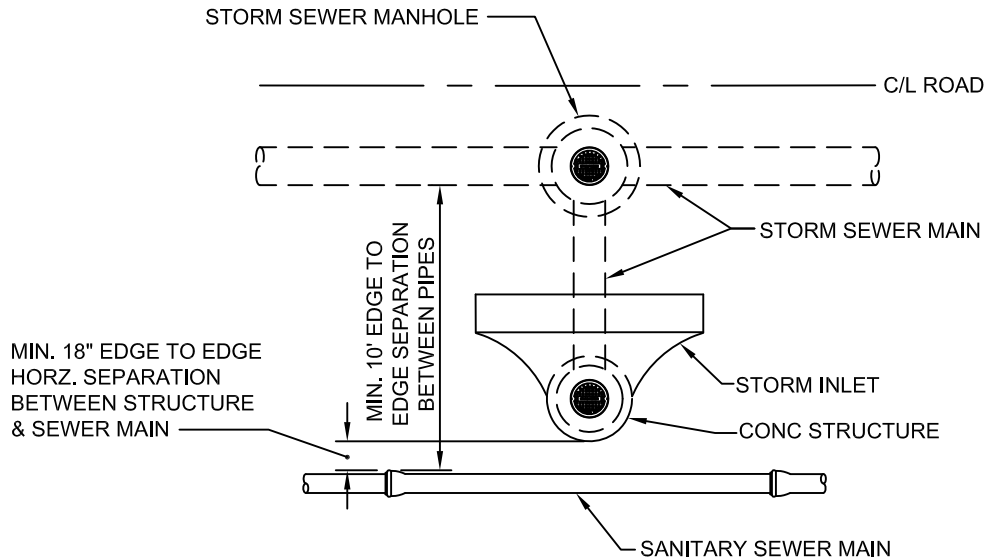


CLEARANCES-VERTICAL SEPARATION

GENERAL NOTES:

1. WHERE ENCROACHMENT UPON THE MINIMUM 10 FOOT HORIZONTAL SEPARATION IS PERMITTED BY THE WATER UTILITY, C900 OR DUCTILE IRON PIPE SHALL BE USED.
2. WHERE ENCROACHMENT UPON THE MINIMUM 18" VERTICAL SEPARATION IS PERMITTED BY THE WATER UTILITY, THE SEWER PIPE SHALL EITHER BE PLACED IN A STEEL SLEEVE OR ARRANGED SO SEWER PIPE AND WATER PIPE JOINTS ARE SEPARATED BY A MINIMUM OF 10 FEET. REFERENCE LAKELAND WATER UTILITIES WASTEWATER OPERATIONS POLICIES, STANDARDS, AND SPECIFICATIONS FOR SUBDIVISIONS AND COMMERCIAL DEVELOPMENTS, SECTION 8.4 "PROTECTION OF WATER SUPPLY".

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE	NO.

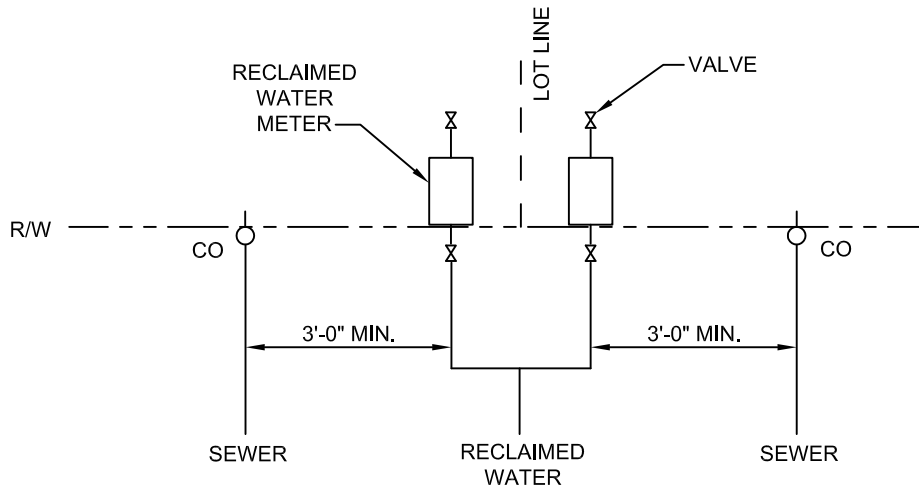


CLEARANCES-HORIZONTAL SEPARATION

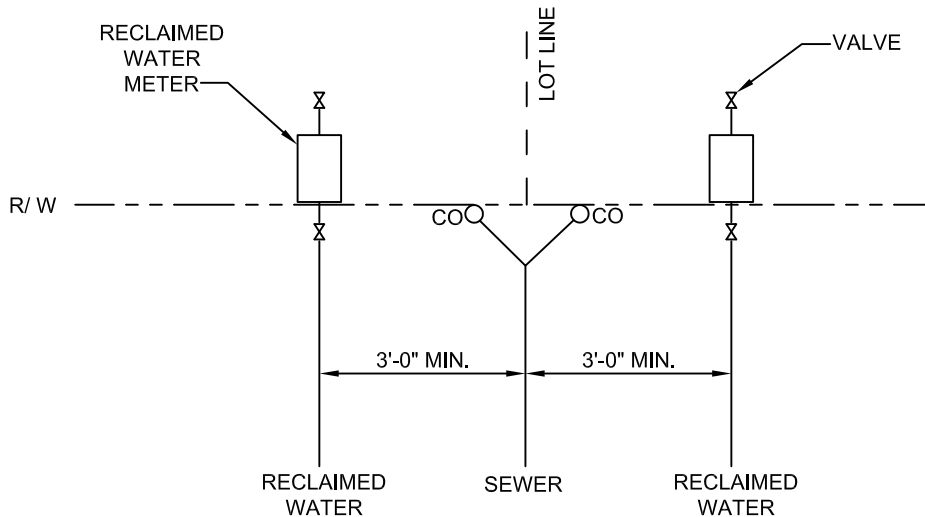
GENERAL NOTES:

1. SANITARY SEWER MAINS SHALL BE DESIGNED WITH MINIMUM 18" EDGE TO EDGE HORIZONTAL SEPARATION FROM STORM STRUCTURES.
2. INCREASE HORIZONTAL SEPARATION AS DEPTH OF COVER INCREASES OVER SANITARY SEWER MAINS DESIGNED ADJACENT TO STORM STRUCTURES. FOR EXCAVATION BELOW THE BASE OF THE STRUCTURE, SOIL CLASSIFICATION AND STABILITY OF THE STRUCTURE DURING EXCAVATION IS TO BE CONSIDERED.

APPROVED	DATE	PREPARED BY GEG	DATE 04/29/05	REVISION	
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE	NO.



OPTION #1
RECLAIMED WATER ADJACENT TO LOT LINE



OPTION #2
SEWER ADJACENT TO LOT LINE

GENERAL NOTES:

1. ALL RECLAIMED WATER METER ASSEMBLIES SHALL BE INSTALLED BY CITY OF LAKELAND WATER OPERATIONS.
2. RECLAIMED WATERMAIN TAPS BY CITY OF LAKELAND CREWS ONLY. REFERENCE WATER OPERATIONS MANUAL FOR FURTHER INFORMATION.
3. REFERENCE CITY OF LAKELAND WATER UTILITIES ALTERNATIVE IRRIGATION SYSTEM EXCEPTION TABLE.

APPROVED	DATE	PREPARED BY WG	DATE 09/29/03	REVISION	
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE	NO.

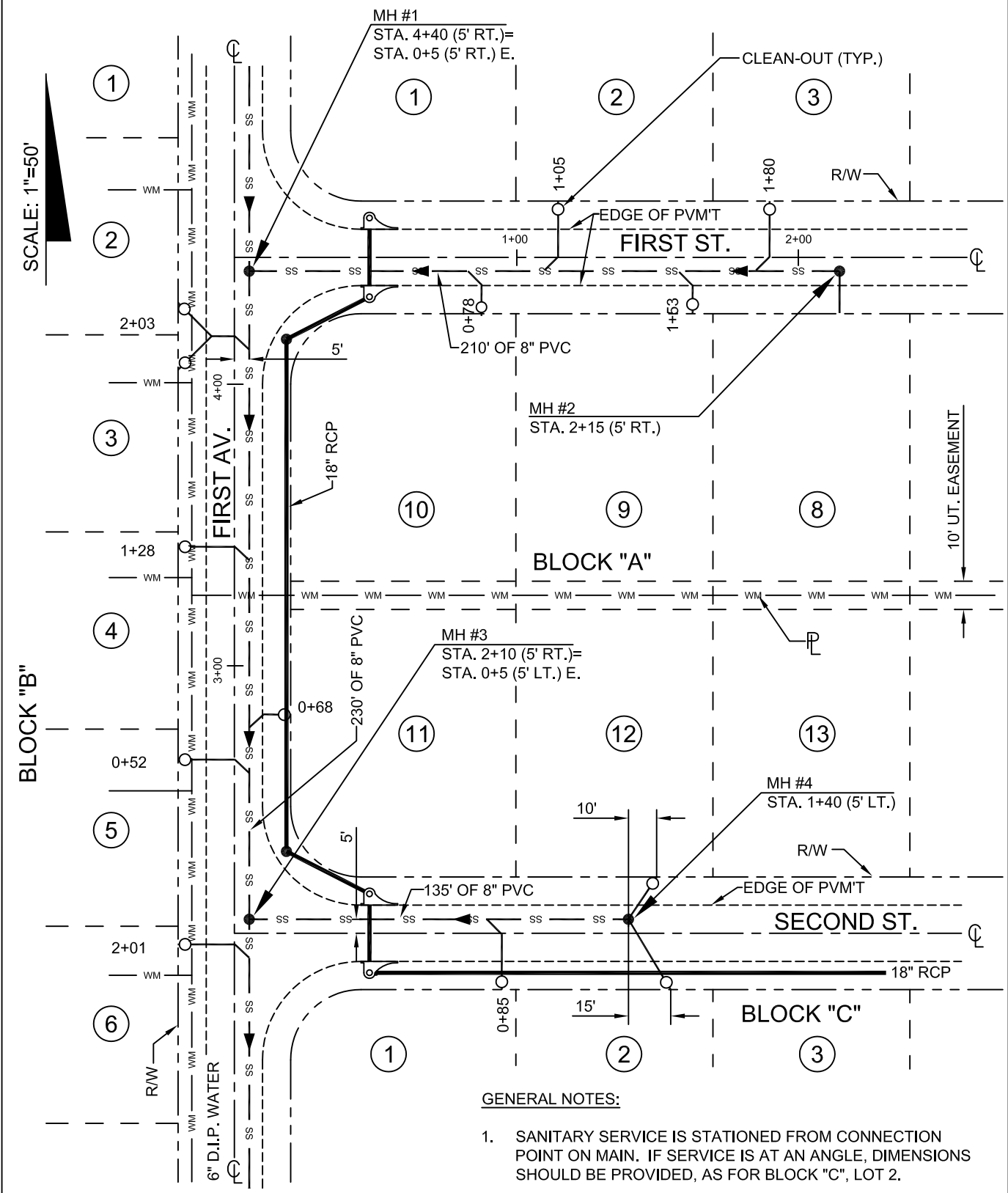


WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

DETAIL NO.: WWS-012

SANITARY SEWER
MASTER PLAN - SAMPLE

SHT. 1 OF 1



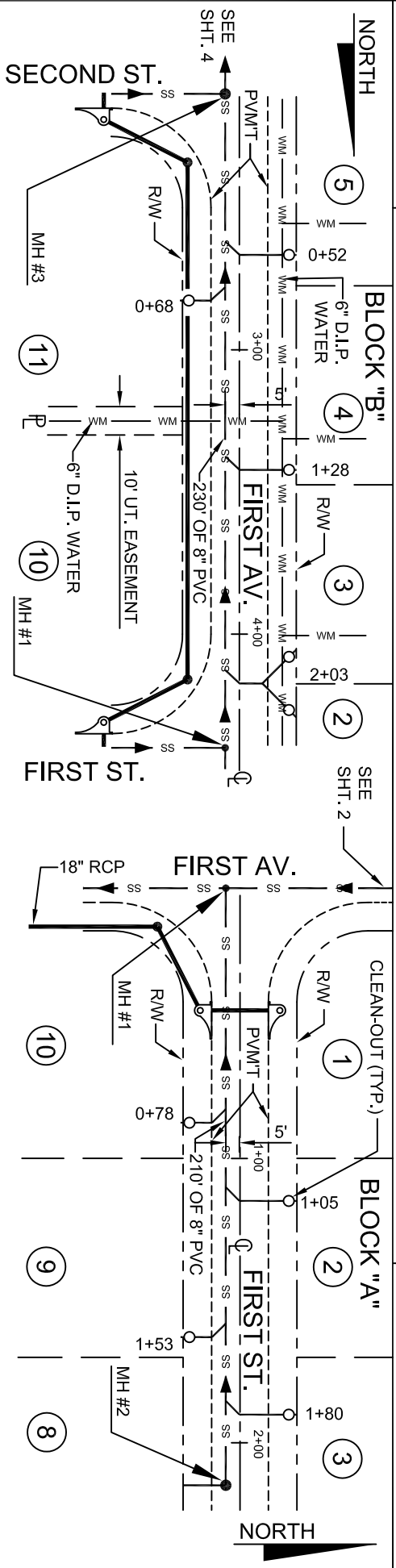
GENERAL NOTES:

- SANITARY SERVICE IS STATIONED FROM CONNECTION POINT ON MAIN. IF SERVICE IS AT AN ANGLE, DIMENSIONS SHOULD BE PROVIDED, AS FOR BLOCK "C", LOT 2.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	2
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE	

SANITARY SEWER
PLAN AND PROFILE - SAMPLE

SHT. 1 OF 1



NO.	DATE	REVISION
115		
120		
125		

APPROVED	DATE	PREPARED BY	DATE	REVISION
APPROVED	DATE	GEG	09/29/03	2
APPROVED	DATE	CHECKED BY	ISSUE DATE	REVISION DATE
			10/15/07	

NO.	DATE	REVISION
115		
120		
125		



WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

DETAIL NO.: WWS-014

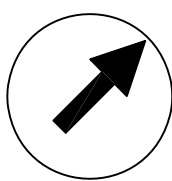
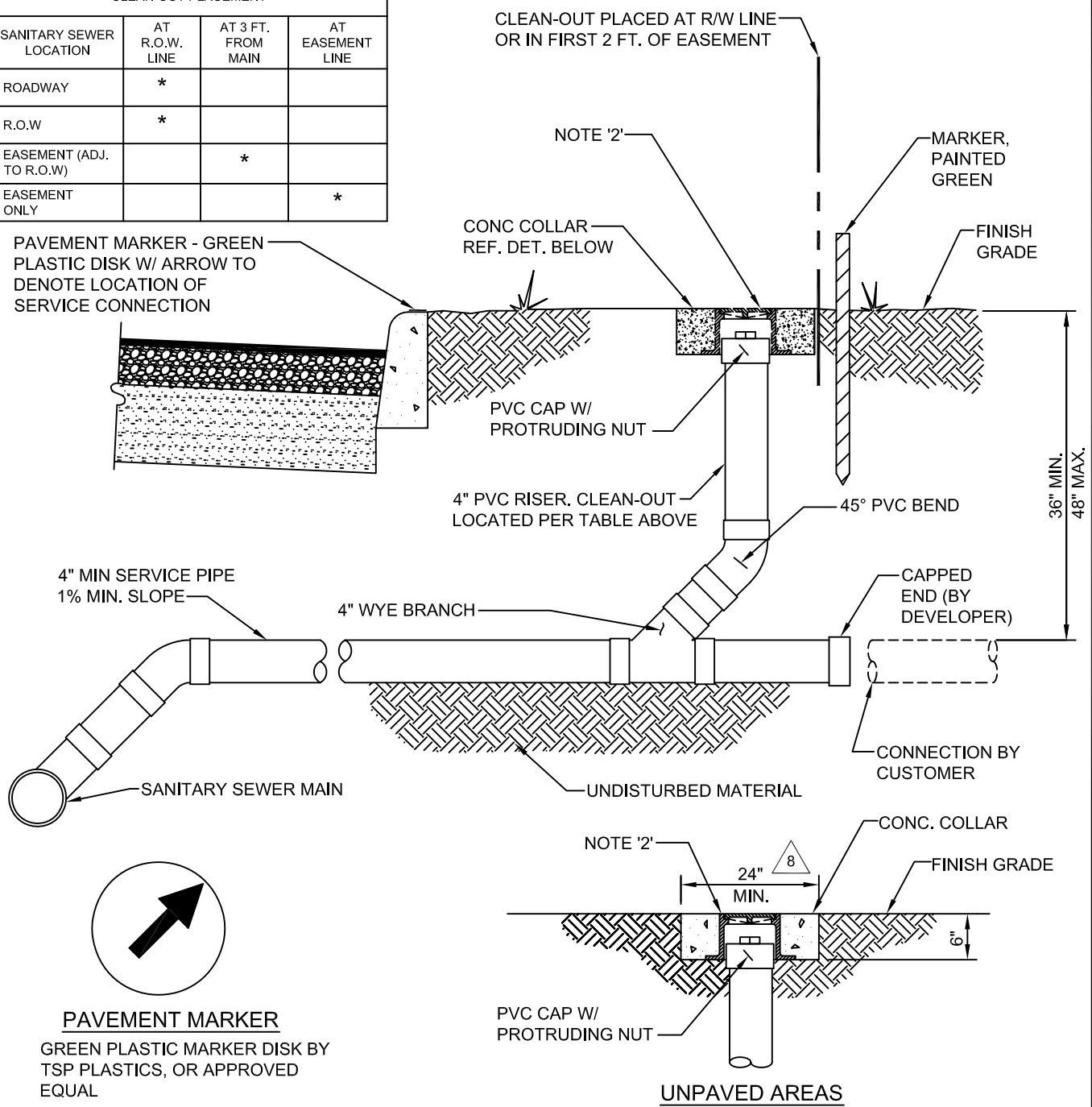
SANITARY SEWER - SINGLE WYE CONNECTION
AND TYPICAL CLEAN-OUT

SHT. 1 OF 1

CLEAN-OUT PLACEMENT			
SANITARY SEWER LOCATION	AT R.O.W. LINE	AT 3 FT. FROM MAIN	AT EASEMENT LINE
ROADWAY	*		
R.O.W	*		
EASEMENT (ADJ. TO R.O.W)		*	
EASEMENT ONLY			*

PAVEMENT MARKER - GREEN
PLASTIC DISK W/ ARROW TO DENOTE LOCATION OF SERVICE CONNECTION

CLEAN-OUT PLACED AT R/W LINE OR IN FIRST 2 FT. OF EASEMENT



PAVEMENT MARKER
GREEN PLASTIC MARKER DISK BY TSP PLASTICS, OR APPROVED EQUAL

GENERAL NOTES:

- CLEAN-OUTS IN UNPAVED AREAS SHALL HAVE A MIN. 24" SQUARE OR 24" DIAMETER POURED IN PLACE ⁸ CONCRETE COLLAR 6" THICK CENTERED ON THE C.I. COVER.
- US FOUNDRY #7621 FOR 4" AND 6" CO'S OR, FOR 4" CO'S ONLY, AN ADJUSTABLE 6" C.I. VALVE BOX, TOP SECTION ONLY. COVERS TO BE MARKED W/ 'S' OR 'SEWER'. NON-DOMESTIC EQUAL IS ACCEPTABLE.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	⁸
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	NO.



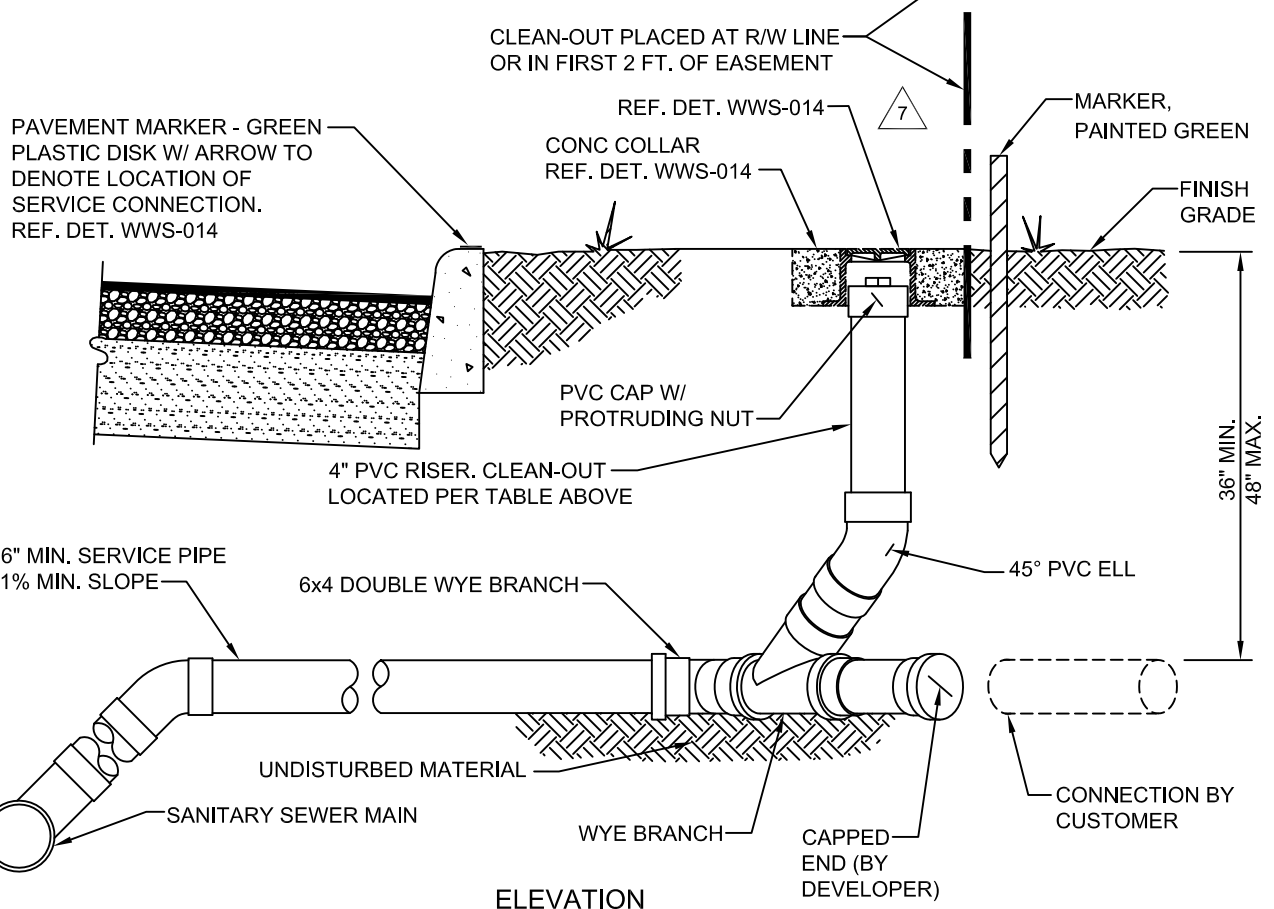
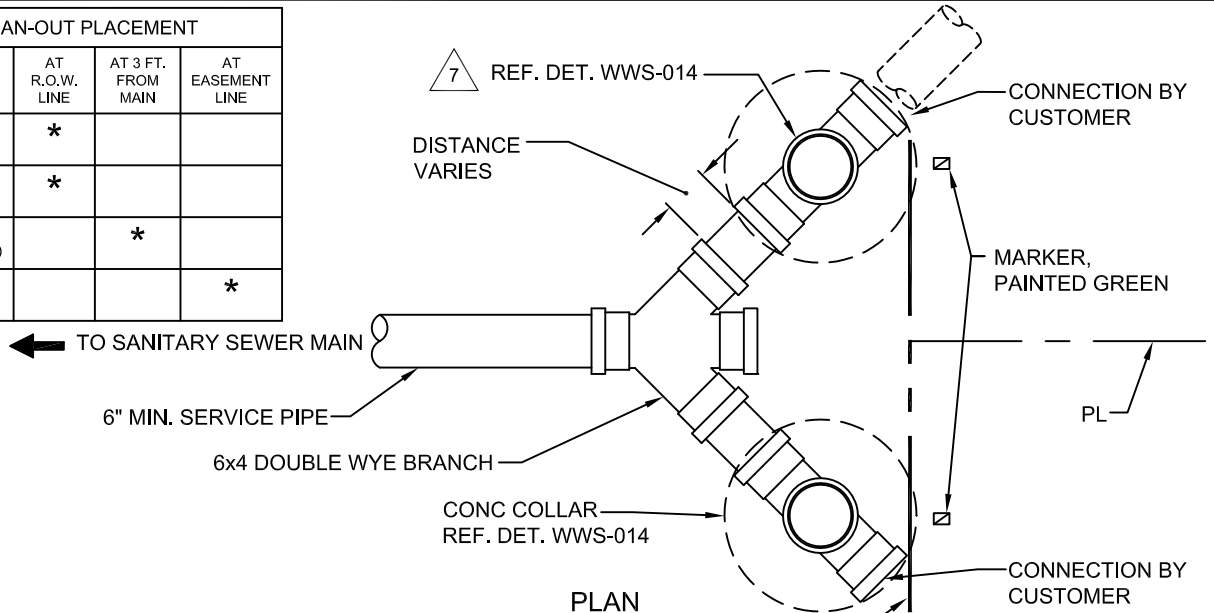
WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

DETAIL NO.: WWS-014A

SANITARY SEWER - DOUBLE WYE CONNECTION
AND TYPICAL CLEAN-OUTS

SHT. 1 OF 1

CLEAN-OUT PLACEMENT			
SANITARY SEWER LOCATION	AT R.O.W. LINE	AT 3 FT. FROM MAIN	AT EASEMENT LINE
ROADWAY	*		
R.O.W	*		
EASEMENT (ADJ. TO R.O.W)		*	
EASEMENT ONLY			*



GENERAL NOTES:

1. REFERENCE WASTEWATER DETAIL WWS-014 FOR CLEAN-OUTS LOCATED IN UNPAVED AREAS.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	7
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 11/18/09	



WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

DETAIL NO.: WWS-015

SANITARY SEWER PUMP STATION
SAMPLE PLAN, SECTION, & DETAILS

SHT. 1 OF 1

**PLEASE SEE SEWER PUMP STATION
DETAILS & SPECIFICATIONS ON CITY
OF LAKELAND WEBSITE**

APPROVED	DATE	PREPARED BY MRIES	DATE 12/30/22	REVISION	
APPROVED	DATE	CHECKED BY	ISSUE DATE 12/30/22	REVISION DATE	NO.

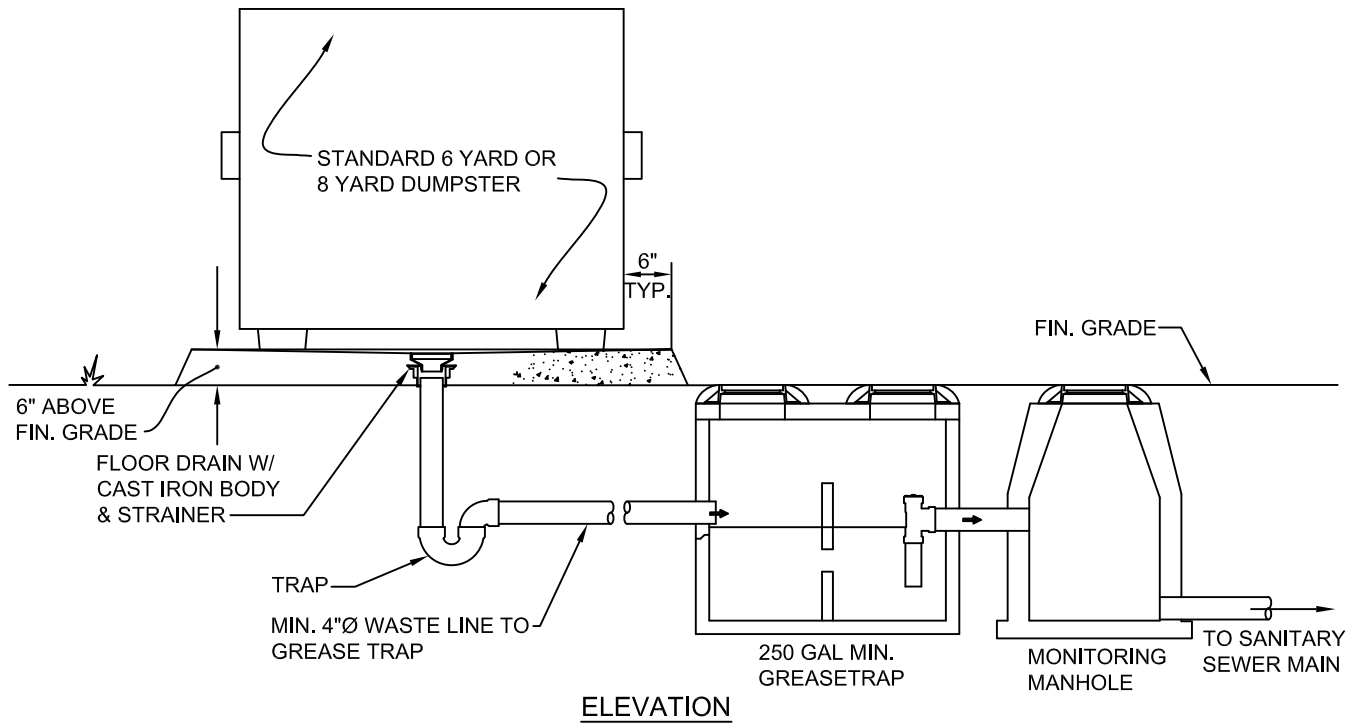
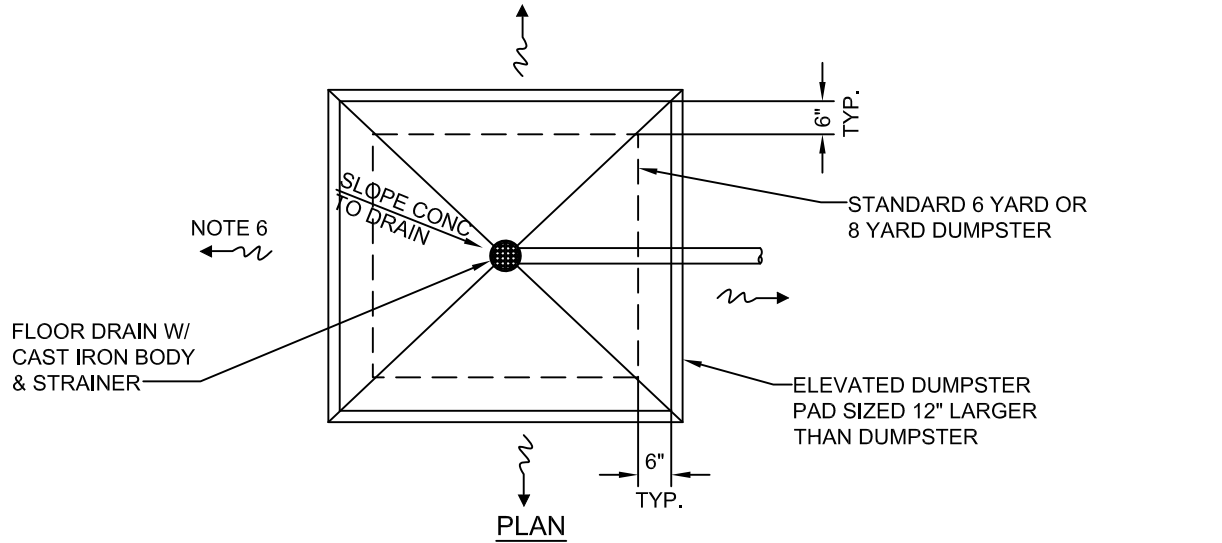


WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

DETAIL NO.: WWS-016

ELEVATED DUMPSTER PAD W/ FLOOR DRAIN
FOR DUMPSTERS AND COMPACTORS
DRAINED TO SANITARY SEWER

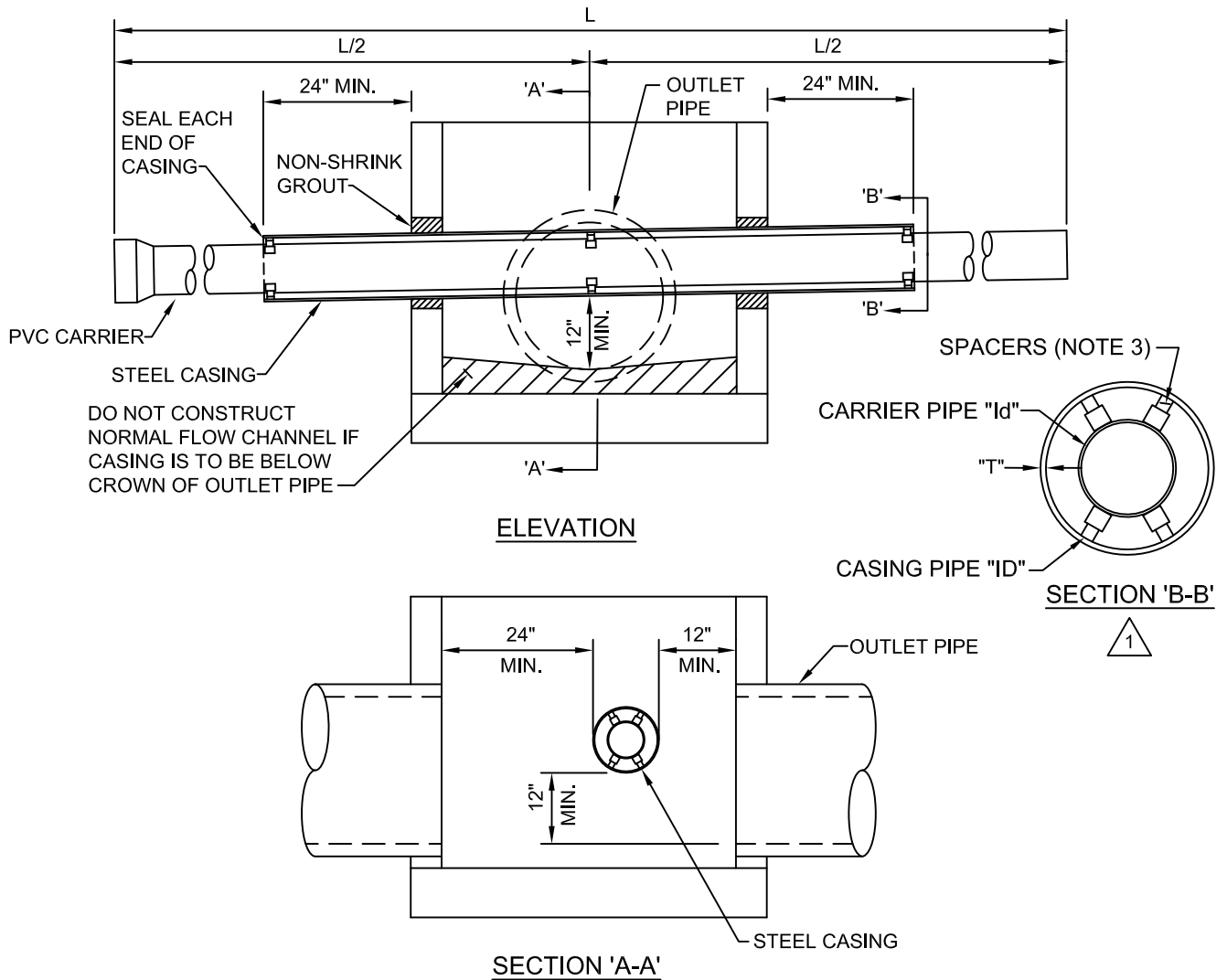
SHT. 1 OF 1



GENERAL NOTES:

1. THIS DETAIL TO BE EMPLOYED WHEN OTHER JURISDICTIONAL AGENCIES REQUIRE DUMPSTERS/COMPACTORS TO BE DRAINED TO SEWER. **THIS IS NOT A REQUIREMENT OF THE WATER UTILITIES DEPARTMENT.**
2. DUMPSTERS AND TRASH COMPACTORS SHALL INCLUDE A MIN. 250 GAL. CAPACITY GREASE TRAP AND 5 MONITORING MANHOLE (REF. DET. WWS-005A).
3. DUMPSTER - REFERENCE CITY OF LAKELAND SOLID WASTE DIV., 6 YARD OR 8 YARD CAPACITY, 72"W x 66"D x 60"/80"H.
4. IMPACT FEES AND MONTHLY WASTEWATER FEES SHALL APPLY.
5. REFERENCE DETAIL WWS-005A FOR COMBINED WASTE FLOWS TO MONITORING MANHOLE.
6. SURROUNDING AREA SHALL BE GRADED TO DRAIN AWAY FROM ELEVATED DUMPSTER PAD ON ALL SIDES.

APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	5
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	NO.



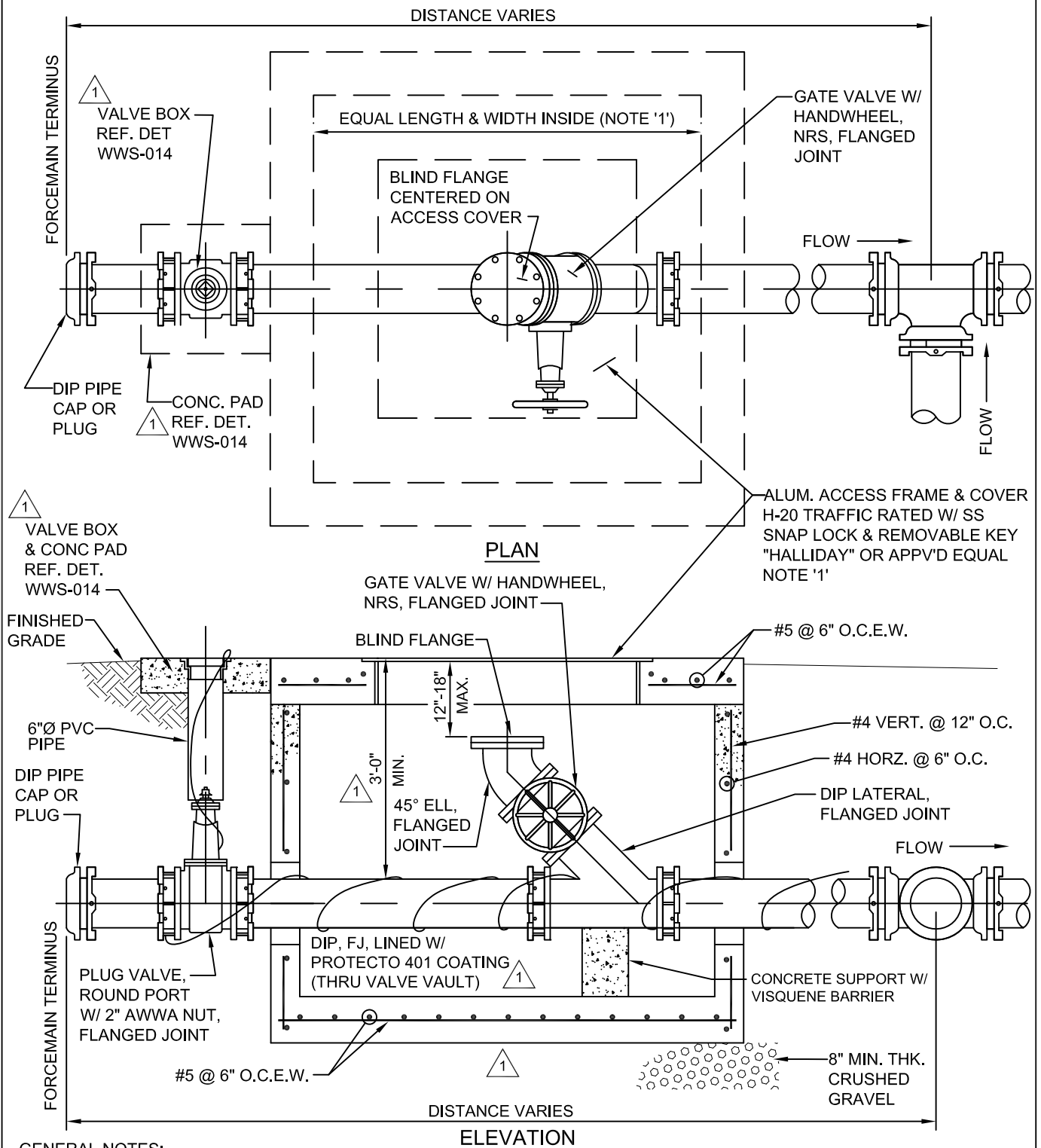
CASING SCHEDULE										
PVC CARRIER PIPE SIZE (Id)	4"	6"	8"	10"	12"	14"	16"	18"	21"	24"
STEEL CASING PIPE SIZE (ID)	10"	12"	16"	18"	20"	24"	30"	30"	30"	36"
STEEL CASING PIPE SIZE (T)	.188"	.250"	.281"	.312"	.344"	.375"	.469"	.469"	.469"	.532"

GENERAL NOTES:

1. PIPE BELLS / JOINTS ARE NOT PERMITTED WITHIN CASING. ONE STICK OF PVC TO BE CENTERED ON STRUCTURE.
2. "SUMPED" CONFLICT STRUCTURES SHALL NOT BE USED UNLESS THE SYSTEM IS DESIGNED TO ACCOUNT FOR COMPLETE BLOCKAGE OF THE SUMP.
3. SPACERS ARE REQUIRED AT EACH END AND MIDDLE OF THE CASING. USE OF WOOD SKIDS ARE NOT PERMITTED.



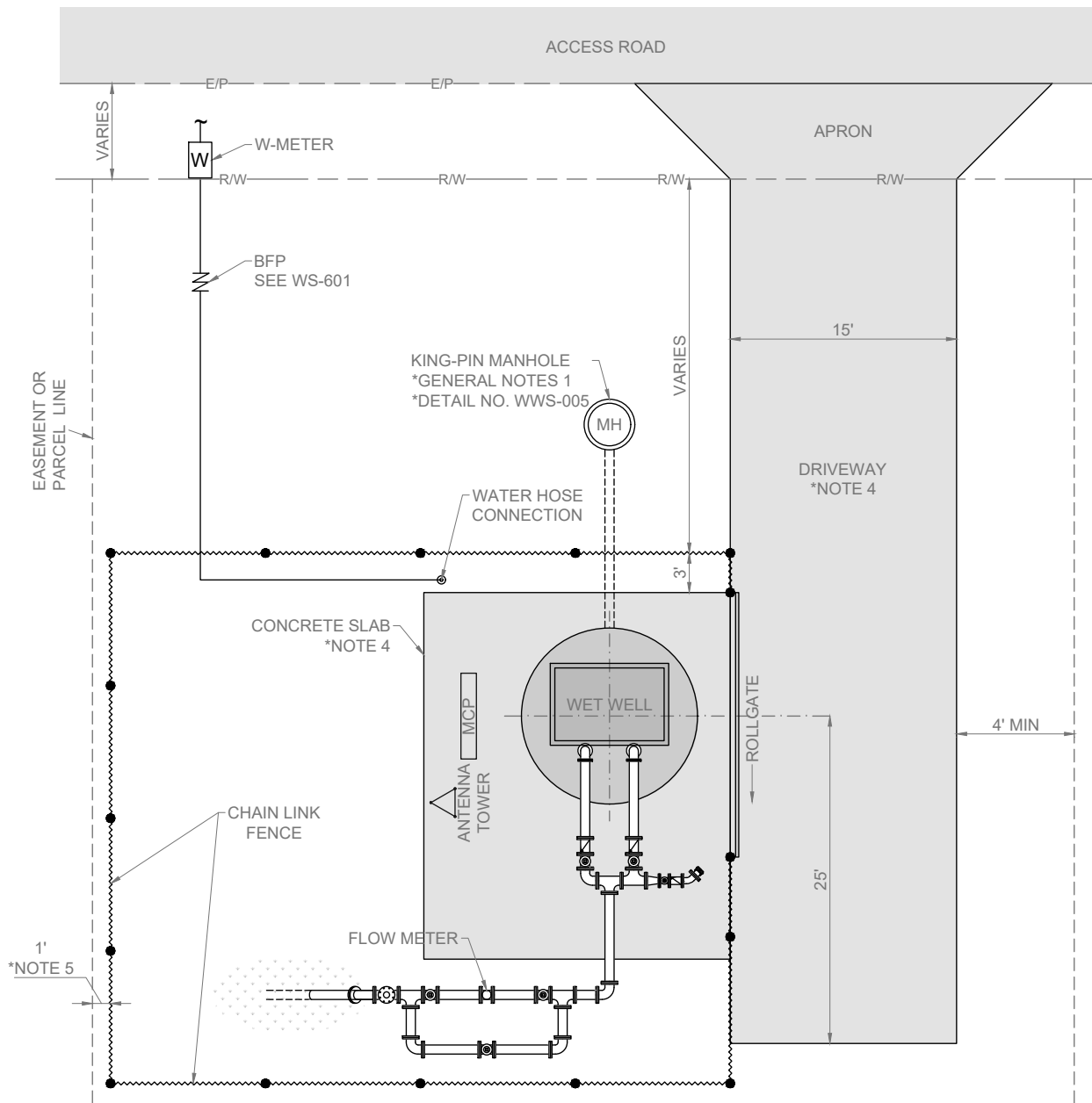
APPROVED	DATE	PREPARED BY GEG	DATE 09/29/03	REVISION	1
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	



GENERAL NOTES:

1. DIMENSION VARIES ACCORDING TO PIPE SIZE.
2. THE USE OF 'DOGHOUSE' STYLE VAULTS FOR PIG LAUNCHING PORTS ON EXISTING FORCEMAINS MAY BE EVALUATED BY CONTACTING WATER UTILITIES ENGINEERING.

APPROVED	DATE	PREPARED BY GEG	DATE 09/22/04	REVISION 1
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15 NO.



GENERAL NOTES:

1. KINGPIN MH AND WET WELL SHALL BE POLYMER CONCRETE.
2. REFER TO CITY OF LAKELAND OR POLK COUNTY STANDARDS FOR DRIVE WAY AND APRON SPECIFICATIONS.
3. DRIVE WAY IS REQUIRED AS DIMENSIONED WHEN ACCESS ROAD IS CONSIDERED TO HAVE, OR IS INTENDED FOR, SIGNIFICANT TRAFFIC.
4. DRIVE WAY AND CONCRETE SLAB TO BE FLUSH AND WITHOUT GRASS STRIP IN BETWEEN.
5. WITH THE EXCEPTION OF THE FRONT, FENCING SHALL BE PLACED 1 FOOT INSIDE THE EASEMENT OR PARCEL LINE.
6. FOR FINAL LAYOUT OF STATION, DRIVEWAY AND FENCING A FIELD MEETING IS REQUIRED WITH WATER UTILITIES DEPARTMENT, LIFT STATION SUPERVISOR, AND ENGINEERING INSPECTOR; OR OTHER DEPARTMENT DESIGNEES.
7. FOR PIPING AND WET WELL DETAILS REFER TO "SANITARY SEWER PUMP STATION DETAILS AND SPECIFICATIONS".

DRAWN BY

GEG

DATE

9/22/2004

REVISION NO.

2

REVISION BY

M.RIESNER

REVISION DATE

09/20/2023

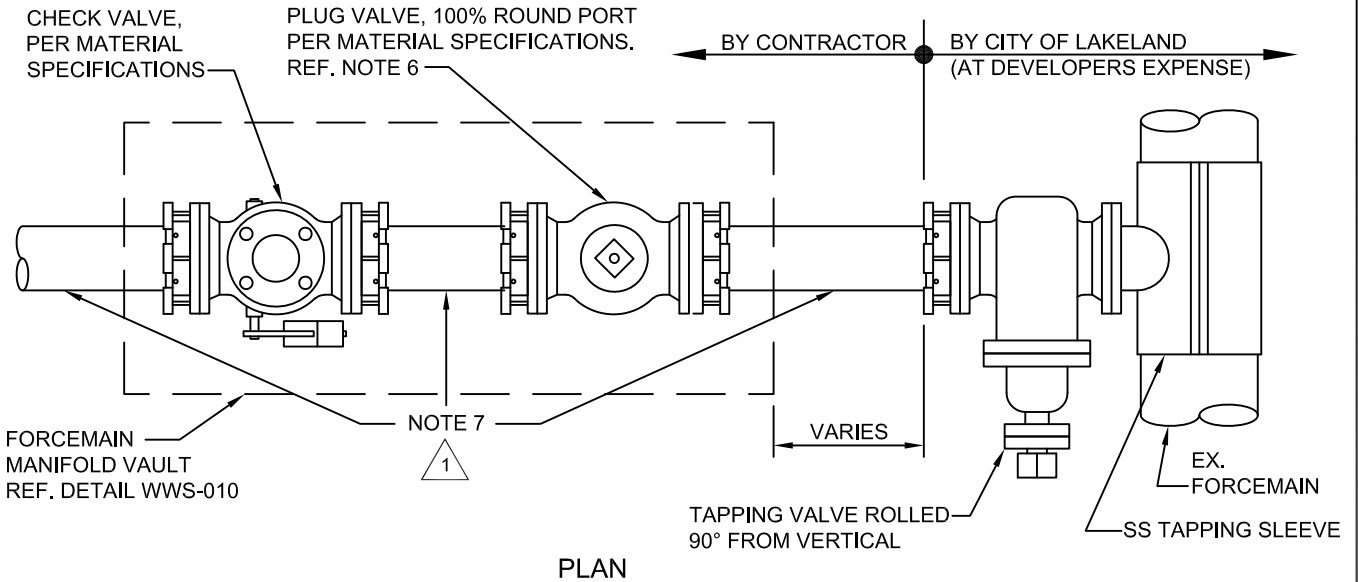


WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

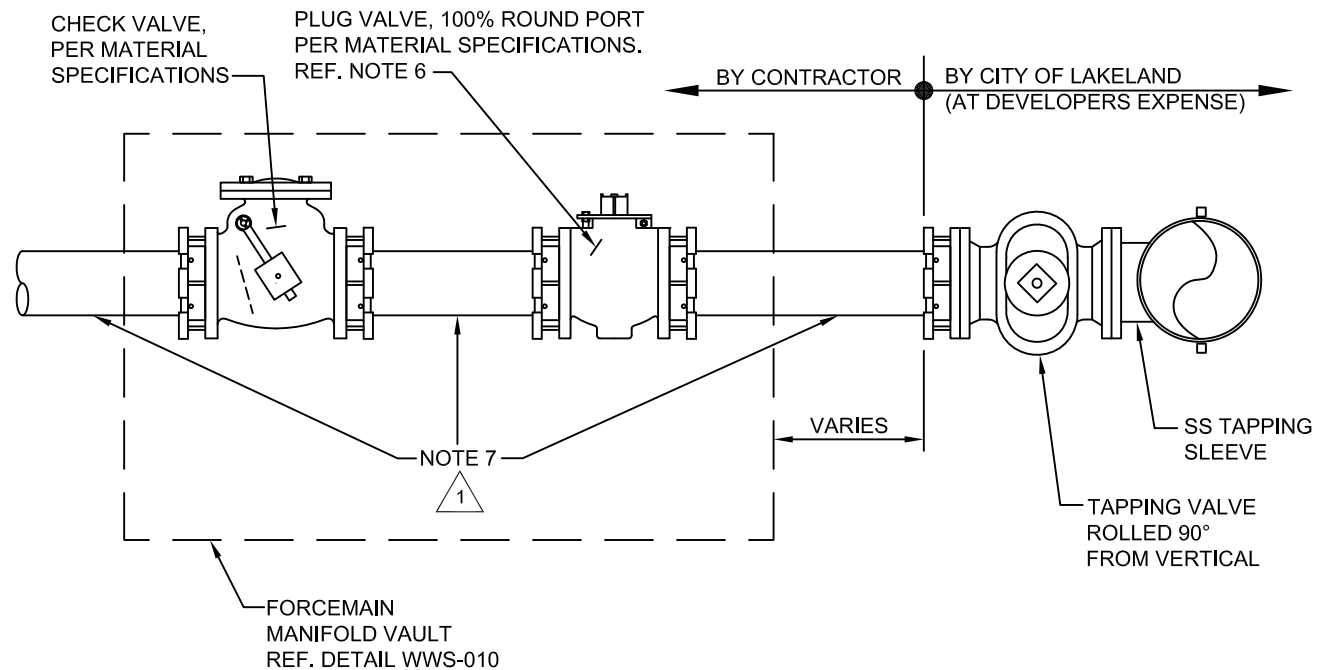
DETAIL NO.: WWS-020

SANITARY SEWER FORCEMAIN
WET TAP - PLAN AND ELEVATION

SHT. 1 OF 1



PLAN



ELEVATION

GENERAL NOTES:

1. WET TAPS ON WASTEWATER FORCEMAINS ARE TO BE PERFORMED BY CITY OF LAKELAND AT THE EXPENSE OF THE DEVELOPER.
2. TAPPING VALVE TO BE ROLLED 90° FROM VERTICAL.
3. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING A MANIFOLD VAULT WITH A ROUND PORT PLUG VALVE AND A CHECK VALVE. REFERENCE DETAIL WWS-010 FOR MANIFOLD VAULT SPECIFICATIONS.
4. MINIMUM DISTANCE FOR EXCAVATION OF TAPPING PIT SHALL BE SIX FEET FROM EXISTING FORCEMAIN TO BACK OF PIT.
5. TAPPING SLEEVES SHALL NOT BE INSTALLED WITHIN TWO FEET OF ANY PIPE JOINT.
6. PLUG VALVES SIX INCHES IN SIZE AND GREATER SHALL BE EQUIPPED WITH A GEAR OPERATOR.
7. DUCTILE IRON PIPE, FLANGED JOINT OR PLAIN END, LINED W/ 401 PROTECTO COATING (THRU VAULT BOX). △ 1

APPROVED	DATE	PREPARED BY RP/GEG	DATE 06/15/07	REVISION	△ 1
APPROVED	DATE	CHECKED BY	ISSUE DATE 10/15/07	REVISION DATE 02/10/15	

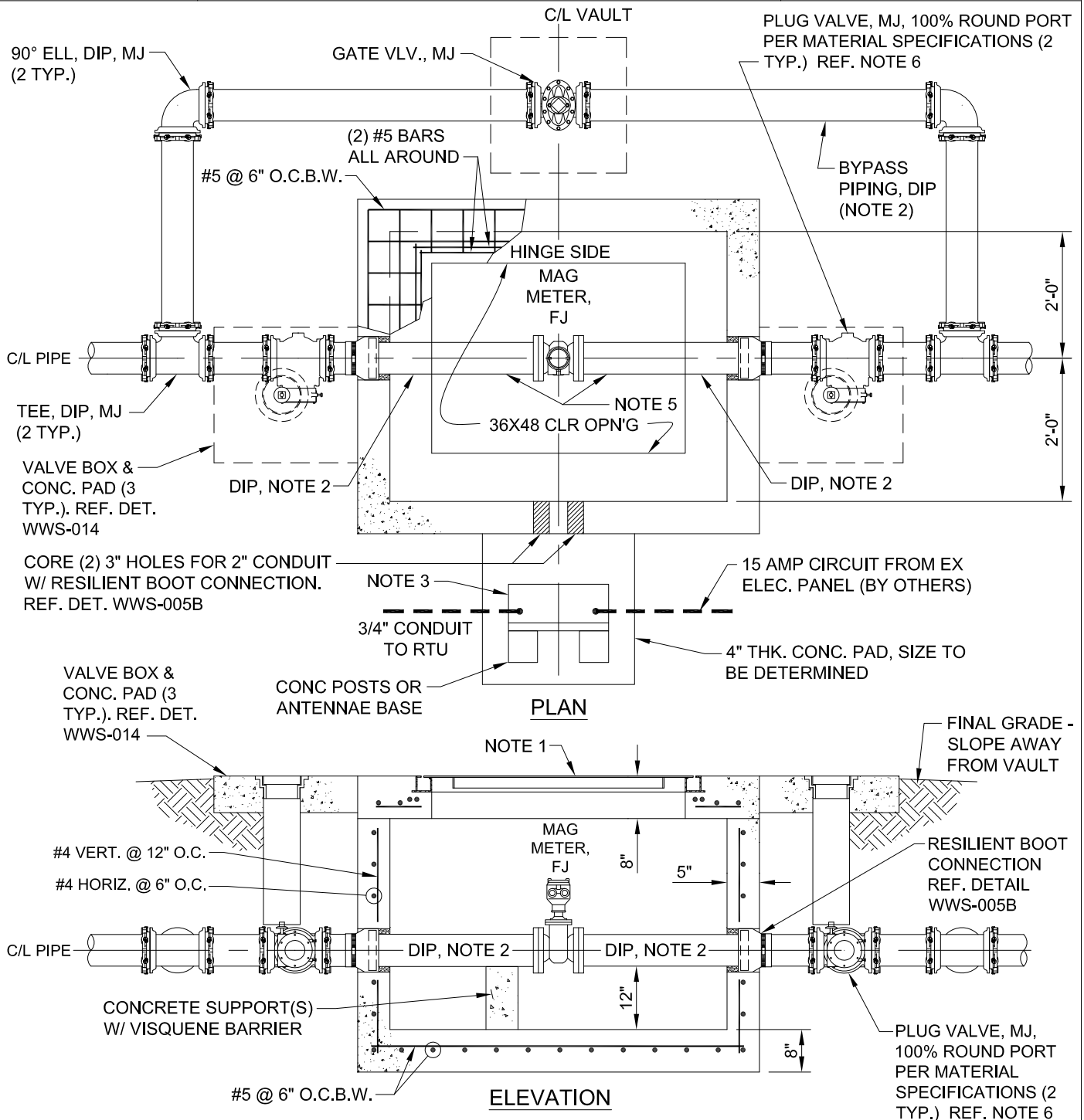


WASTEWATER STANDARDS
WATER ENGINEERING DIVISION

DETAIL NO.: WWS-021

SANITARY SEWER FORCEMAIN
MAG METER VAULT

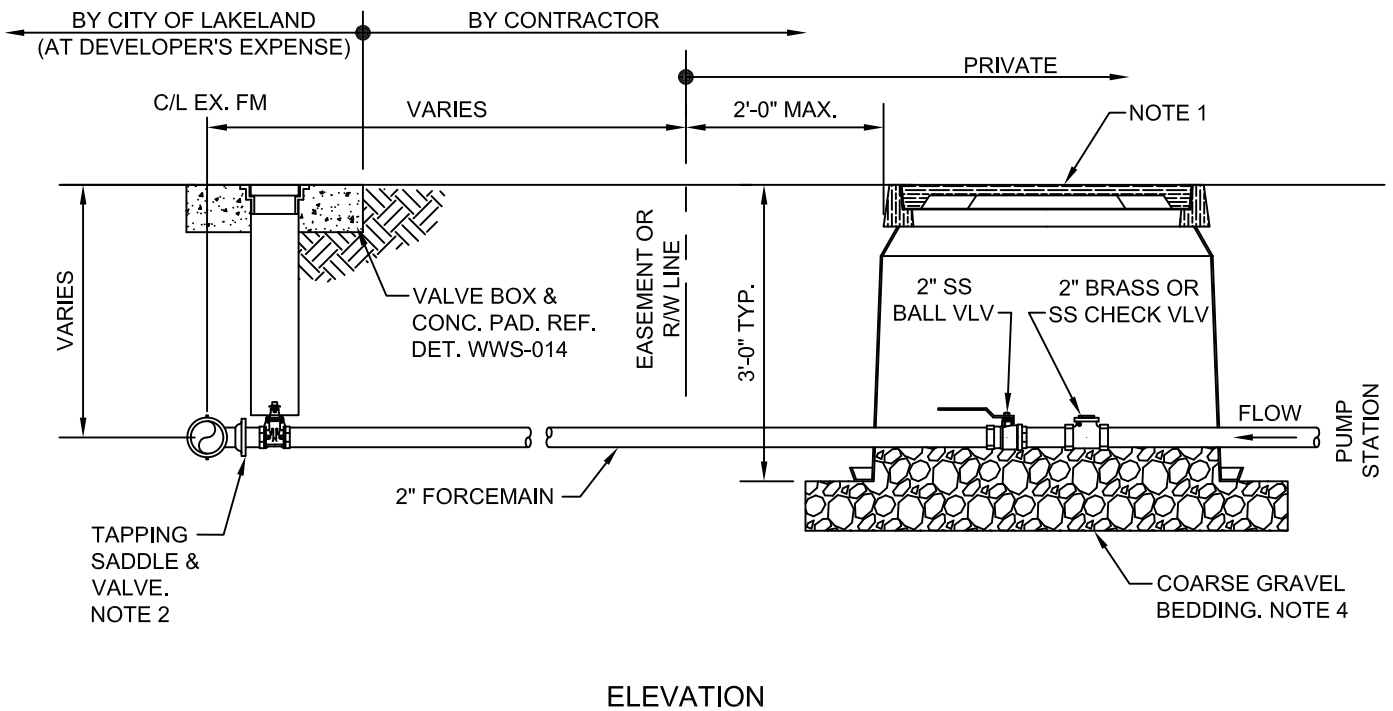
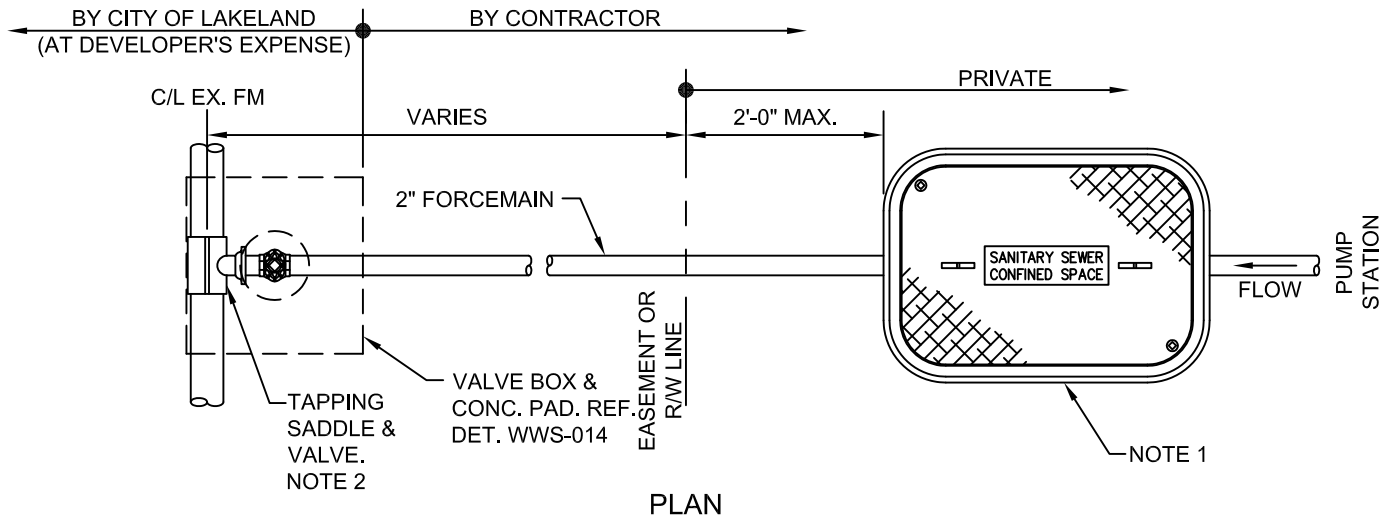
SHT. 1 OF 1



GENERAL NOTES:

1. HALLIDAY ALUMINUM ACCESS DOOR SERIES W1R3648, OR EQUAL. LOAD RATINGS - WITHIN ROADWAY NOT PERMITTED. ALL OTHER AREAS H-20.
2. ALL DUCTILE IRON PIPE AND FITTINGS TO BE EPOXY LINED WITH PROTECTO 401.
3. STAINLESS STEEL ENCLOSURE OR SUN SHIELD FOR REMOTE READOUT AND 110V OUTLET. SIZE TO BE DETERMINED.
4. SIZES FOR METER, PIPE, AND VAULT TO BE DETERMINED BY THE ENGINEER.
5. DUCTILE IRON PIPE LENGTHS TO MEET MANUFACTURER'S RECOMMENDATION; MINIMUM OF 30" LONG ON ONE SIDE FOR CALIBRATION (EITHER SIDE).
6. PLUG VALVES SIX INCHES IN SIZE AND GREATER SHALL BE EQUIPPED WITH A GEAR OPERATOR.
7. BASED ON FIELD CONDITIONS AND THE LOCATION OF THE VALVE VAULT, WATER UTILITIES ENGINEERING MAY REQUIRE THE USE OF BOLLARDS FOR THE PROTECTION OF THE VAULT.

APPROVED	DATE	PREPARED BY CHART/GEK	DATE 10/10/13	REVISION	
APPROVED	DATE	CHECKED BY	ISSUE DATE 01/15/15	REVISION DATE	NO.



GENERAL NOTES:

1. 'CDR SYSTEMS' FRP VAULT BOX A12-2436-36 W/ ONE-PIECE POLYMER CONC COVER. NOT FOR USE IN ROADWAYS. H-20 LOAD RATING FOR ALL OTHER AREAS. IMPRINT COVER WITH "SANITARY SEWER" AND NOTE " CONFINED SPACE".
2. WET TAPS ON WASTEWATER FORCEMAINS ARE TO BE PERFORMED BY CITY OF LAKELAND AT THE EXPENSE OF THE DEVELOPER. REFERENCE DETAIL WWS-020.
3. ALL DUCTILE IRON PIPE AND FITTINGS TO BE EPOXY LINED WITH PROTECTO 401.
4. COARSE GRAVEL BEDDING REQUIRED REGARDLESS OF SOIL TYPE.

APPROVED	DATE	PREPARED BY SGUIS	DATE 12/15/14	REVISION
APPROVED	DATE	CHECKED BY	ISSUE DATE 01/26/15	REVISION DATE NO.