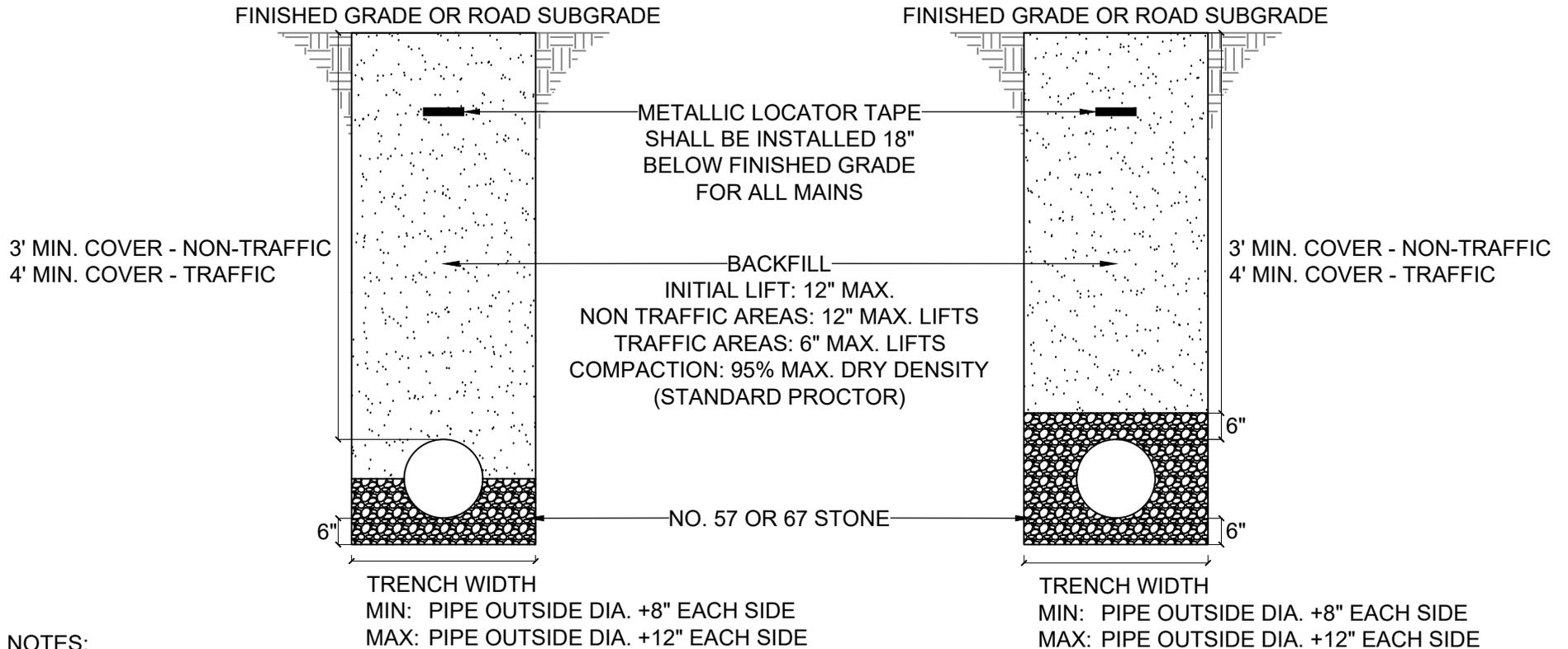


NOTES:

1. NO STONES SHALL BE INCLUDED IN THE BACKFILL MATERIAL FOR AT LEAST 2 FEET ABOVE THE TOP OF THE PIPE.
2. PROVIDE RECESSES TO RECEIVE PIPE BELL.
3. UNDERCUT UNSUITABLE MATERIAL AS DIRECTED BY THE ENGINEER AND BACKFILL WITH APPROVED MATERIAL.
4. WHERE NECESSARY, TEMPORARILY DIVERT SURFACE WATER TO MAINTAIN A DRY CONDITION IN THE PIPE FOUNDATION. DIRECT THIS TEMPORARY FLOW INTO SUITABLE EROSION CONTROL DEVICES.
5. NO ORGANIC MATERIAL PERMITTED FOR BACKFILLING.
6. FLOWABLE FILL MAY BE REQUIRED AT THE DIRECTION OF THE WATER RESOURCES DIRECTOR.

CLASS A BEDDING
 REQUIRED FOR DEPTHS ≤ 16 FEET

CLASS B BEDDING
 REQUIRED FOR DEPTHS > 16 FEET



NOTES:

1. FOR TRENCHES REQUIRING SHORING & BRACING, DIMENSIONS SHALL BE TAKEN FROM THE INSIDE FACE OF THE SHORING & BRACING.
2. FLOWABLE FILL MAY BE REQUIRED AT THE DIRECTION OF THE WATER RESOURCES DIRECTOR.
3. NO STONES SHALL BE INCLUDED IN THE BACKFILL MATERIAL FOR AT LEAST 2 FEET ABOVE THE TOP OF THE PIPE.
4. PROVIDE RECESSES TO RECEIVE PIPE BELL.
5. UNDERCUT UNSUITABLE MATERIAL AS DIRECTED BY THE ENGINEER AND BACKFILL WITH APPROVED MATERIAL.
6. WHERE NECESSARY, TEMPORARILY DIVERT SURFACE WATER TO MAINTAIN A DRY CONDITION IN THE PIPE FOUNDATION. DIRECT THIS TEMPORARY FLOW INTO SUITABLE EROSION CONTROL DEVICES.
7. NO ORGANIC MATERIAL PERMITTED FOR BACKFILLING.

**TOWN OF APEX
 STANDARDS**

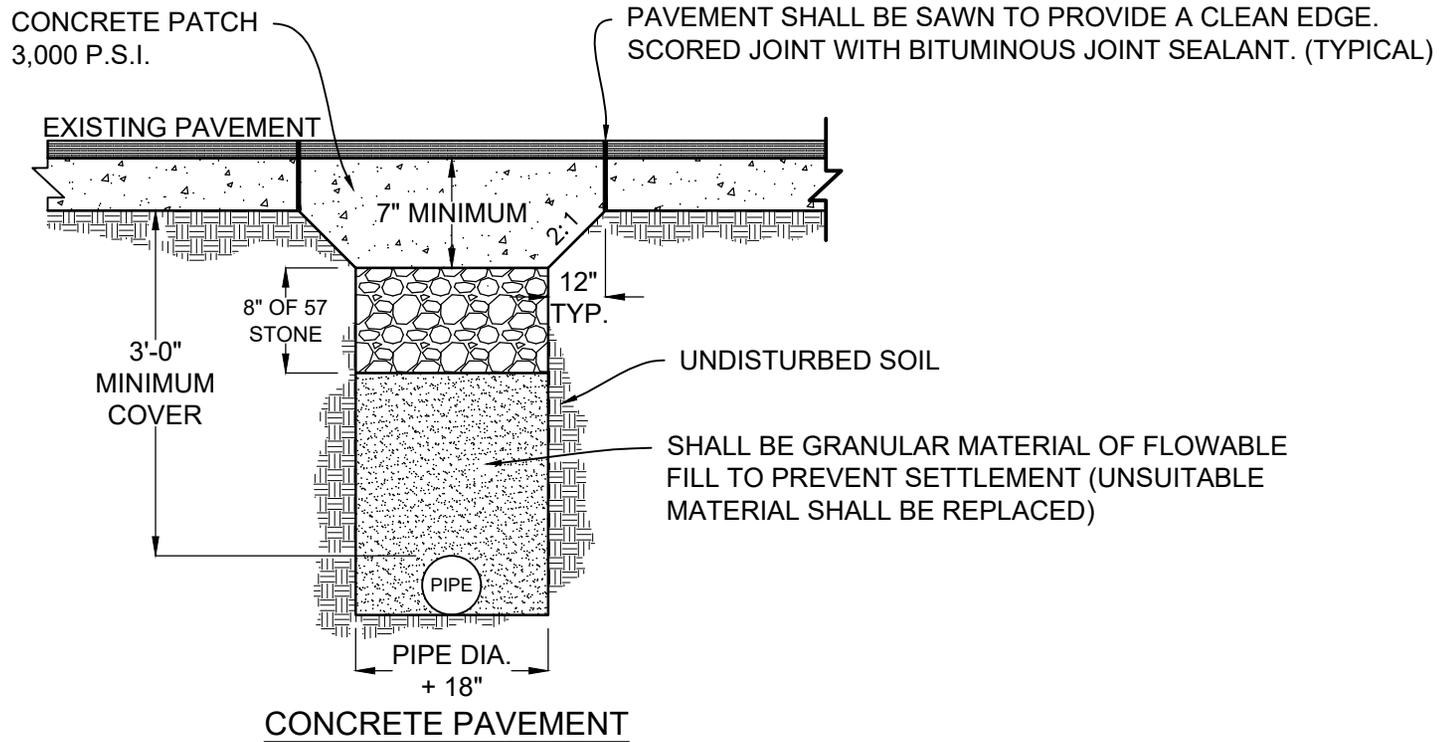
SANITARY SEWER PIPE BEDDING & BACKFILLING

EFFECTIVE: MARCH 23, 2021

STD. NO.

450.02

SHEET 1 OF 1



NOTES:

1. ALL PAVEMENT CUTS SHALL BE REPAIRED WITHIN A MAXIMUM OF SEVEN (7) DAYS FROM THE DATE THE CUT IS MADE.
2. CONCRETE TRENCH CAP ON ASPHALT STREETS SHALL BE USED ONLY DURING INCLEMENT WEATHER WHEN ASPHALT PLANTS ARE NOT OPERATING.
3. IN ALL OPEN TRENCHES, BACKFILL SHALL BE COMPACTED TO 95% MAXIMUM DRY DENSITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING COMPACTION REQUIREMENTS BY SOILS TESTING CERTIFIED BY A LICENSED PROFESSIONAL GEOTECHNICAL ENGINEER.
4. BACKFILL WITH A HIGH CLAY CONTENT, HIGH SHRINK-SWELL POTENTIAL, OR HIGH MOISTURE CONTENT THAT CANNOT MEET COMPACTION REQUIREMENTS SHALL BE DEEMED UNSUITABLE AND SHALL BE REPLACED WITH SUITABLE BACKFILL MATERIAL.
5. ALL PAVEMENT PATCHES SHALL PROVIDE A UNIFORM AND SMOOTH DRIVING SURFACE.
6. OPEN CUT OF NCDOT ROADWAYS WILL NOT BE ALLOWED WITHOUT PRIOR APPROVAL FROM THE NCDOT DISTRICT ENGINEER OR AS INDICATED ON THE DRAWING

**TOWN OF APEX
STANDARDS**

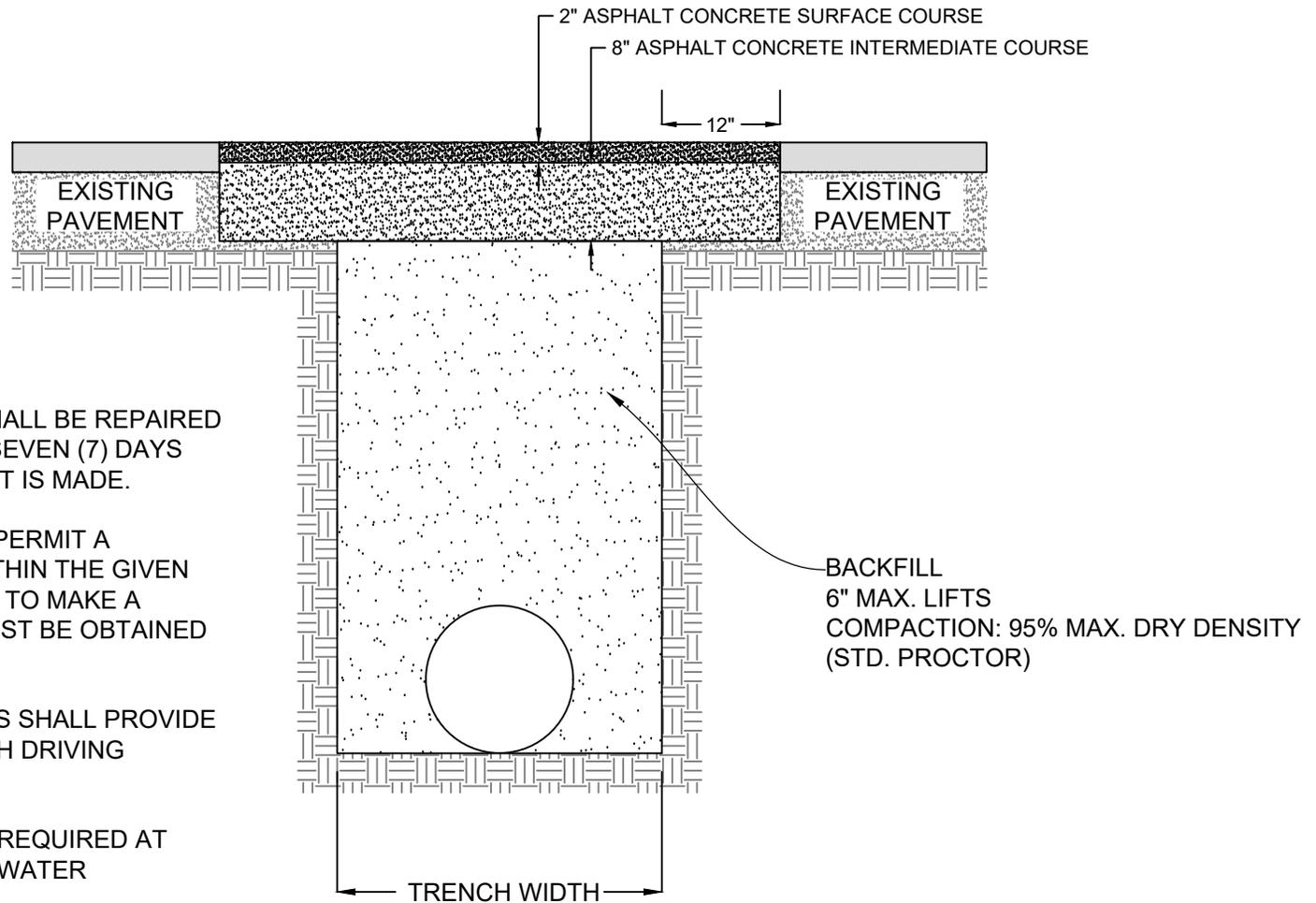
CONCRETE REPAIR

STD. NO.

450.03

EFFECTIVE: MARCH 23, 2021

SHEET 1 OF 1



NOTES:

1. ALL PAVEMENT CUTS SHALL BE REPAIRED WITHIN A MAXIMUM OF SEVEN (7) DAYS FROM THE DATE THE CUT IS MADE.
2. IF CONDITIONS DO NOT PERMIT A PERMANENT REPAIR WITHIN THE GIVEN TIME LIMIT, PERMISSION TO MAKE A TEMPORARY REPAIR MUST BE OBTAINED FROM THE TOWN.
3. ALL PAVEMENT PATCHES SHALL PROVIDE A UNIFORM AND SMOOTH DRIVING SURFACE.
4. FLOWABLE FILL MAY BE REQUIRED AT THE DIRECTION OF THE WATER RESOURCES DIRECTOR.

MIN: PIPE OUTSIDE DIAMETER + 8" EACH SIDE
 MAX: PIPE OUTSIDE DIAMETER +12" EACH SIDE

**TOWN OF APEX
STANDARDS**

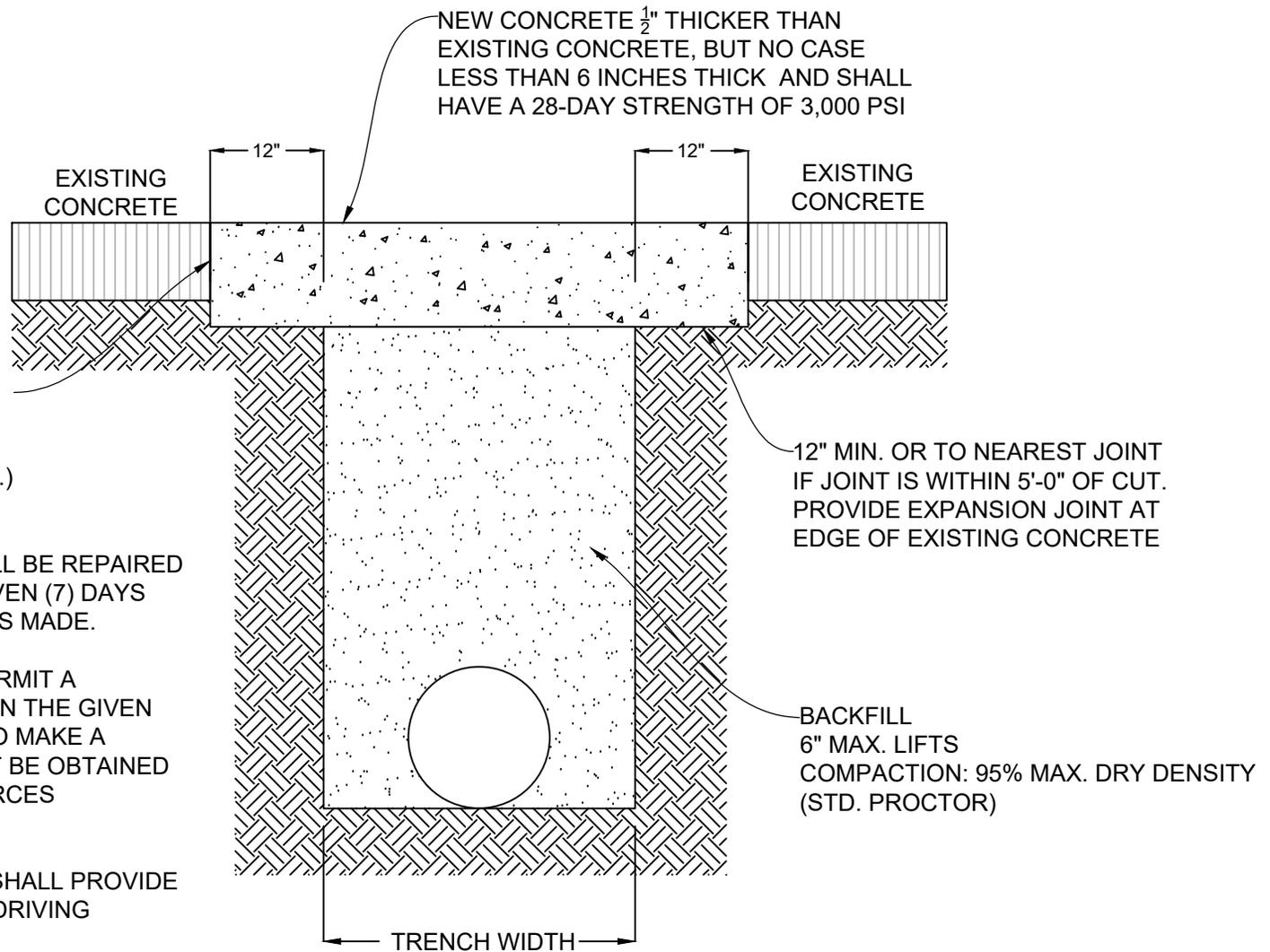
EFFECTIVE: MARCH 23, 2021

**TRENCH & PAVEMENT REPAIR
SECTION FOR ASPHALT**

STD. NO.

450.04

SHEET 1 OF 1



PAVEMENT SHALL BE SAW CUT TO PROVIDE A CLEAN EDGE (TYP.)

NOTES:

1. ALL PAVEMENT CUTS SHALL BE REPAIRED WITHIN A MAXIMUM OF SEVEN (7) DAYS FROM THE DATE THE CUT IS MADE.
2. IF CONDITIONS DO NOT PERMIT A PERMANENT REPAIR WITHIN THE GIVEN TIME LIMIT, PERMISSION TO MAKE A TEMPORARY REPAIR MUST BE OBTAINED FROM THE WATER RESOURCES DIRECTOR.
3. ALL PAVEMENT PATCHES SHALL PROVIDE A UNIFORM AND SMOOTH DRIVING SURFACE.
4. FLOWABLE FILL MAY BE REQUIRE THE DIRECTION OF THE WATER RESOURCES DIRECTOR.

MIN: PIPE OUTSIDE DIAMETER + 8" EACH SIDE
 MAX: PIPE OUTSIDE DIAMETER +12" EACH SIDE

**TOWN OF APEX
 STANDARDS**

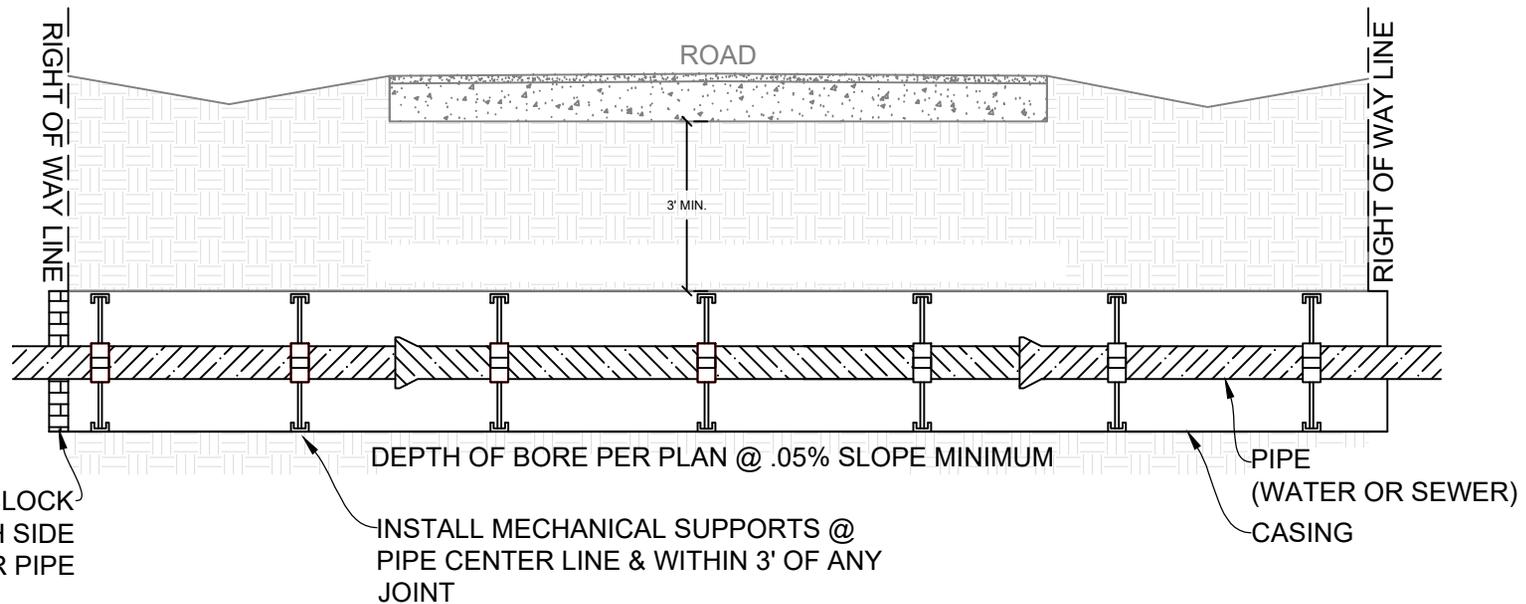
**TRENCH & PAVEMENT REPAIR
 SECTION FOR CONCRETE**

STD. NO.

450.05

EFFECTIVE: MARCH 23, 2021

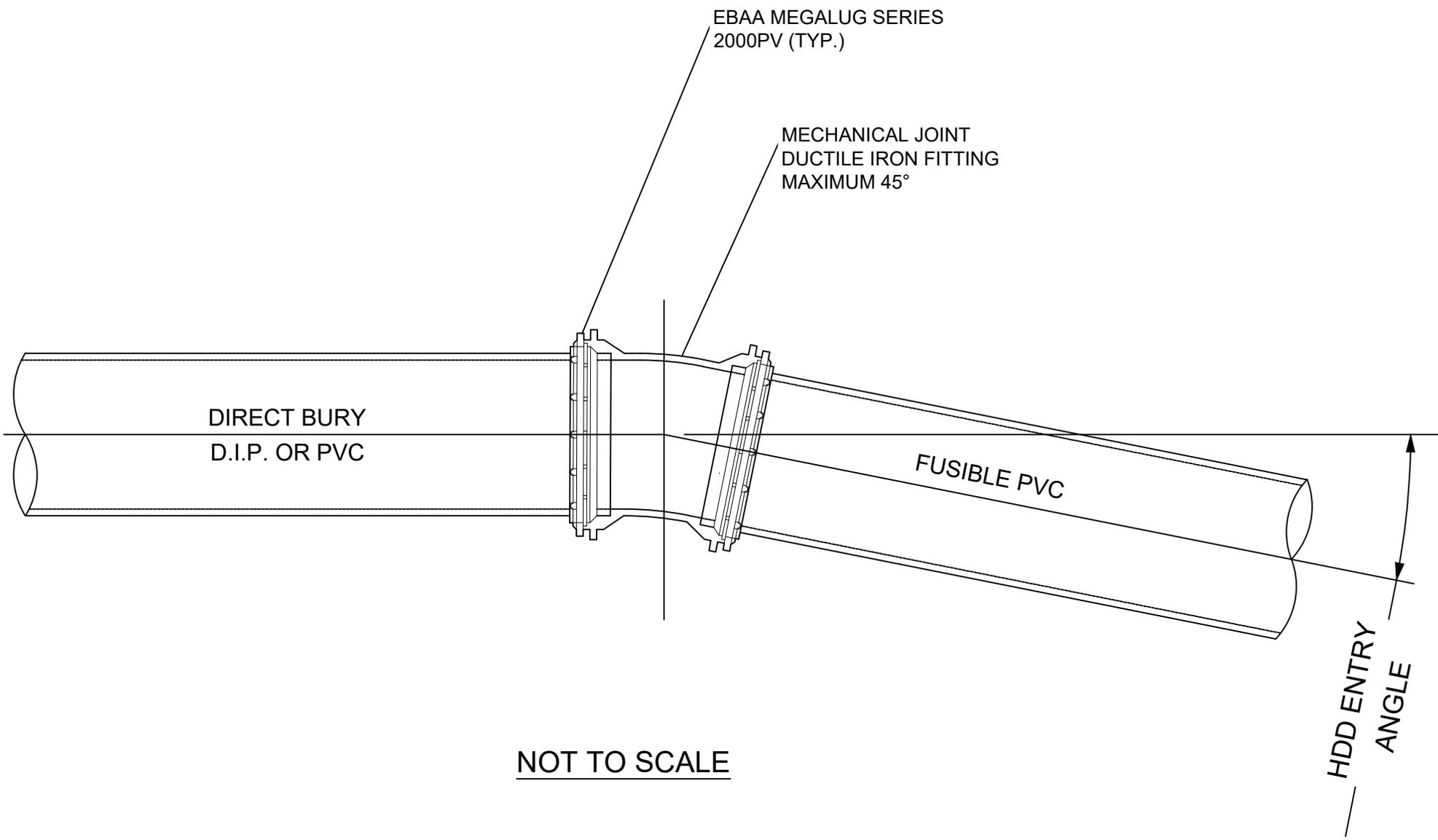
SHEET 1 OF 1



NOTES:

1. CASING SHALL BE UNCOATED SPIRAL WELDED STEEL MEETING ASTM A-139, GRADE B WITH A YIELD STRENGTH OF 35,000 PSI.
2. CROSSINGS ON NCDOT MAINTAINED ROADS TO BE IN ACCORDANCE WITH CURRENT NCDOT STANDARDS AND APPROVED ENCROACHMENT AGREEMENT.
3. RESTRAINED JOINT PIPE ONLY. MEGE-LUGS ARE NOT PERMITTED.
4. SUPPORTS SHALL BE MANUFACTURED BY ADVANCE PRODUCTS & SYSTEMS, INC, PIPELINE SEAL AND INSULATOR LTD, OR BWM COMPANY.
5. THREE SUPPORTS SHALL BE INSTALLED ON EACH PIPE SEGMENT.
6. LARGER ENCASEMENT SIZES MAY BE UTILIZED AT THE DISCRETION OF THE DESIGN ENGINEER AND/OR CONTRACTOR FOR EASE OF INSTALLATION AS LONG AS ALL OTHER DESIGN CRITERIA IS MET.
7. ALL PIPES 36" AND LARGER SHALL REQUIRE 4 SUPPORTS.

Carrier Pipe Nominal Diameter (inches)	Casing Minimum Inside Diameter (inches)	Casing Nominal Wall Thickness (inches)
6	14	0.375
8	16	0.375
10	18	0.375
12	20	0.375
14	24	0.375
16	30	0.500
18	30	0.500
20	36	0.500
24	36	0.625
30	42	0.625
36	48	0.750
42	54	0.875



TOWN OF APEX
STANDARDS

EFFECTIVE: MARCH 23, 2021

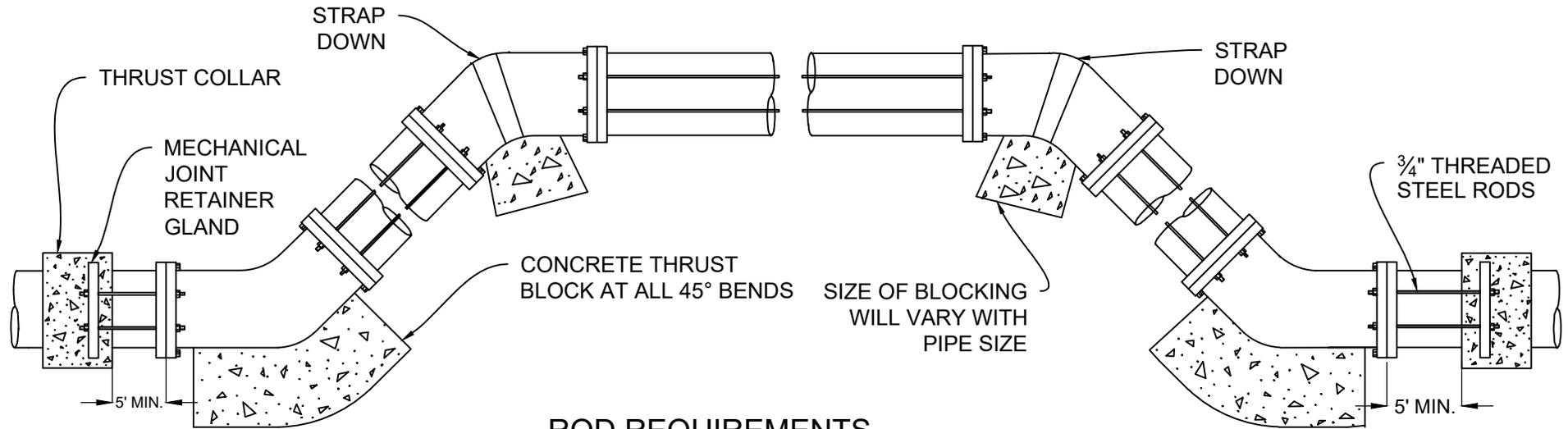
HDD TRANSITION FITTING

STD. NO.

450.07

SHEET 1 OF 1

TOP OF GROUND



ROD REQUIREMENTS

SIZE OF 45 BEND	STATIC THRUST IN POUNDS	NO. OF RODS REQUIRED
6"	4,328	2
8"	7,694	4
10"	12,503	4
12"	17,312	4
14"	24,046	6
16"	30,779	8
18"	50,016	8
24"	69,252	8

NOTES:

1. STEEL RODS AND BOLTS SHALL BE 3/4" HOT DIPPED GALVANIZED.
2. CONCRETE SHALL NOT CONTACT BOLTS OR ENDS OF MECHANICAL JOINT BENDS.
3. RESTRAINED MECHANICAL GLANDS TO BE USED AT ALL FITTINGS.
4. MUST USE DUCTILE IRON EYE BOLTS WHERE NECESSARY.
5. 3' MINIMUM COVER MUST BE MAINTAINED ON ALL MAINS.
6. ADD MECHANICAL JOINT RETAINER GLANDS THROUGHOUT ASSEMBLY.

**TOWN OF APEX
STANDARDS**

VERTICAL BEND

STD. NO.

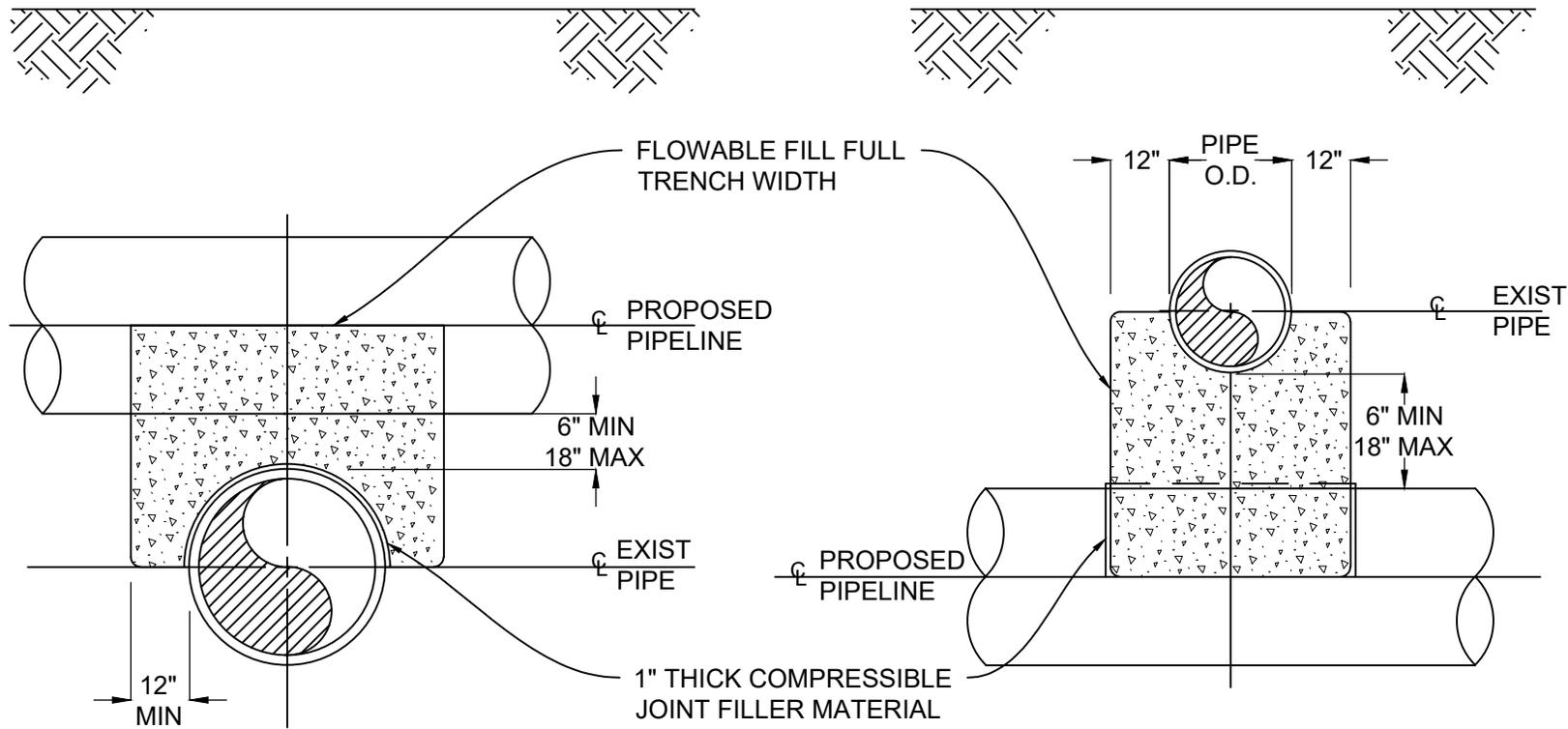
450.08

EFFECTIVE: MARCH 23, 2021

SHEET 1 OF 1

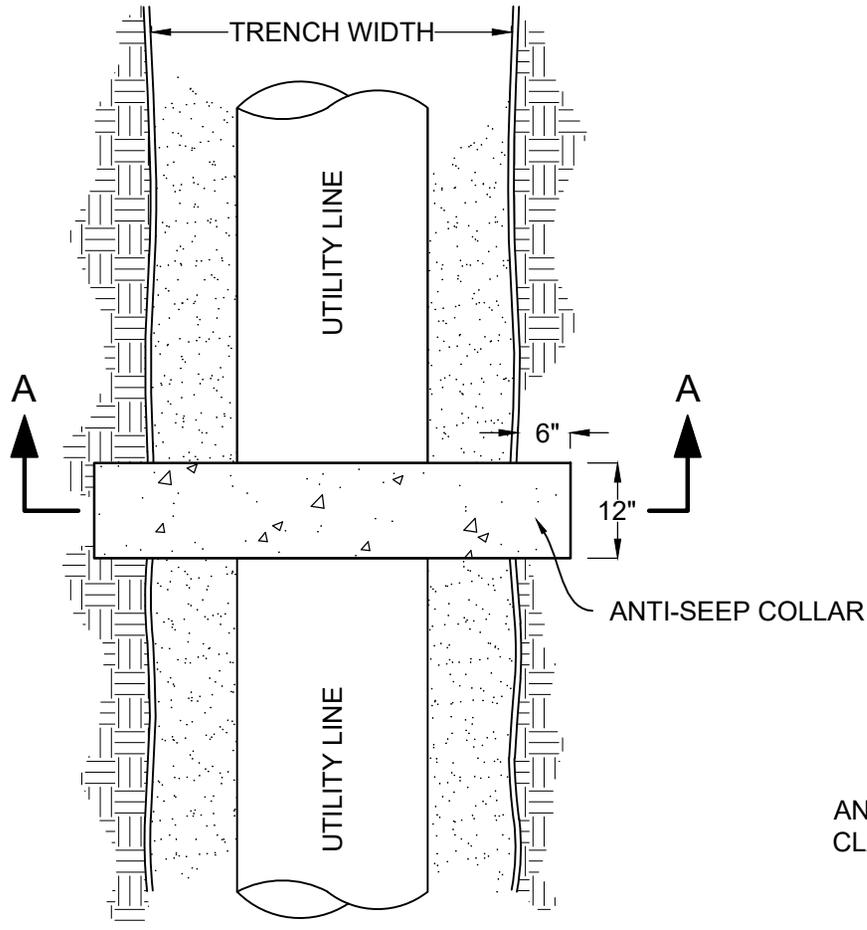
NOTES:

1. NO CONCRETE CRADLE REQUIRED FOR SEPARATION GREATER THAN 18"
2. ALL PIPE BELLS SHALL BE LOCATED OUTSIDE OF CONCRETE CRADLE.

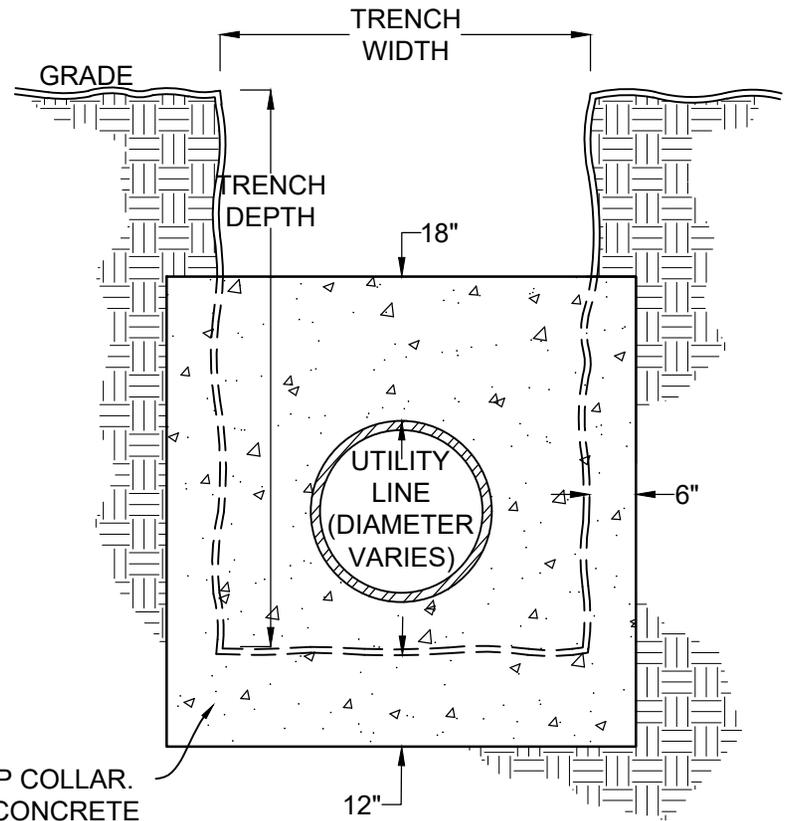


PROPOSED PIPELINE OVER EXISTING PIPE

PROPOSED PIPELINE UNDER EXISTING PIPE



PLAN VIEW



SECTION A-A

TOWN OF APEX
STANDARDS

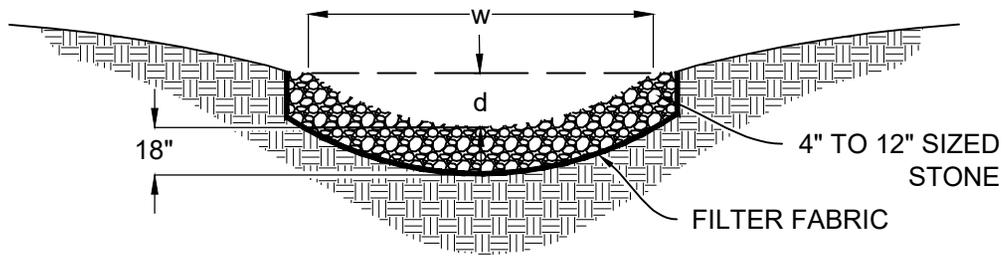
EFFECTIVE: MARCH 23, 2021

ANTI-SEEP COLLAR

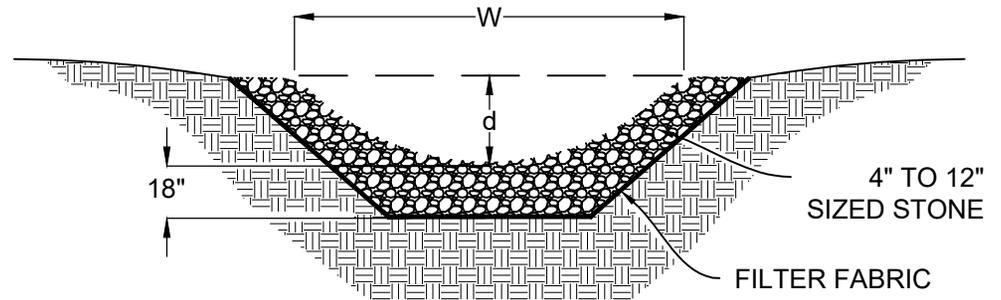
STD. NO.

450.10

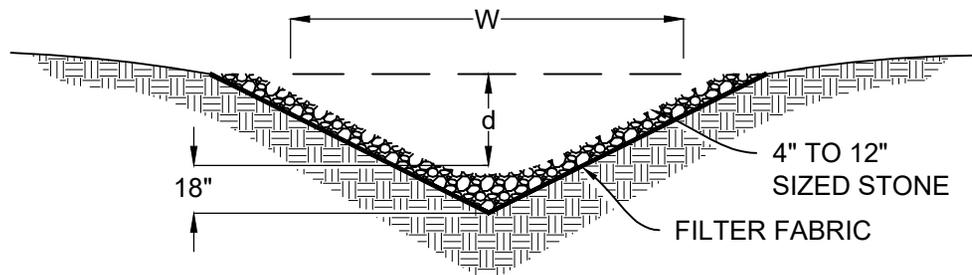
SHEET 1 OF 1



PARABOLIC-SHAPED



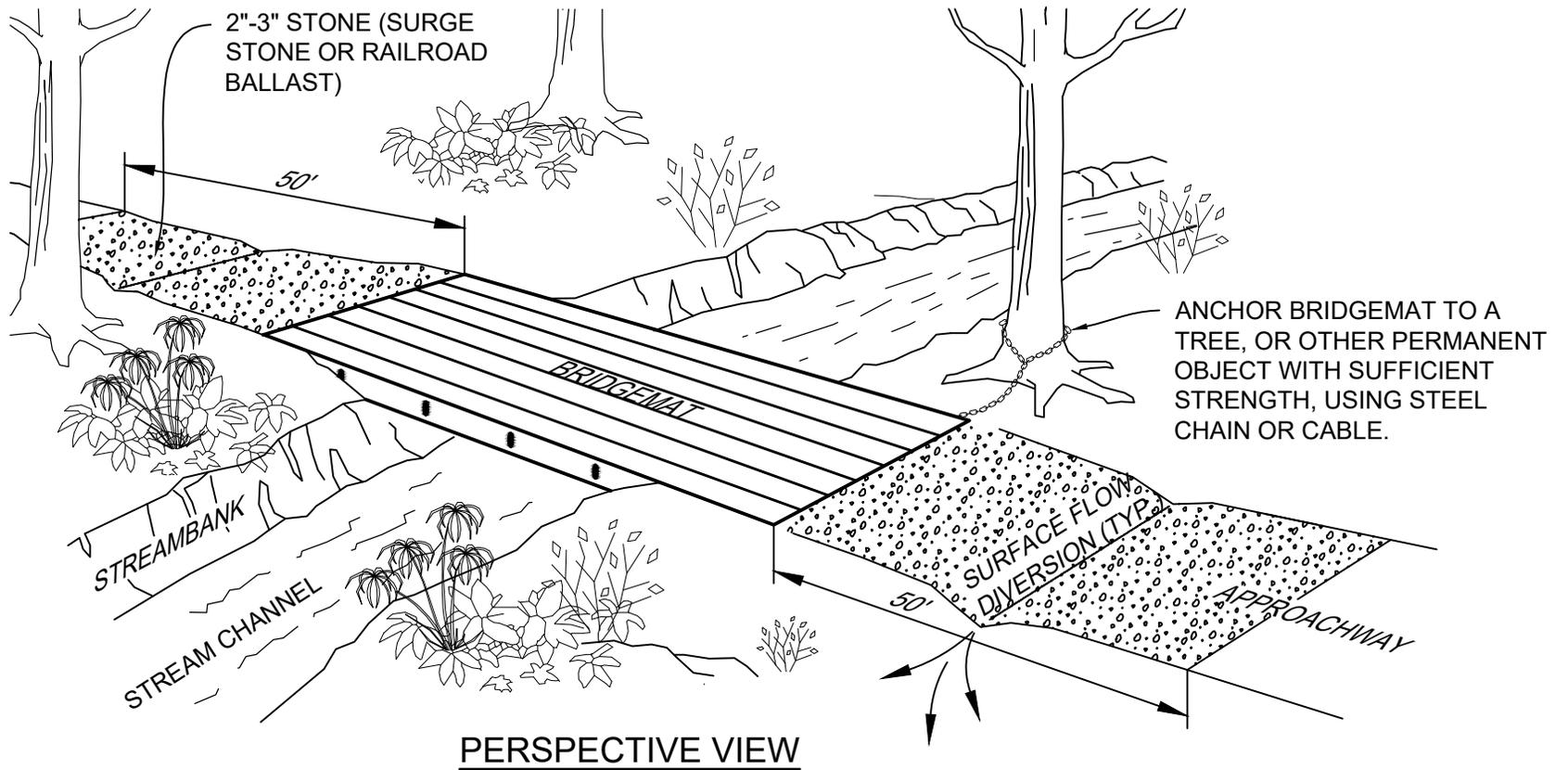
TRAPEZOIDAL
(TYPICAL RIPRAP CHANNEL)



V-SHAPED

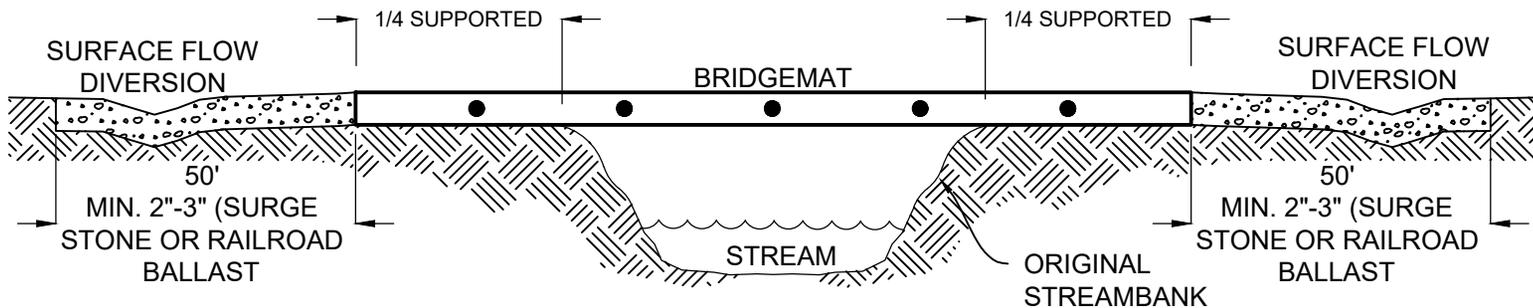
NOTES:

1. TO BE USED WHERE EXCESSIVE STORM WATER VELOCITIES PROHIBIT VEGETATIVE LININGS.
2. SIZE OF STONE MUST BE DETERMINED BY APPROPRIATE DESIGN PROCEDURE.
3. DIMENSIONS FOR d & W VARIES ACCORDING TO DESIGN.



NOT TO SCALE

SIDE VIEW



TOWN OF APEX
STANDARDS

EFFECTIVE: MARCH 23, 2021

VEHICLE CROSSING AT STREAM

STD. NO.

450.12

SHEET 1 OF 2

INSTALLATION NOTES:

1. REFER TO "NORTH CAROLINA DIVISION OF FOREST RESOURCES" LITERATURE, INSTALLATION MAINTENANCE GUIDELINES, & "NORTHCAROLINA FORESTRY BMP MANUAL-2006".
2. USE A BULLDOZER, KNUCKLEBOOM LOADER, OR SKIDDER TO INSTALL & REMOVE DRAGLINE MATS.
3. KEEP HEAVY EQUIPMENT OUT OF STREAM.
4. INSTALL WATER DIVERSION DEVICES (WATER BARS, TURNOUTS, BROAD-BASED DIPS, ETC.) ON BOTH SIDES OF THE MATS.
5. STABILIZE EXPOSED MINERAL SOIL WITH TREE TOPS OR BRUSH DURING MAT INSTALLATION, AND SEEDING/MULCH AFTER MAT REMOVAL.
6. INSTALL MATS TO CREATE A MINIMUM TEN FOOT BRIDGE WIDTH.
7. MATS SHALL BE INSTALLED SUCH THAT THERE ARE NO GAPS BETWEEN THE MATS AND NO GAPS BETWEEN THE END OF THE MATS AND STONE APPROACHES.

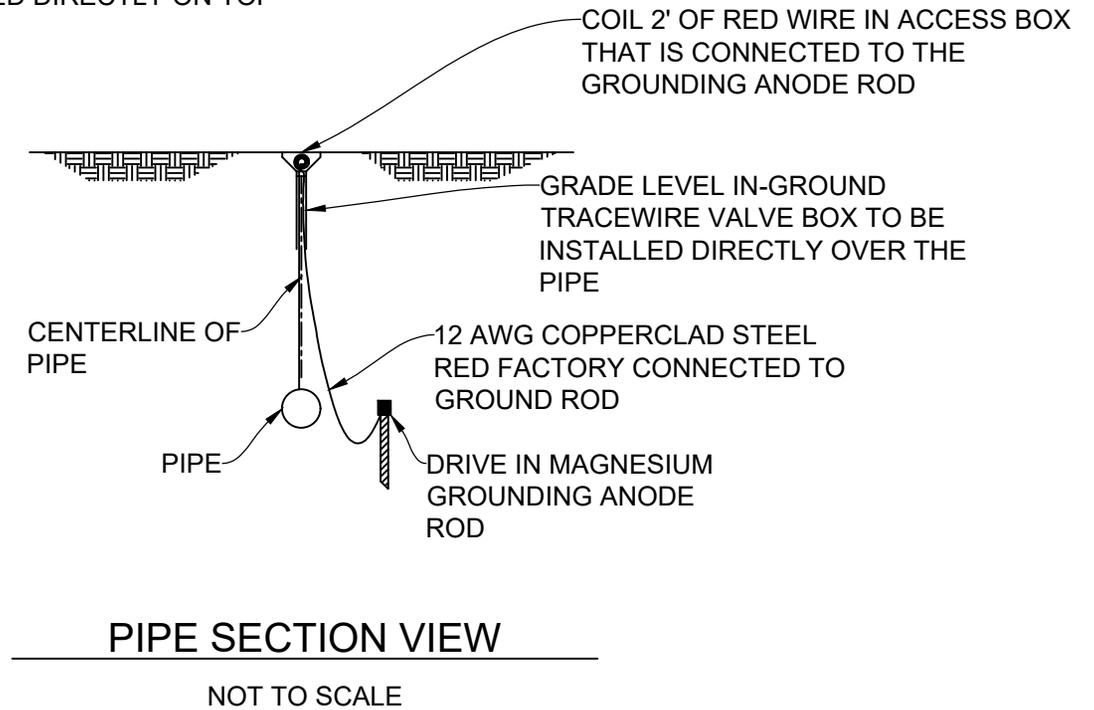
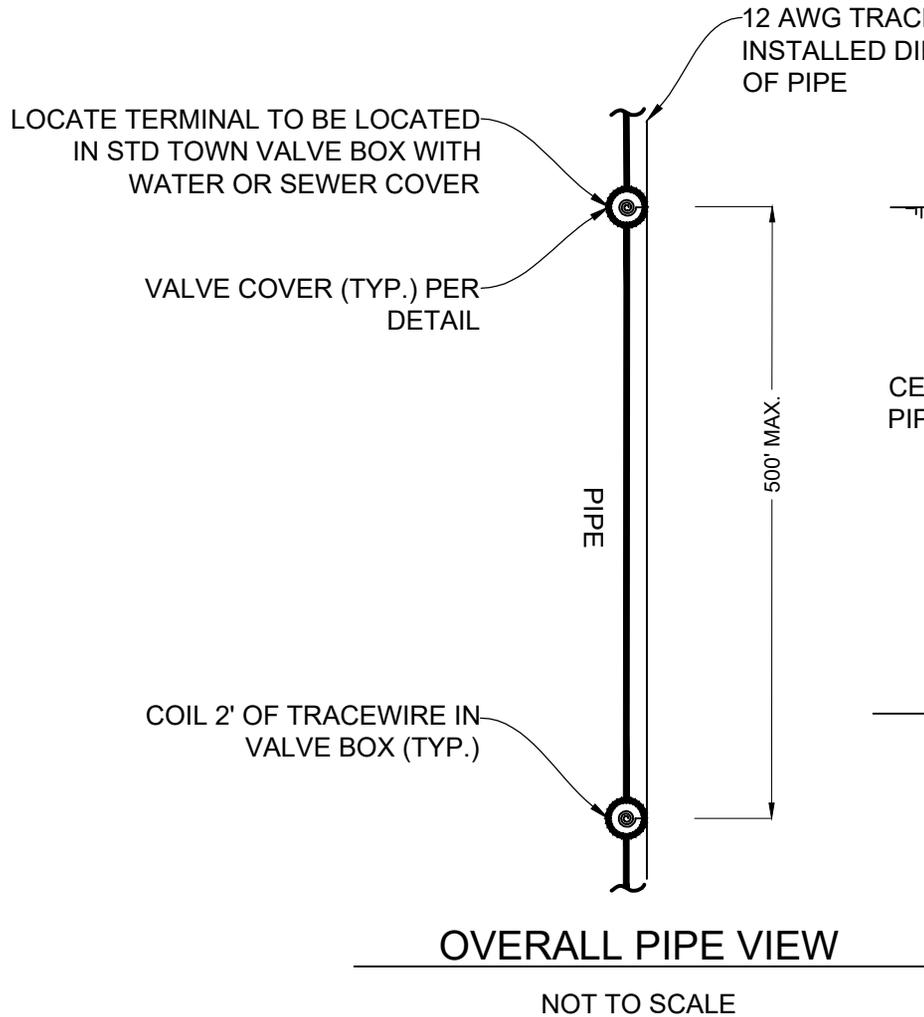
MAINTENANCE NOTES:

1. KEEP MATS' SURFACE FREE OF MINERAL SOIL AND DEBRIS THAT COULD ENTER STREAM.
2. PERIODICALLY CHECK MAT HARDWARE; RETIGHTEN NUTS & CABLE CLAMPS AS NECESSARY TO MAINTAIN BRIDGE STRENGTH AND INTEGRITY.
3. IMMEDIATELY REMOVE ANY DEBRIS WHICH ENTERS THE STREAM AT THE CROSSING LOCATION.

REMOVAL NOTES:

1. CLEAN OFF BRIDGE SURFACE.
2. REMOVE MATS BY USING MAT CABLE LOOP OR SKIDDER GRAPPLE.
3. PERMANENTLY STABILIZE DISTURBED PORTIONS OF STREAM BANK AND APPROACH ROADS WITH PERENNIAL GRASSES/MULCH (OR WETLAND MIX WHEN APPLICABLE).
4. LEAVE APPROPRIATE WATER DIVERSION STRUCTURES IN PLACE ON BOTH SIDES OF STREAM.

TOWN OF APEX STANDARDS	VEHICLE CROSSING AT STREAM	STD. NO.
		450.12
EFFECTIVE: MARCH 23, 2021		SHEET 2 OF 2



NOTE:

1. TRACER WIRE AND ACCESSORIES SHALL BE BLUE FOR WATER INSTALLATIONS AND GREEN FOR WASTEWATER INSTALLATIONS.
2. TEST STATIONS SHALL BE 2.5" DIAMETER WITH 2 TERMINALS, GREEN OR BLUE TOP AND BE EQUIVALENT TO BINGHAM AND TAYLOR MODEL P-225SR OR COPPERHEAD MODEL LD12TP AND SHALL BE INSTALLED IN A TOWN STANDARD VALVE BOX PER STANDARD DETAIL.