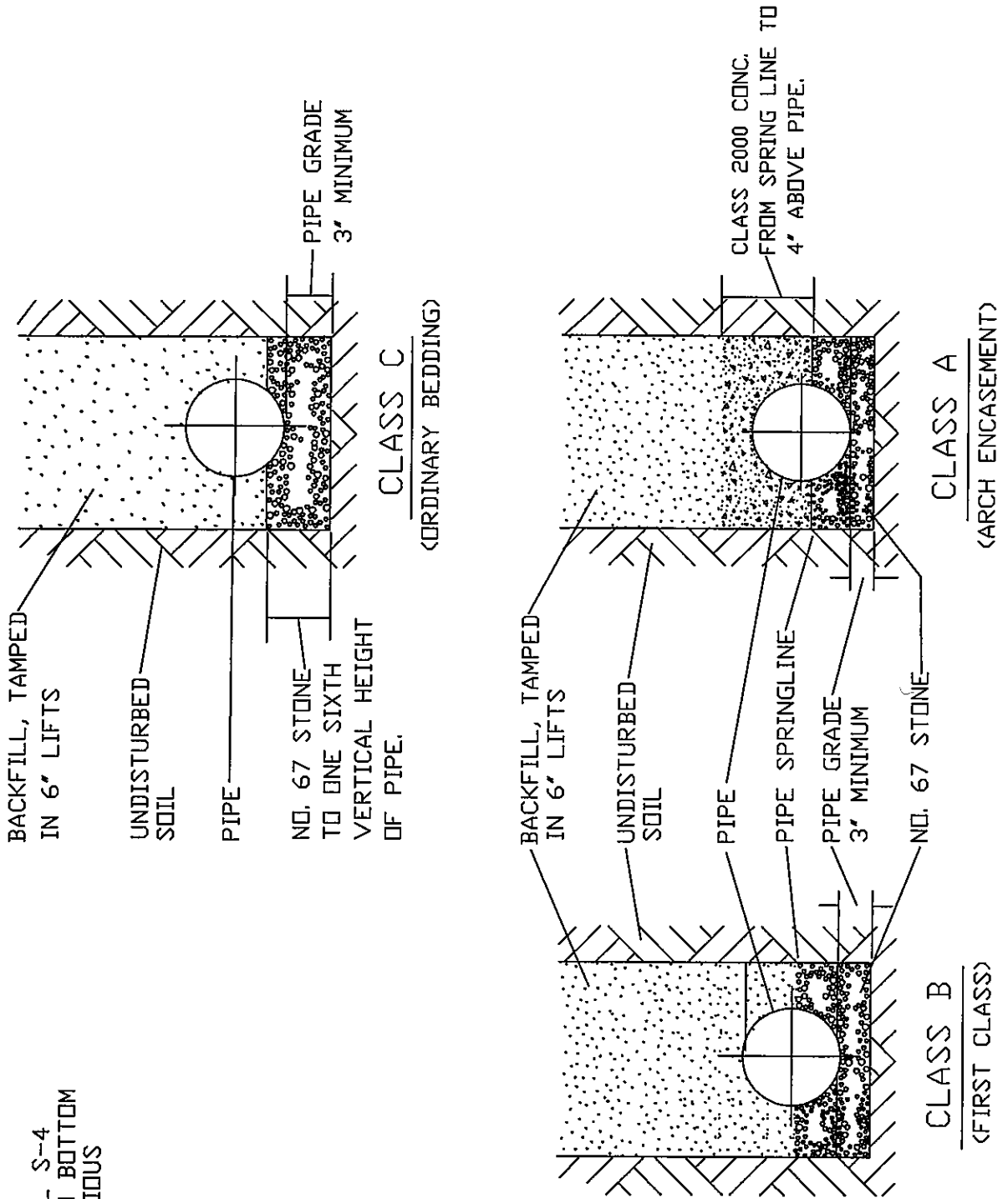
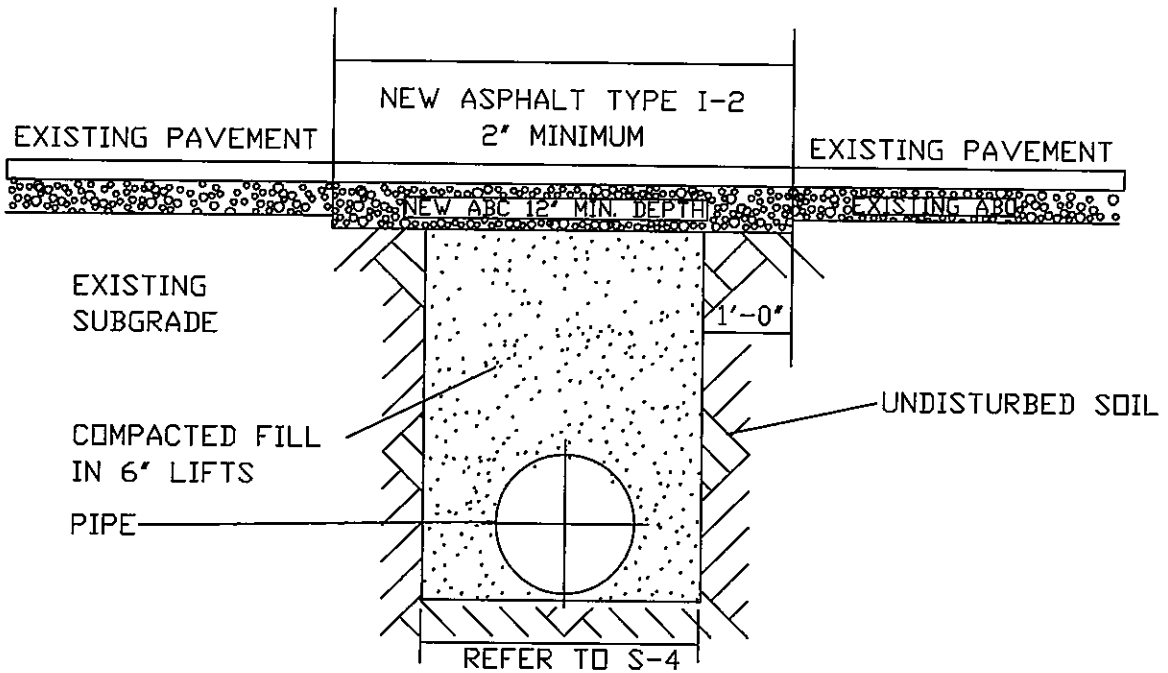


NOTE: SEE STANDARD DETAIL S-4 AND S-5 FOR TRENCH BOTTOM DIMENSIONS FOR VARIOUS TYPES OF PIPE.



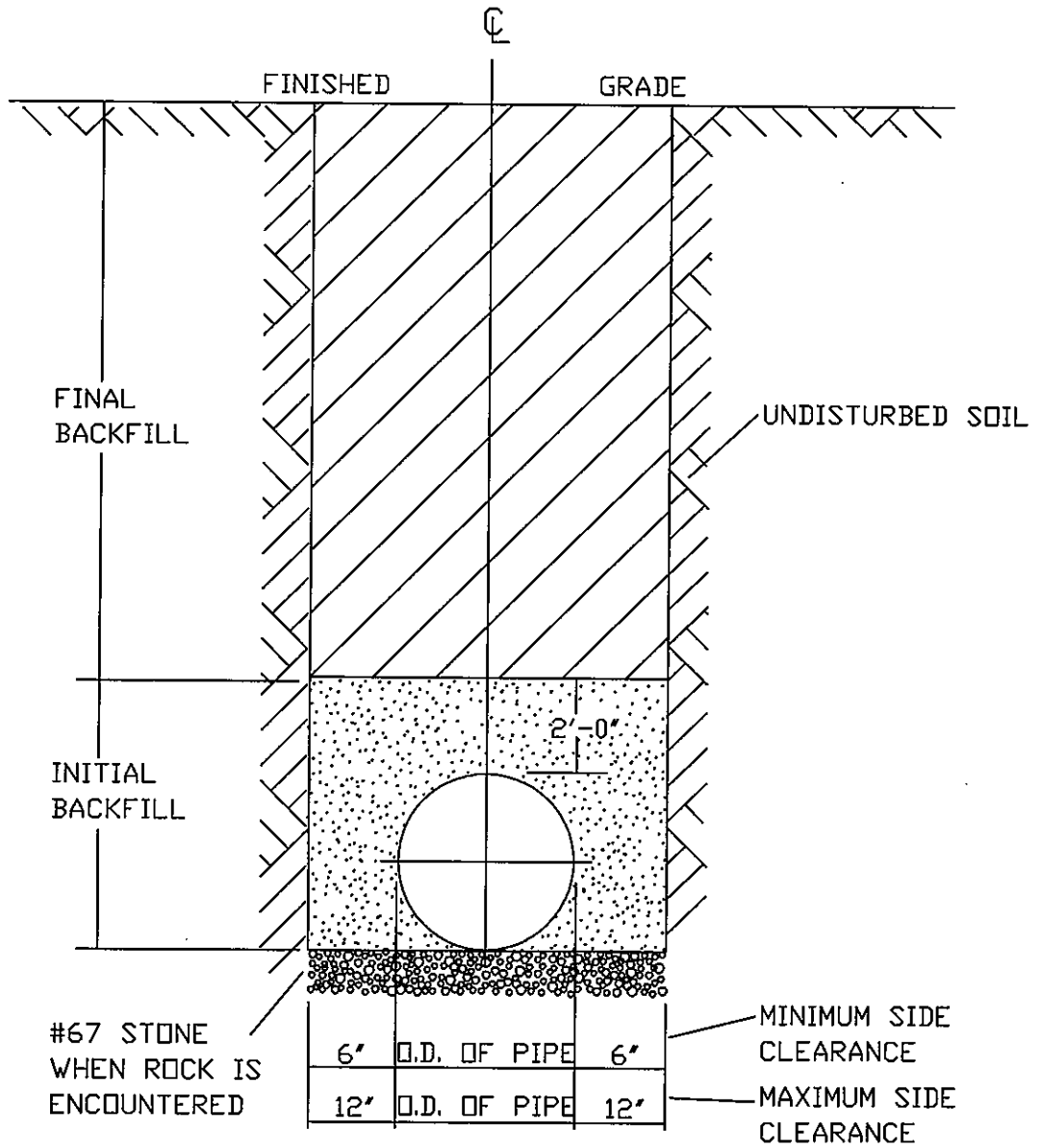
SGWASA				
UTILITY DEPARTMENT				
STANDARD BEDDING DETAILS				
FOR R.C. PIPES				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-1				



NOTES:

1. The pavement cut shall be defined by a straight edge preferably a machine saw cut.
2. The trench subgrade material shall be backfilled with suitable material and compacted to a density of at least 95% of that obtained by compacting a sample of the material in accordance with AASHTO T-99 as modified by NCDOT.
3. The final 1' of fill shall consist of ABC material compacted to a density equal to 100% of that obtained by compacting a sample of the material in accordance with AASHTO T-80 as modified by NCDOT.
4. The entire thickness and vertical edge of cut shall be tacked.
5. The same depth of pavement material which exists shall be reinstalled, but in no case shall the asphalt be less than 2" thick.
6. The asphalt pavement material shall be installed and compacted thoroughly to achieve a smooth level patch.
7. Refer to SGWASA standards for trenches and pipe bedding (S-4 & S-5) for additional details.

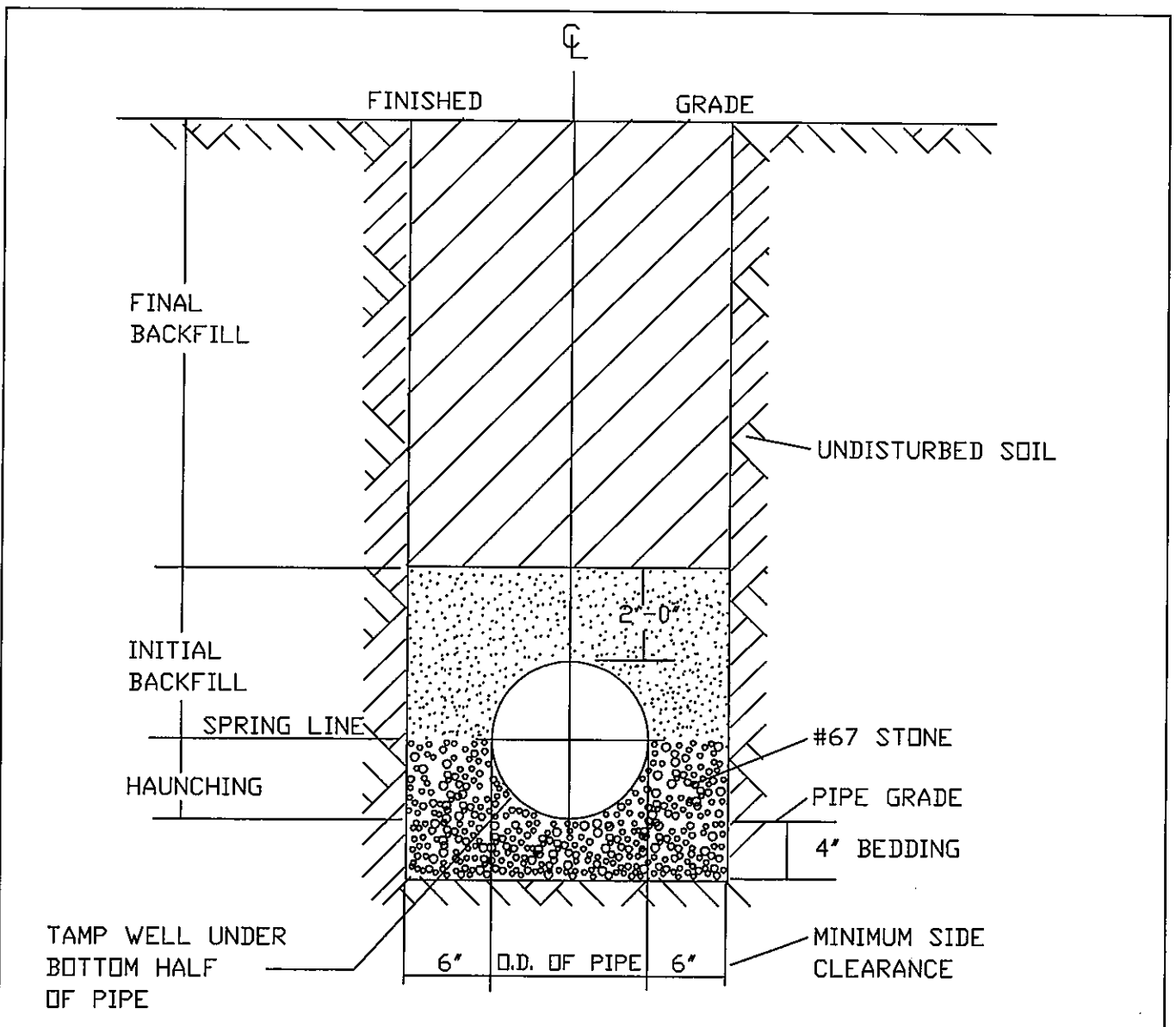
SGWASA				
UTILITY DEPARTMENT				
STANDARD ASPHALT PAVEMENT PATCH DETAIL				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-3				



NOTES:

1. Trenches requiring shoring and bracing, dimensions shall be taken from the inside face of the shoring and bracing.
2. No rocks or boulders 4" or larger to be used in initial backfill.
3. All backfill material shall be suitable native material.
4. Backfill shall be tamped in 6" lifts in traffic areas, 12" in non-traffic areas.
5. Achieve 80% compaction in non-traffic areas, and 95% compaction in traffic areas.
6. If in easement 4" topsoil, and 12" clean select fill is required.
7. No boulders 8" in diameter or greater allowed.

SGWASA				
UTILITY DEPARTMENT				
TRENCH BOTTOM DIMENSIONS & BACKFILLING REQUIREMENTS FOR DUCTILE IRON AND REINFORCED CONCRETE PIPE.				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-4				

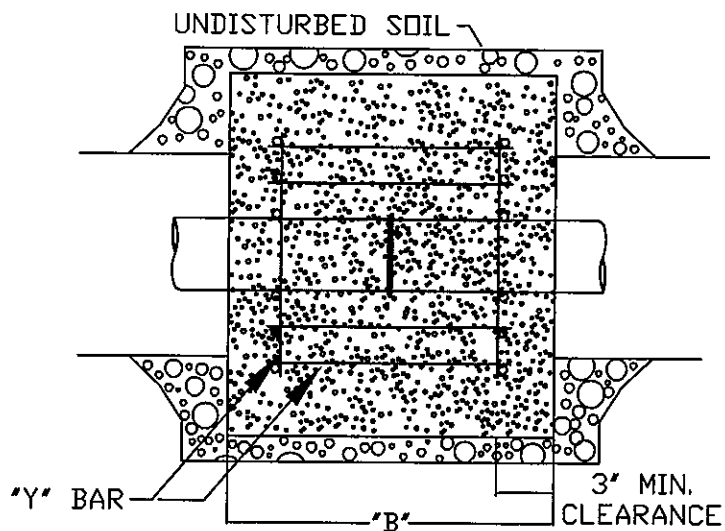
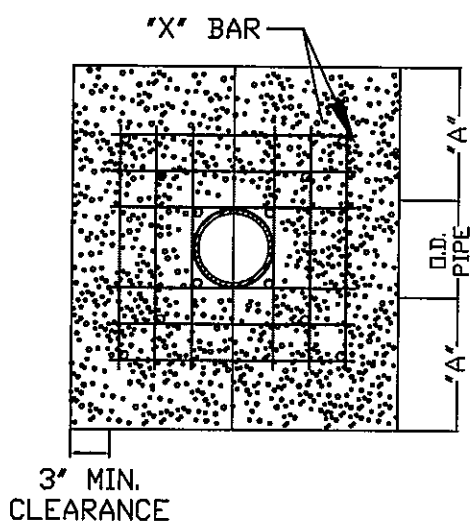
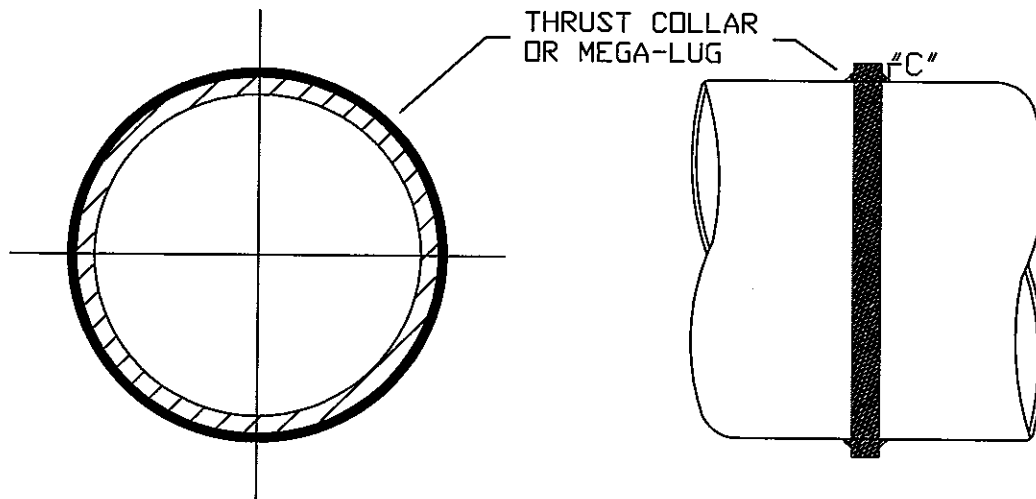


TYPICAL TRENCH BOTTOM DIMENSIONS FOR SDR 35 PVC GRAVITY PIPE

NOTES:

1. For trenches requiring shoring and bracing, dimensions shall be taken from the inside face of the shoring and bracing.
2. No rocks or boulders 4" or larger to be used in initial backfill.
3. All backfill material shall be suitable native material.
4. Backfill shall be tamped in 6" lifts in traffic areas, 12" in non-traffic areas.

SGWASA				
UTILITY DEPARTMENT				
TRENCH BOTTOM DIMENSIONS AND BACKFILLING REQUIREMENTS FOR PVC GRAVITY SEWER MAIN				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-5				



REINFORCING REQUIREMENTS

I.D. PIPE	REBAR SIZE	"X" BAR LENGTH	"X" BAR WEIGHT	"Y" BAR LENGTH	"Y" BAR WEIGHT	NO. REQUIRED
6' - 36'	#5	2'-2"+ O.D. PIPE	1.043 LBS/FT	1'-1"	1.1 LBS. EACH	X-24, Y-12
48" & greater	#6	3'-0"+ O.D. PIPE	1.502 LBS/FT	1'-3"	1.9 LBS. EACH	X-24, Y-12

THRUST COLLAR, AND THRUST SCHEDULE

I.D. PIPE	"A"	"B"	"C"-6'-16', 20'-24', 30'-36', 48'			
6' - 36'	1'-4"	1'-7"	2'	3'	4'	
48" & greater	1'-8"	1'-9"				6'

NOTES:

- SEE STANDARD DETAIL S-7 FOR THRUST BLOCK LOCATIONS.
- CONCRETE SHALL BE 3000 PSI AND TRANSIT MIXED.
- REINFORCING BARS SHALL BE DEFORMED AND TIED TOGETHER.
- TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK INSTALLATION SHALL BE THE MINIMUM WIDTH AS SHOWN ON STANDARD DETAIL S-4 & S-5.
- BACKFILL TAMPED IN 6" LIFTS PER STANDARD DETAIL S-4 & S-5.
- THRUST COLLAR MUST BE FACTORY WELDED ON BOTH SIDES ALONG BOTH EDGES OF COLLAR AROUND CIRCUMFERENCE, OR A MEGA-LUG

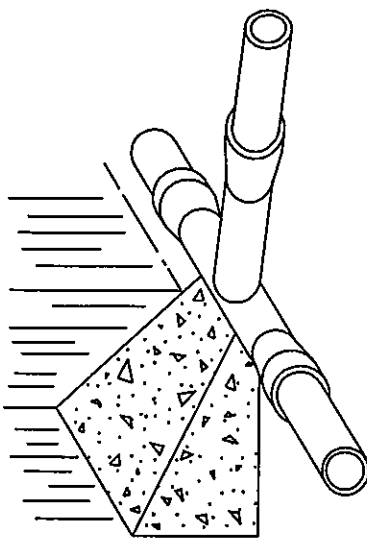
SGWASA

UTILITY DEPARTMENT

THRUST BLOCKING DESIGN DATA
FOR SEWER FORCE MAIN

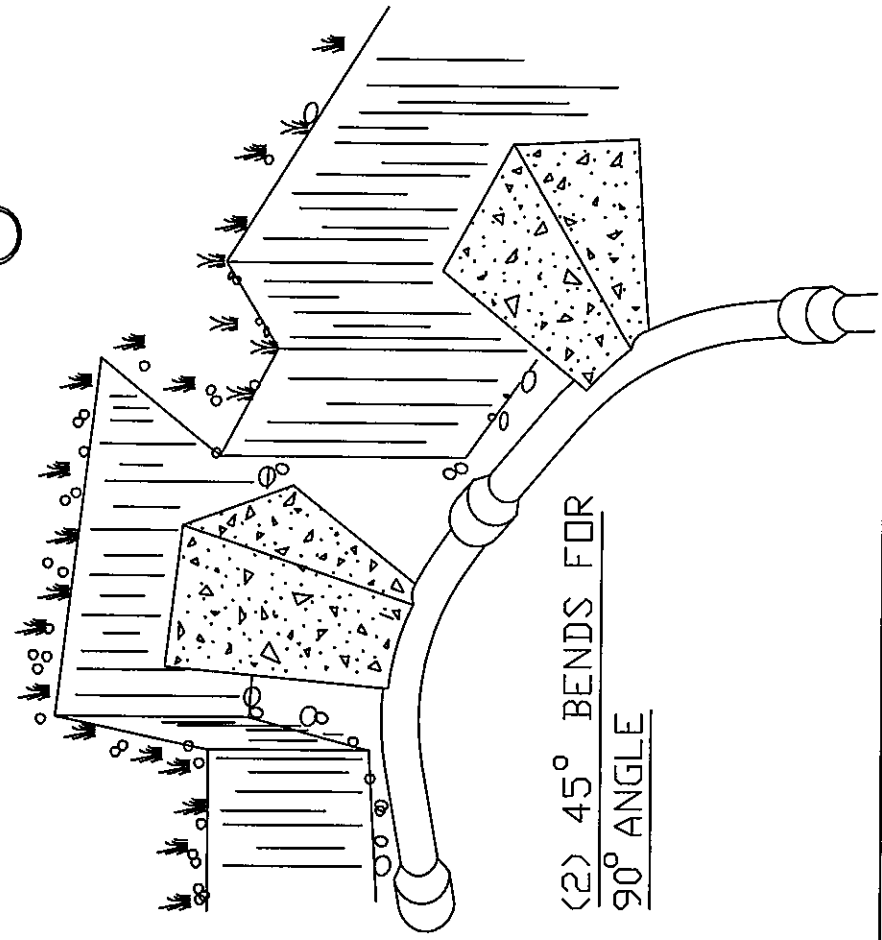
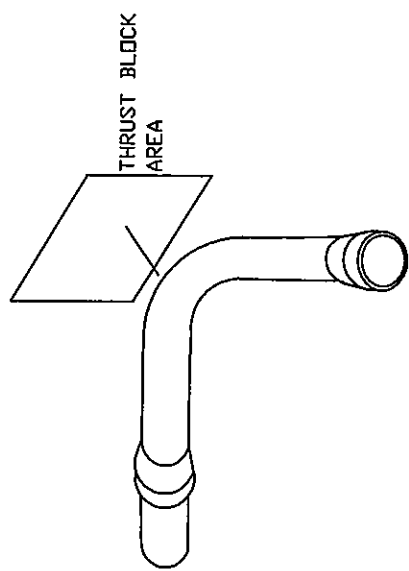
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-6				

THRUST BLOCKING



45° BEND

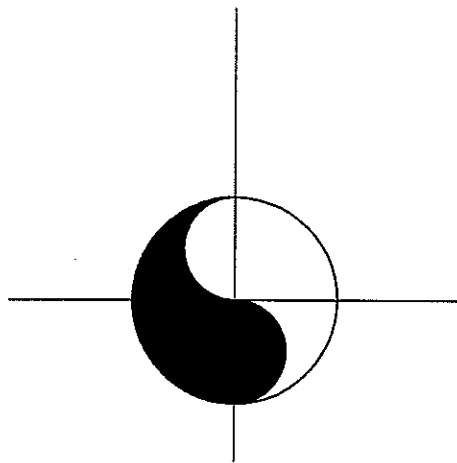
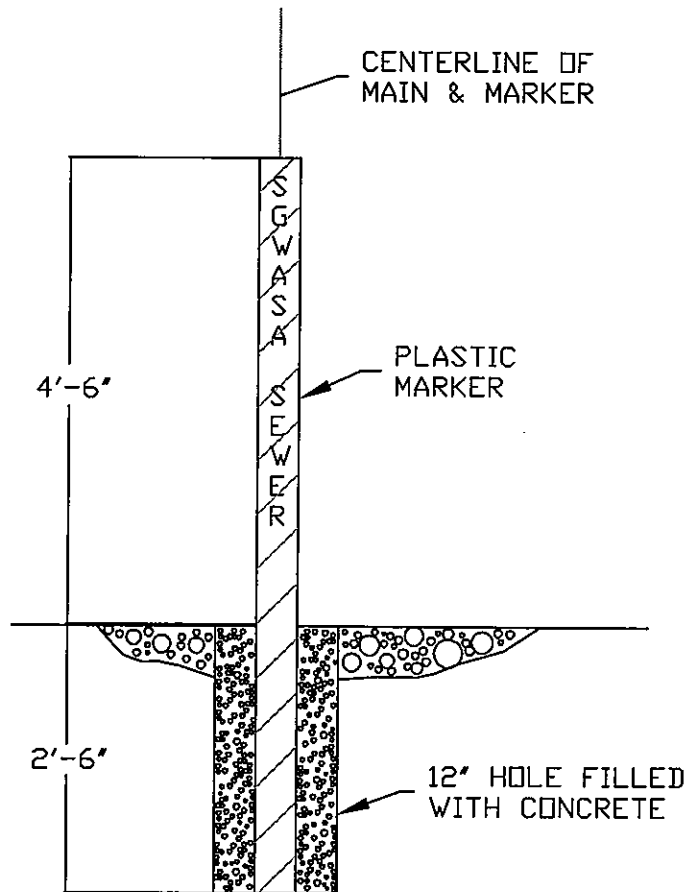
TEE INTERSECTION



(2) 45° BENDS FOR
90° ANGLE

- NOTES:
1. CONCRETE SHALL BE 3000 PSI
 2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT FITTINGS.
 3. TRENCHES SHALL CONFORM TO STANDARD DETAIL S-4 & S-5.
 4. SEE STANDARD THRUST BLOCK TABLES, W-10 THRU W-11, FOR AREA OF CONCRETE REQUIRED.
 5. ALL BENDS AND INTERSECTIONS SHALL HAVE CONCRETE THRUST BLOCKING.

SGWASA				
UTILITY DEPARTMENT				
STANDARD THRUST BLOCKING VIEWS				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-7				

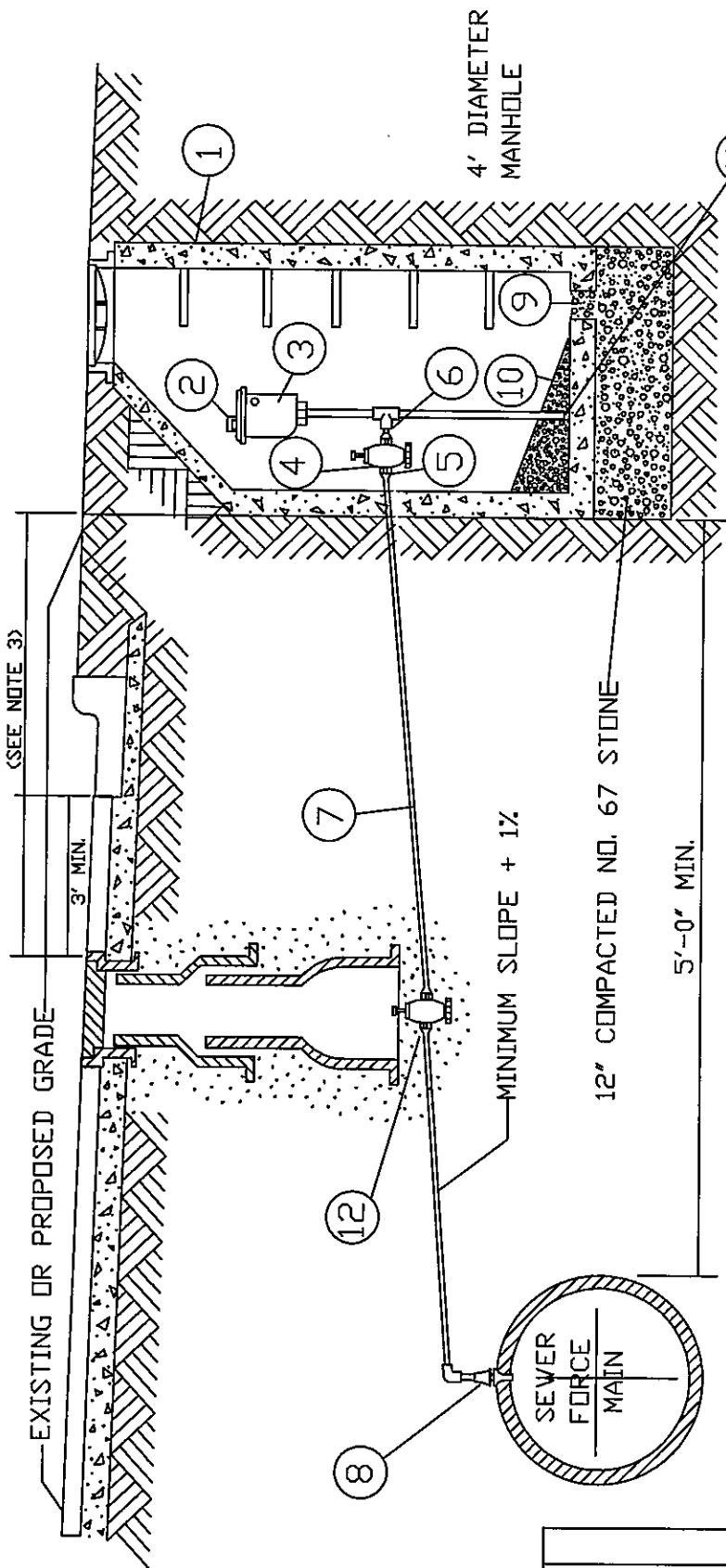


SEWER FORCE MAIN

NOTES:

1. PLASTIC MARKER NEEDS TO BE RED IN COLOR.
2. IT SHALL BE LABELED "SGWASA SEWER"
3. TO BE SPACED EVERY 300 FEET ON EACH SIDE OF ANY ROADWAY OR JUNCTION.

SGWASA				
UTILITY DEPARTMENT				
STANDARD MAIN MARKER FOR SEWER FORCE MAINS IN EASEMENTS				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-8				



NOTE:

1. AIR RELEASE/VACUUM VALVE TO BE P-20 WITH VACUUM CHECK BY CRISPIN UL 20, OR VAL MATIC 881 BW.
2. THE AIR RELEASE MANHOLE SHALL BE INSTALLED IN THE SHOULDER OR AS DIRECTED BY THE ENGINEER.
3. FOR MAINS LOCATED OUTSIDE OF STREET RIGHT-OF-WAYS THE MAXIMUM DISTANCE BETWEEN THE MANHOLE AND THE VALVE BOX SHOULD BE THREE (3) FEET.
4. MAIN SHALL BE DEEP ENOUGH TO ACCOMMODATE INSTALLATION AS SHOWN

BILL OF MATERIALS

1	PRECAST MANHOLE, SEE STANDARD DETAIL S-20
2	TRASH HOOD
3	2" AIR RELEASE VALVE
4	2"-GATE VALVE
5	ADAPTER
6	2" MECHANICAL JOINT BRASS PIPE AND FITTINGS
7	2" TYPE "K", SOFT COPPER WITH FLARED ELBOW
8	CORPORATION COCK
9	6" DIAMETER DRAIN
10	GROUT, 1/8" TO 1'-0" MIN. SLOPE TO DRAIN
11	PIPE CAP
12	2"-GATE VALVE

SEE STANDARD DETAIL S-4 & S-5 TO INSURE PROPER BACKFILL.

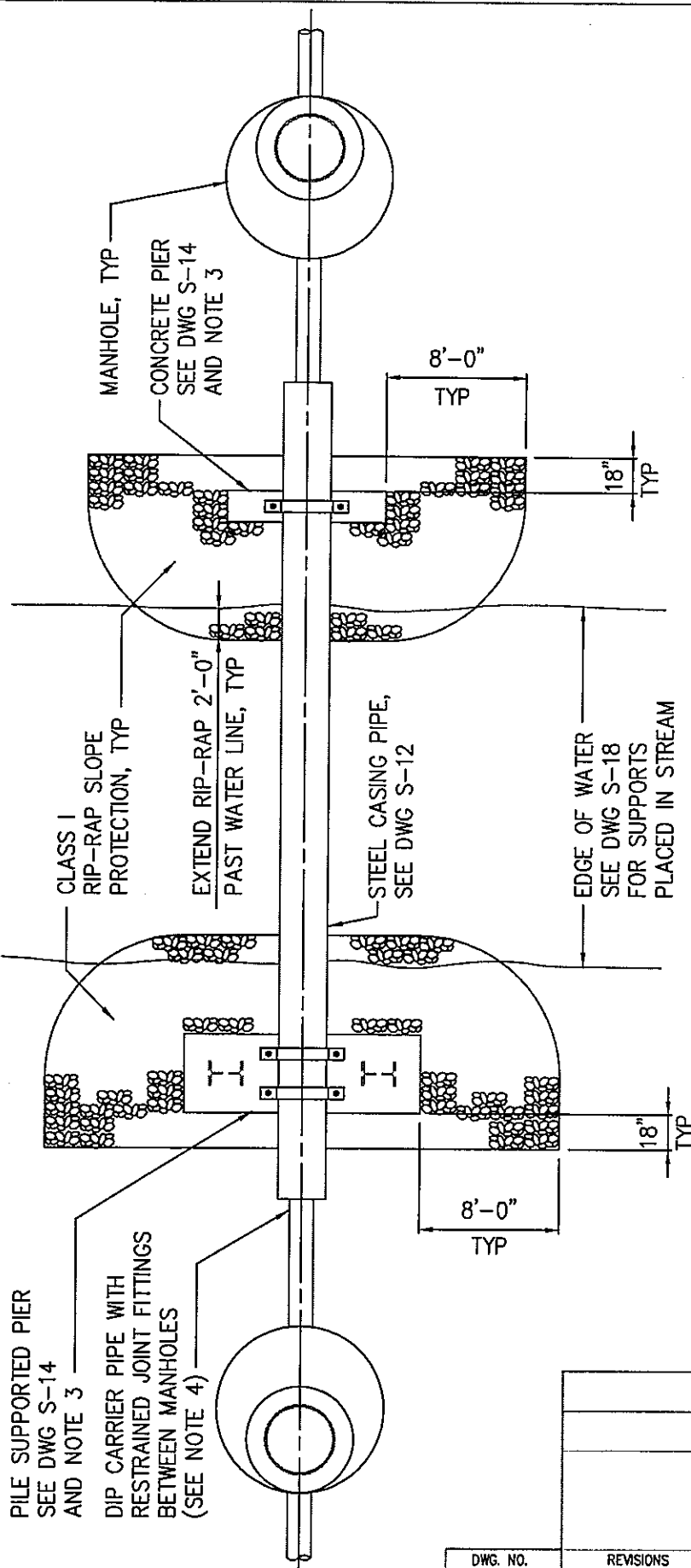
SGWASA				
UTILITY DEPARTMENT				
STANDARD SEWER FORCE MAIN AIR RELEASE VALVE				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-9				

AERIAL PIPE CROSSING

GENERAL NOTES:

1. ALL MATERIALS UTILIZED ON THESE DETAIL SHEETS SHALL CONFORM TO THE APPROPRIATE SECTIONS OF THE CITY OF ROXBORO PUBLIC SERVICES' STANDARDS UNLESS OTHERWISE NOTED.
2. RESTRAINED JOINT PIPE AND FITTINGS SHALL CONSIST OF BOLTED RETAINER RINGS AND WELDED RETAINER BARS OR BOLTLESS TYPE WHICH INCLUDE DUCTILE IRON LOCKING SEGMENTS AND RUBBER RETAINERS. BOLTS FOR RESTRAINED JOINTS (IF APPLICABLE) SHALL CONFORM TO ANSI B18.2. RESTRAINED PIPE AND FITTINGS SHALL BE FLEX-RING OR LOK-RING TYPE JOINTS AS MANUFACTURED BY AMERICAN CAST IRON CO.; TR FLEX AS MANUFACTURED BY US PIPE, BOLT-LOK AS MANUFACTURED BY GRIFFRN PIPE PRODUCTS, OR EQUAL.
3. CONCRETE PROPERTIES SHALL BE AS FOLLOWS:
CONCRETE COMPRESSIVE STRENGTH = 4000 PSI
NORMAL SLUMP = 4 INCHES
WATER/CEMENTITIOUS MATERIALS RATIO = 0.45 (MAX)
AIR CONTENT = 6% +/- 1.5%
CONCRETE SHALL BE COMPOSED OF CEMENT, WATER, COARSE AGGREGATES, FINE AGGREGATES AND AIR. CEMENT SHALL BE TYPE I/II OR II IN ACCORDANCE WITH ASTM C-150. MATERIAL REQUIREMENTS FOR ALL FINE AND COARSE AGGREGATES SHALL CONFORM TO ASTM C-33. COARSE AGGREGATE SHALL BE SIZE No. 57 OR 67. AN APPROVED CLASS 'F' FLYASH MAY BE SUBSTITUTED FOR AN EQUAL AMOUNT OF CEMENT BY WEIGHT UP TO 25%.
4. ALL EXPOSED CONCRETE CORNERS SHALL BE CHAMFERRED 3/4".
5. CONVENTIONAL REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 60 AND SHALL BE PLACED IN ACCORDANCE WITH "RECOMMENDED PRACTICE FOR PLACING REINFORCING BARS" (LATEST EDITION) AS PUBLISHED BY THE CONCRETE REINFORCING INSTITUTE. SPLICES SHALL BE CLASS 'B' CONFORMAING TO THE PROVISIONS OF ACI 318 - "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE".
6. NEOPRENE BEARING PADS SHALL BE FORMED FROM PREVIOUSLY UNVULCANIZED, 100% VIRGIN NEOPRENE, WITH DUROMETER HARDNESS = 50.
7. PILES SHALL BE STRUCTURAL STEEL HP12x53 PILES AND SHALL CONFORM TO THE REQUIREMENTS OF ASTM A36. PILES SHALL BE DRIVEN TO DEPTHS REQUIRED TO OBTAIN AN ULTIMATE BEARING CAPACITY OF NOT LESS THAT TWO TIMES THE DESIGN LOADING OF 30 TONS. PILES SHALL PENETRATE A MINIMUM OF FIFTEEN FEET INTO UNDISTURBED SOIL. IN DRIVING PILES, A METHOD APPROVED BY THE ENGINEER SHALL BE USED WHEREBY THE HEAD OF THE PILE IS NOT DAMAGED. IF REQUESTED BY THE ENGINEER, PILES SHALL BE TESTED TO DETERMINE THE ULTIMATE CAPACITY OF THE PILES. THE METHOD OF LOAD TESTING SHALL CONFORM TO ASTM D1143 AND THE NORTH CAROLINA STATE BUILDING CODE OR US BUILDING CODE. WHERE PILES ARE EXPOSED, PILES SHALL BE PAINTED AND/OR COATED IN ACCORDANCE WITH THE AUTHORITY SPECIFICATIONS.

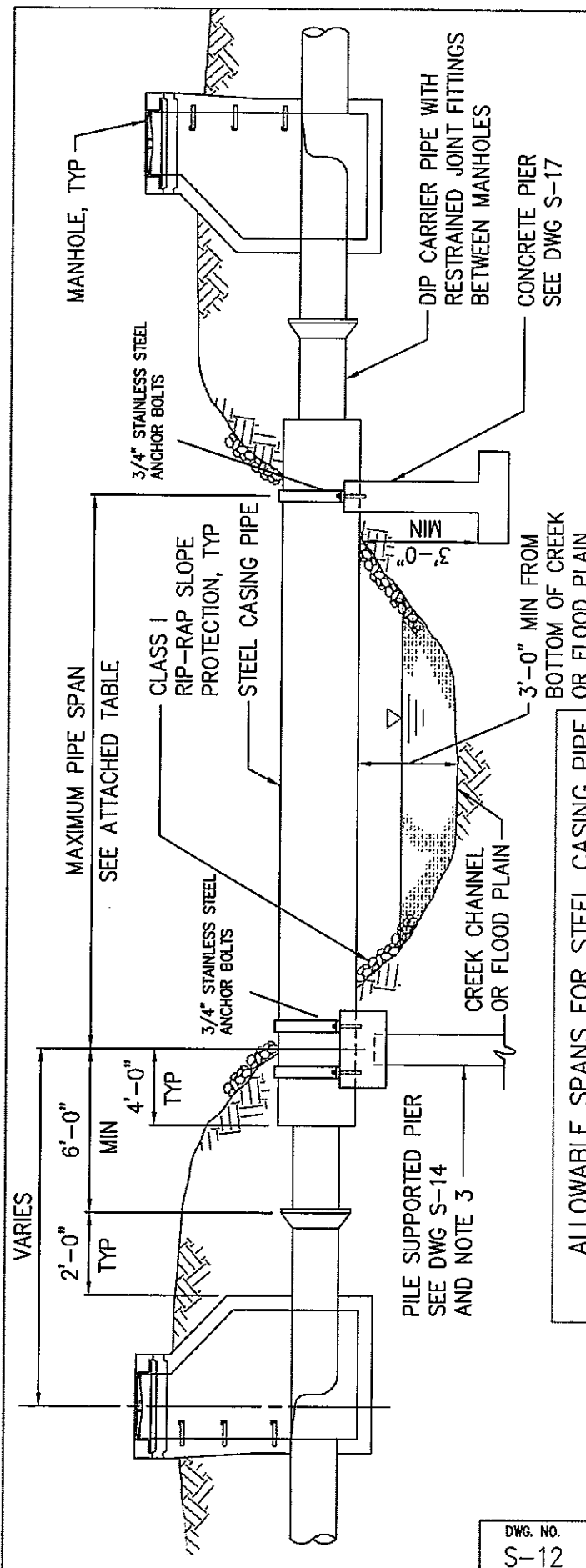
SGWASA			
UTILITY DEPARTMENT			
AERIAL PIPE CROSSING GENERAL NOTES			
DWG. NO. S-10	REVISIONS	DATE	REVISIONS DATE



NOTES:

1. RIP RAP FOR SLOPE PROTECTION SHALL BE CLASS I RIP RAP IN ACCORDANCE WITH SECTION 868 OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES".
2. RIP RAP SHALL BE PLACED IN ACCORDANCE WITH DRAWING 868.01 OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION'S "ROADWAY STANDARD DRAWINGS".
3. SUPPORT TYPE FOR PIERS SHALL BE DETERMINED BY ENGINEER BASED ON SUBGRADE CONDITIONS AT SITE. SEE DRAWING S-13 AND S-14 FOR SUBGRADE PARAMETERS FOR EACH TYPE OF FOUNDATION.
4. WHERE STEEL PIPE IS USED FOR CARRIER PIPE, STEEL CARRIER PIPE SHALL BE INSTALLED UTILIZING PIPE ALIGNMENT GUIDES SPACED WITHIN PIPE AT DISTANCES NOT TO EXCEED 25 FEET. JOINT INDICATED 2 FEET FROM MANHOLE IS NOT REQUIRED FOR STEEL CARRIER PIPE.

SGWASA			
UTILITY DEPARTMENT			
AERIAL PIPE CROSSING			
TYPICAL PLAN			
DWG. NO.	REVISIONS	DATE	REVISIONS
S-11			

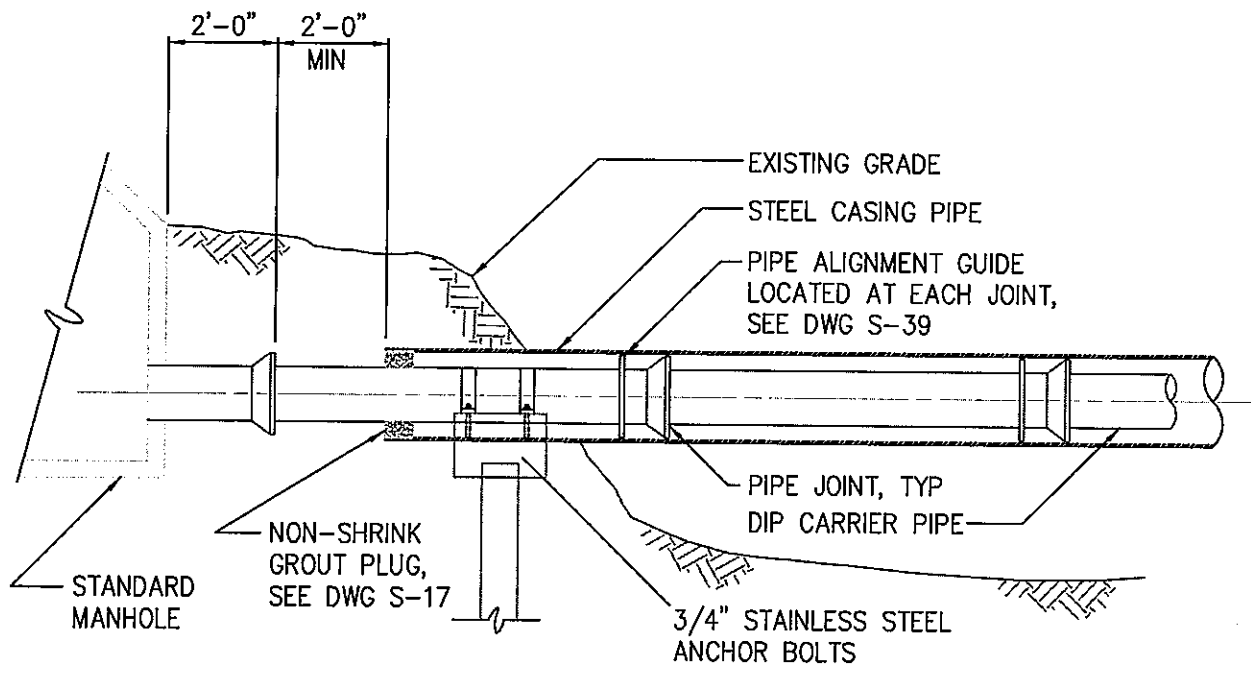


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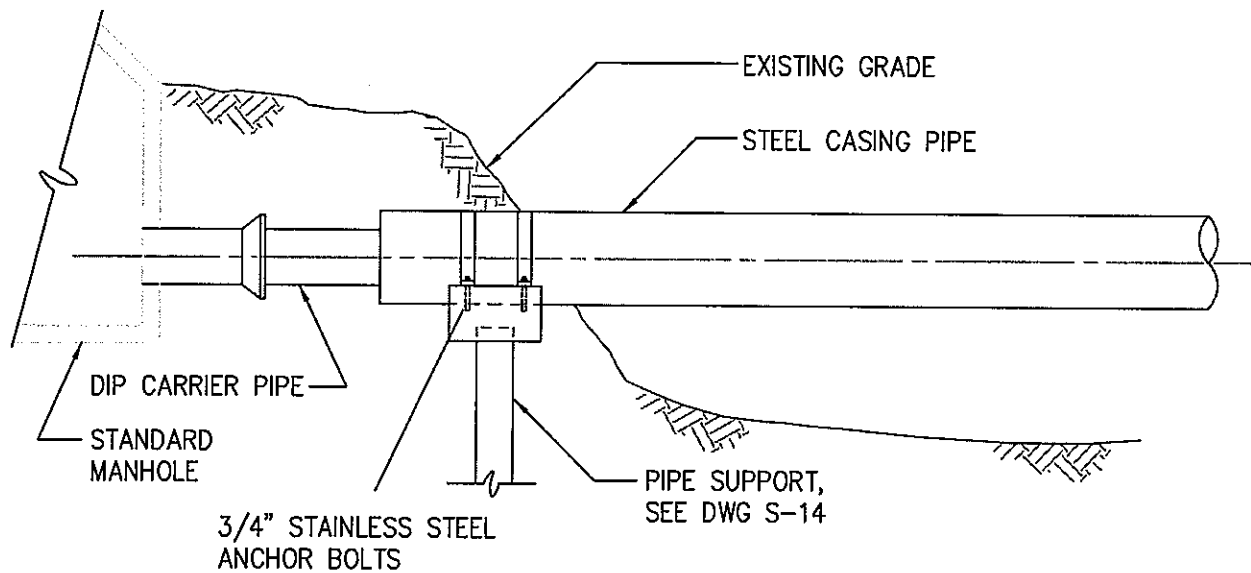
1. STEEL PIPE SHALL BE EITHER SPIRAL WELDED OR SMOOTH WALL SEAMLESS WITH A MINIMUM YIELD STRENGTH OF 35,000 PSI. PAINTING AND LINING SHALL BE AS REQUIRED
2. DUCTILE IRON PIPE SHALL BE SUPPORTED WITH TWO SPIDERS AT EVERY JOINT WITHIN THE CASING PIPE USING APPROVED PIPE ALIGNMENT GUIDE. SEE DRAWING S-39. ALL JOINTS SHALL BE RESTRAINED JOINT. SEE NOTE 2, DWG S-10.
3. SUPPORT TYPE FOR PIERS SHALL BE DETERMINED BY ENGINEER BASED ON SUBGRADE CONDITIONS AT SITE. SEE DRAWING S-13 AND S-14 FOR SUBGRADE PARAMETERS FOR EACH TYPE OF FOUNDATION. SEE DRAWING S-18 FOR SUPPORTS PLACED WITHIN STREAM.
4. BOTTOM OF PIPE TO BE AT A MINIMUM OF 1' ABOVE THE 25 YEAR FLOOD ELEVATION.

ALLOWABLE SPANS FOR STEEL CASING PIPE			
CARRIER PIPE, DIP DIAMETER (IN.)	CASING PIPE, STEEL DIAMETER (IN.)	MINIMUM CASING PIPE WALL THICKNESS (IN.)	ALLOWABLE SPAN (FT.)
6	14	0.2500	40
8	16	0.2500	45
10	18	0.3125	50
12	20	0.3125	50
14	24	0.3125	55
16	26	0.3750	55
18	30	0.3750	60
20	32	0.3750	60
24	36	0.4375	65
30	42	0.4375	65
36	48	0.4375	65
42	56	0.5000	65

SGWASA			
UTILITY DEPARTMENT			
AERIAL PIPE CROSSING			
STEEL CASING PIPE ELEVATION			
DWG. NO. S-12	REVISIONS	DATE	REVISIONS



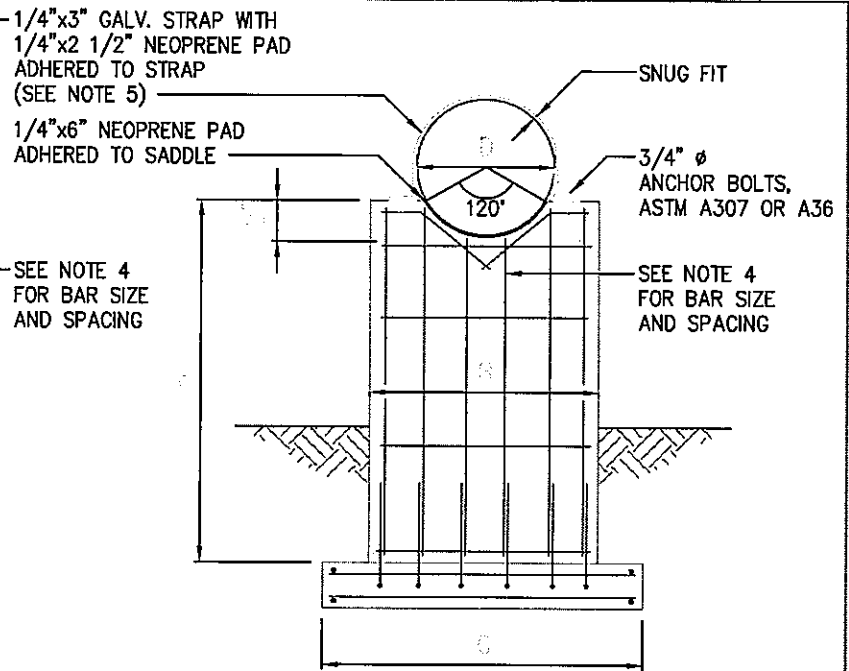
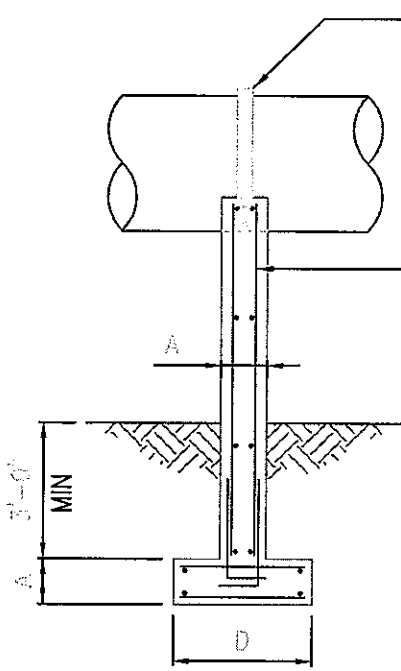
SECTION



ELEVATION

NOTE:
SEE NOTE 4 ON DWG S-11 IF STEEL
PIPE IS USED IN LIEU OF DUCTILE IRON
PIPE FOR CARRIER PIPE.

SGWASA			
UTILITY DEPARTMENT			
AERIAL PIPE CROSSING			
TYPICAL PIPE SECTION AND ELEVATION			
DWG. NO.	REVISIONS	DATE	REVISIONS
S-13			



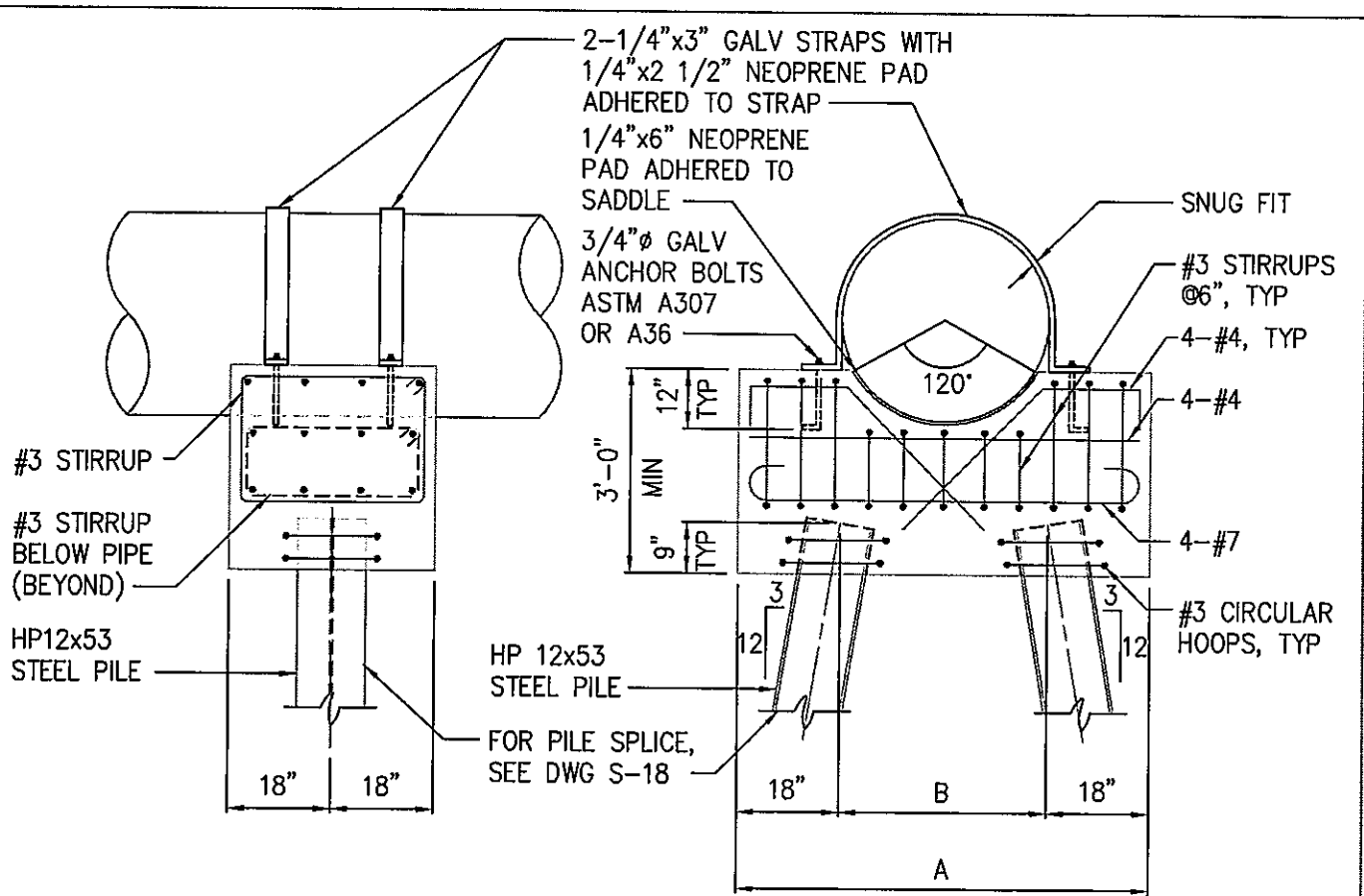
CASING PIPE DIA. "D" (IN.)	"H" (FT.)	THICKNESS "A" (IN.)	PIER WIDTH "B" (FT.)	FOOTING LENGTH "C" (FT.)	FOOTING WIDTH "D" (FT.)
6-12	≤ 6	12	2'-4"	5'-6"	3'-0"
	8	12	2'-4"	6'-3"	3'-0"
	10	12	2'-4"	6'-8"	3'-0"
	12	12	2'-4"	7'-2"	3'-0"
14-20	≤ 6	12	3'-0"	8'-0"	3'-0"
	8	12	3'-0"	9'-0"	3'-0"
	10	12	3'-0"	9'-10"	3'-0"
22-28	≤ 6	14	3'-8"	8'-9"	4'-0"
	8	14	3'-8"	10'-0"	4'-0"
	10	14	3'-8"	11'-0"	4'-0"
30-36	≤ 6	18	4'-4"	9'-0"	4'-0"
	8	18	4'-4"	10'-6"	4'-0"
	10	18	4'-4"	11'-6"	4'-0"
38-48	≤ 6	18	5'-4"	9'-6"	5'-0"
	8	18	5'-4"	11'-0"	5'-0"
	10	18	5'-4"	12'-0"	5'-0"
51-56	≤ 6	18	6'-4"	9'-10"	5'-0"
	8	18	6'-4"	11'-4"	5'-0"
	10	18	6'-4"	12'-4"	5'-0"
	12	18	6'-4"	13'-2"	5'-0"

NOTES:

- SHALLOW FOUNDATION DESIGN SHOWN ON THIS DETAIL IS BASED ON THE FOLLOWING PARAMETERS:
 ALLOWABLE SOIL BEARING CAPACITY = 2000 PSF
 CONCRETE COMPRESSIVE STRENGTH = 4000 PSI
 GRADE 60 REINFORCING STEEL
 MAXIMUM STREAM VELOCITY = 10 FT/SEC
 MAXIMUM SUPPORT HEIGHT (H) = 12'-0"
 IF FIELD CONDITIONS REQUIRE ANY DEVIATION FROM THESE PARAMETERS, THE FOUNDATION DESIGN SHALL BE REVIEWED BY THE ENGINEER.
- IF SUBGRADE AT LOCATION OF SUPPORTS IS DEEMED UNABLE TO WITHSTAND 2000 PSF BEARING PRESSURE, A PILE SUPPORTED FOUNDATION SHALL BE UTILIZED AS PER DRAWING S-15.
- IF BEDROCK IS ENCOUNTERED WHICH WILL PREVENT 3-FOOT MINIMUM COVER OVER FOOTING, DOWELS SHALL BE DRILLED INTO BEDROCK PRIOR TO PLACING FOUNDATION. SEE DRAWING S-16.
- TWELVE-INCH AND FOURTEEN-INCH WIDE PIERS AND FOOTINGS SHALL BE REINFORCED WITH #5 BARS AT 12 INCHES OC IN EACH DIRECTION ON EACH FACE. EIGHTEEN-INCH WIDE PIERS AND FOOTINGS SHALL BE REINFORCED WITH #7 BARS AT 12 INCHES OC IN EACH DIRECTION ON EACH FACE.
- EIGHTEEN-INCH WIDE PIERS SHALL REQUIRE TWO STRAPS OVER THE PIPE INSTEAD OF ONE (AS SHOWN).

WHEN CONCRETE SUPPORTS ARE REQUIRED TO BE LOCATED WITHIN A STREAM AND ARE NOT COVERED WITH BACKFILL, SEE DRAWING S-18 FOR MODIFICATIONS TO UPSTREAM FACE OF SUPPORT.

SGWASA			
UTILITY DEPARTMENT			
AERIAL PIPE CROSSING			
CONCRETE PIER DETAIL			
DWG. NO.	REVISIONS	DATE	REVISIONS
S-14			

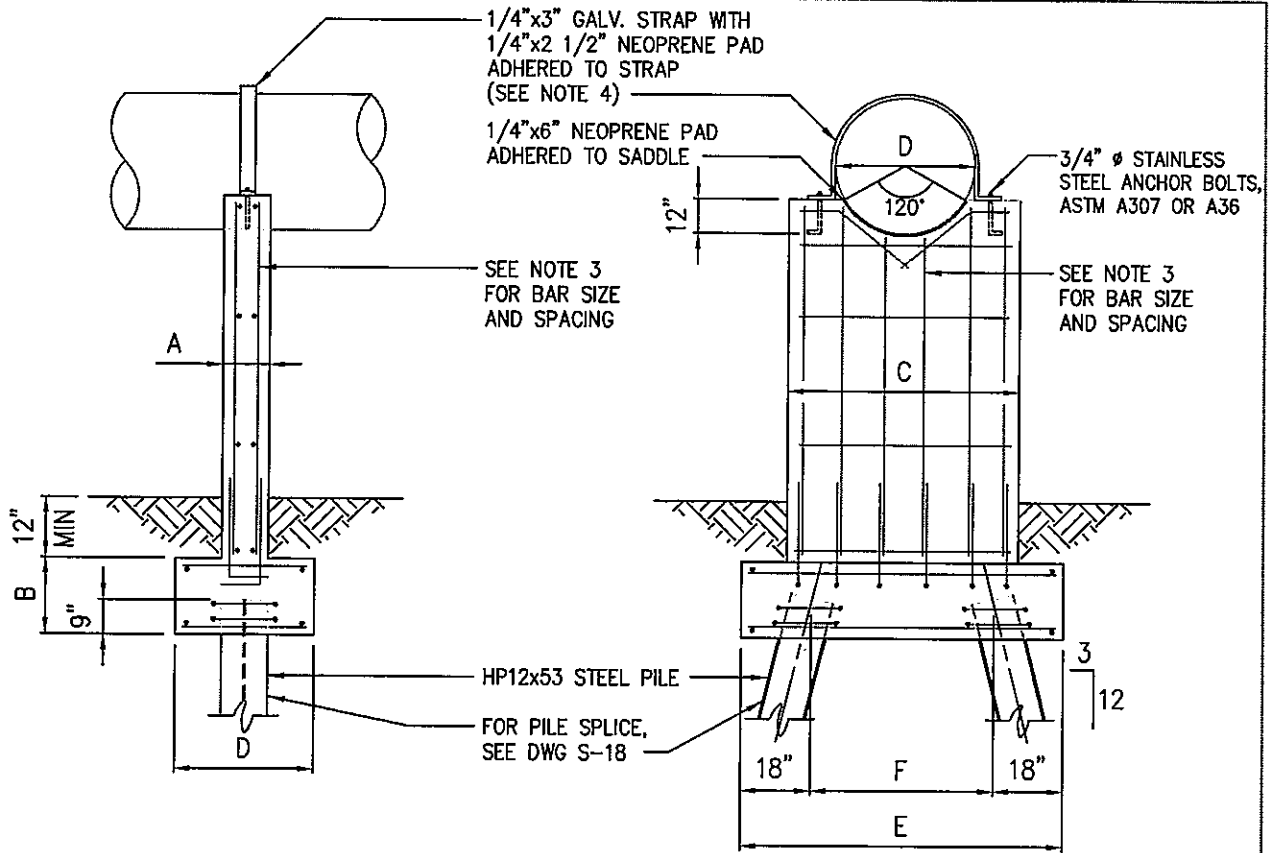


WIDTH OF PILE CAP		
CASING PIPE DIAMETER (IN.)	TOTAL WIDTH "A" (FT.)	PILE SPACING "B" (FT.)
≤ 36	6'-0"	3'-0"
38-42	6'-6"	3'-6"
45-51	7'-3"	4'-3"
54-60	8'-0"	5'-0"

NOTES:

- PILE SUPPORTED FOUNDATION DESIGN SHOWN ON THIS DETAIL IS BASED UPON THE FOLLOWING PARAMETERS:
 MINIMUM CAPACITY OF HP12x53 PILE = 30 TONS
 CONCRETE COMPRESSIVE STRENGTH = 4000 PSI
 GRADE 60 REINFORCING STEEL
 MAXIMUM STREAM VELOCITY = 10 FT/SEC
 IF FIELD CONDITIONS REQUIRE ANY DEVIATION FROM THESE PARAMETERS, FOUNDATION DESIGN SHALL BE REVIEWED BY THE ENGINEER.
- LENGTH OF PILES SHALL BE AS REQUIRED TO DEVELOP 30 TON CAPACITY BY EITHER END BEARING, FRICTION OR A COMBINATION OF END BEARING AND FRICTION. AS A MINIMUM, PILES SHALL BE DRIVEN AT LEAST 15 FEET INTO UNDISTURBED SOIL.

SGWASA			
UTILITY DEPARTMENT			
AERIAL PIPE CROSSING			
PILE CAP DETAIL			
DWG. NO.	REVISIONS	DATE	REVISIONS
S-15			



NOTES:

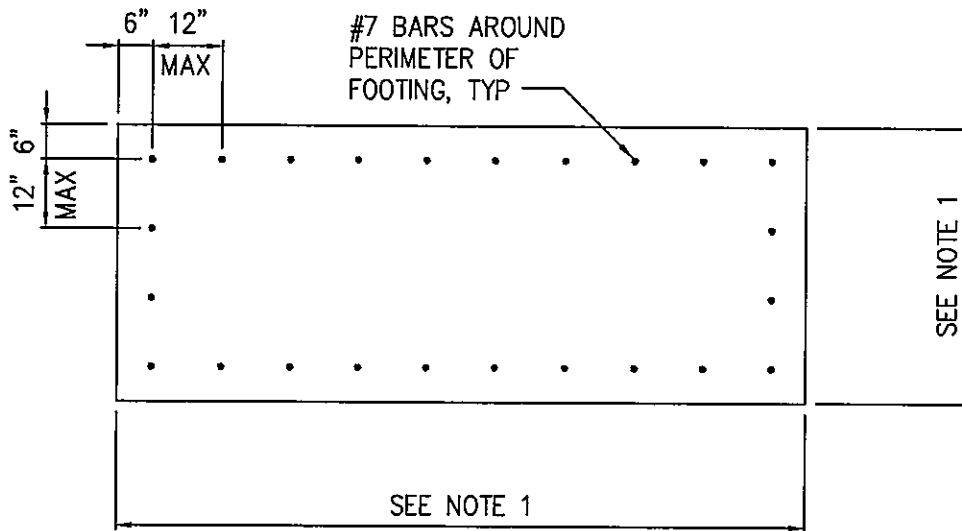
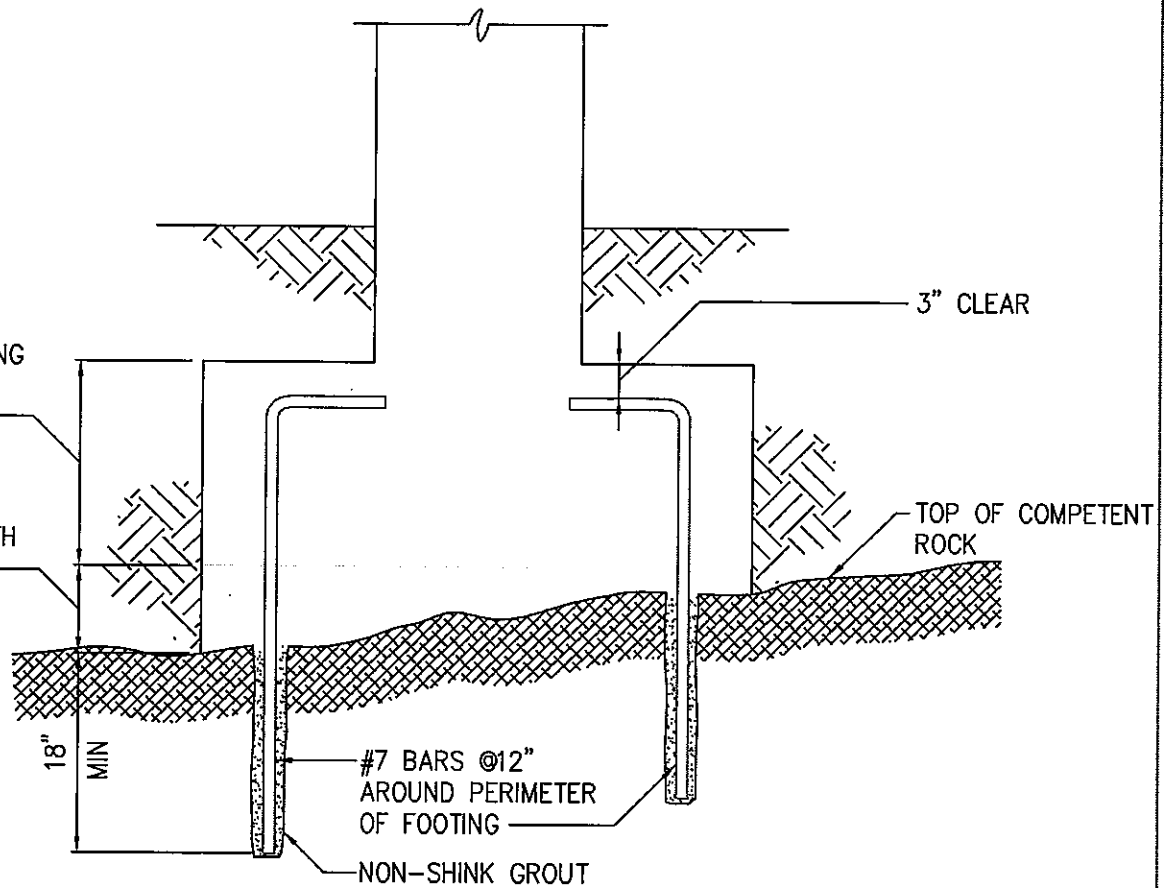
- PILE SUPPORTED PIER FOUNDATION DESIGN SHOWN ON THIS DETAIL IS BASED ON THE FOLLOWING PARAMETERS:
 MINIMUM CAPACITY OF HP12x53 PILE = 30 TONS
 CONCRETE COMPRESSIVE STRENGTH = 4000 PSI
 GRADE 60 REINFORCING STEEL
 MAXIMUM STREAM VELOCITY = 10 FT/SEC
 IF FIELD CONDITIONS REQUIRE ANY DEVIATION FROM THESE PARAMETERS, THE FOUNDATION DESIGN SHALL BE REVIEWED BY THE ENGINEER.
- LENGTH OF PILES SHALL BE AS REQUIRED TO DEVELOP 30 TON CAPACITY BY EITHER END BEARING, FRICTION OR A COMBINATION OF END BEARING AND FRICTION. AS A MINIMUM, PILES SHALL BE DRIVEN AT LEAST 15 FEET INTO UNDISTURBED SOIL.
- TWELVE-INCH AND FOURTEEN-INCH WIDE PIERS SHALL BE REINFORCED WITH #5 BARS AT 12 INCHES OC IN EACH DIRECTION ON EACH FACE. EIGHTEEN-INCH WIDE PIERS SHALL BE REINFORCED WITH #7 BARS AT 12 INCHES OC IN EACH DIRECTION ON EACH FACE. FOOTINGS SHALL BE REINFORCED TYPICALLY TO PIERS.
- EIGHTEEN-INCH WIDE PIERS SHALL REQUIRE TWO STRAPS OVER THE PIPE INSTEAD OF ONE (AS SHOWN).
- WHEN CONCRETE SUPPORTS ARE REQUIRED TO BE LOCATED WITHIN A STREAM AND ARE NOT COVERED WITH BACKFILL, SEE DRAWING S-18 FOR MODIFICATIONS TO UPSTREAM FACE OF SUPPORT.

CASING PIPE DIA "D" (IN.)	PIER THICKNESS "A" (IN.)	FOOTING THICKNESS "B" (IN.)	PIER WIDTH "C" (FT.)	FOOTING WIDTH "D" (FT.)	FOOTING LENGTH "E" (FT.)	PILE SPACING "F" (FT.)
6-12	12	20	2'-4"	3'-0"	6'-0"	3'-0"
14-20	12	20	3'-0"	3'-0"	8'-0"	5'-0"
22-28	18	26	3'-8"	4'-0"	8'-9"	5'-9"
30-36	18	26	4'-4"	4'-0"	9'-0"	6'-0"
38-48	18	26	5'-4"	5'-0"	9'-6"	6'-6"
51-60	18	26	6'-4"	5'-0"	9'-10"	6'-10"

SGWASA			
UTILITY DEPARTMENT			
AERIAL PIPE CROSSING			
PILE SUPPORTED PIER DETAIL			
DWG. NO.	REVISIONS	DATE	REVISIONS
S-16			

NORMAL FOOTING THICKNESS, SEE NOTE 1

CONCRETE FOR LEVELING MAY BE PLACED WITH FOOTING



NOTES:

1. GEOMETRY OF FOOTING SHALL MATCH GEOMETRY OF CONCRETE PIERS WITH HEIGHT OF 6 FEET OR LESS AS PER DRAWING S-14.
2. NON-SHRINK GROUT SHALL BE "EUCO-N-S" BY THE EUCLID CHEMICAL COMPANY; "MASTERFLOW 713" BY MASTER BULDERS, OR EQUAL.

SGWASA			
UTILITY DEPARTMENT			
AERIAL PIPE CROSSING CONCRETE PIER ON BEDROCK			
REVISIONS	DATE	REVISIONS	DATE

DWG. NO.
S-17

NON-SHRINK GROUT
BULKHEAD AT EACH
END OF CASING PIPE

STYROFOAM PLUG TO
ASSIST GROUT PLACEMENT,
ALL AROUND

STEEL CASING PIPE
DIP CARRIER PIPE

FINISHED GRADE

12"

TURN DOWN ELBOW
WITH INSECT SCREEN

8"

2" Ø GALV STEEL VENT,
TWO PER CASING, ONE
AT EACH END OF
CASING PIPE

PROVIDE PLASTIC SHEET
BOND-BREAKER BETWEEN
CARRIER PIPE AND GROUT,
ALL AROUND

PROVIDE 2" Ø GALV STEEL DRAIN
IN BULKHEAD AT EACH END
OF CASING PIPE AND 1/3
CU YD OF CRUSHED STONE
AT DRAIN, WRAP STONE
WITH FILTER FABRIC

NOTE:
NON-SHRINK GROUT SHALL BE
"EUCCO-N-S" BY THE EUCLID
CHEMICAL COMPANY; "MASTERFLOW
713" BY MASTER BUILDERS,
OR EQUAL.

TYPICAL CASING PIPE PLUG

CARRIER PIPE

3/8" STEEL PLATE, TYP

3/8"x4" STEEL
PLATE, TYP

5/8" Ø A325 BOLT

CASING PIPE

3/16 4

1" R ON ALL CORNERS

PIPE ALIGNMENT GUIDE

SGWASA

UTILITY DEPARTMENT

AERIAL PIPE CROSSING
CASING PIPE DETAILS

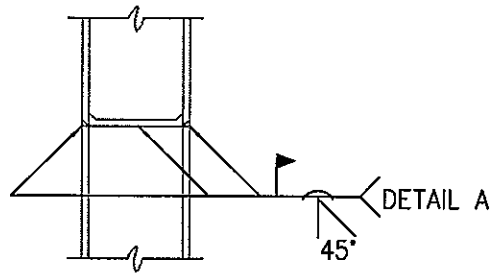
DWG. NO.
S-18

REVISIONS

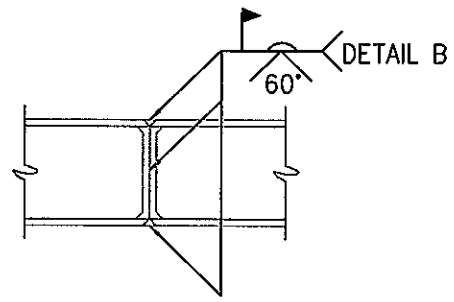
DATE

REVISIONS

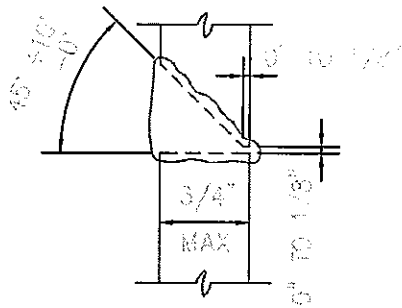
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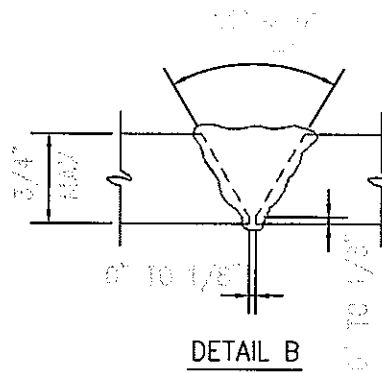
COLUMN VERTICAL



* COLUMN HORIZONTAL OR VERTICAL



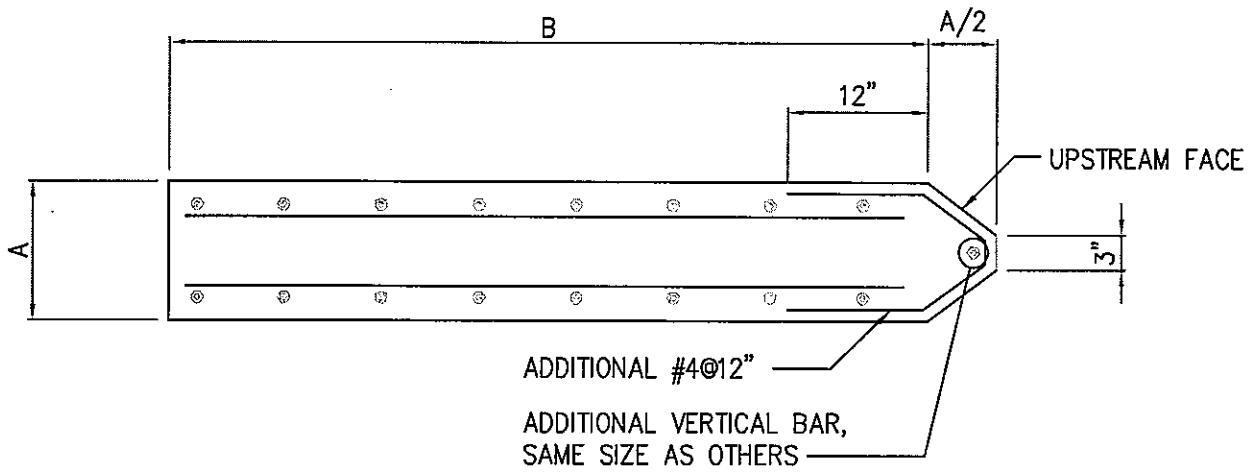
DETAIL A



DETAIL B

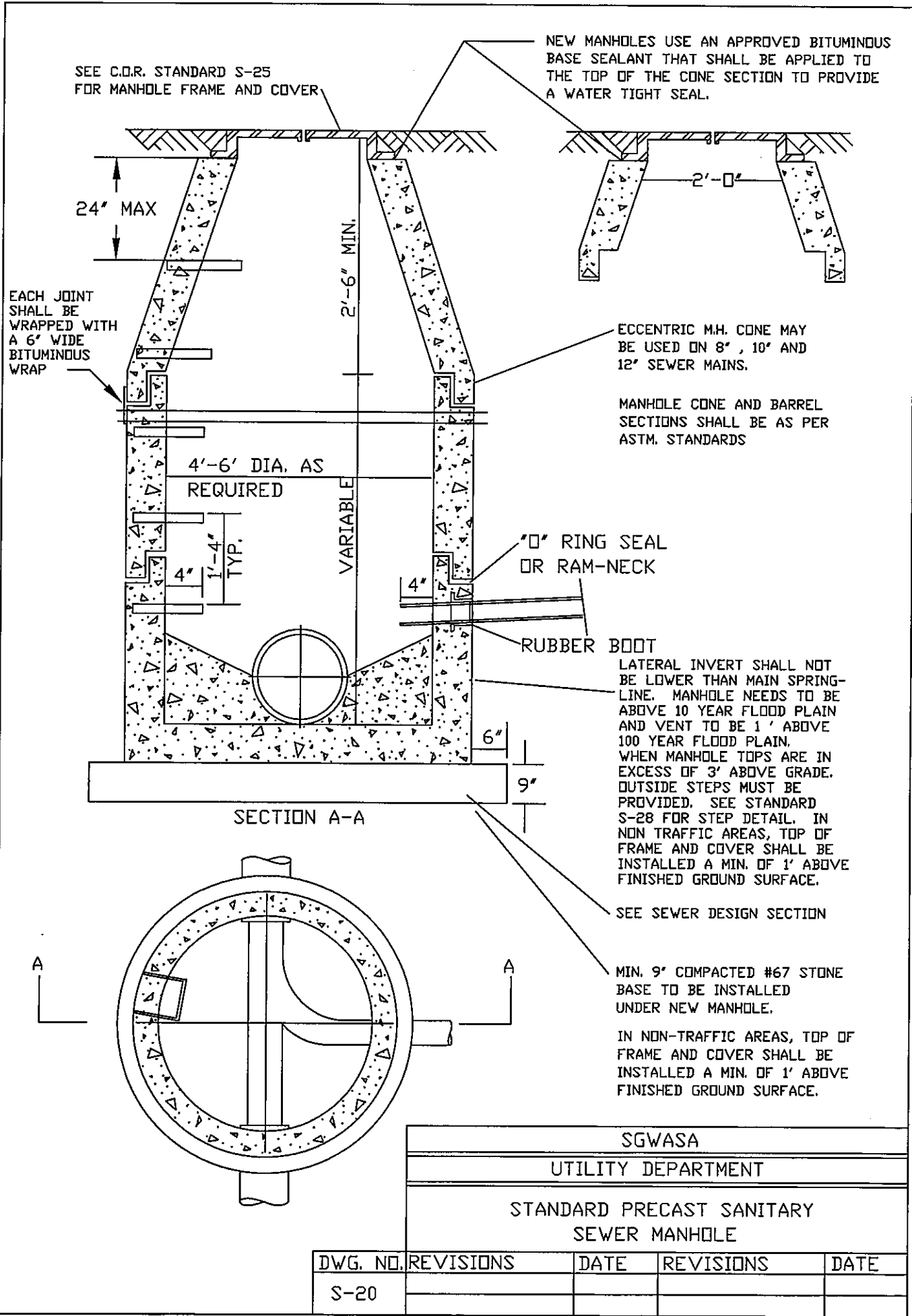
* POSITION OF COLUMN DURING WELDING

STEEL PILE SPLICE



PLAN - CONCRETE SUPPORT NOSING
(WHEN EXPOSED TO STEAM FLOW)

SGWASA			
UTILITY DEPARTMENT			
AERIAL PIPE CROSSING CONCRETE SUPPORT DETAILS			
DWG. NO. S-19	REVISIONS	DATE	REVISIONS DATE



SEE C.D.R. STANDARD S-25 FOR MANHOLE FRAME AND COVER

NEW MANHOLES USE AN APPROVED BITUMINOUS BASE SEALANT THAT SHALL BE APPLIED TO THE TOP OF THE CONE SECTION TO PROVIDE A WATER TIGHT SEAL.

24" MAX

2'-6" MIN.

EACH JOINT SHALL BE WRAPPED WITH A 6" WIDE BITUMINOUS WRAP

ECCENTRIC M.H. CONE MAY BE USED ON 8", 10" AND 12" SEWER MAINS.

MANHOLE CONE AND BARREL SECTIONS SHALL BE AS PER ASTM. STANDARDS

4'-6" DIA. AS REQUIRED

VARIABLE

Ø" RING SEAL OR RAM-NECK

RUBBER BOOT

LATERAL INVERT SHALL NOT BE LOWER THAN MAIN SPRING-LINE. MANHOLE NEEDS TO BE ABOVE 10 YEAR FLOOD PLAIN AND VENT TO BE 1' ABOVE 100 YEAR FLOOD PLAIN. WHEN MANHOLE TOPS ARE IN EXCESS OF 3' ABOVE GRADE. OUTSIDE STEPS MUST BE PROVIDED. SEE STANDARD S-28 FOR STEP DETAIL. IN NON TRAFFIC AREAS, TOP OF FRAME AND COVER SHALL BE INSTALLED A MIN. OF 1' ABOVE FINISHED GROUND SURFACE.

SECTION A-A

SEE SEWER DESIGN SECTION

MIN. 9" COMPACTED #67 STONE BASE TO BE INSTALLED UNDER NEW MANHOLE.

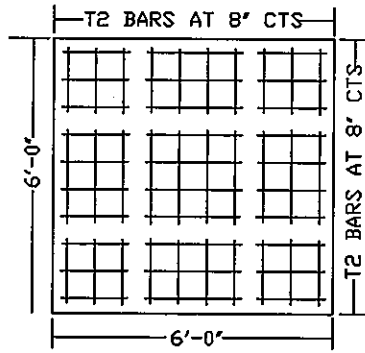
IN NON-TRAFFIC AREAS, TOP OF FRAME AND COVER SHALL BE INSTALLED A MIN. OF 1' ABOVE FINISHED GROUND SURFACE.

SGWASA

UTILITY DEPARTMENT

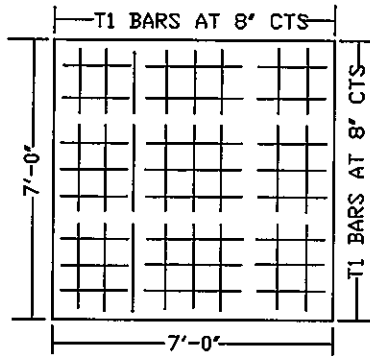
STANDARD PRECAST SANITARY SEWER MANHOLE

DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-20				



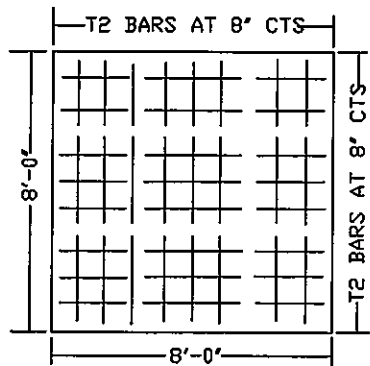
REINFORCED CONC. FOOTING FOR
4' PRECAST MANHOLE

BILL OF MATERIAL FOR 4' MANHOLE				
BAR	SIZE	LENGTH	NO.	WT. LBS.
T2	#5	5'-6"	18	103
CL. 'A' CONCRETE TOTAL CU. YDS				1,000



REINFORCED CONC. FOOTING FOR
5' PRECAST MANHOLE

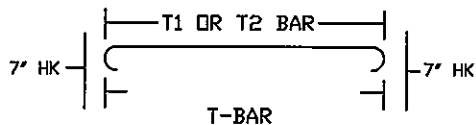
BILL OF MATERIAL FOR 4' MANHOLE				
BAR	SIZE	LENGTH	NO.	WT. LBS.
T1	#5	6'-6"	20	136
CL. 'A' CONCRETE TOTAL CU. YDS				1,361



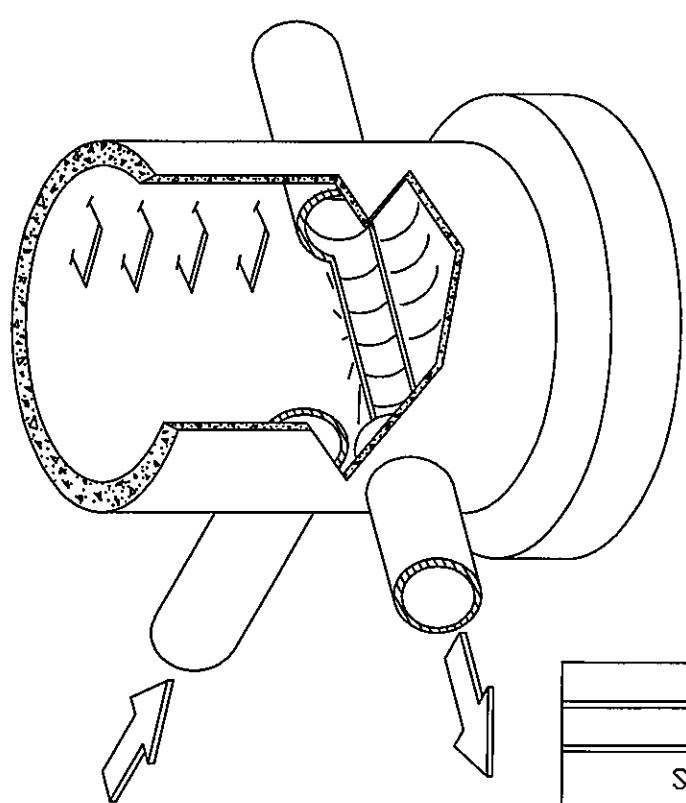
REINFORCED CONC. FOOTING FOR
6' PRECAST MANHOLE

BILL OF MATERIAL FOR 4' MANHOLE				
BAR	SIZE	LENGTH	NO.	WT. LBS.
T2	#5	7'-6"	24	165
CL. 'A' CONCRETE TOTAL CU. YDS				1,778

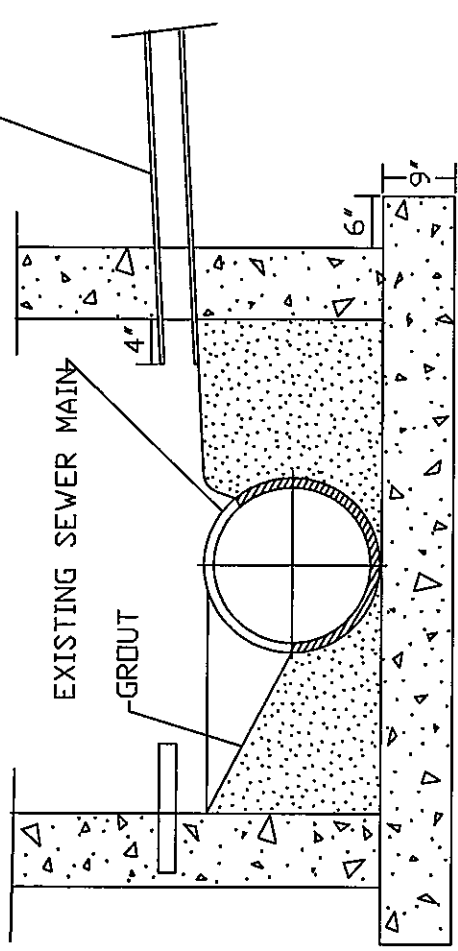
* ALL BASES ARE MINIMUM 9" THICK



SGWASA				
UTILITY DEPARTMENT				
EXTENDED BASE OR CAST-IN-PLACE REINFORCED CONCRETE BASE				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-21				

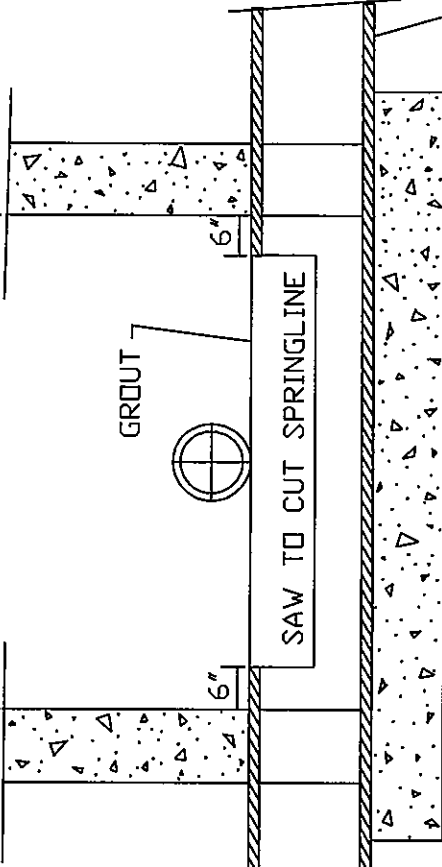


EXTEND OVER INVERT



SECTION AT RIGHT ANGLE TO EXISTING MAIN

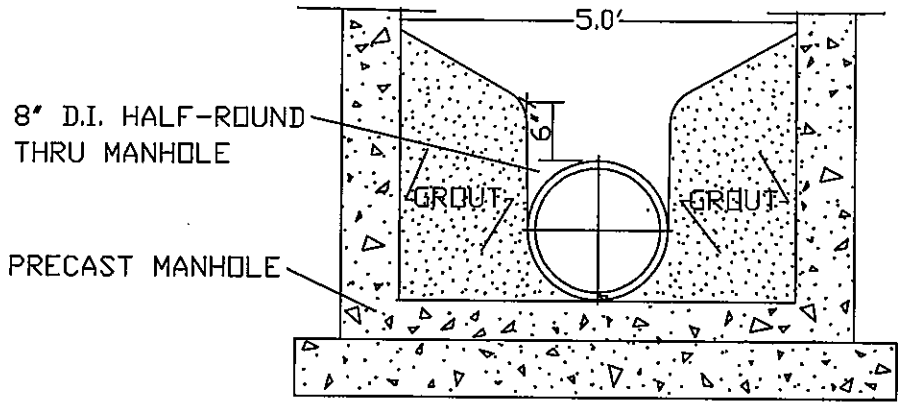
- 4'-0" FOR 8" TO 12" MAINS
- 5'-0" FOR 15" TO 30" MAINS
- 6'-0" FOR 36" TO 54" MAINS



SECTION ALONG CENTERLINE OF EXISTING MAIN

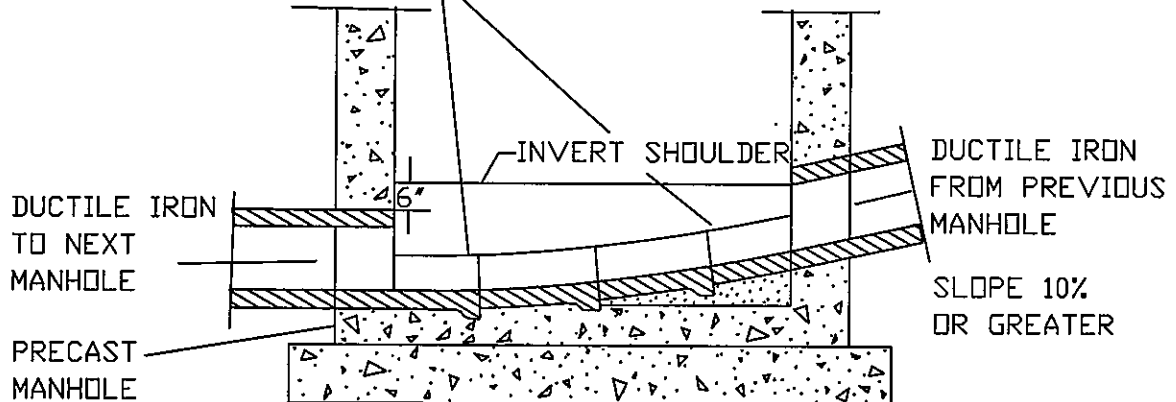
- NOTES:
1. FLOW SHALL BE MAINTAINED DURING CONSTRUCTION.
 2. THIS DETAIL TO BE USED WHEN A 6" OR LARGER LATERAL NECESSITATES CONSTRUCTION OF A NEW MANHOLE.
 3. SEE STANDARD DETAIL S-20, FOR PRECAST MANHOLES. THE CONTRACTOR SHALL PROVIDE A MINIMUM 6" COMPACTED # 67 STONE BASE.
 5. FOR USE ON DIP AND PVC ONLY.

SGWASA				
UTILITY DEPARTMENT				
STANDARD MANHOLE INSTALLATION OVER EXISTING SEWER MAIN				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-22				



SECTION AT RIGHT ANGLE TO CENTER LINE OF PIPE

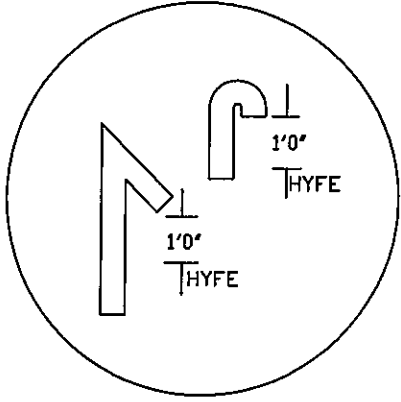
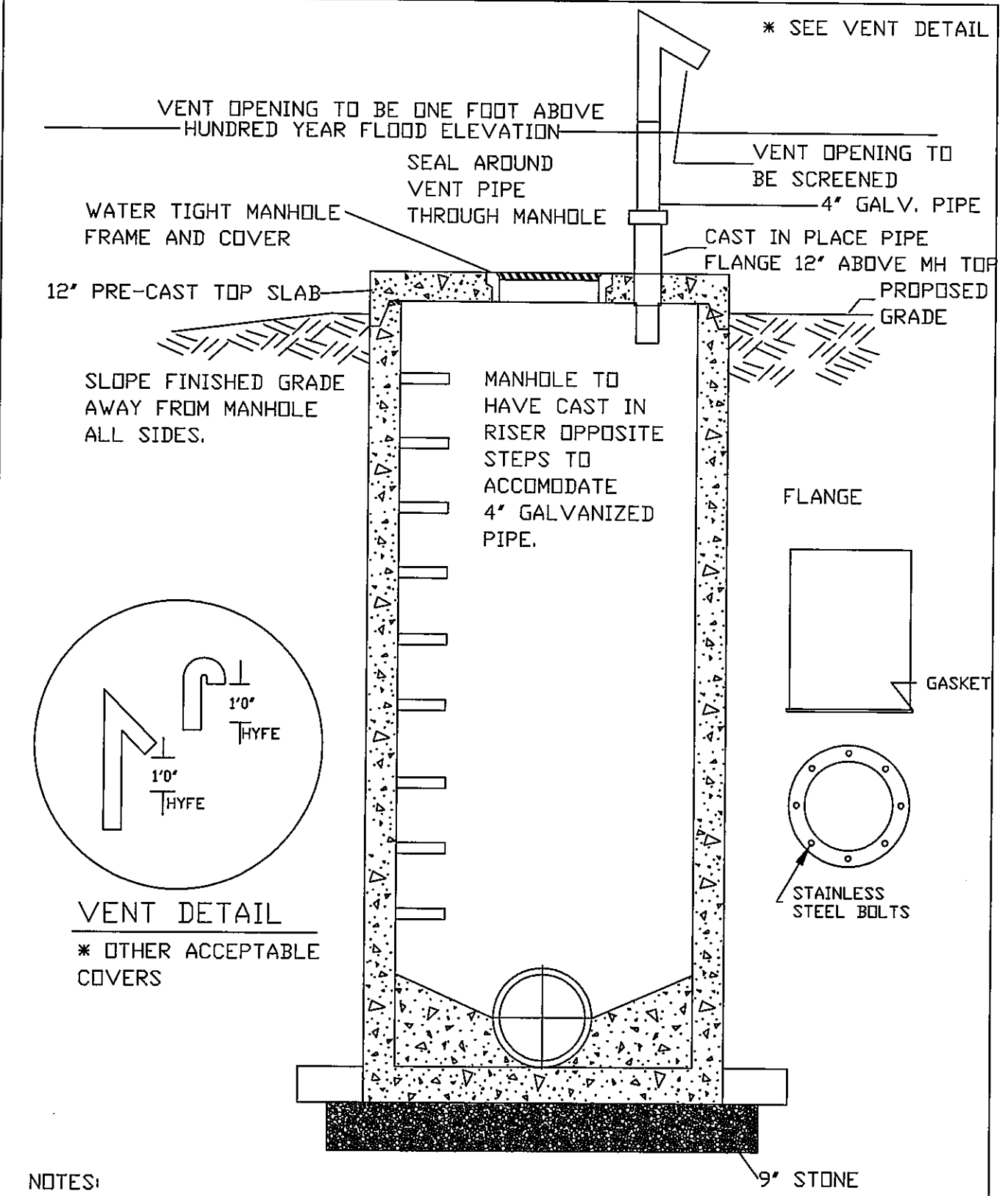
DUCTILE IRON PIPE AND
DUCTILE IRON
BENDS AS NEEDED, WITH
NO MORE THAN THREE
JOINTS OF HALF PIPE.



SECTION ALONG CENTER LINE OF PIPE

NOTE:
NO HORIZONTAL ALIGNMENT CHANGE
CAN BE MADE WITH IN THIS MANHOLE
TYPE. USE ON GRADES 10% OR GREATER.

SGWASA				
UTILITY DEPARTMENT				
STANDARD HIGH VELOCITY MANHOLE INVERT				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-23				

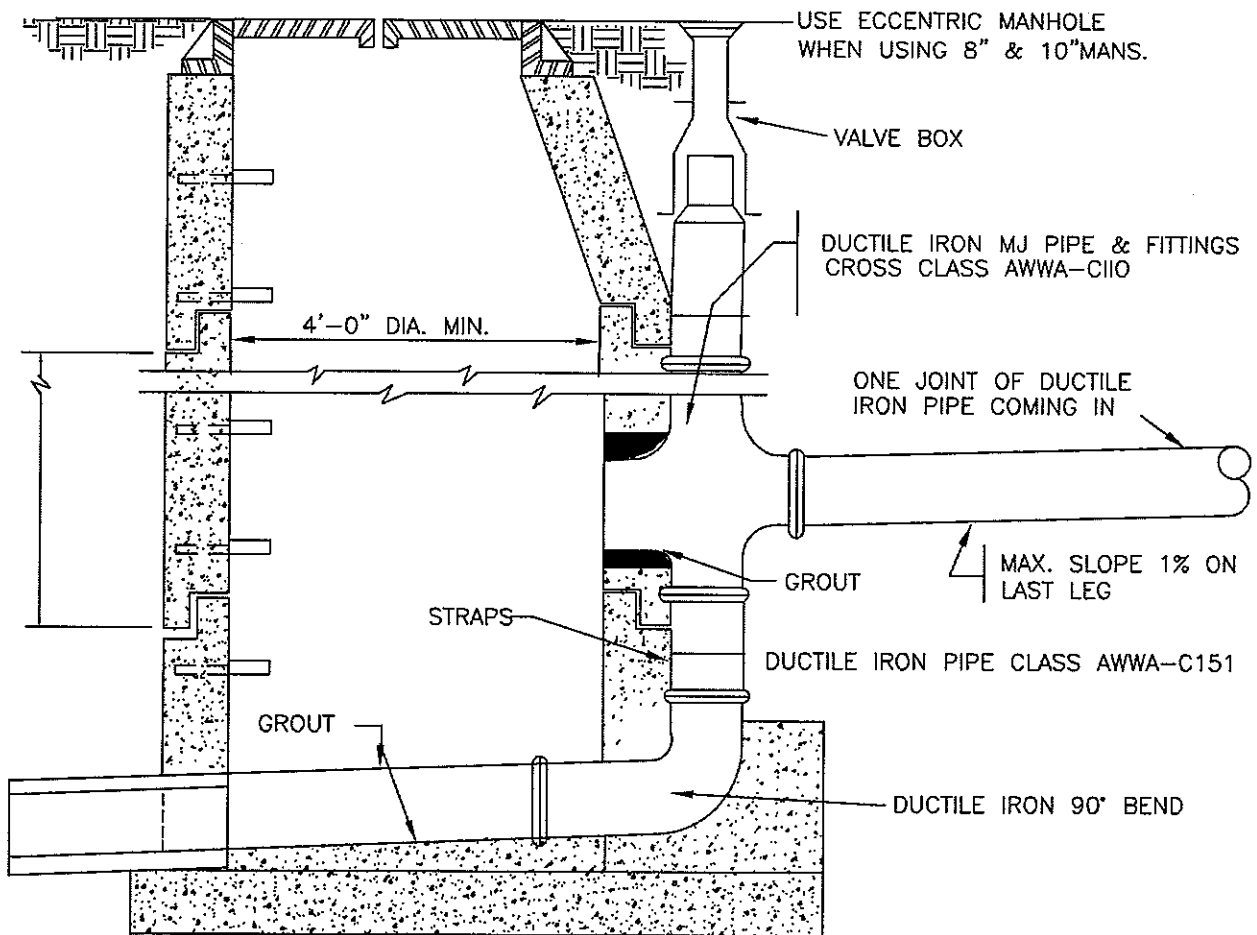


VENT DETAIL
 * OTHER ACCEPTABLE COVERS

NOTES:

1. VENT MUST BE FACTORY WELDED FABRICATED AND GALVANIZED OR COATED TWICE WITH GREEN EPOXY PAINT
2. MANHOLE NUMBER NEEDS TO COINCIDE WITH VENT NUMBER

SGWASA				
UTILITY DEPARTMENT				
STANDARD SEAL TIGHT MANHOLE WITH VENTED STACK				
DWG. NO.	REVISIONS	DATE	REVISIONS	DATE
S-24				



NOTES:

1. PIPE SIZE FOR DROP TO EQUAL INFLOW SEWER PIPE SIZE
2. DRILL ALL HOLES FOR PIPE AND BOLTS.
3. DROP-MANHOLE MANDATORY WHEN DIFFERENTIAL BETWEEN INVERTS IS GREATER THAN 2'-6".
4. SEE SGWASA STANDARD FOR PRECAST MANHOLES, DETAIL S-20, FOR MANHOLE DETAILS.

SOUTH GRANVILLE WATER AND SEWER AUTHORITY
STANDARD OUTSIDE DROP MANHOLE - S-24A