

CITY OF KINGS MOUNTAIN

WATER RESOURCES

STANDARD DETAILS INDEX



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Std Detail #	Detail Title	Detail Sub-Title	Last Updated
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1. SEWER AND WATER SYSTEMS ARE TO BE CONSTRUCTED IN GENERAL ACCORDANCE WITH ALL CITY OF KINGS MOUNTAIN AND NCDEQ REGULATIONS, REFERENCE SEWER AND WATER STANDARDS AND PROJECT SPECIFICATIONS.
2. SEWER AND WATER CONSTRUCTION ON THIS SITE IS AUTHORIZED BY PERMITS ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY (NCDEQ). THE WORK IS SUBJECT TO INSPECTION AT ALL TIMES BY REPRESENTATIVES OF NCDEQ, THE CITY, AND THE ENGINEER OF RECORD. THE PERMITS REQUIRE CERTIFICATION OF COMPLETION BY THE ENGINEER OF THE WATER AND SEWER SYSTEMS PRIOR TO THE ISSUANCE OF FINAL OPERATIONAL APPROVAL BY NCDEQ.
3. CONTRACTOR SHALL VERIFY THE ACTUAL LOCATION AND ELEVATION FOR ALL UTILITIES, DRAINAGE, AND OTHER UNDERGROUND FACILITIES, AND SHALL NOTIFY THE ENGINEER OF RECORD OF ANY DISCREPANCY OR CONFLICTS PRIOR TO CONSTRUCTION.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF LOCATING AND MARKING ALL EXISTING UNDERGROUND UTILITIES.
5. CONTRACTOR SHALL SUBMIT AT LEAST THREE (3) COPIES OF SHOP DRAWINGS FOR ALL MATERIALS TO THE CITY OF KINGS MOUNTAIN AND THEIR ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION.
6. CONTRACTOR SHALL CONDUCT A PRE-CONSTRUCTION CONFERENCE ON SITE WITH THE ENGINEER OF RECORD, CITY, AND OTHER INTERESTED PARTIES PRIOR TO CONSTRUCTION.
7. CONNECTION TO ANY EXISTING LINES SHALL BE BY THE CONTRACTOR IN THE PRESENCE OF CITY INSPECTION PERSONNEL. PLUG NEW CONNECTION UNTIL CONSTRUCTION AND TESTING HAS BEEN COMPLETED, INSPECTED BY THE ENGINEER OF RECORD AND THE CITY, AND FINAL CONNECTION IS AUTHORIZED.
8. MAINTAIN 18 INCH VERTICAL SEPARATION BETWEEN STORM AND SANITARY SEWER / WATER MAIN OR INSTALL DUCTILE IRON PIPE ON SANITARY SEWER / WATER MAIN WITHIN 10 FEET EACH SIDE OF CROSSING.
9. UTILITY SERVICES SHALL NOT BE LOCATED UNDER DRIVEWAYS.
10. THE CITY OF KINGS MOUNTAIN SHALL OWN AND MAINTAIN THE PROPOSED WATER AND SANITARY SEWER LINE UPON COMPLETION, INSPECTION, APPROVAL, AND ACCEPTANCE.
11. THE PROPOSED WATER AND SEWER LINES BEYOND THE METER AND/OR MAIN LINE CONNECTION POINTS WILL NOT BE OWNED, OPERATED, OR MAINTAINED BY THE CITY OF KINGS MOUNTAIN.
12. WATER MAINS, WITHIN OR PARALLEL TO ROAD RIGHTS OF WAY, MUST HAVE A MINIMUM OF 36" COVER MEASURED FROM THE ROAD EDGE OF PAVEMENT ELEVATION.
13. PRIOR TO BEGINNING CONSTRUCTION OF ANY WATER AND SEWER INFRASTRUCTURE, COPIES OF THE NCDEQ PERMITS TO CONSTRUCT MUST BE PROVIDED TO THE CITY OF KINGS MOUNTAIN.
14. ALL UNDERGROUND PIPING TO HAVE A 14 GAUGE INSULATED SOLID COPPER WIRE INSTALLED PER CITY SPECIFICATIONS TO AID IN LOCATING THE PIPE FOR MAINTENANCE PURPOSES.
15. ALL SERVICE LINES REQUIRE INDIVIDUAL CONNECTIONS TO THE MAIN. MULTIPLE SERVICE LINES INTERCONNECTING WILL NOT BE ALLOWED.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**WATER / SEWER
GENERAL NOTES**

STD. NO		DATE
1.01		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

1. FIRE HYDRANTS SHALL BE CITY OF KINGS MOUNTAIN STANDARD.
2. ALL WATER MAIN VALVES MUST OPEN COUNTERCLOCKWISE IN CONFORMANCE WITH CITY OF KINGS MOUNTAIN STANDARDS.
3. BLOCKING SHALL BE INSTALLED AT ALL BENDS, TEES, VALVES, REDUCERS, BLOW-OFFS, AND HYDRANT LOCATIONS, UNLESS ALTERNATIVES ARE SHOWN ON DETAILS.
4. WATER MAINS LESS THAN 4 INCH IN DIAMETER SHALL BE PVC ASTM D2241 SDR 13.5, CLASS 315 . ALL MAINS 4 INCH TO 12 INCH SHALL BE AWWA C-900, PRESSURE CLASS 200 PVC SDR14. FITTINGS 4 INCH AND LARGER SHALL BE MECHANICAL JOINT CAST IRON. FITTINGS LESS THAN 4 INCH SHALL BE SLIP JOINT PVC PER SPECIFICATIONS. PVC PIPING SHALL BE INSTALLED WITH APPROVED COPPER LOCATING WIRE.
5. ASBESTOS CEMENT PIPE SHALL NOT BE USED IN POTABLE WATER SYSTEMS EXCEPT IN THE REPAIR OF EXISTING ASBESTOS CEMENT LINES.
6. DIP SHALL BE IN ACCORDANCE WITH AWWA C150/ A21 .50 & AWWA C151/ A21 .51.
7. NO FLUSHING DEVICE SHALL BE DIRECTLY CONNECTED TO ANY SEWER SYSTEM.
8. CHAMBERS, PITS OR MANHOLES CONTAINING VALVES, BLOW-OFFS, METERS , AIR RELIEF VALVES, OR OTHER SUCH APPURTENANCES TO A DISTRIBUTION SYSTEM, SHALL NOT BE CONNECTED DIRECTLY TO ANY STORM DRAIN OR SANITARY SEWER.
9. INSTALLATION OF WATER MAINS AND APPURTENANCES SHALL BE CONDUCTED IN ACCORDANCE SECTION C OF THE AWWA STANDARDS AND/OR MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES.
10. A CONTINUOUS AND UNIFORM BEDDING SHALL BE PROVIDED IN THE TRENCH FOR ALL BURIED PIPE. BACK-FILL MATERIAL SHALL BE TAMPED IN LAYERS AROUND THE PIPE AND TO A SUFFICIENT HEIGHT ABOVE THE PIPE TO ADEQUATELY SUPPORT AND PROTECT THE PIPE. STONES, OTHER THAN CRUSHED BEDDING, SHALL NOT COME INTO CONTACT WITH THE PIPE AND SHALL NOT BE WITHIN SIX (6) INCHES OF THE PIPE.
11. ALL WATER MAINS SHALL MEET THE CITY OF KINGS MOUNTAIN WATER SPECIFICATIONS FOR PIPE TRACING WIRE.
12. VALVES CANNOT BE LOCATED IN SIDEWALKS , CURBING, DRIVEWAYS , OR ASPHALT AREAS UNLESS APPROVED BY THE CITY.
13. REFER TO CITY OF KINGS MOUNTAIN STANDARD SPECIFICATIONS AND DETAILS REGARDING SERVICE LINE PIPE MATERIAL.
14. ALL SERVICE LINES REQUIRE INDIVIDUAL CONNECTIONS TO THE MAIN . MULTIPLE SERVICE LINES INTERCONNECTING WILL NOT BE ALLOWED.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**WATER
NOTES**

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NO	DATE	DESCRIPTION

1. SEWER FORCE MAINS LESS THAN 4 INCH IN DIAMETER SHALL BE PVC ASTM-D2241 SDR13.5 CLASS 315 . ALL MAINS 4 INCH TO 12 INCH SHALL BE AWWA C-900, PRESSURE CLASS 200 PVC SDR14. FITTINGS 4 INCHES AND LARGER SHALL BE MECHANICAL JOINT CAST IRON. FITTINGS LESS THAN 4 INCH SHALL BE SLIP JOINT PVC PER SPECIFICATIONS. PVC PIPING SHALL BE INSTALLED WITH APPROVED COPPER LOCATING WIRE.
2. SANITARY SEWER MAINS SHALL BE PVC (ASTM D3034-SDR 35) WITH STONE BEDDING EXCEPT WHERE DUCTILE IRON PIPE OR LONG SPAN STEEL PIPE IS SHOWN. DUCTILE IRON PIPE SHALL BE BITUMINOUS COATED, CEMENT LINED WITH PUSH-ON JOINTS CONFORMING TO ASA A21.54 PC350 . TRANSITIONAL COUPLINGS SHALL BE USED FOR PVC/DI SEWER CONNECTIONS. SEWER SERVICES SHALL BE SCHEDULE 40 PVC. LONG SPAN STEEL PIPE SHALL BE COATED ON BOTH SIDES ON BOTH SIDES WITH 4 MILS EPOXY. ANY SEWER LINE PLACED 16 FEET OR GREATER IN DEPTH SHALL BE DUCTILE IRON PIPE.
3. ALL SEWER MANHOLES SHALL BE PRE-CAST CONCRETE WITH INTEGRALLY CAST WATERTIGHT CONNECTIONS.
4. SANITARY SEWER LATERALS SHALL BE 4 INCH DIAMETER EXCEPT AS SPECIFICALLY NOTED.
5. CONTRACTOR SHALL STABILIZE ALL OUT OF STREET GRAVITY SEWER RIGHTS OF WAY WITH GRASS.
6. DIP SHALL BE IN ACCORDANCE WITH AWWA C150/ A21 .50 & AWWA C151/A21.51.
7. A CONTINUOUS AND UNIFORM BEDDING SHALL BE PROVIDED IN THE TRENCH FOR ALL BURIED PIPE. BACK-FILL MATERIAL SHALL BE TAMPED IN LAYERS AROUND THE PIPE AND TO A SUFFICIENT HEIGHT ABOVE THE PIPE TO ADEQUATELY SUPPORT AND PROTECT THE PIPE. STONES , OTHER THAN CRUSHED BEDDING, SHALL NOT COME INTO CONTACT WITH THE PIPE AND SHALL NOT BE WITHIN SIX (6) INCHES OF THE PIPE.
8. ALL OFF-SITE SEWER MANHOLES MUST BE A MINIMUM OF TWO (2) FEET ABOVE FINISHED GRADE OR THE 100 YEAR FLOOD PLAIN ELEVATION. ALL MANHOLE TOPS ARE TO BE BOLTED DOWN TO THE PRE-CAST HOUSINGS.
9. MANHOLES MUST NOT BE PLACED WITHIN THE WHEEL-PATHS OF ANY ROADWAY TRAVELING LANES.
10. SEWER SERVICE LATERALS CONNECTING TO THE MAINLINE WITHIN 10' OF A MANHOLE MUST GO DIRECTLY INTO THE MANHOLE.
11. ALL SERVICE LINES REQUIRE INDIVIDUAL CONNECTIONS TO THE MAIN . MULTIPLE SERVICE LINES INTERCONNECTING WILL NOT BE ALLOWED.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**SEWER
NOTES**

STD. NO		DATE
1.03		1/1/2021
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NO	DATE	DESCRIPTION

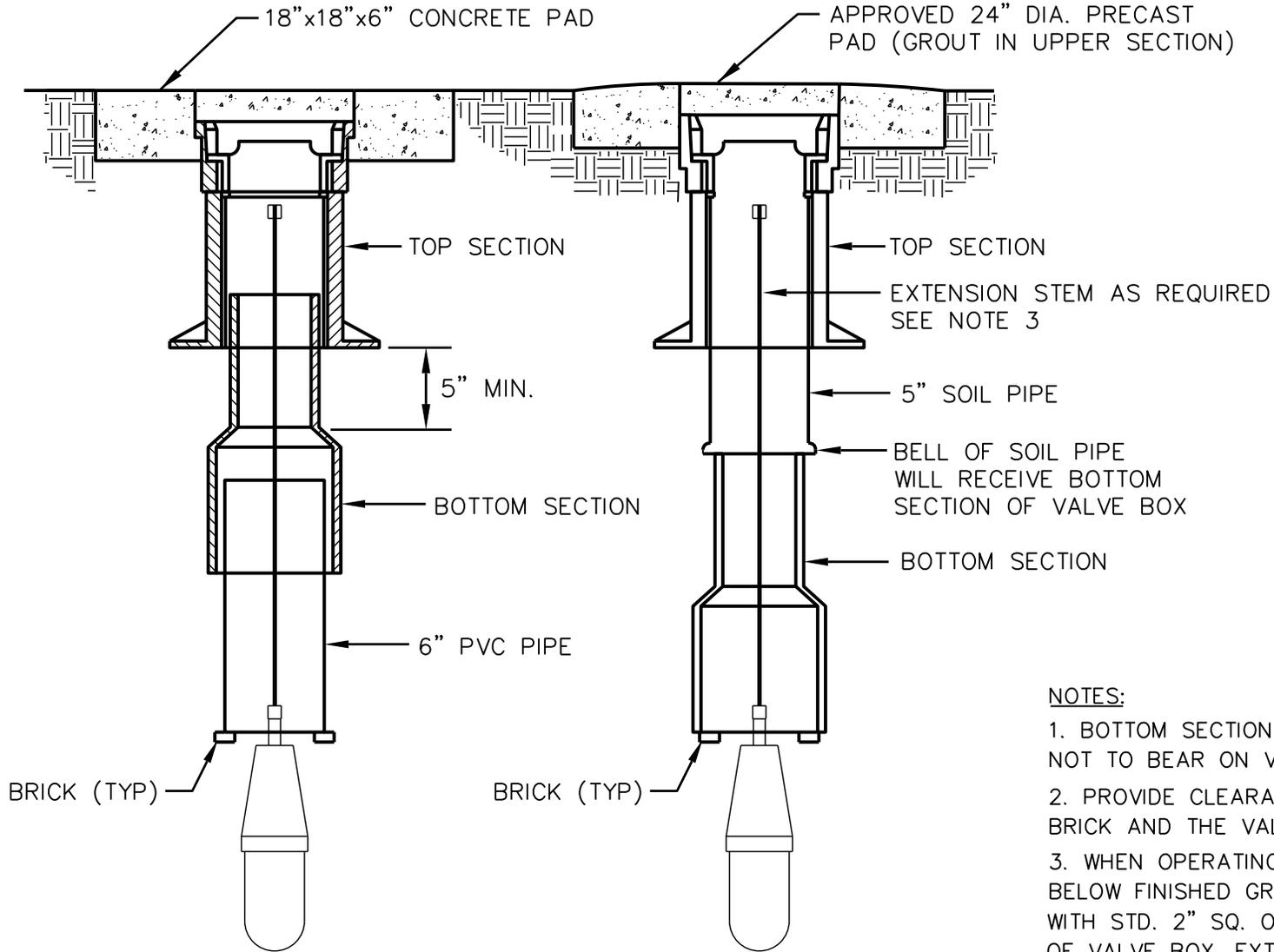
1. NOTIFY THE ENGINEER OF RECORD AND THE CITY OF KINGS MOUNTAIN AT LEAST 48 HOURS BEFORE STARTING CONSTRUCTION OF SEWER AND WATER FACILITIES. THE ENGINEER SHALL PERIODICALLY INSPECT THE PROGRESS OF INSTALLATION AND SHALL COMPLETE A FINAL WATER AND SEWER INSPECTION. THE ENGINEER OF RECORD AND THE CITY SHALL WITNESS PRESSURE TESTING OF THE WATER SYSTEM, AND AIR AND MANDREL TESTING OF THE SEWER SYSTEM. THE CONTRACTOR SHALL FURNISH, SECURE, AND PROVIDE ALL NECESSARY TESTING MATERIALS, EQUIPMENT, PROCEDURES AND CERTIFIED LABORATORY TEST RESULTS FOR USE WITH ENGINEERS FINAL CERTIFICATION OF COMPLETION.
2. WATER MAINS AND SEWER FORCE MAINS MUST BE HYDROSTATICALLY TESTED PER THE CITY OF KINGS MOUNTAIN SPECIFICATIONS AND UNDER THE SUPERVISION OF A CITY INSPECTOR AND THE ENGINEER OF RECORD.
3. DISINFECT WATER LINES AND PROVIDE ACCEPTABLE BACTERIOLOGICAL TEST FROM A CERTIFIED TESTING LABORATORY FOR USE WITH THE ENGINEERS CERTIFICATION OF COMPLETION. A MINIMUM OF TWO (2) SAMPLES, COLLECTED AT LEAST TWENTY-FOUR (24) HOURS APART, ARE TO BE TAKEN FROM EACH SAMPLING SITE FOR TOTAL COLIFORM ANALYSIS AND TOTAL CHLORINE RESIDUAL. THE NUMBER OF TEST SITES MUST INCLUDE ALL DEAD-END LINES AND SHALL BE COLLECTED A MINIMUM OF EVERY 1,200 LINEAR FEET.
4. SECURE FINAL OPERATIONAL APPROVAL FROM THE CITY OF KINGS MOUNTAIN AND NCDEQ PRIOR TO ACTIVATION OF THE SYSTEM.
5. TEST SANITARY SEWER LINES FOR DEFLECTION WITH A 5 % MANDREL NOT LESS THAN 30 DAYS AFTER COMPLETION OF BACKFILL. PERFORM LOW PRESSURE AIR TESTING IN ACCORDANCE WITH ASTM C-828 AND C924 ON ALL SEWER MAINS.
6. TRENCH BACKFILL AND COMPACTION TESTING SHALL BE PERFORMED BY A CERTIFIED SOILS LABORATORY UNDER ALL AREAS WITHIN ROAD AND RAILWAY RIGHTS-OF-WAY. BACKFILL MATERIAL FROM THE BOTTOM OF TRENCH TO WITHIN SIX (6) INCHES OF THE SUBGRADE SHALL HAVE A MINIMUM DRY DENSITY OF 95% AS DEFINED BY THE STANDARD PROCTOR TEST. ALL MATERIAL WITHIN THE TOP 6 INCHES OF THE SUBGRADE LEVEL SHALL HAVE AN IN PLACE DENSITY OF 100%.
7. THE CONTRACTOR SHALL SUPPLY THE ENGINEER WITH SEWER AS-BUILTS (LOCATION, ELEVATION, LENGTH, AND SLOPE) PREPARED BY A REGISTERED LAND SURVEYOR AND WATER SERVICE MEASUREMENTS SUITABLE FOR PREPARATION OF FINAL AS-BUILTS.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**TESTING / INSPECTION
GENERAL NOTES**

STD. NO		DATE
1.04		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



EXTENSION USING PVC (C-900) PIPE

EXTENSION USING SOIL PIPE

NOTES:

1. BOTTOM SECTION TO BE CENTERED OVER NUT, NOT TO BEAR ON VALVE BODY.
2. PROVIDE CLEARANCE BETWEEN VALVE BOX/ BRICK AND THE VALVE.
3. WHEN OPERATING NUT DEPTH EXCEEDS 4'-0" BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STD. 2" SQ. OPERATING NUT IN TOP SECTION OF VALVE BOX. EXTENSION STEM SHALL BE SIZED AS RECOMMENDED BY THE VALVE MANUFACTURER.



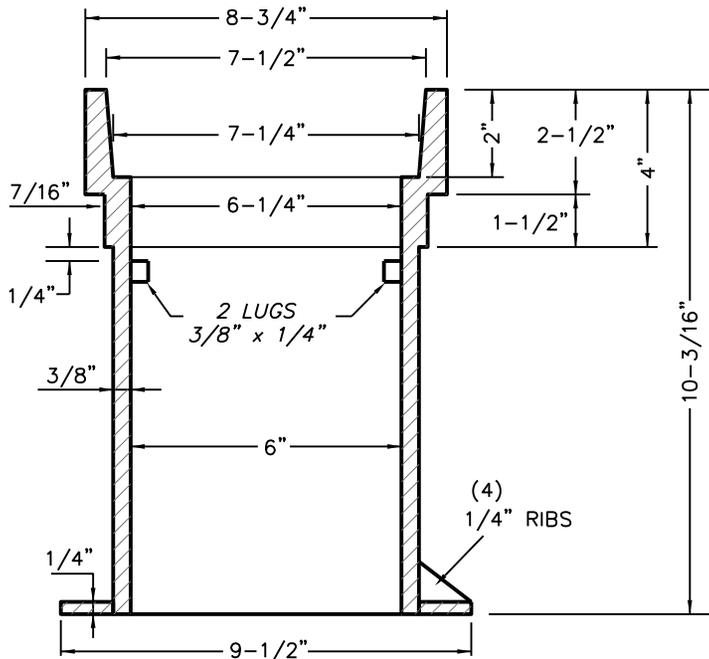
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

WATER VALVE BOX INSTALLATION DETAIL

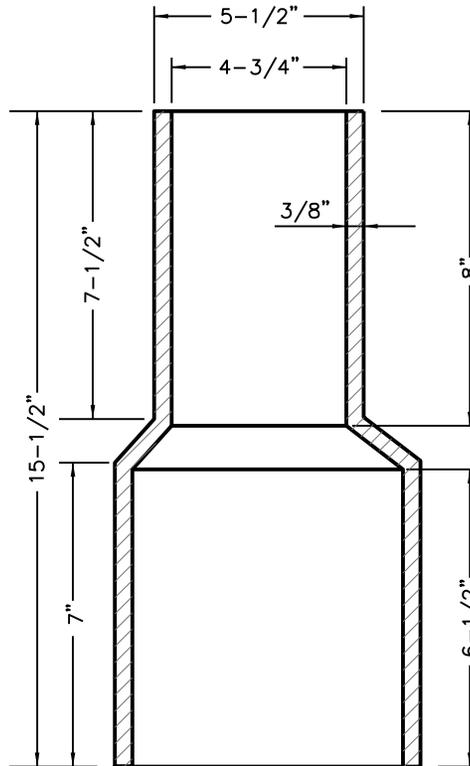
STD. NO		DATE
2.01		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

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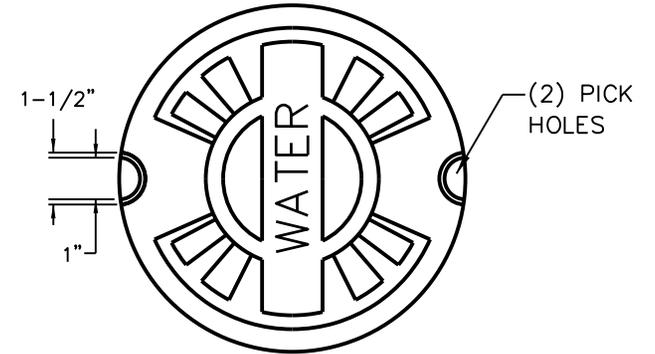
1. VALVE BOXES SHALL BE CAST IRON, SCREW TYPE WITH 5-1/4" SHAFT.
2. THE BOXES SHALL BE ADJUSTABLE TO FIT THE DEPTH OF EARTH COVER OVER THE VALVE.
3. VALVE BOXES SHALL HAVE "WATER" CLEARLY MARKED ON TOP COVER.
4. ALL VALVE BOXES SHALL HAVE A 27" DIA, 3,000 PSI CONCRETE PROTECTOR.



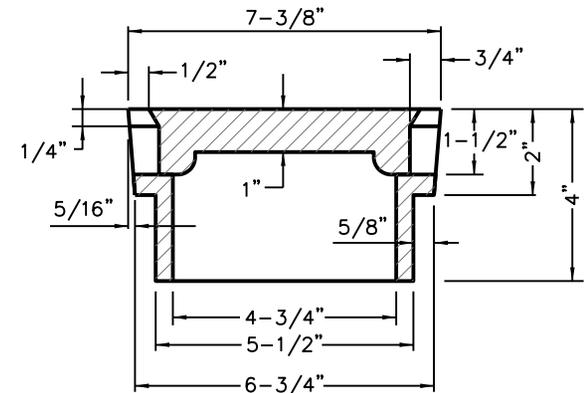
VALVE BOX - TOP SECTION
N.T.S.



VALVE BOX - BOTTOM SECTION
N.T.S.



COVER - TOP VIEW
N.T.S.



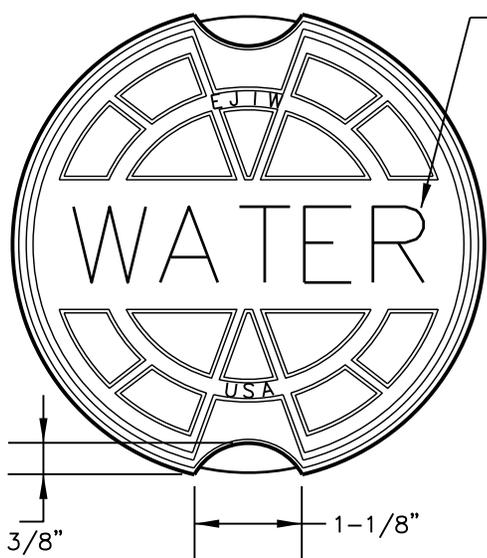
COVER - SECTION VIEW
N.T.S.



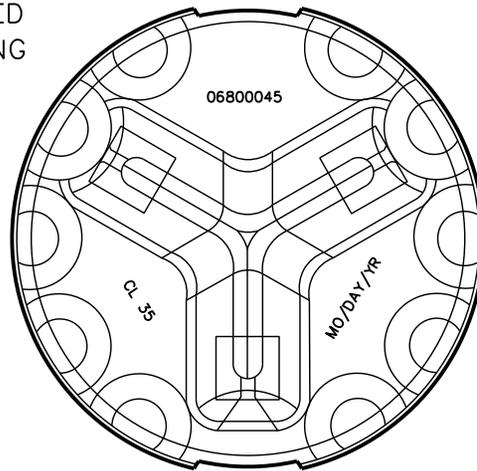
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**WATER VALVE BOX
STANDARD DETAIL**

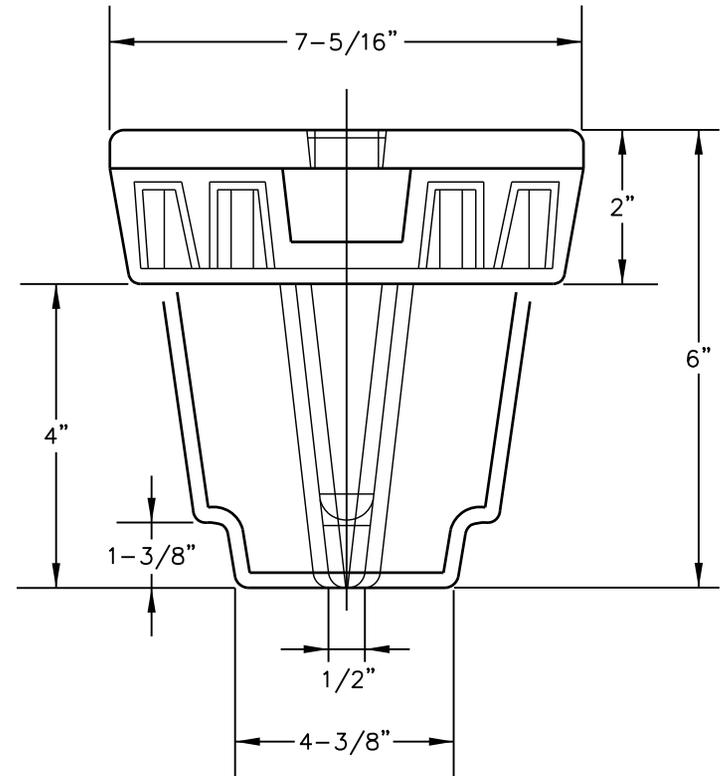
STD. NO		DATE
2.02		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



PLAN VIEW
N.T.S.



BOTTOM VIEW
N.T.S.



SIDE VIEW
N.T.S.

NOTES

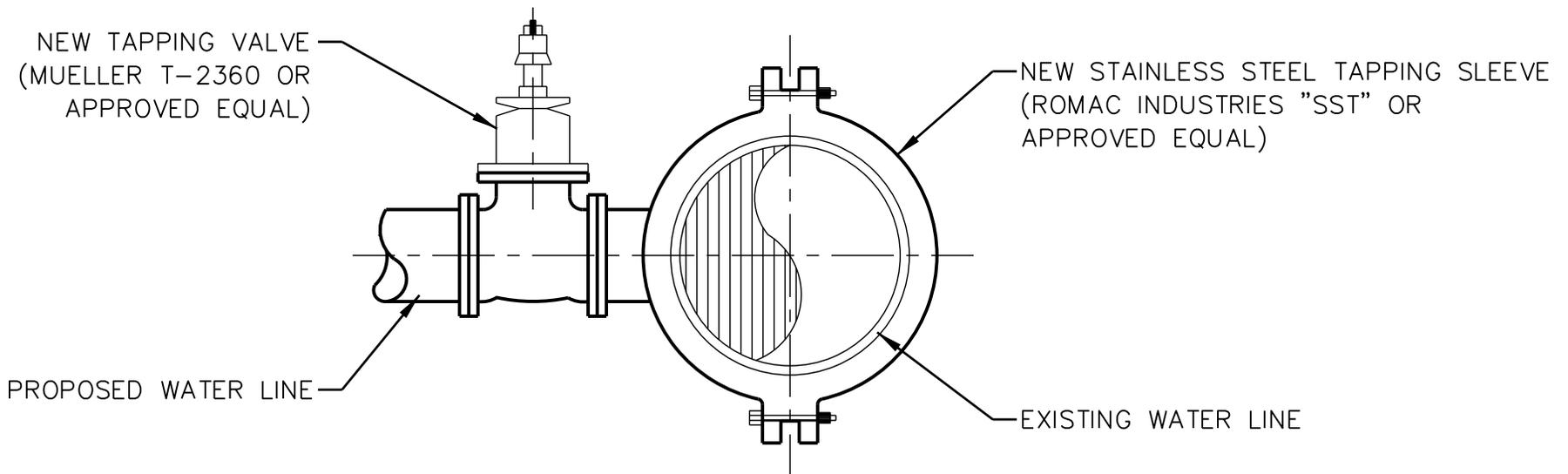
1. 5-1/4" DROP LID WITH 4" SKIRT
2. HEAVY-DUTY RATING ASTM A48 CL35



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**WATER VALVE
HEAVY DUTY LID**

STD. NO		DATE
2.03		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



NOTES

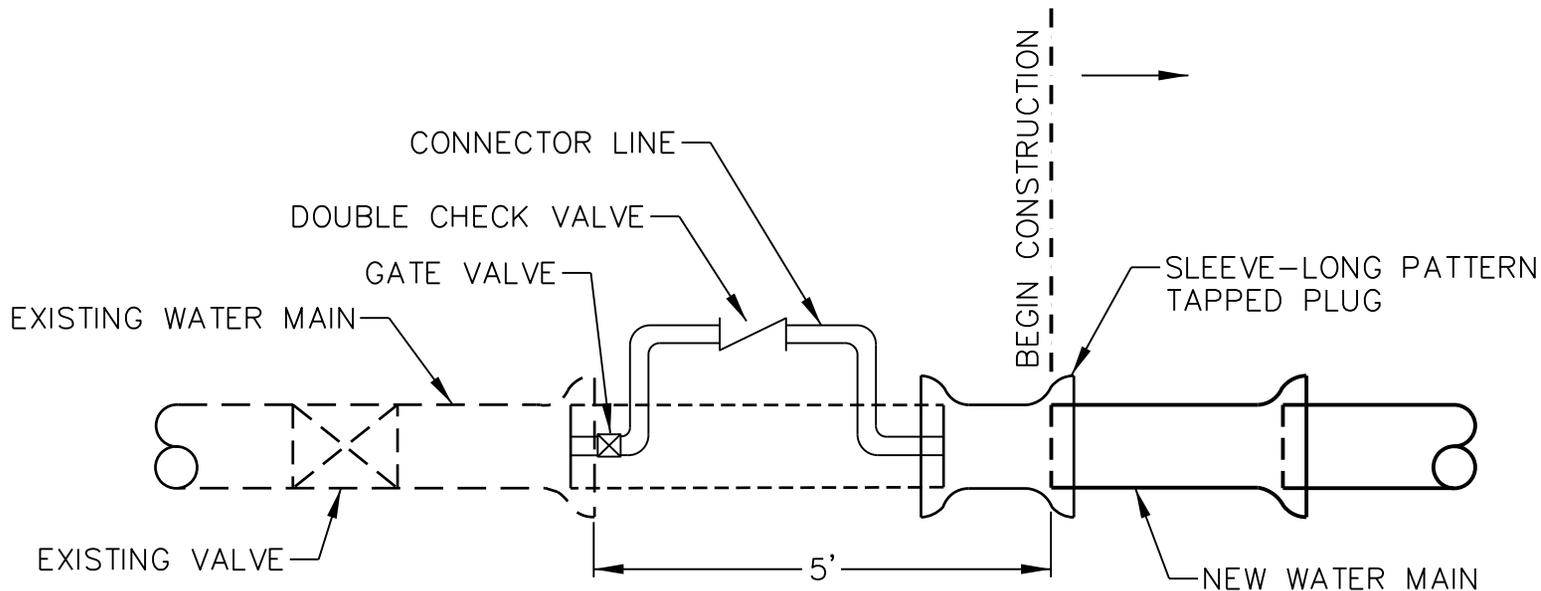
1. ALL BOLTS ARE TO BE STAINLESS STEEL.
2. INSTALLATION IS TO INCLUDE TEST PLUG. PRIOR TO TAPPING THE LINE CONTRACTOR MUST PROVIDE A HYDROSTATIC TEST ON THE SLEEVE PER CITY OF KINGS MOUNTAIN SPECIFICATIONS.
3. SIZE ON SIZE TAPS FOR ABESTOS CEMENT ARE TO BE MUELLER H619 MJ TAPPING SLEEVES OR APPROVED EQUAL.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**WATER TAPPING
SLEEVE & VALVE
STANDARD DETAIL**

STD. NO		DATE
2.07		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



PLAN VIEW
N.T.S.

NOTES:

1. INSTALL CONNECTOR LINE FROM EXISTING BLOW-OFF ASSEMBLY TO NEW MAIN FOR FILLING, TESTING AND STERILIZING NEW MAIN.
2. CONNECTOR LINE TO BE ASSEMBLED WITH CHECK VALVE AND TO BE OPERATED INDEPENDENT OF EXISTING MAIN.
3. BLOCKING ON EXISTING LINE NOT TO BE DISTURBED.
4. FINAL CONNECTION TO EXISTING MAIN TO BE MADE ONLY AFTER TOTAL PROJECT IS ACCEPTED BY THE CITY.
5. VALVES ON EXISTING SYSTEM TO BE OPERATED BY CITY PERSONNEL ONLY.
6. ONLY ONE CONNECTION WILL BE ALLOWED BETWEEN THE EXISTING SYSTEM AND THE NEW CONSTRUCTION UNTIL TESTING AND DISINFECTION ARE COMPLETE.



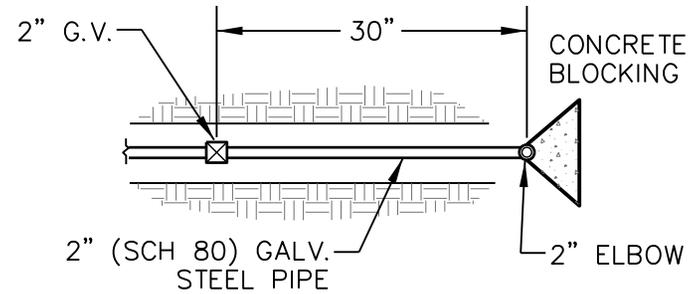
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**JUMPER CONNECTION
STANDARD DETAIL**

STD. NO		DATE
2.09		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

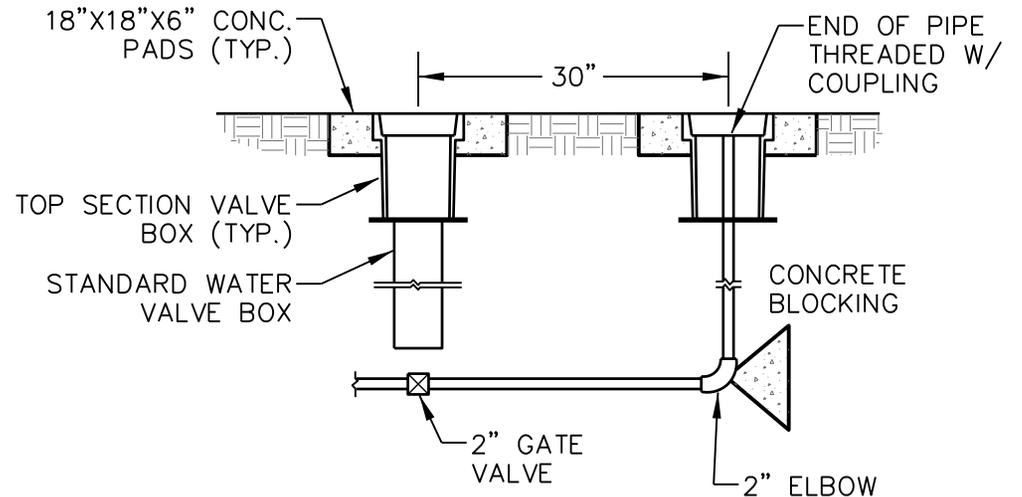
DIA. OF MAIN (IN.)	FLOW REQUIRED (GPM)	MIN. ORIFICE SIZE (IN.)	RECOMMENDED BLOW-OFF SIZE (IN.)
2	25	0.56	3/4
2 1/2	40	0.71	1
3	60	0.87	1 1/4
4	100	1.10	1 1/2

* UNDER MOST SITUATIONS, THE ABOVE TABLE CAN BE USED. BUT, IN SOME AREAS WHERE THE STATIC PRESSURES ARE EXCEEDINGLY HIGH, SMALLER BLOW-OFFS MAY BE NECESSARY.



PLAN VIEW

N.T.S.



ELEVATION VIEW

N.T.S.

NOTES:

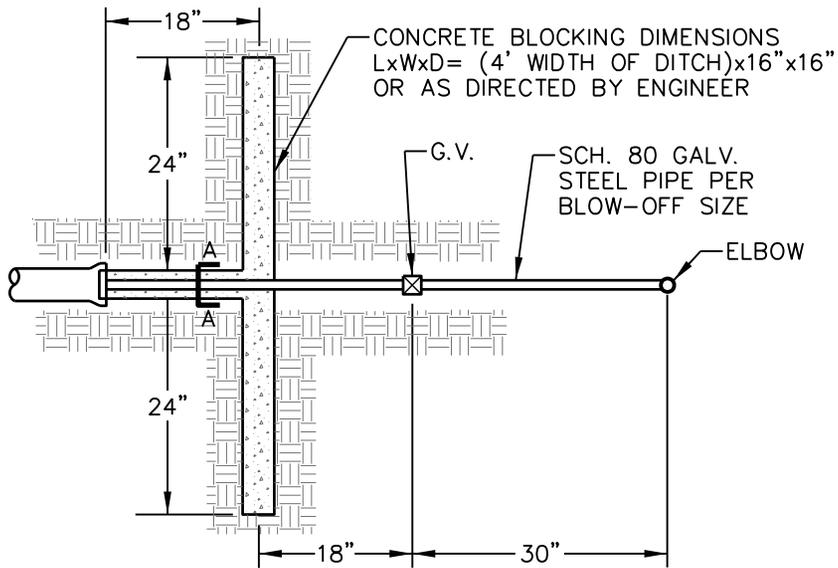
1. 24" DIAMETER X 6" THICK PRECAST CONCRETE PADS MAY BE USED IN LIEU OF 18"x18"x6" CAST IN PLACE PADS.
2. ON 2" WATER MAINS PROVIDE BLOCKING AT ELBOW IN PLACE OF BLOCKING AT PLUG.
3. SEE CHART FOR RECOMMENDED BLOW-OFF SIZE.
4. ALL FITTINGS TO BE BRASS.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

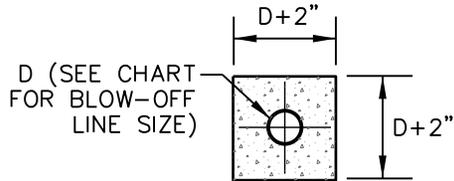
**WATER BLOW-OFF
2" & 4"**

STD. NO		DATE
2.10		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



PLAN VIEW

N.T.S.



SECTION A-A

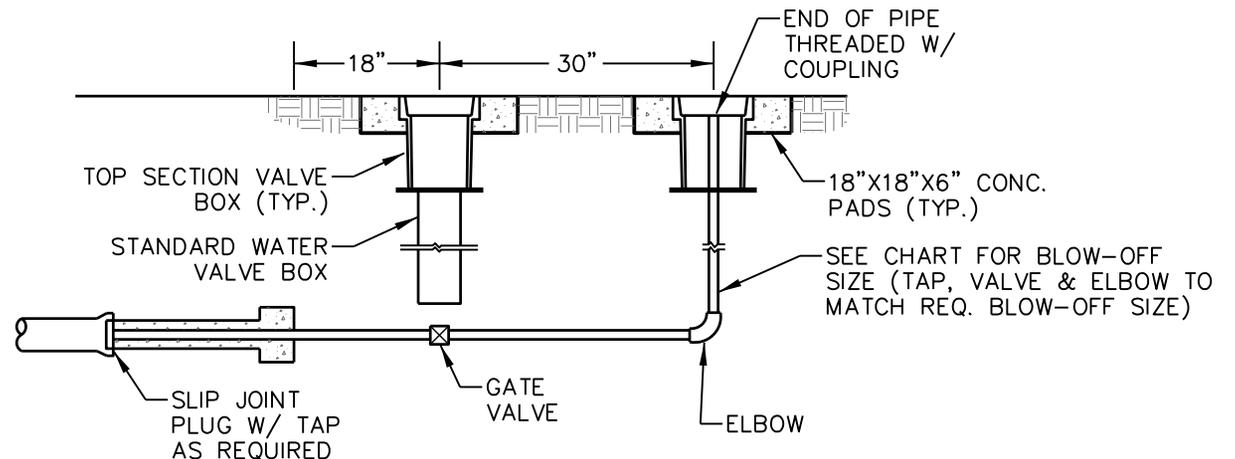
N.T.S.

NOTES:

1. 24" DIAMETER X 6" THICK PRECAST CONCRETE PADS MAY BE USED IN LIEU OF 18"x18"x6" CAST IN PLACE PADS.
2. SEE CHART FOR RECOMMENDED BLOW-OFF SIZE.
3. ALL FITTINGS TO BE BRASS.

DIA. OF MAIN (IN.)	FLOW REQUIRED (GPM)	MIN. ORIFICE SIZE (IN.)	RECOMMENDED BLOW-OFF SIZE (IN.)
6	220	1.65	2
8	390	2.21	2-1/2
10	610	-	4
12	880	-	4

* UNDER MOST SITUATIONS, THE ABOVE TABLE CAN BE USED. BUT, IN SOME AREAS WHERE THE STATIC PRESSURES ARE EXCEEDINGLY HIGH, SMALLER BLOW-OFFS MAY BE NECESSARY.



ELEVATION VIEW

N.T.S.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**WATER BLOW-OFF
6" TO 12"**

STD. NO

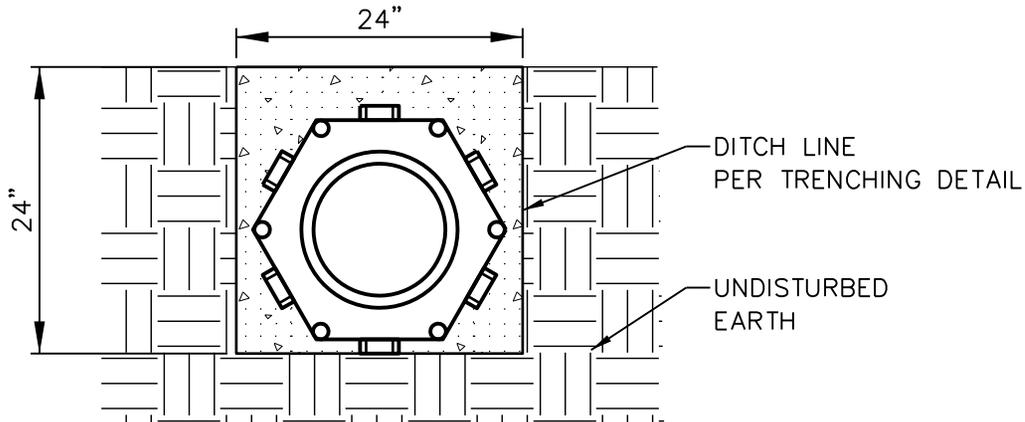
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2.11

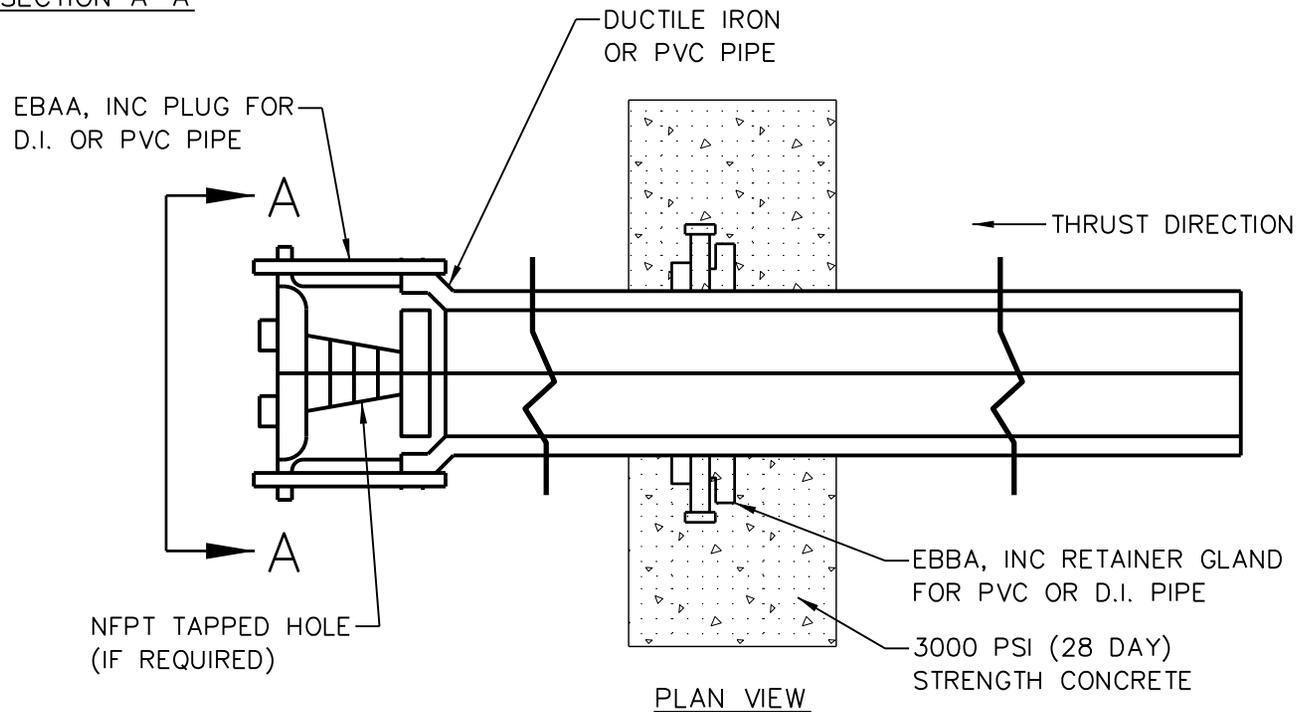
1/1/2021

REVISIONS

NO	DATE	DESCRIPTION



SECTION A-A



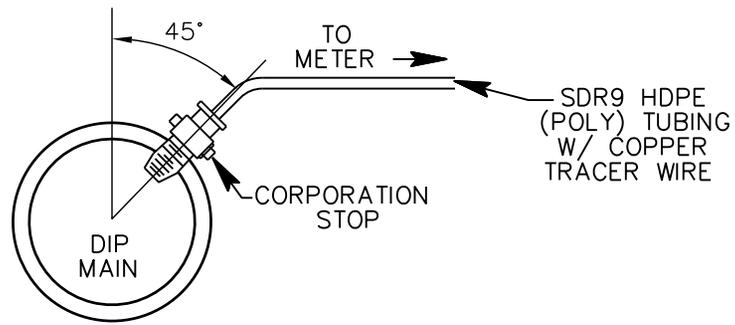
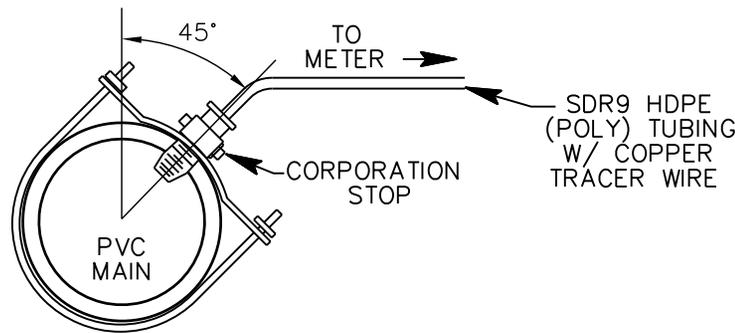
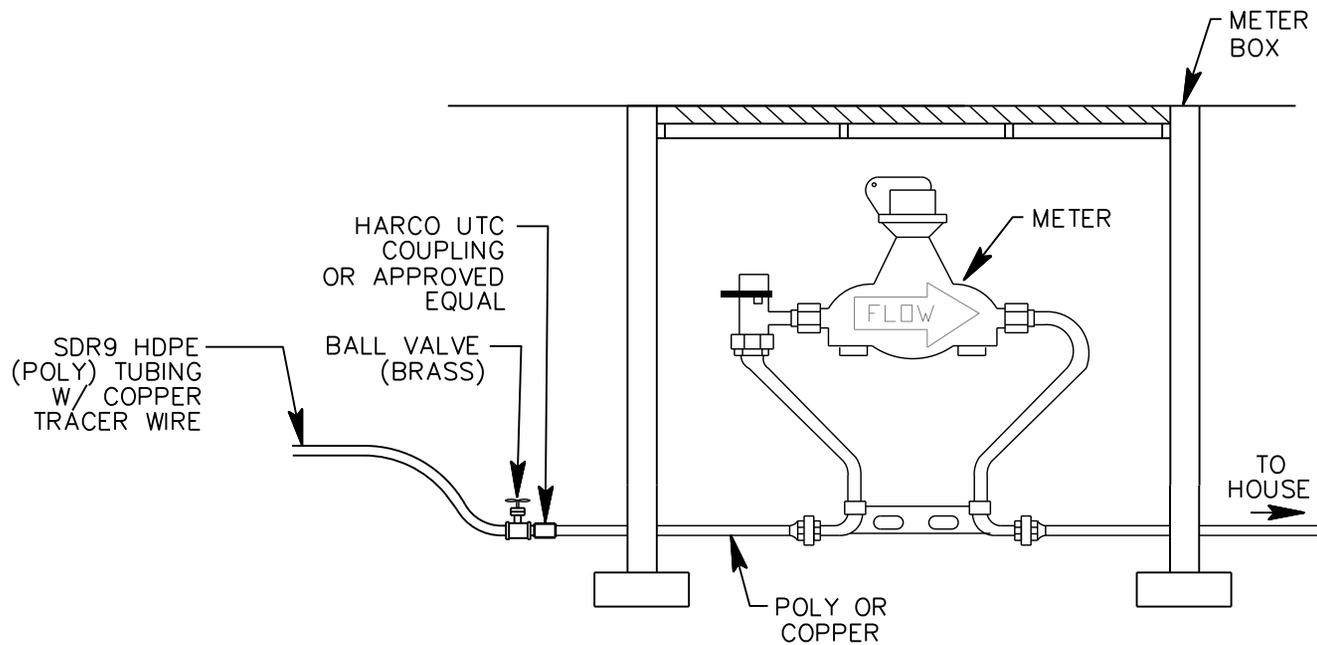
PLAN VIEW



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

STUB-OUT STANDARD DETAIL

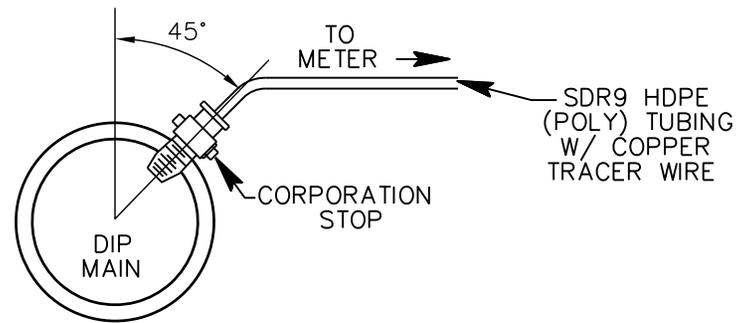
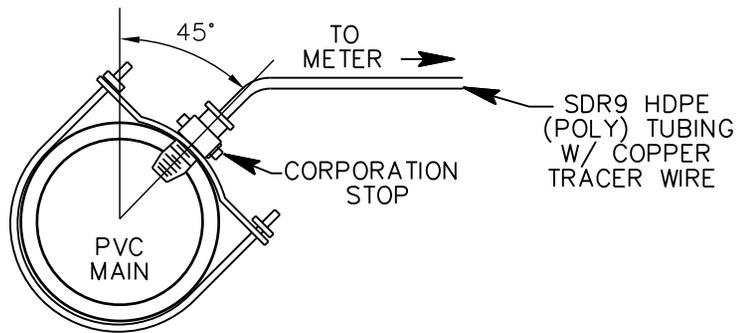
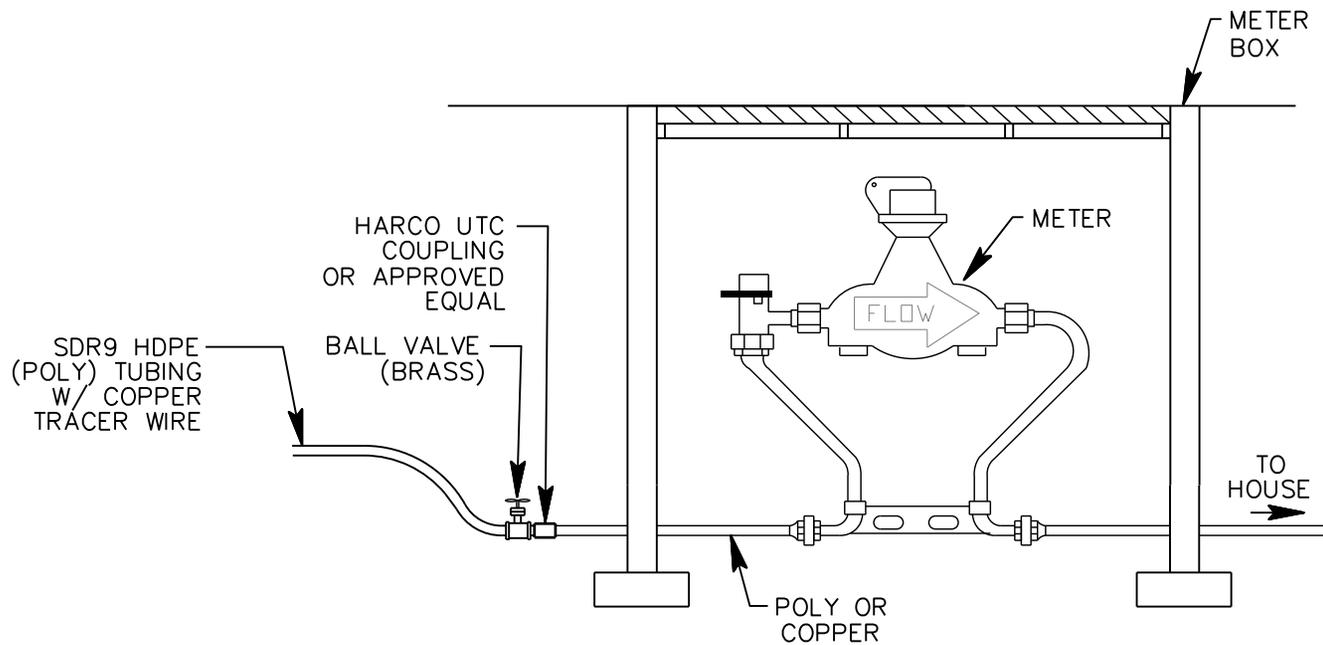
STD. NO		DATE
2.12		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

3/4" WATER METER BOX & TAP

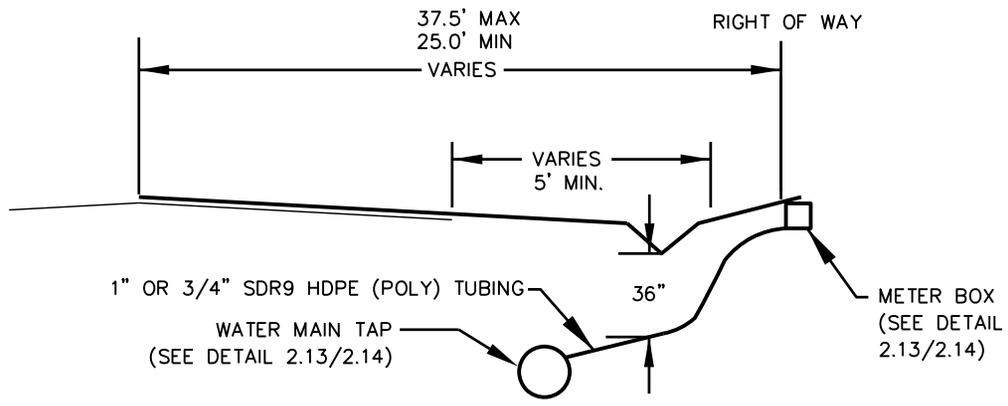
STD. NO		DATE
2.13		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

1" WATER METER BOX & TAP

STD. NO		DATE
2.14		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

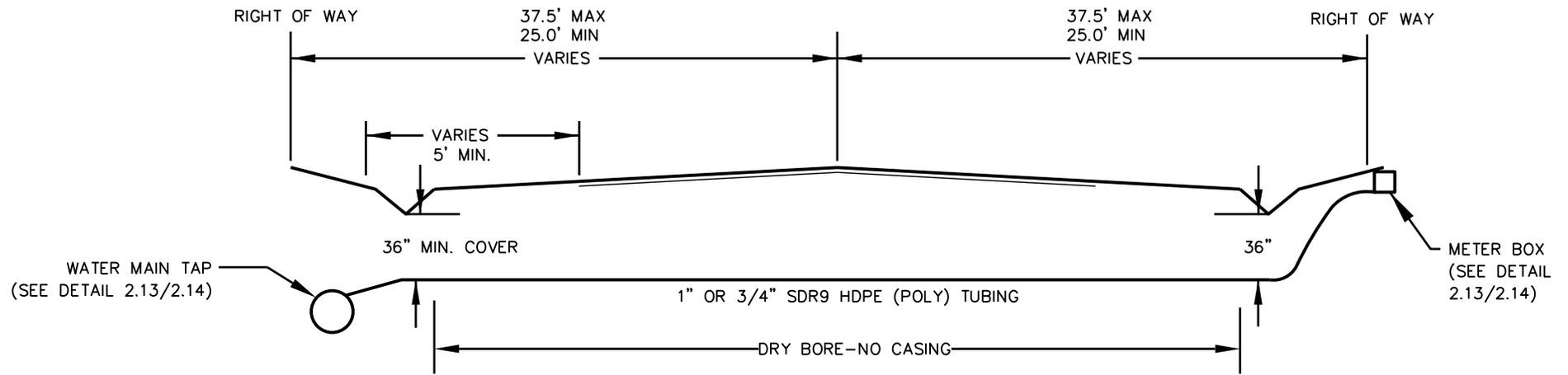


NOTES:
 1. A 14 GAUGE INSTALLED SOLID COPPER WIRE SHALL BE LAID ON TOP OF THE PVC PIPE TO AID IN LOCATING THE PIPE FOR MAINTENANCE PURPOSES. THE WIRE SHALL BE SECURED TO THE PIPE WITH DUCT TAPE NEAR EVERY BELL AND AT THE CENTER OF EACH PIPE JOINT. THE WIRE SHALL BE FASTENED SECURELY TO A CAST IRON FITTING AT EACH MAIN LINE VALVE AND FIRE HYDRANT AND TO SERVICE LINES AS DIRECTED.

• NOTE: METER BOXES TO BE LOCATED OUTSIDE OF THE RIGHT OF WAY

SHORT SIDE SERVICE CONNECTION

NTS



• NOTE: METER BOXES TO BE LOCATED OUTSIDE OF THE RIGHT OF WAY. NO DRY BORE PIT REQUIRED.

LONG SIDE SERVICE CONNECTION

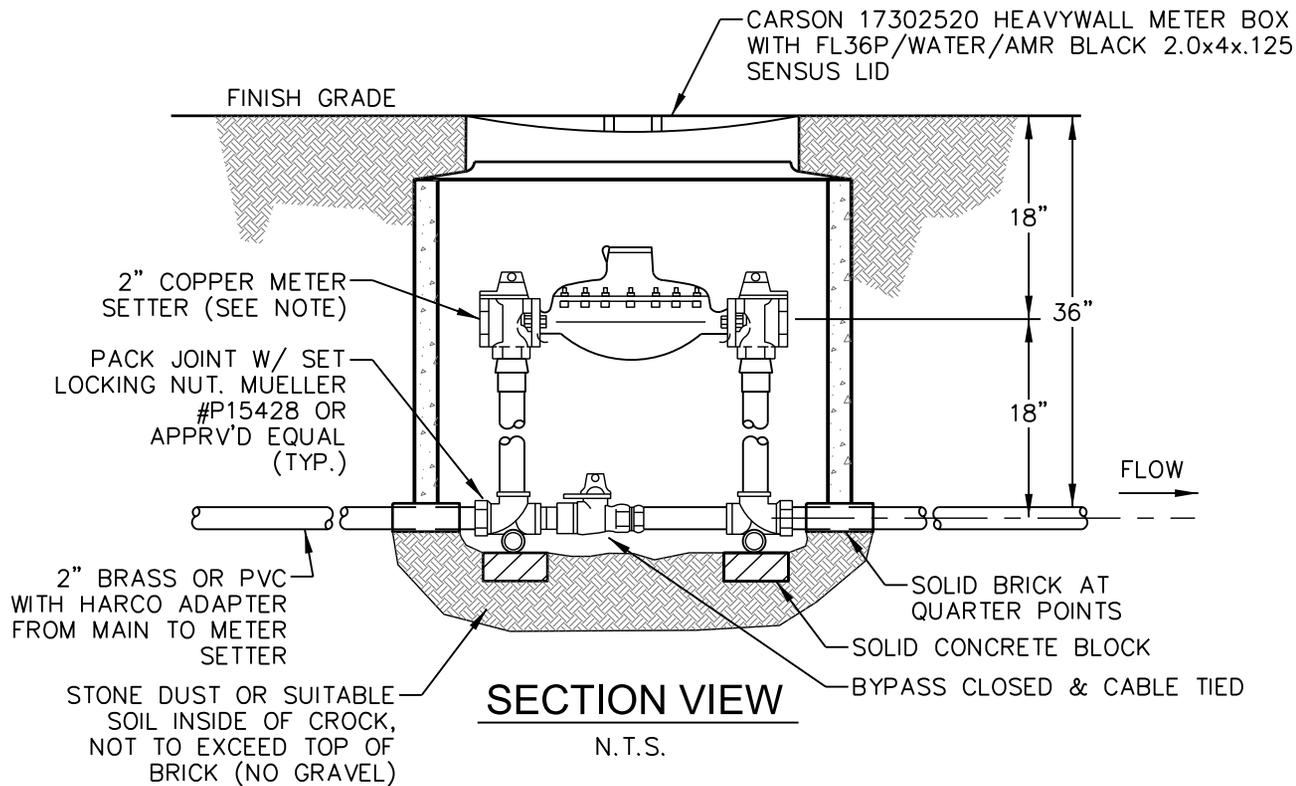
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**CITY OF KINGS MOUNTAIN
 WATER RESOURCES
 STANDARDS**

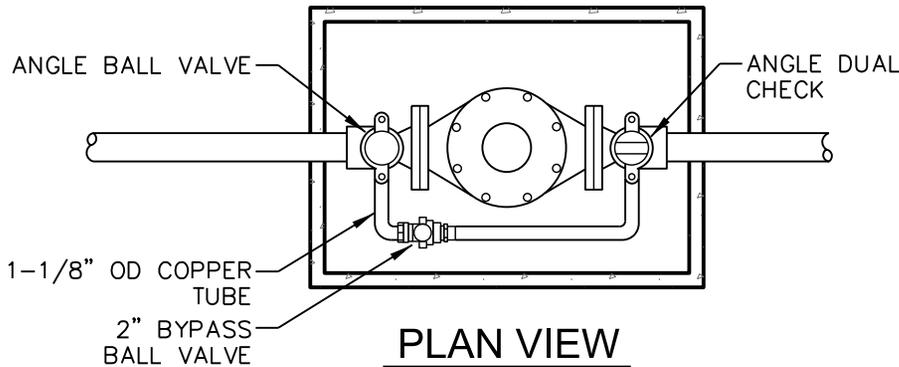
**3/4" & 1" WATER
 SERVICE CONNECTION**

STD. NO		DATE
2.15		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



SECTION VIEW

N.T.S.



PLAN VIEW

N.T.S.

NOTES:

1. METER TO BE OBTAINED FROM THE CITY.
2. INSTALLER MAY SUBSTITUTE TYPE "K" SOFT COPPER FOR BRASS SHOWN, PROVIDED APPROPRIATE FITTINGS AND VALVES ARE USED.
3. COPPER METER SETTER TO BE MCDONALD NL LARGE SIZE METER SETTER – 720BB712WDF 775 (FNPTxFNPT) OR APPROVED EQUAL.
4. NO FIELD ADJUSTMENTS OF METER SETTER IS PERMITTED.
5. ONLY 2" METER SETTER IS TO BE INSTALLED.

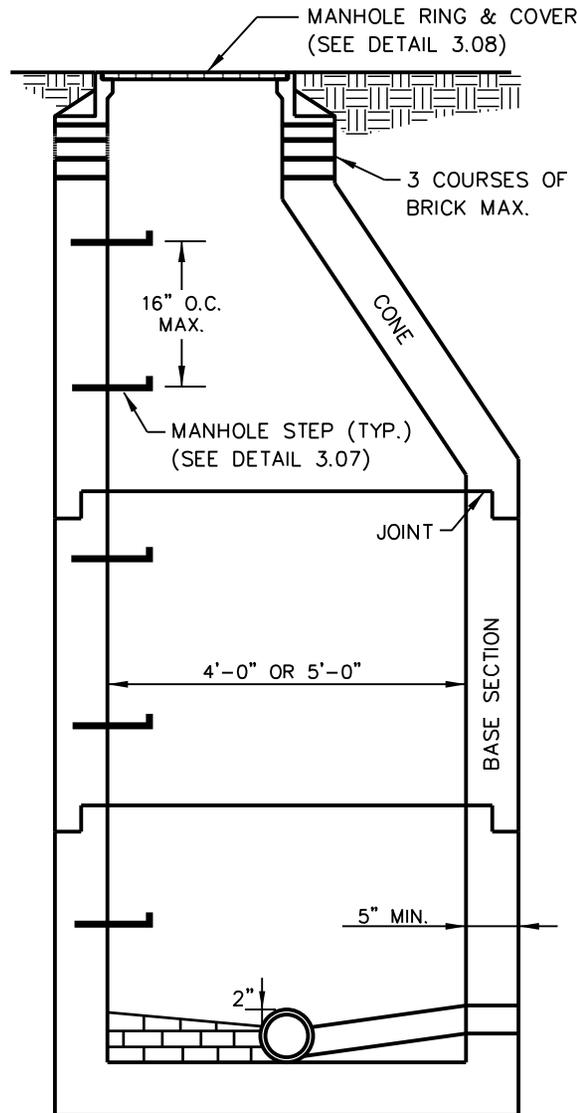
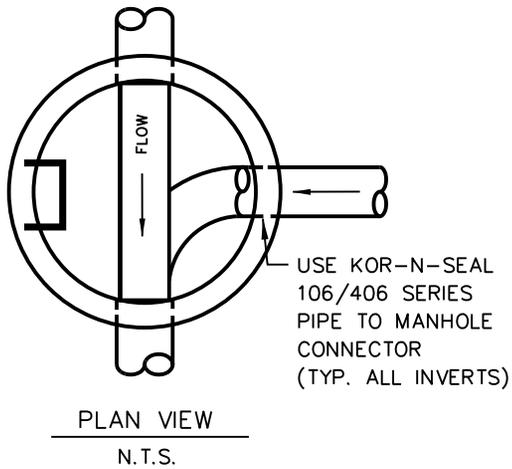


**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**WATER METER & SERVICE
WITH BYPASS**

2"

STD. NO		DATE
2.18		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



NOTES:

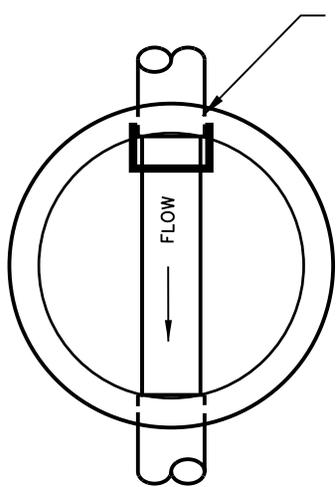
1. MANHOLE TO CONFORM WITH ASTM C478, LATEST REVISION, EXCEPT AS MODIFIED BELOW.
2. MANHOLE BASE TO BE REINFORCED WITH A MINIMUM AREA OF 0.20 SQ. IN. PER LINEAR FOOT EACH WAY AND BENT UP AT WALLS 10" AND SPLICED TO A WALL REINFORCING. WALL REINFORCING TO BE A MINIMUM OF 0.12 SQ. IN. PER LINEAR FOOT. BOTH TONGUE AND GROOVE OF JOINTS SHALL HAVE REINFORCING EQUAL IN AREA TO MINIMUM OF WALL SECTION.
3. ALL JOINTS SHALL CONFIRM TO ASTM C443.
4. STEPS SHALL BE PLASTIC PER PROJECT STANDARDS.
5. ALL PIPE OPENINGS TO BE NO GREATER THAN 3" LARGER THAN THE O.D. OF PIPE AND ADDITIONALLY REINFORCED WITH A MINIMUM OF 0.20 SQ. IN. OF STEEL AT 90 DEGREES. PIPE TO BE CENTERED IN OPENINGS AND SUPPORTED WITH A CONCRETE COLLAR 12" GREATER THAN THE O.D. OF PIPE FOR ONE FOOT FROM THE WALL. CONCRETE SHALL BE REINFORCED FROM THE OUTSIDE TO BECOME AN INTEGRAL PART OF THE MANHOLE INVERT OR TO A POINT FLUSH WITH INSIDE WALL.
6. ALL SURFACES SHALL BE SMOOTH EVEN TEXTURED WITH A MINIMUM OF HONEYCOMB, FINS AND OTHER IMPERFECTIONS.
7. LIFTING HOLES SHALL BE PLUGGED WITH EXPANSION GROUT FROM OUTSIDE PRIOR TO BACKFILLING.
8. INVERTS IN 5' DIA. MANHOLES TO BE 3600 PSI READY MIX CONCRETE IN LIEU OF BRICK.
9. STEPS IN 5' DIA. MANHOLES TO BE OVER WIDEST SHELF.
10. ALL MASONRY MORTAR SHALL BE PORTLAND CEMENT 1:3 MIX.
11. CARE MUST BE TAKEN TO FORM A SMOOTH FINISHED TROUGH FROM ENTRANCE PIPES TO EXIT PIPE, AND IN CURVED MANHOLES THE TROUGH MUST BE A SMOOTH CIRCULAR ARC TANGENT TO THE INSIDE WALLS OF THE PIPES AT THEIR ENDS.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**MANHOLE
(4' & 5' DIAMETER)**

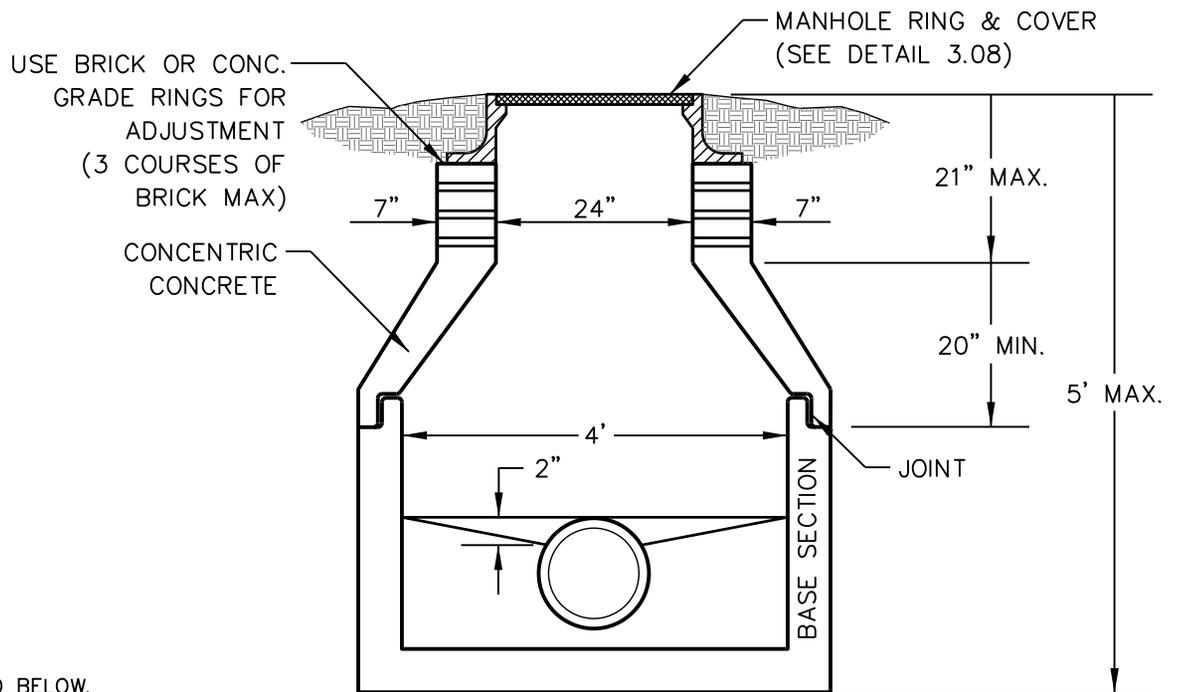
STD. NO		DATE
3.01		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



USE KOR-N-SEAL
106/406 SERIES
PIPE TO MANHOLE
CONNECTOR
(TYP. ALL INVERTS)

PLAN VIEW

N.T.S.



USE BRICK OR CONC.
GRADE RINGS FOR
ADJUSTMENT
(3 COURSES OF
BRICK MAX)

CONCENTRIC
CONCRETE

MANHOLE RING & COVER
(SEE DETAIL 3.08)

21" MAX.

20" MIN.

5' MAX.

ELEVATION VIEW

N.T.S.

NOTES:

1. MANHOLE TO CONFORM TO ASTM C478 EXCEPT AS MODIFIED BELOW.
2. MANHOLE BASE TO BE REINFORCED WITH A MINIMUM AREA OF 0.20 SQ. IN. PER LINEAR FOOT EACH WAY. WALL REINFORCING TO BE A MINIMUM OF 0.12 SQ. IN. PER LINEAR FOOT. BOTH TONGUE AND GROOVE OF JOINTS SHALL HAVE REINFORCING EQUAL IN AREA TO MINIMUM OF WALL SECTION.
3. ALL JOINTS SHALL CONFORM TO ASTM C443.
4. STEPS TO BE PLASTIC PER COUNTY STANDARDS.
5. ALL PIPE OPENINGS TO BE NO GREATER THAN 3" LARGER THAN O.D. OF PIPE AND ADDITIONALLY REINFORCED WITH A MINIMUM OF 0.20 SQ. IN. OF STEEL AT 90 DEGREES. ADDITIONAL REINFORCING NOT REQUIRED FOR CORED OPENINGS.
6. ALL SURFACES SHALL BE SMOOTH, EVEN TEXTURED WITH A MINIMUM OF HONEYCOMB, FINS, AND OTHER IMPERFECTIONS.
7. LIFTING HOLES SHALL BE PLUGGED WITH EXPANSION GROUT FROM OUTSIDE PRIOR TO BACKFILLING.
8. ALL MASONRY MORTAR SHALL BE PORTLAND CEMENT 1:3 MIX.
9. CARE MUST BE TAKEN TO FORM A SMOOTH FINISHED TROUGH FROM ENTRANCE PIPES TO EXIT PIPE, AND IN CURVED MANHOLES THE TROUGH MUST BE A SMOOTH CIRCULAR ARC TANGENT TO THE INSIDE WALLS OF THE PIPES AT THEIR ENDS.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**MANHOLE
(4' DIAMETER - SHORT)**

STD. NO

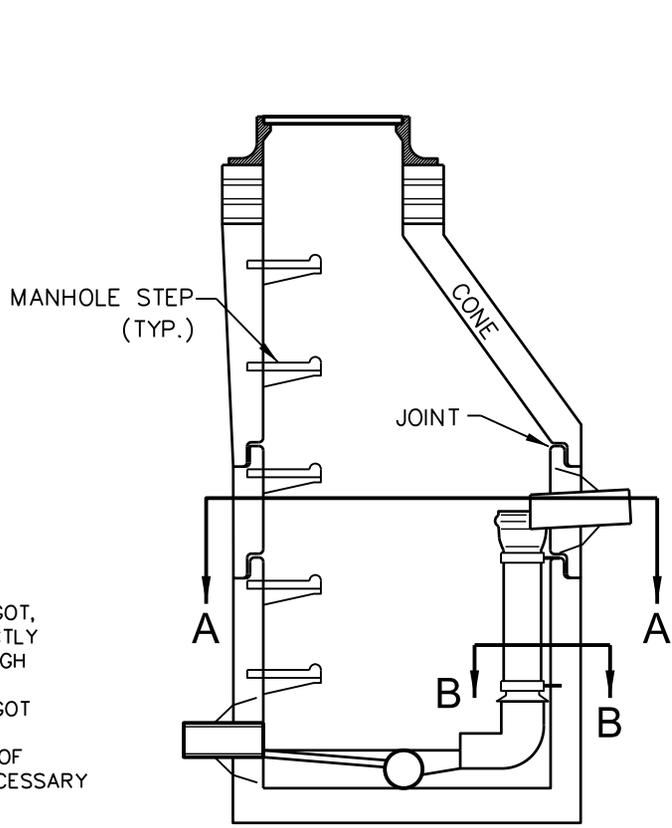
DATE

3.02

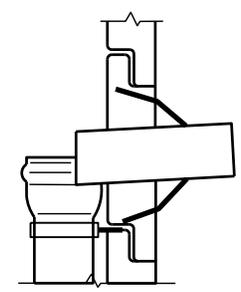
1/1/2021

REVISIONS

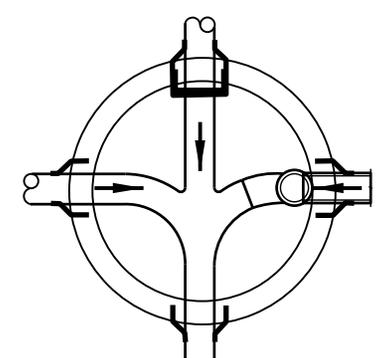
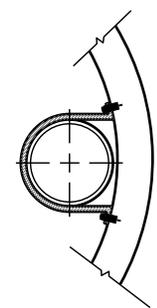
NO	DATE	DESCRIPTION



ELEVATION VIEW
N.T.S.



SECTION B-B
N.T.S.



SECTION A-A
N.T.S.

NOTES:

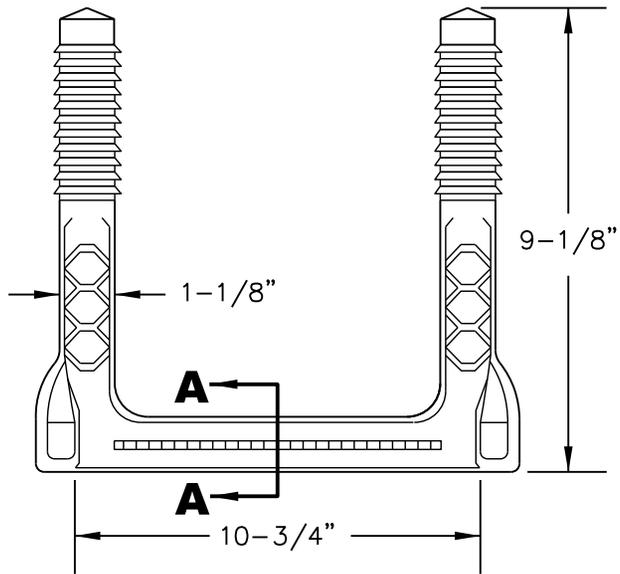
1. PIPE FOR INSIDE DROP SHALL BE SDR 35 PVC CONFORMING TO ASTM SPEC. D3034.
2. BOTTOM BEND TO BE 90° SHORT BEND, BELL SPIGOT, OF SDR 35 PVC. SPIGOT OF BEND TO REST DIRECTLY ON EXISTING SHELF. CONSTRUCT MASONRY THROUGH FROM DROP EFFLUENT TO MAIN CHANNEL.
3. NOTCH BELL OF PVC DROP TO ACCEPT D.I.P. SPIGOT AS SHOWN.
4. LOCATE STRAPS AT PIPE BELL AND ABOVE BELL OF 90° BEND AS SHOWN. ADD EXTRA STRAPS AS NECESSARY TO MAINTAIN MAX. SPACING OF TEN FEET.
5. HOLE IN MANHOLE WALL TO MADE WITH A CORING MACHINE. INSTALL FLEXIBLE RUBBER COUPLING.
6. CORE HOLE SHALL NOT ENTER CONE SECTION.
7. STEPS SHALL BE RELOCATED IF THEY CONFLICT WITH INSIDE DROP.
8. INSIDE DROP PIPE TO BE STRAPPED WITH 1/4"x 2" STAINLESS STEEL STRAPS WITH 2 ANCHOR BOLTS. (4' MAXIMUM SPACING BETWEEN STRAPS)
9. MANHOLE DIAMETER MUST BE MINIMUM OF 60".
10. STRAIGHT WALL OF MH TO BE LOCATED OVER INFLUENT PIPE OR OVER WIDEST SHELF.



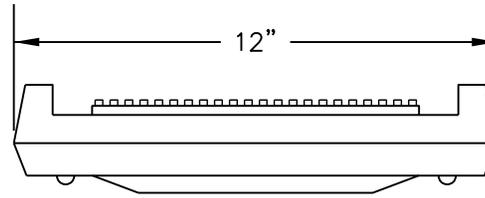
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**MANHOLE
(INSIDE DROP)**

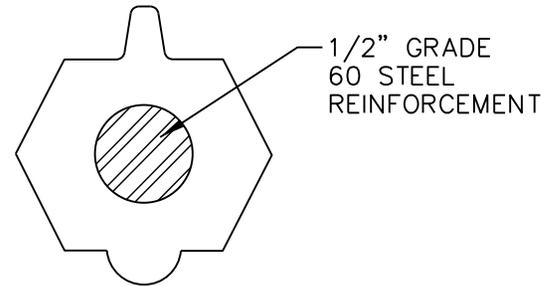
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REVISIONS		
NO	DATE	DESCRIPTION



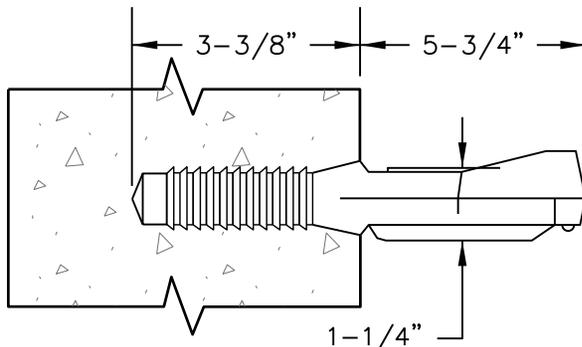
PLAN VIEW
N.T.S.



FRONT VIEW
N.T.S.



SECTION A-A



SIDE VIEW
N.T.S.

NOTES:

1. THIS STEP TO BE DRIVEN INTO TAPERED HOLES IN PRECAST MANHOLE SECTIONS. DO NOT USE AS A GROUTED-IN STEP.
2. STEP TO BE CONSTRUCTED OF COPOLYMER POLYPROPYLENE PLASTIC.
3. 1,000 POUND PULL OUT TEST REPORT REQUIRED FOR EACH STEP.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**MANHOLE
PLASTIC STEP**

STD. NO

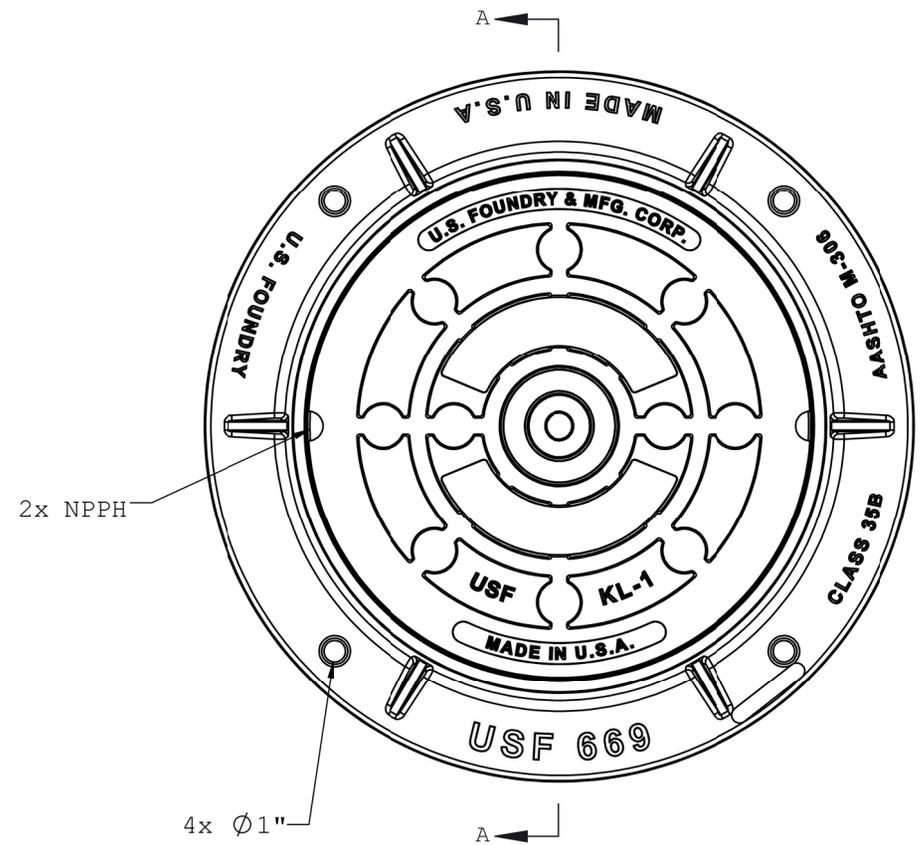
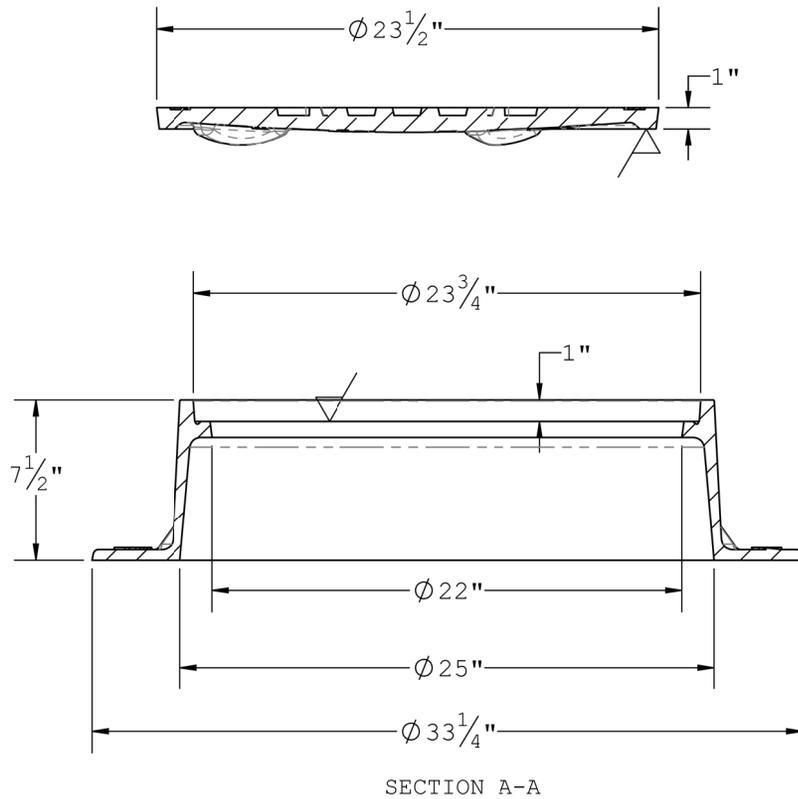
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3.07

1/1/2021

REVISIONS

NO	DATE	DESCRIPTION



NOTES:

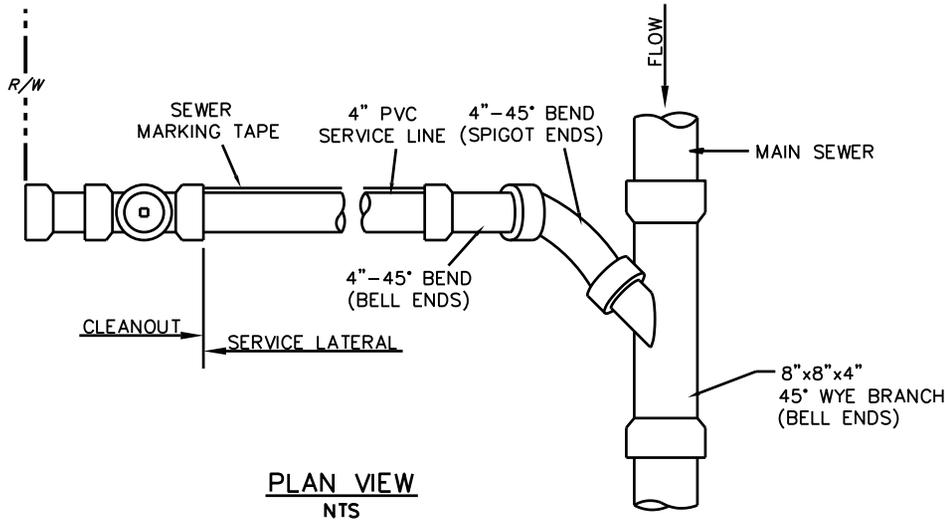
1. MANHOLE RING & COVER TO BE USF 669 RING & KL-1 COVER BY US FOUNDRY.
2. LOAD CLASSIFICATION: HEAVY DUTY
3. MATERIAL: GRAY CAST IRON, ASTM-A48 CLASS 35B



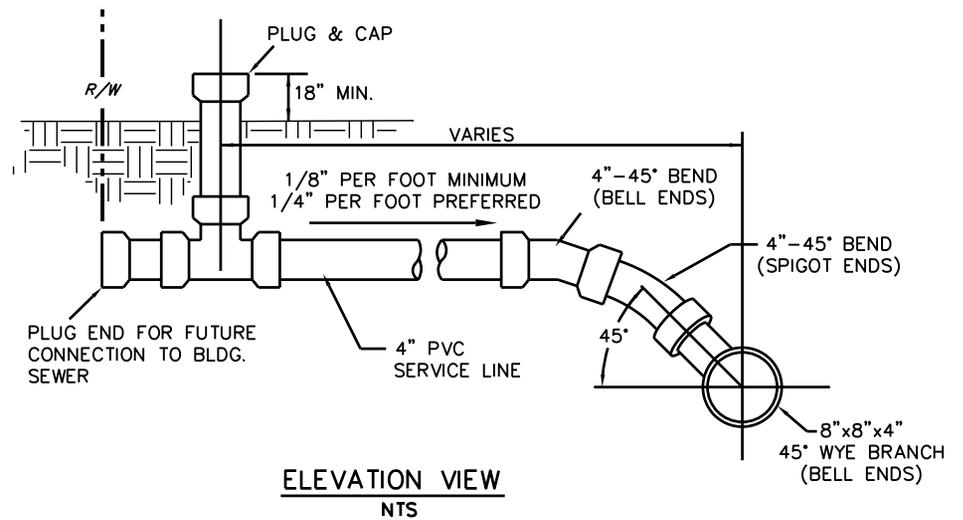
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**MANHOLE RING & COVER
(CAST IRON)**

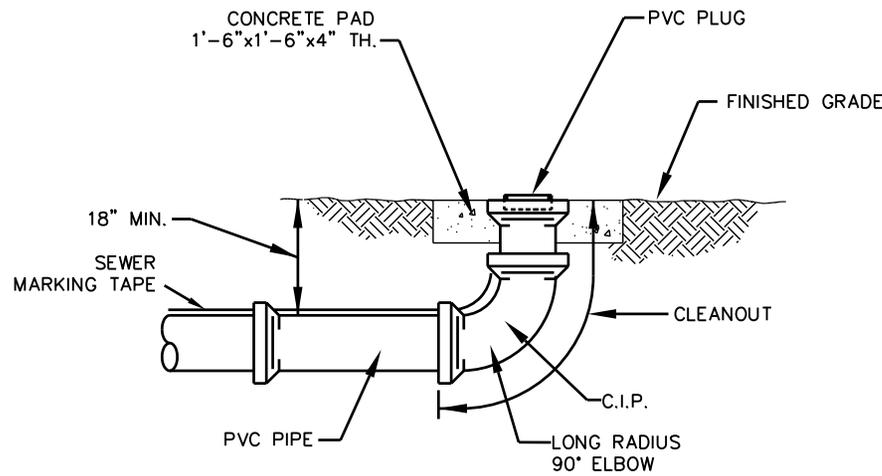
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3.08		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



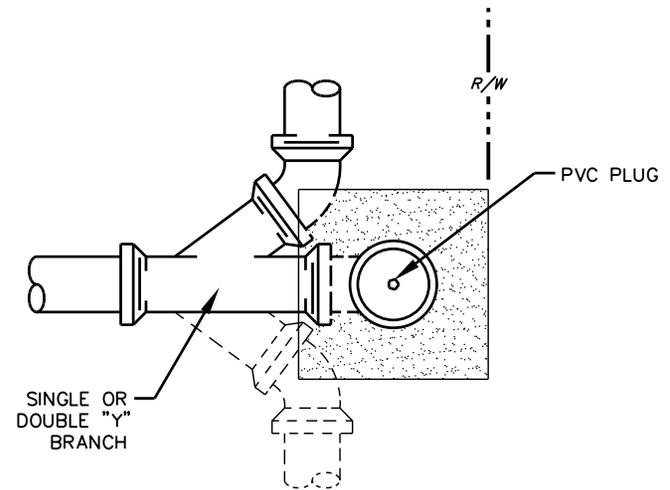
PLAN VIEW
NTS



ELEVATION VIEW
NTS



ELEVATION VIEW
NTS



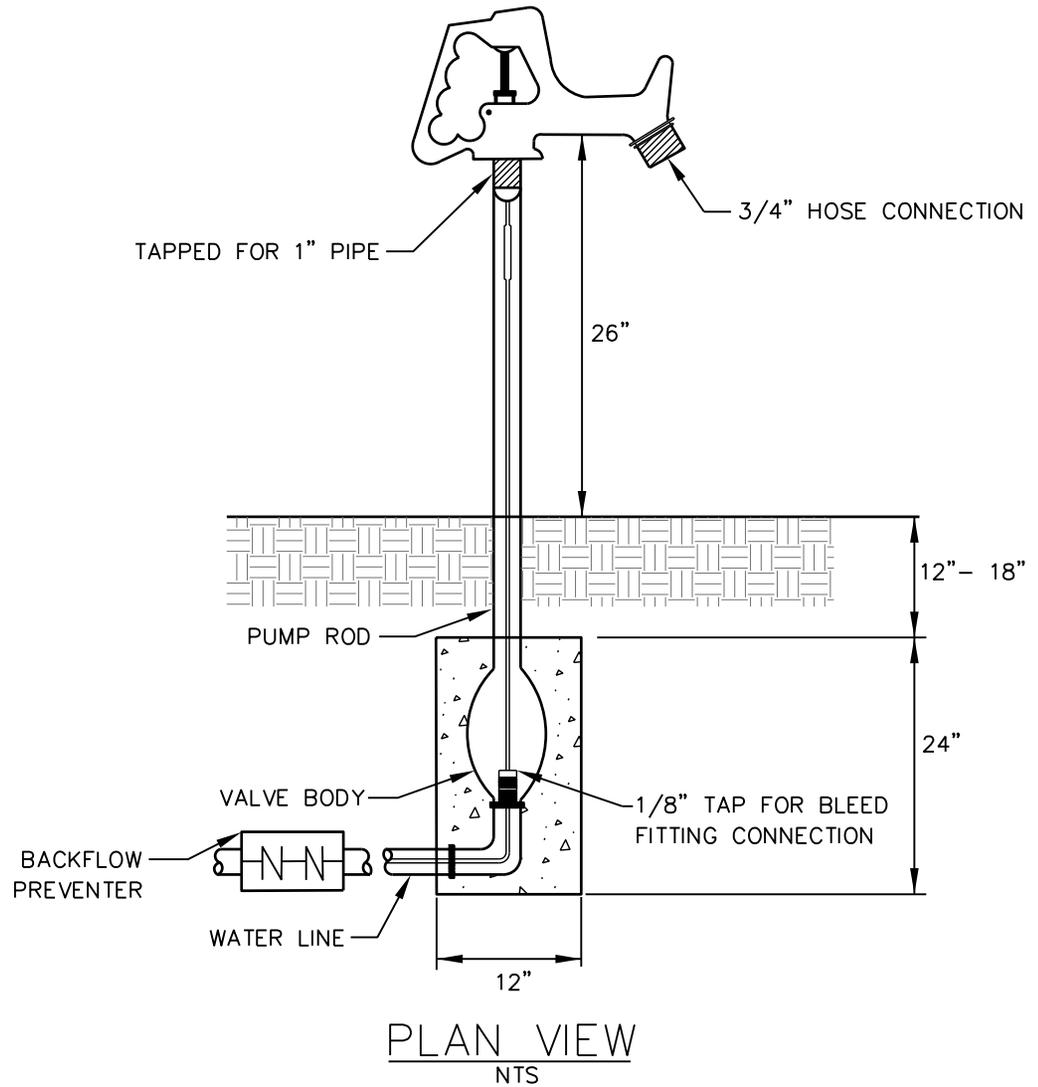
PLAN VIEW
NTS



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

SEWER SERVICE LATERAL CLEAN-OUT & TAP

STD. NO		DATE
3.09		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



NOTES:

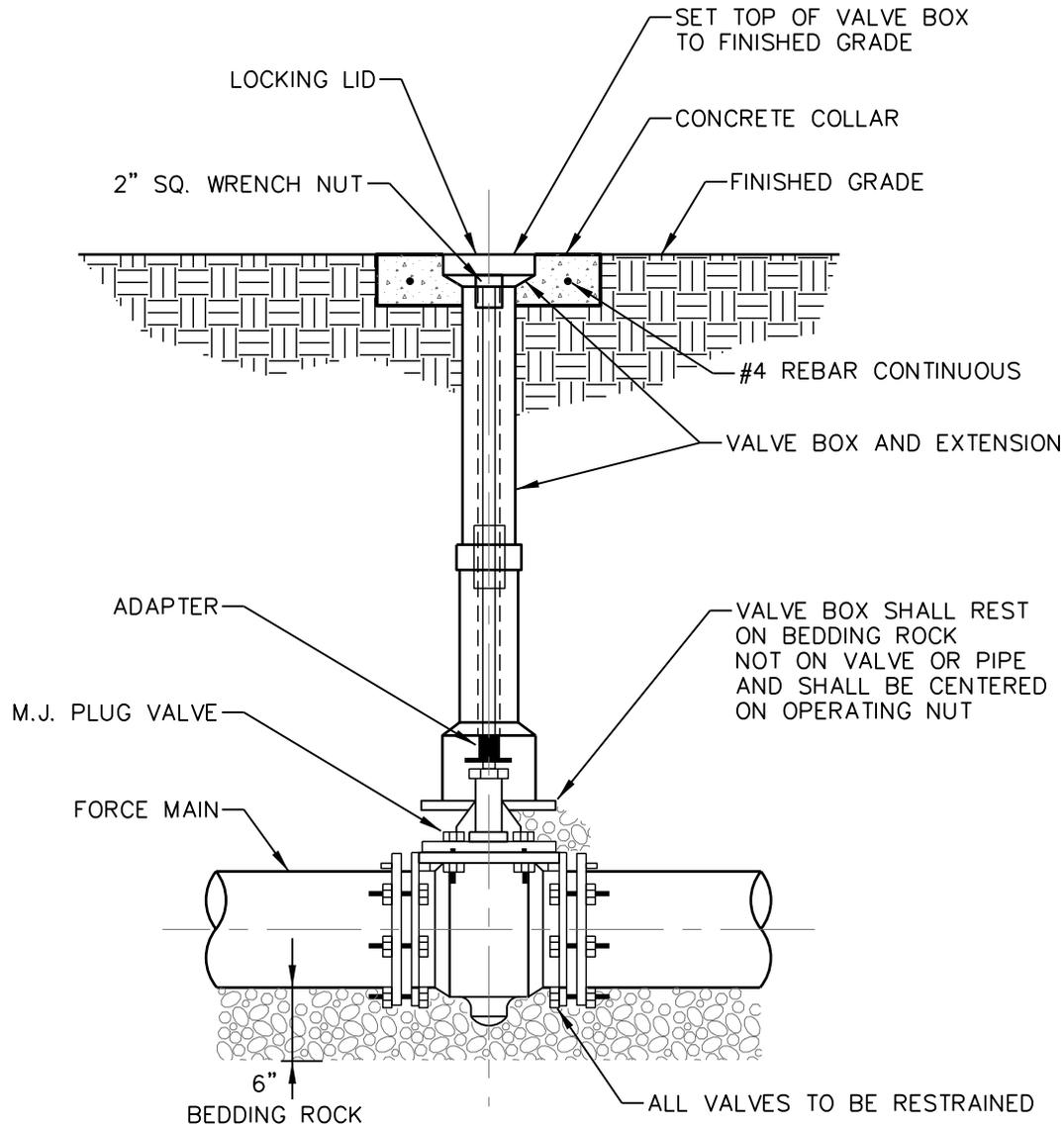
1. YARD HYDRANT TO BE SIMMONS 800 SERIES FREEZE PROOF OR APPROVED EQUAL.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**YARD HYDRANT
(TYPICAL PUMP STATION)**

STD. NO		DATE
4.04		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



NOTES:

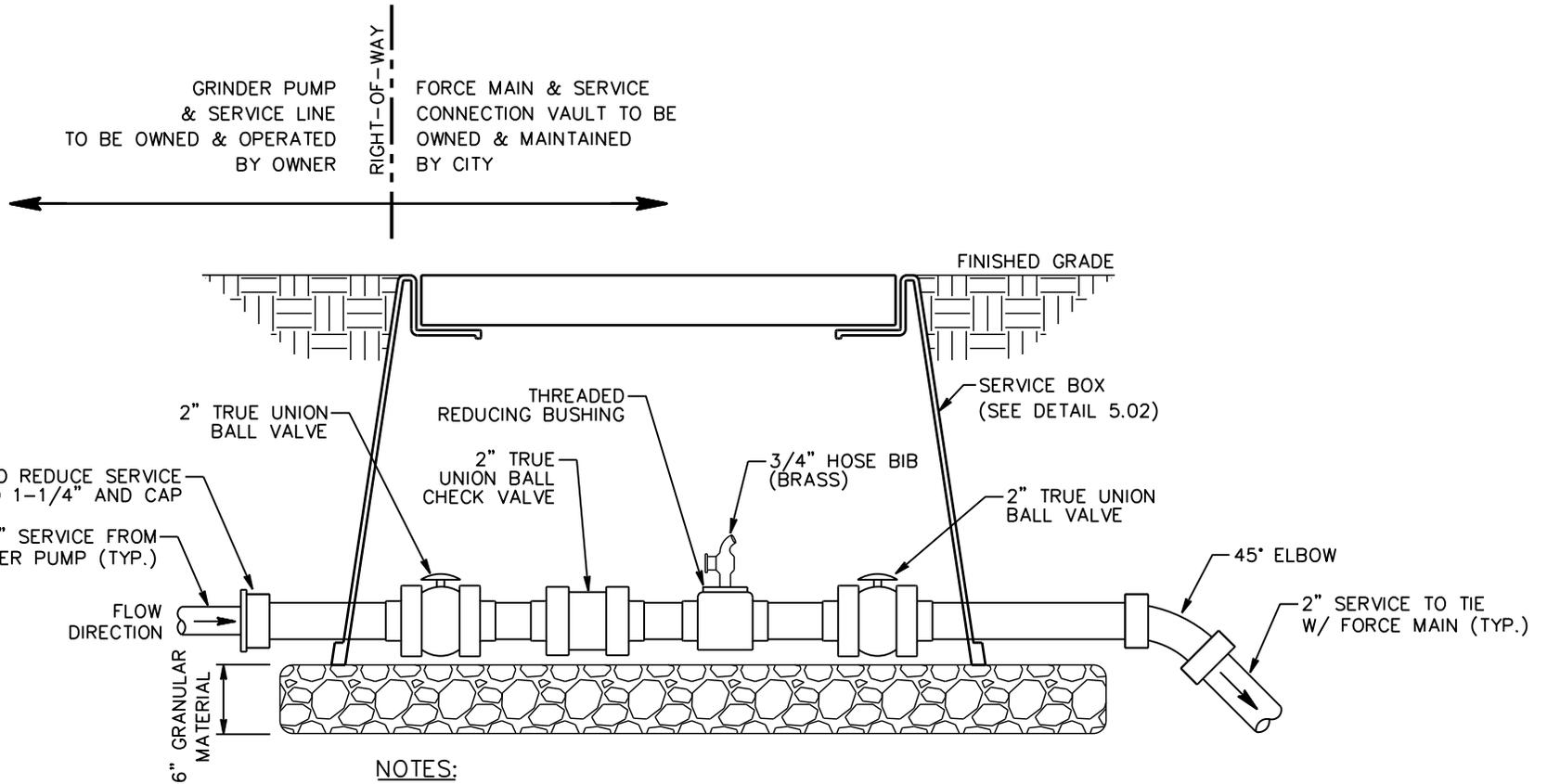
1. WRENCH NUT NOT TO BE MORE THAN 30" BELOW FINISHED GRADE.
2. WHEN OPERATING NUT DEPTH EXCEEDS 4'-0" BELOW FINISHED GRADE, PROVIDE EXTENSION STEM WITH STD. 2" SQ. OPERATING NUT IN TOP SECTION OF VALVE BOX. EXTENSION STEM SHALL BE SIZED AS RECOMMENDED BY THE VALVE MANUFACTURER.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**PLUG VALVE WITH
VALVE BOX
STANDARD DETAIL**

STD. NO		DATE
4.10		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



SECTION VIEW

N.T.S.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**LOW-PRESSURE SEWER
SERVICE CONNECTION**

STD. NO

DATE

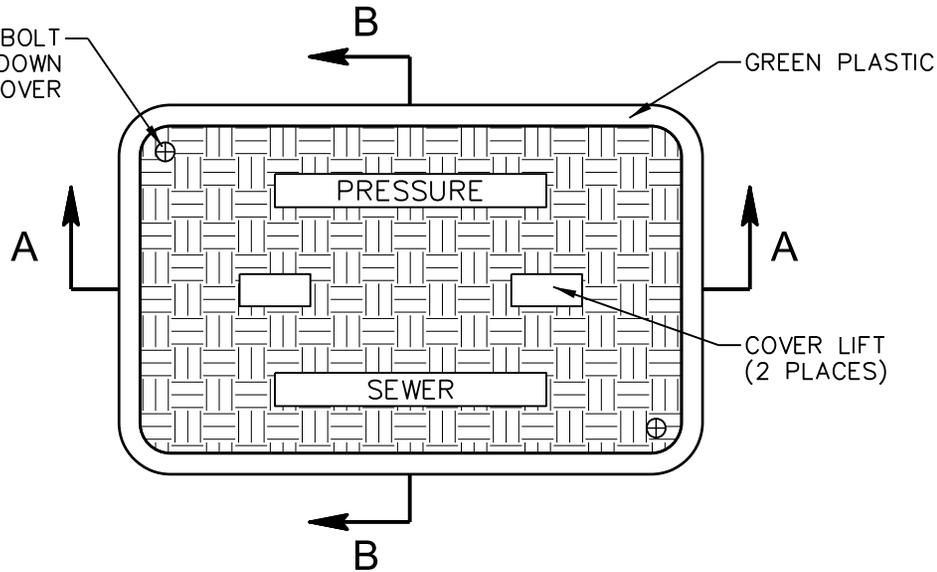
5.01

1/1/2021

REVISIONS

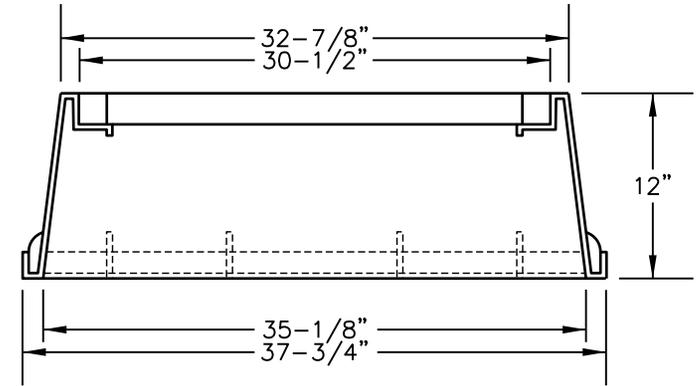
NO	DATE	DESCRIPTION

3/8" SS BOLT
FOR BOLT-DOWN
COVER



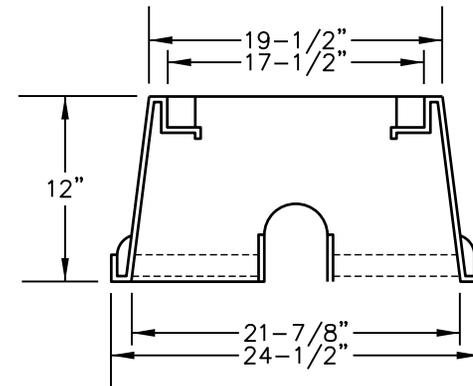
PLAN VIEW

N.T.S.



SECTION A-A

N.T.S.



SECTION B-B

N.T.S.

NOTES:

- METER BOX TO BE BROOKS SERIES 1419, OR APPROVED EQUAL.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**LOW-PRESSURE SEWER
SERVICE BOX
VAULT**

STD. NO

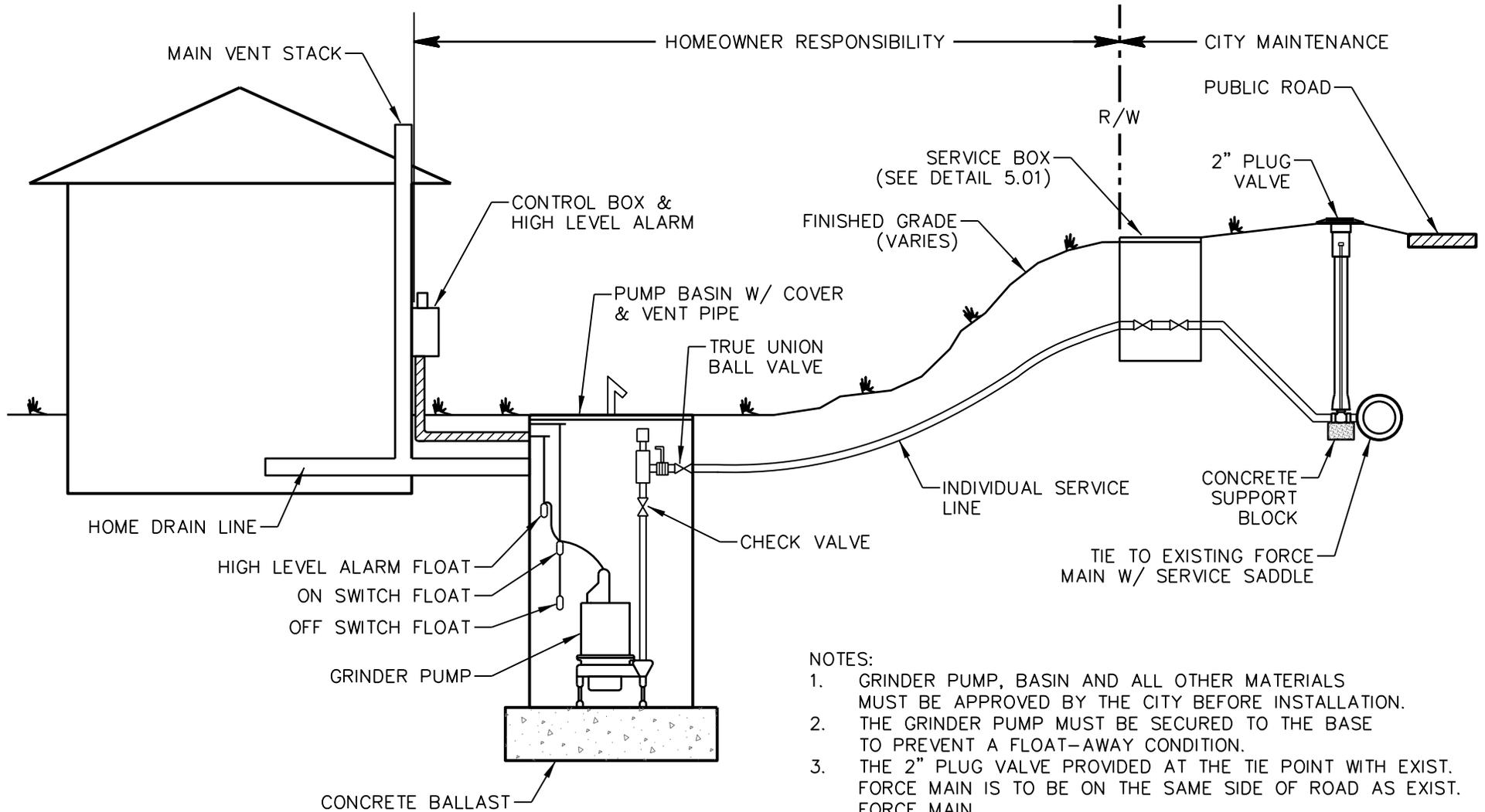
DATE

5.02

1/1/2021

REVISIONS

NO	DATE	DESCRIPTION



- NOTES:
1. GRINDER PUMP, BASIN AND ALL OTHER MATERIALS MUST BE APPROVED BY THE CITY BEFORE INSTALLATION.
 2. THE GRINDER PUMP MUST BE SECURED TO THE BASE TO PREVENT A FLOAT-AWAY CONDITION.
 3. THE 2" PLUG VALVE PROVIDED AT THE TIE POINT WITH EXIST. FORCE MAIN IS TO BE ON THE SAME SIDE OF ROAD AS EXIST. FORCE MAIN.
 4. ALL PRIVATE PLUMBING SHALL BE IN ACCORDANCE WITH NORTH CAROLINA BUILDING CODE.



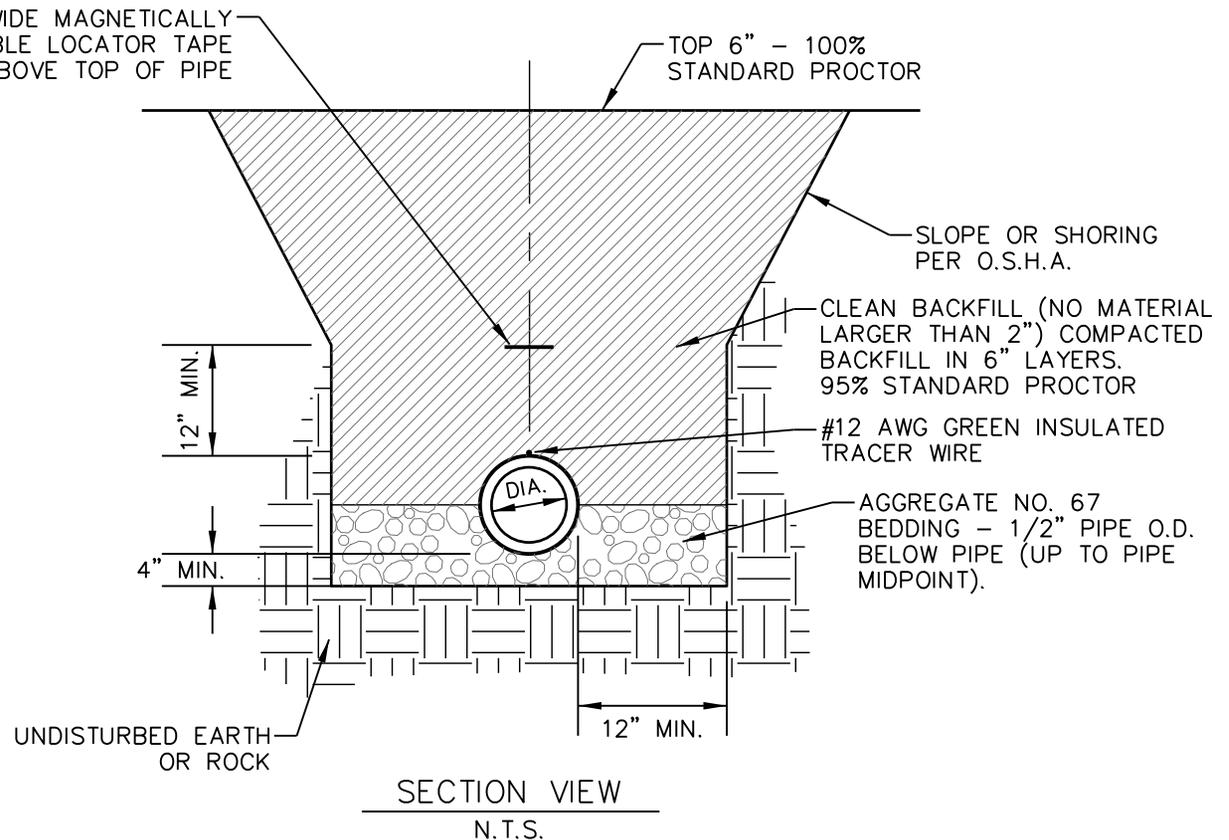
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**LOW PRESSURE SEWER
INDIVIDUAL GRINDER
PUMP SYSTEM TYPICAL**

STD. NO		DATE
5.03		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

**SUGGESTED TRENCH WIDTHS
AT TOP OF THE PIPE:**

NOMINAL PIPE SIZE (IN.)	TRENCH WIDTH (IN.)
8	32
10	34
12	36
14	38
16	40
18	42
20	44
24	48
30	54
36	60
42	66
48	72



NOTES:

- TRENCH SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS. SUPPORT OR SHORE WHEN TRENCH IS MORE THAN 5' DEEP AND 8' LONG. BEGIN SIDE SLOPE, IF USED, APPROX. 18" ABOVE TOP OF PIPE.
- BACKFILLING OF TRENCHES SHALL BE ACCOMPLISHED IMMEDIATELY AFTER PIPE IS LAID. COMPACTION REQUIREMENTS SHALL BE ATTAINED BY THE USE OF MECHANICAL TAMPS ONLY. EACH AND EVERY LAYER OF BACKFILL SHALL BE PLACED LOOSE IN 6" LAYERS AND THOROUGHLY COMPACTED INTO PLACE.
- UNDER NO CIRCUMSTANCES SHALL WATER BE PERMITTED TO RISE IN UN-BACKFILLED TRENCHES AFTER THE PIPE HAS BEEN PLACED.
- ALL MATERIAL SHALL HAVE AN IN-PLACE DENSITY OF 100% TO A DEPTH OF 6" BELOW THE FINISHED GRADE OF THE BACKFILL MATERIAL, AND 95% AT GREATER THAN 6" BELOW GRADE.
- USE PC350 DUCTILE IRON PIPE IF COVER IS LESS THAN 3' OR GREATER THAN 18'.



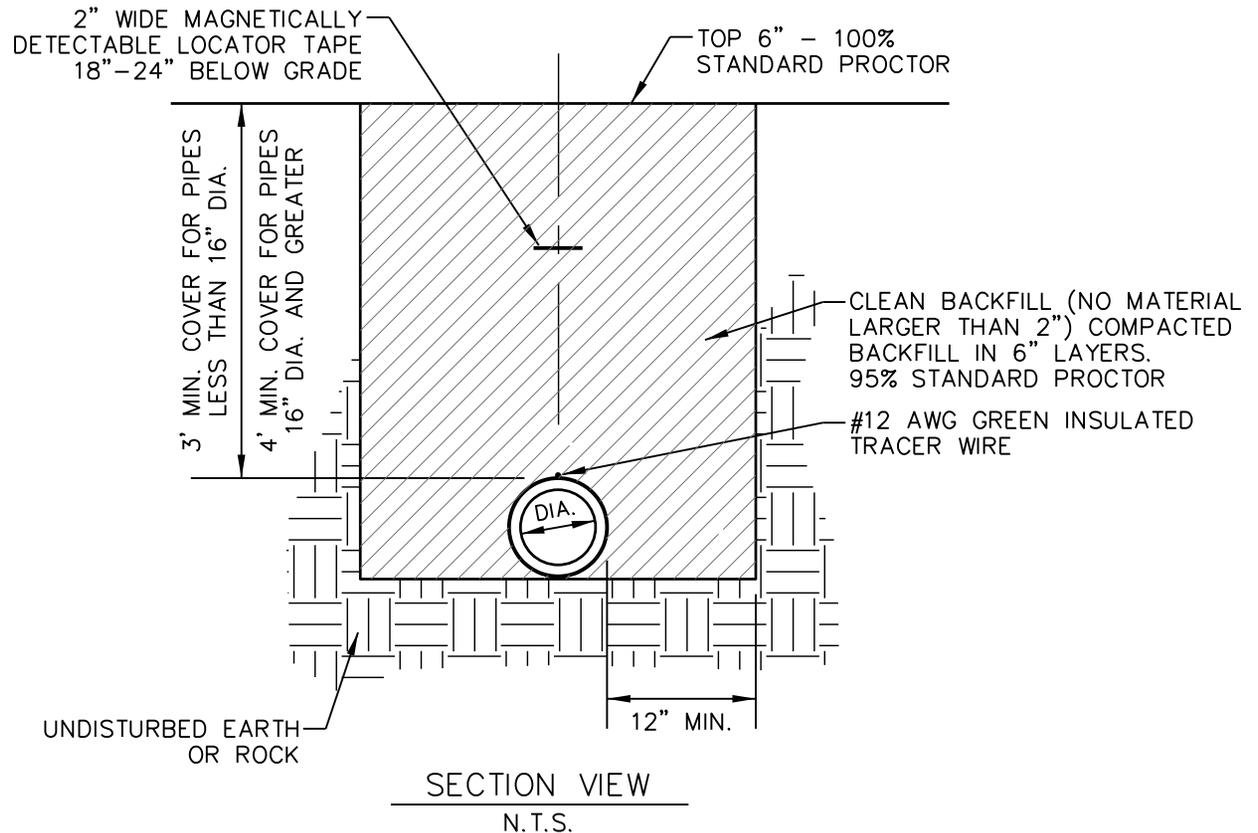
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**PIPE INSTALLATION
GRAVITY SEWER**

STD. NO		DATE
6.01		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

SUGGESTED TRENCH WIDTHS
AT TOP OF THE PIPE:

NOMINAL PIPE SIZE (IN.)	TRENCH WIDTH (IN.)
8	32
10	34
12	36
14	38
16	40
18	42
20	44
24	48
30	54
36	60
42	66
48	72



NOTES:

- TRENCH SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS. SUPPORT OR SHORE WHEN TRENCH IS MORE THAN 5' DEEP AND 8' LONG. BEGIN SIDE SLOPE, IF USED, APPROX. 18" ABOVE TOP OF PIPE.
- BACKFILLING OF TRENCHES SHALL BE ACCOMPLISHED IMMEDIATELY AFTER PIPE IS LAID. COMPACTION REQUIREMENTS SHALL BE ATTAINED BY THE USE OF MECHANICAL TAMPS ONLY. EACH AND EVERY LAYER OF BACKFILL SHALL BE PLACED LOOSE IN 6" LAYERS AND THOROUGHLY COMPACTED INTO PLACE.
- UNDER NO CIRCUMSTANCES SHALL WATER BE PERMITTED TO RISE IN UN-BACKFILLED TRENCHES AFTER THE PIPE HAS BEEN PLACED.
- ALL MATERIAL SHALL HAVE AN IN-PLACE DENSITY OF 100% TO A DEPTH OF 6" BELOW THE FINISHED GRADE OF THE BACKFILL MATERIAL, AND 95% AT GREATER THAN 6" BELOW GRADE.
- USE PC350 DUCTILE IRON PIPE IF COVER IS LESS THAN 3' OR GREATER THAN 18'.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**PIPE INSTALLATION
SEWER FORCE MAIN**

STD. NO

DATE

6.02

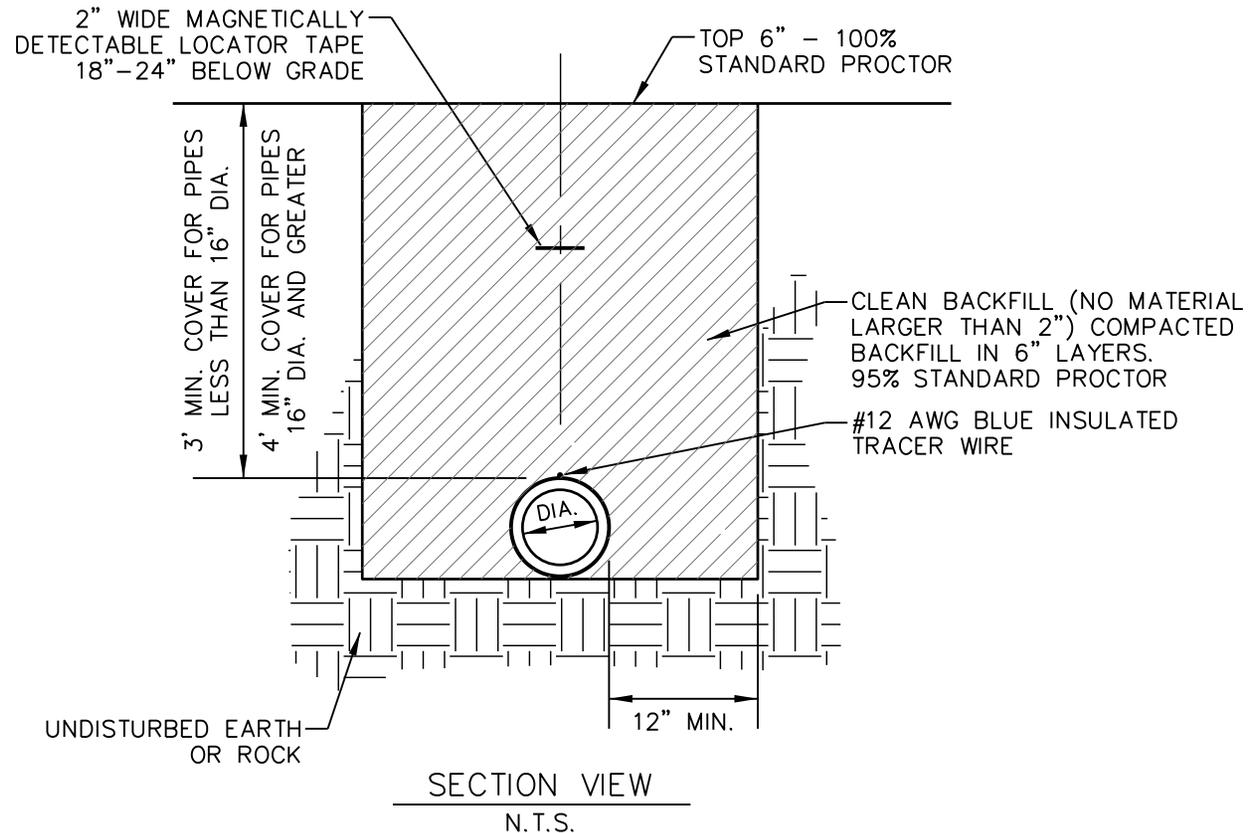
1/1/2021

REVISIONS

NO	DATE	DESCRIPTION

SUGGESTED TRENCH WIDTHS
AT TOP OF THE PIPE:

NOMINAL PIPE SIZE (IN.)	TRENCH WIDTH (IN.)
8	32
10	34
12	36
14	38
16	40
18	42
20	44
24	48
30	54
36	60
42	66
48	72



NOTES:

- TRENCH SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA REQUIREMENTS. SUPPORT OR SHORE WHEN TRENCH IS MORE THAN 5' DEEP AND 8' LONG. BEGIN SIDE SLOPE, IF USED, APPROX. 18" ABOVE TOP OF PIPE.
- BACKFILLING OF TRENCHES SHALL BE ACCOMPLISHED IMMEDIATELY AFTER PIPE IS LAID. COMPACTION REQUIREMENTS SHALL BE ATTAINED BY THE USE OF MECHANICAL TAMPS ONLY. EACH AND EVERY LAYER OF BACKFILL SHALL BE PLACED LOOSE IN 6" LAYERS AND THOROUGHLY COMPACTED INTO PLACE.
- UNDER NO CIRCUMSTANCES SHALL WATER BE PERMITTED TO RISE IN UN-BACKFILLED TRENCHES AFTER THE PIPE HAS BEEN PLACED.
- ALL MATERIAL SHALL HAVE AN IN-PLACE DENSITY OF 100% TO A DEPTH OF 6" BELOW THE FINISHED GRADE OF THE BACKFILL MATERIAL, AND 95% AT GREATER THAN 6" BELOW GRADE.
- USE PC350 DUCTILE IRON PIPE IF COVER IS LESS THAN 3' OR GREATER THAN 18'.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**PIPE INSTALLATION
WATER MAIN**

STD. NO

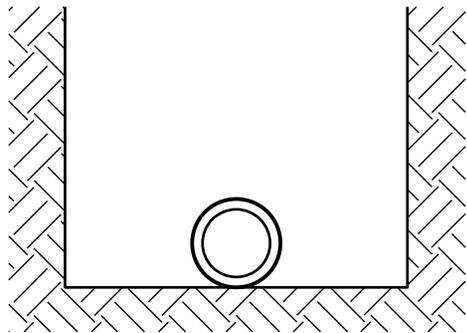
DATE

6.03

1/1/2021

REVISIONS

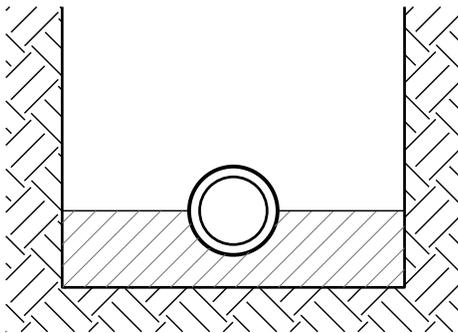
NO	DATE	DESCRIPTION



TYPE 1

N.T.S.

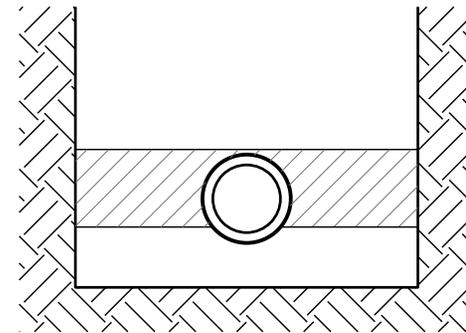
FLAT-BOTTOM TRENCH WITH LOOSE BACKFILL.



TYPE 2

N.T.S.

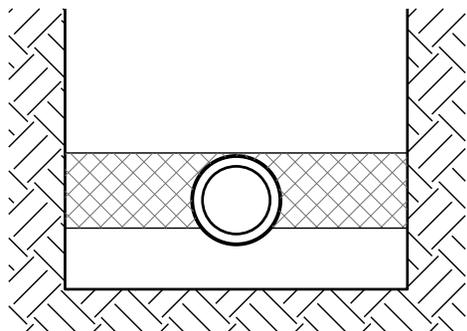
FLAT-BOTTOM TRENCH WITH LOOSE BACKFILL LIGHTLY CONSOLIDATED TO CENTERLINE OF PIPE.



TYPE 3

N.T.S.

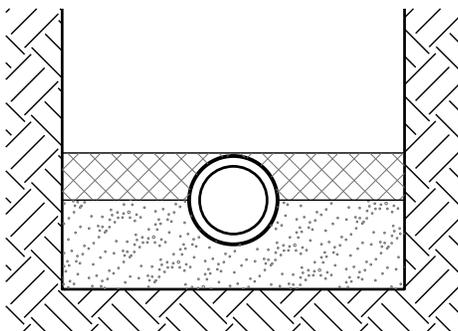
PIPE BEDDED IN 4-IN. MINIMUM LOOSE SOIL WITH BACKFILL LIGHTLY CONSOLIDATED TO TOP OF PIPE.



TYPE 4

N.T.S.

PIPE BEDDED IN SAND, GRAVEL OR CRUSHED STONE TO DEPTH OF 1/8 PIPE DIAMETER, 4-IN. MINIMUM, WITH BACKFILL COMPACTED TO TOP OF PIPE. (APPROX. 80% STANDARD PROCTOR AASHTO T-99)



TYPE 5

N.T.S.

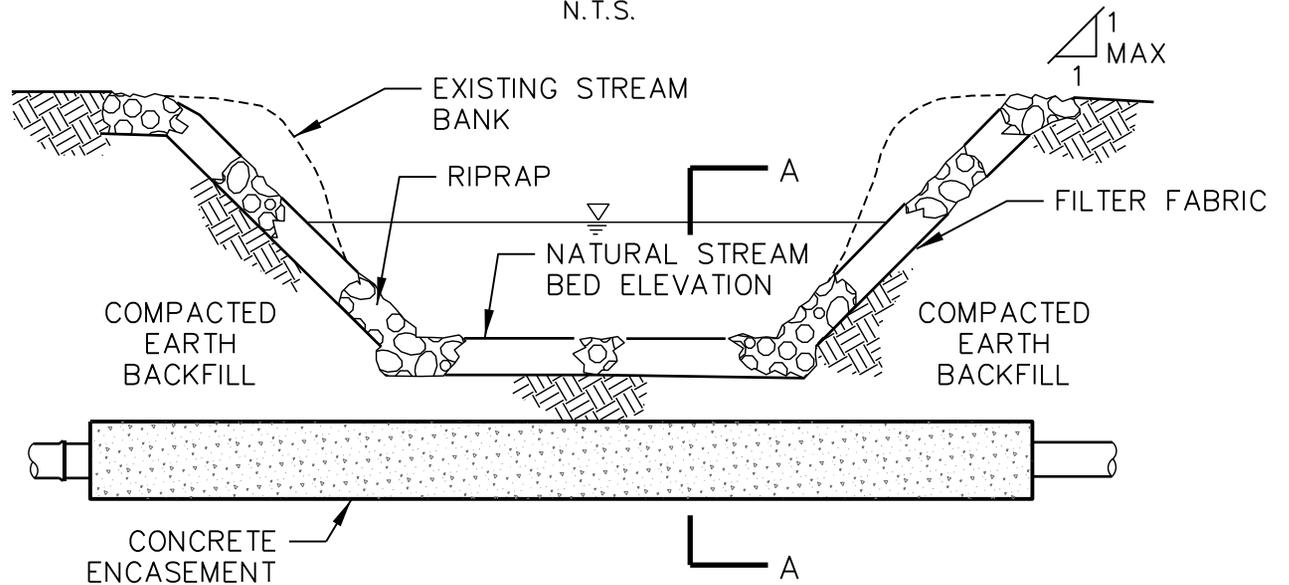
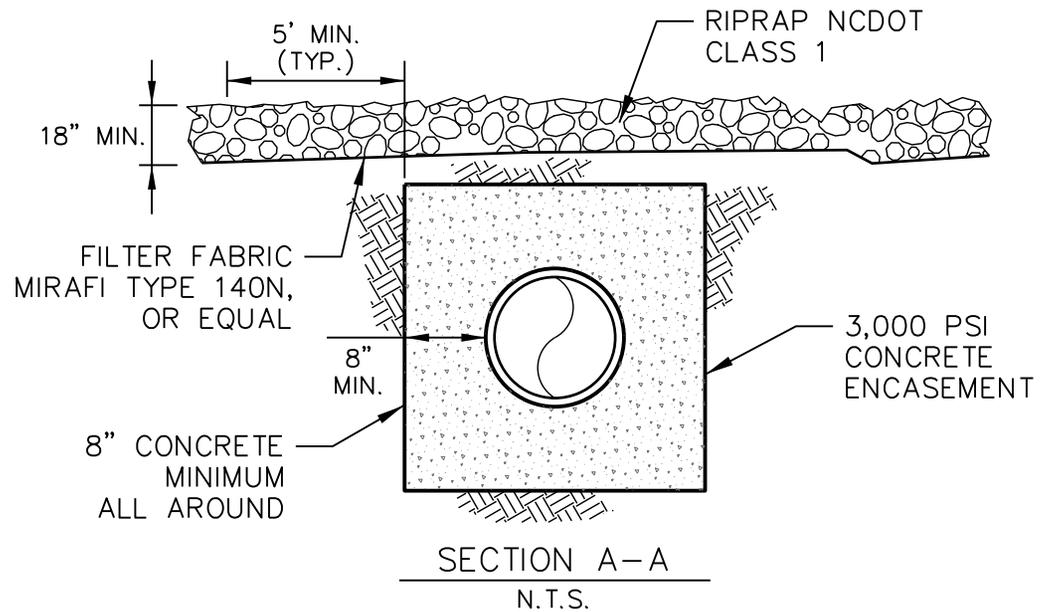
PIPE BEDDED TO ITS CENTERLINE IN COMPACTED GRANULAR MATERIAL, 4-IN. MINIMUM UNDER PIPE. COMPACTED GRANULAR OR SELECT MATERIAL TO TOP OF PIPE. (APPROX. 90% STANDARD PROCTOR AASHTO T-99)



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**PIPE BEDDING
STANDARD DETAIL**

STD. NO		DATE
6.04		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



- NOTES:
1. CREEK CROSSINGS MAY REQUIRE A PERMIT FROM STATE AND/OR FEDERAL REGULATORY AGENCIES.
 2. COMPACTED EARTH BACKFILL WITHIN EXTENTS OF STREAM CROSSING SHALL EXTEND FROM TOP OF PIPE ENCASEMENT TO TOP OF TRENCH. COMPACT TO 95% MAXIMUM DENSITY PER ASTM D 698.
 3. MATCH EXISTING BANK PROFILE EXCEPT WHERE SLOPE OF BANK EXCEEDS 1 TO 1.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

CREEK CROSSING NON-ELEVATED PIPE

STD. NO

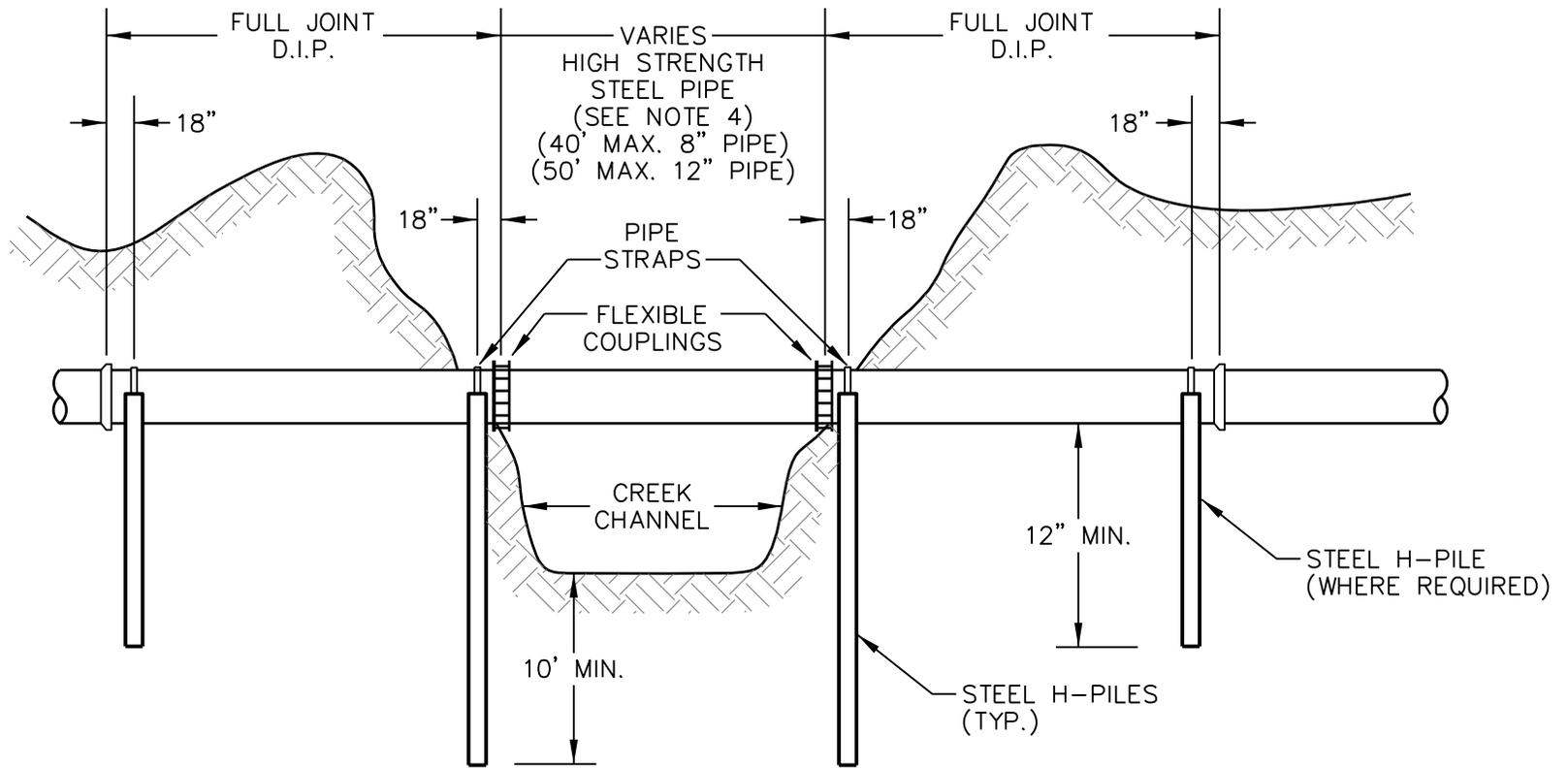
DATE

6.05

1/1/2021

REVISIONS

NO	DATE	DESCRIPTION



NOTES:

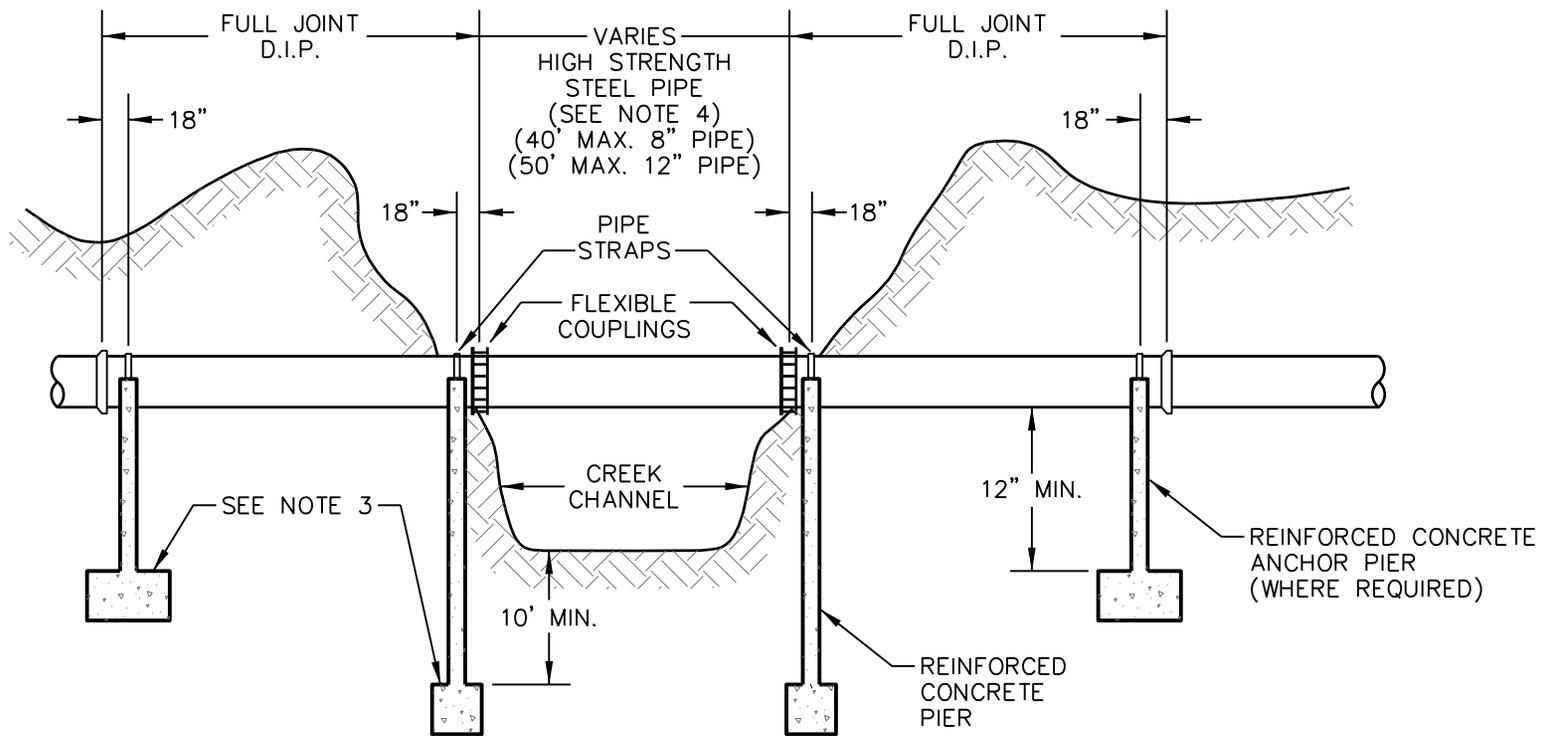
1. STEEL H-PILE DESIGN TO BE PROVIDED BY ENGINEER.
2. COUPLING SHALL BE LONG BODY TYPE, AND COMPLETELY EXPOSED. COUPLINGS TO BE AS MANUFACTURED BY DRESSER INDUSTRIES – STYLE 62 TRANSITION COUPLING OR APPROVED EQUAL. CENTER RING LENGTH FOR 10" TO 15" PIPE TO BE 7". THE CENTER RING, GLANDS, BOLTS AND NUTS SHALL RECEIVE ONE COAT OF SHOP PRIMER.
3. MINIMUM DEPTHS SHOWN SHALL BE TO UNDISTURBED SOIL.
4. STEEL PIPE MUST BE SEAMLESS OR STRAIGHT SEAM. SPIRAL WELD IS NOT ALLOWED. THE INSIDE DIAMETER OF THE STEEL PIPE TO MATCH THE INSIDE DIAMETER OF DUCTILE IRON PIPE. STEEL PIPE TO BE COATED. DUCTILE IRON PIPE IS ALLOWED FOR NARROW CREEK CHANNELS SPANNING LESS THAN 18'.
5. MAXIMUM HEIGHT FROM PIPE TO UNDISTURBED SOIL IS 20 FEET.
6. DUCTILE IRON PIPE TO EXTEND TO NEXT MANHOLE. NO PIPE TRANSITIONS BETWEEN MANHOLES SHALL BE ALLOWED.
7. CREEK CROSSINGS MAY REQUIRE A PERMIT FROM STATE AND/OR FEDERAL REGULATORY AGENCIES.



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**CREEK CROSSING
STEEL H-PILES**

STD. NO		DATE
6.06		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



NOTES:

1. THIS DETAIL APPLIES TO SEWERS RANGING FROM 8" TO 15" IN DIAMETER. FOR SEWERS GREATER THAN 15", SUBMIT A DETAILED DESIGN FOR REVIEW AND APPROVAL.
2. COUPLING SHALL BE LONG BODY TYPE, AND COMPLETELY EXPOSED. COUPLINGS TO BE AS MANUFACTURED BY DRESSER INDUSTRIES – STYLE 62 TRANSITION COUPLING OR APPROVED EQUAL. CENTER RING LENGTH FOR 10" TO 15" PIPE TO BE 7". THE CENTER RING, GLANDS, BOLTS AND NUTS SHALL RECEIVE ONE COAT OF SHOP PRIMER.
3. FOOTING DEPTH SHALL BE TO SUITABLE GRADE AS DETERMINED BY THE ENGINEER, BUT SHALL NOT BE LESS THAN AS SHOWN (EXCEPT WHEN PIER IS ANCHORED TO SOLID ROCK).
4. STEEL PIPE MUST BE SEAMLESS OR STRAIGHT SEAM. SPIRAL WELD IS NOT ALLOWED. THE INSIDE DIAMETER OF THE STEEL PIPE TO MATCH THE INSIDE DIAMETER OF DUCTILE IRON PIPE. STEEL PIPE TO BE COATED. DUCTILE IRON PIPE IS ALLOWED FOR NARROW CREEK CHANNELS SPANNING LESS THAN 18'.
5. DUCTILE IRON PIPE TO EXTEND TO NEXT MANHOLE. NO PIPE TRANSITIONS BETWEEN MANHOLES SHALL BE ALLOWED.
6. CREEK CROSSINGS MAY REQUIRE A PERMIT FROM STATE AND/OR FEDERAL REGULATORY AGENCIES.
7. THE CREEK UPSTREAM AND DOWNSTREAM OF THE AERIAL CROSSING MAY NEED TO BE STRAIGHTENED FOR PROPER INSTALLATION OF THE PIERS. APPROVAL MAY BE REQUIRED FROM REGULATORY AGENCIES TO STRAIGHTEN CREEK. STABILIZE ALL DISTURBED BANKS WITH RIP-RAP.



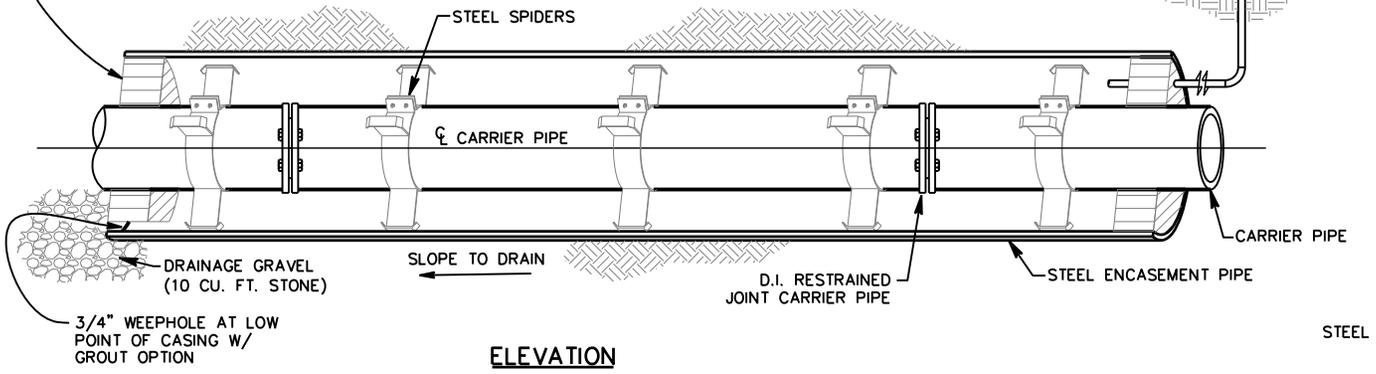
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**CREEK CROSSING
CONCRETE PIERS**

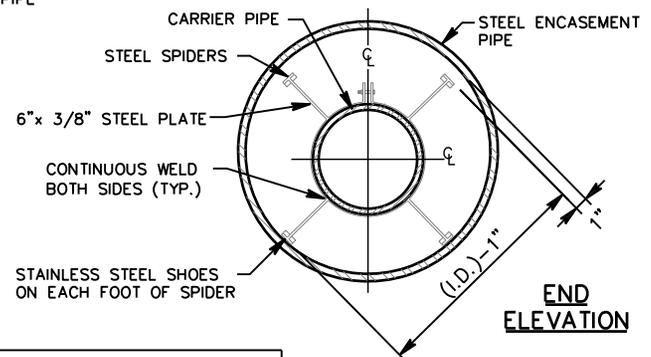
STD. NO		DATE
6.07		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

2" GALVANIZED VENT AT HIGH END OF CASING. VENT TO HAVE INSECT SCREEN WELDED TO END. VENT TO BE USED FOR ALL STREAM CROSSINGS. NOT REQUIRED FOR TYPICAL ROADWAY BORES.

USE APS MODEL AC PULL-ON END SEAL OR EQUIVALENT
OPTIONAL: COMPLETELY GROUT ENDS OF CASING PIPE. ADD A WEEP HOLE ON LOW SIDE FOR DRAINAGE.



ELEVATION



END ELEVATION

NOTES

1. METAL "SPIDERS" SHALL BE USED FOR SUPPORT OF THE CARRIER PIPE WITHIN THE CASING PIPE.
2. A MINIMUM SPACING OF 3 SPIDERS PER JOINT OF CARRIER PIPE SHALL BE REQUIRED.
3. THE SPIDERS SHALL BE SPACED EVENLY ALONG THE CARRIER PIPE SUCH THAT EACH SPIDER SUPPORTS THE SAME UNIT WEIGHT OF THE CARRIER MAIN.
4. PLACE SPIDERS BEHIND BELLS AND ALONG MID-SPAN OF PIPE.
5. FOR CASING SIZE SEE CHARTS.
6. STEEL CASING PIPE SHOULD BE GRADE B STEEL WITH A MINIMUM COMPRESSION STRENGTH OF 35,000 PSI IN ACCORDANCE WITH ASTM A139 & A283.
7. CARRIER PIPE IS TO BE D.I.P. RESTRAINED JOINT.
8. GREASE ENCASEMENT AS REQUIRED FOR EASE OF INSTALLATION.
9. HOT DIP GALVANIZE ALL STEEL ASSEMBLY PARTS AFTER FABRICATION.
10. CADMIUM PLATE ALL NUTS & BOLTS.

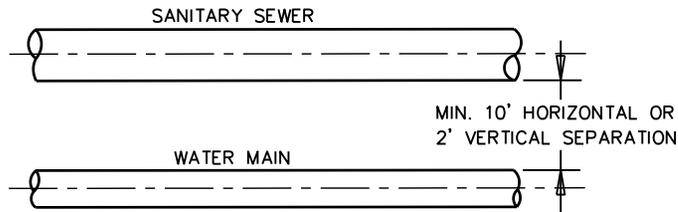
CARRIER PIPE		CASING PIPE			
		RAILROAD		HIGHWAY	
NOMINAL DIAMETER	OUTSIDE DIAMETER	OUTSIDE DIAMETER	WALL THICKNESS	OUTSIDE DIAMETER	WALL THICKNESS
6" & SMALLER	6.90"	12-3/4"	0.188"	12-3/4"	0.250"
8"	9.05"	16"	0.250"	16"	0.250"
10"	11.10"	20"	0.281"	20"	0.250"
12"	13.20"	24"	0.344"	24"	0.250"
14"	15.30"	28"	0.406"	28"	0.312"
16"	17.40"	30"	0.406"	30"	0.312"
20"	21.60"	42"	0.563"	42"	0.312"
24"	25.80"	42"	0.563"	42"	0.312"



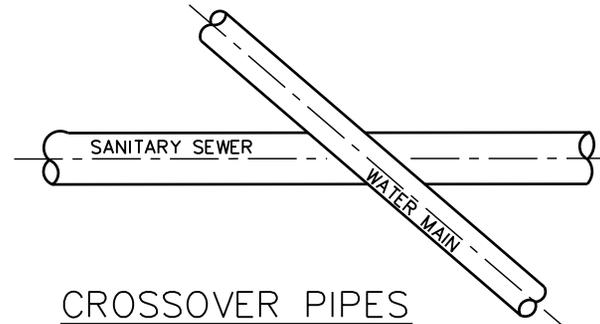
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**BORING ENCASUREMENT
STANDARD DETAIL**

STD. NO	DATE	
6.08	1/1/2021	
REVISIONS		
NO	DATE	DESCRIPTION



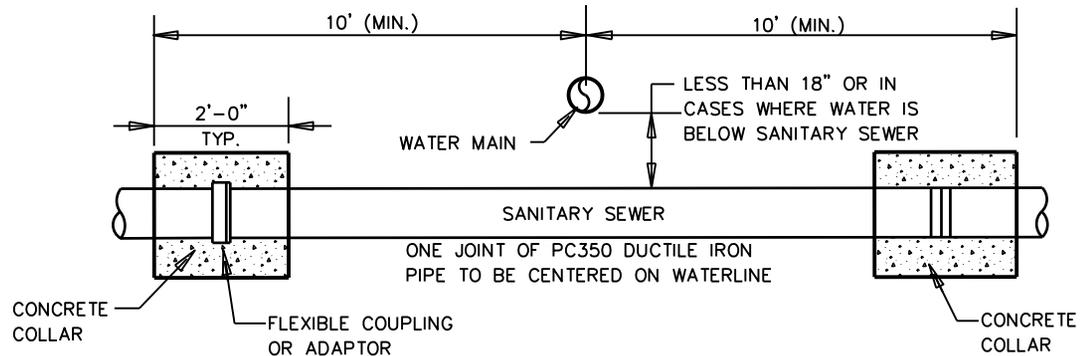
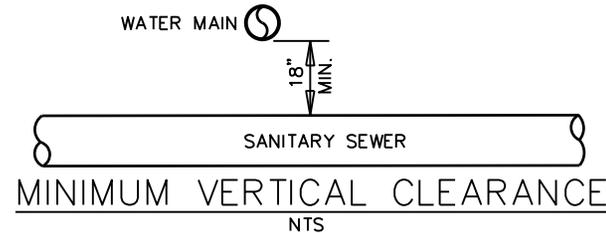
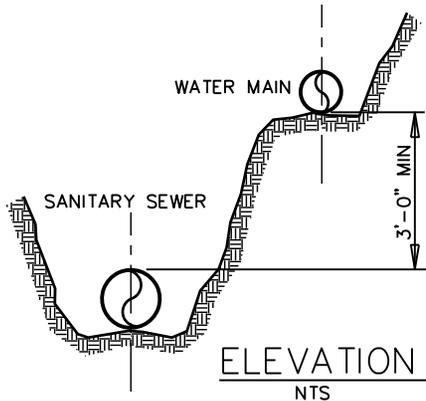
PARALLEL LINES
NTS



CROSSOVER PIPES
NTS

NOTES:

1. WHEN LATERAL SEPARATION IS 10' OR GREATER, NO VERTICAL CLEARANCE IS REQUIRED.



VERTICAL CLEARANCE LESS THAN MINIMUM
NTS

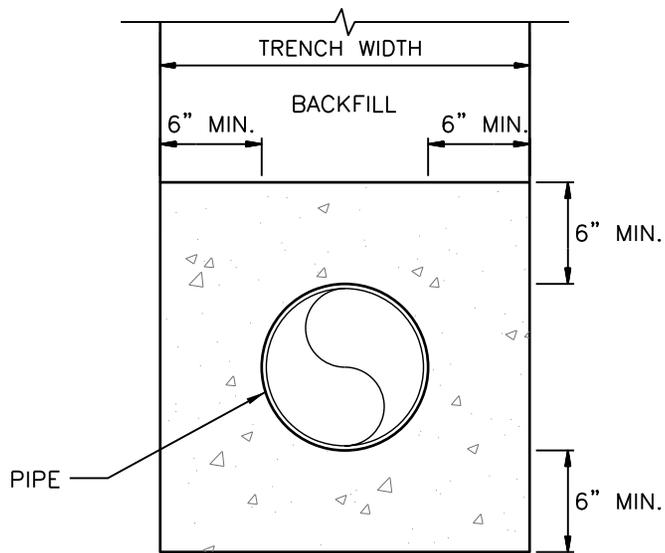
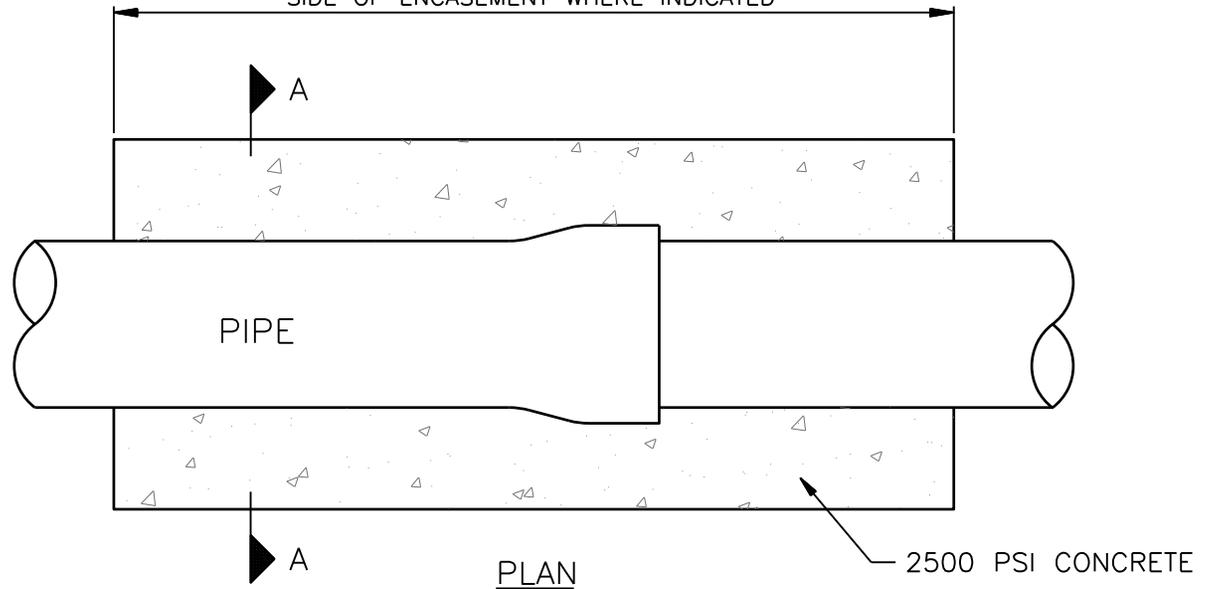


**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**PIPE SEPARATION REQUIREMENTS
FOR WATER MAINS &
SANITARY SEWER MAINS**

STD. NO		DATE
6.09		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

ENCASE PIPING WHERE INDICATED AND UNDER ROADS,
STRUCTURES, AND WITHIN LAGOONS, STREAMS OR POND DIKES TO
A POINT 12" BEYOND PERMANENT OBJECT ON EACH
SIDE OF ENCASEMENT WHERE INDICATED



SECTION "A-A"



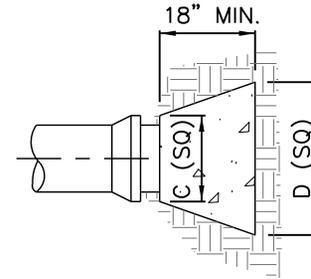
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

CONCRETE COLLAR STANDARD DETAIL

STD. NO		DATE
6.10		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

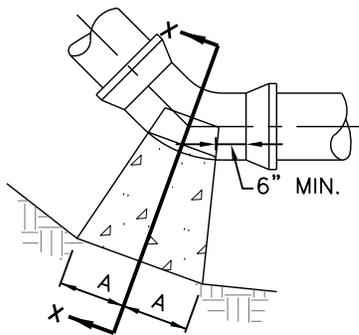
SIZE	1/4 BENDS		1/8 BENDS		1/16 BENDS		TEES		PLUGS	
	A	B	A	B	A	B	A	B	C	D
6"	16"	10"	9"	10"	6"	8"	10"	12"	10"	21"
8"	22"	13"	12"	13"	8"	10"	13"	16"	12"	29"
10"	26"	17"	14"	17"	10"	13"	16"	20"	14"	36"
12"	29"	21"	16"	21"	11"	16"	18"	24"	16"	41"
14"	35"	24"	19"	24"	12"	20"	22"	27"	18"	48"
16"	38"	27"	21"	27"	12"	24"	24"	30"	20"	54"

CONCRETE BLOCKING CHART



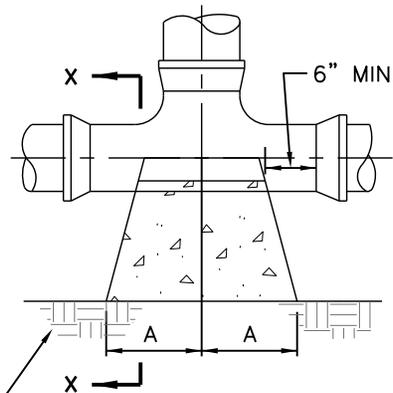
PLAN & ELEVATION-PLUGS

NTS



PLAN-BENDS

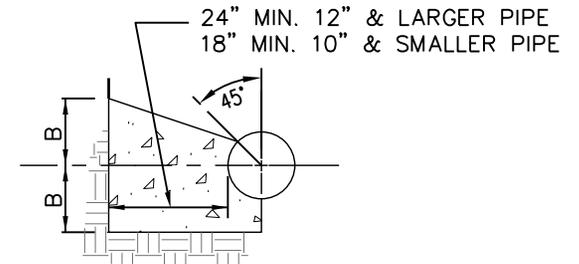
NTS



PLAN-TEES

NTS

COMPACTED OR
UNDISTURBED EARTH
(TYP)



SECTION X-X

NTS

NOTES: CONCRETE BLOCKING AT PLUGS IS TO BE PLACED ONLY WHEN CALLED FOR ON THE PLANS



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**BLOCKING
PIPE SIZES 6" - 16"**

STD. NO

DATE

6.11

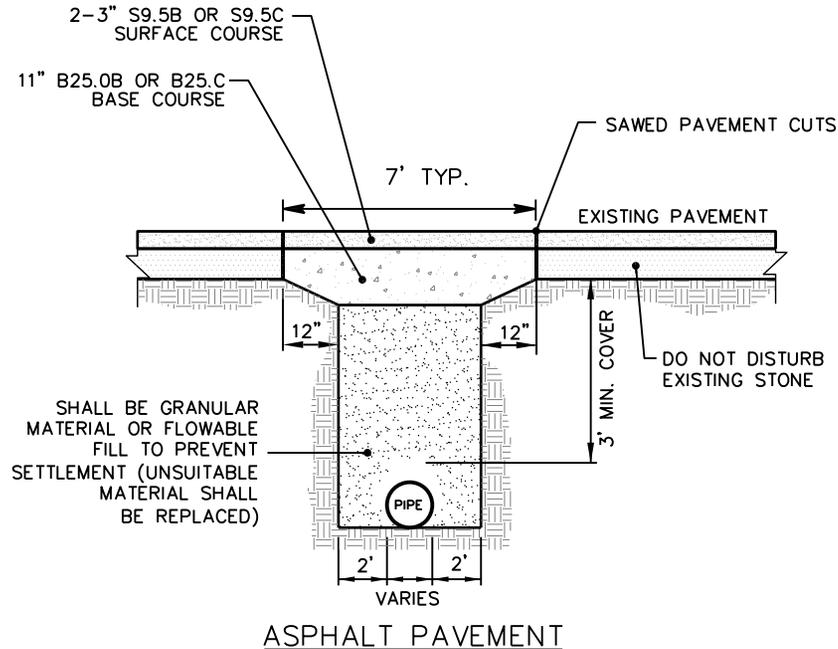
1/1/2021

REVISIONS

NO	DATE	DESCRIPTION

NOTES

1. ALL PAVEMENT CUTS SHALL BE REPAIRED WITHIN A MAXIMUM OF THREE (3) DAYS FROM THE DATE THE CUT IS MADE. IF CONDITIONS DO NOT PERMIT A PERMANENT REPAIR WITHIN THE GIVEN TIME LIMIT, PERMISSION TO MAKE A TEMPORARY REPAIR MUST BE OBTAINED FROM THE CITY ENGINEER.
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.



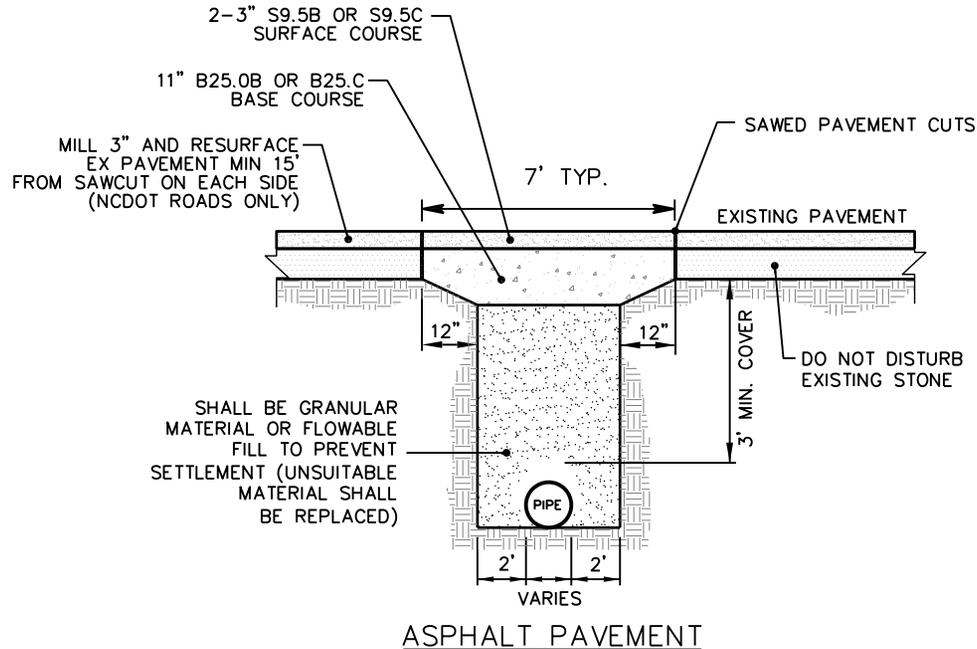
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**OPEN-CUT & REPAIR
(ASPHALT ROADWAY)**

STD. NO		DATE
6.15		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

NOTES

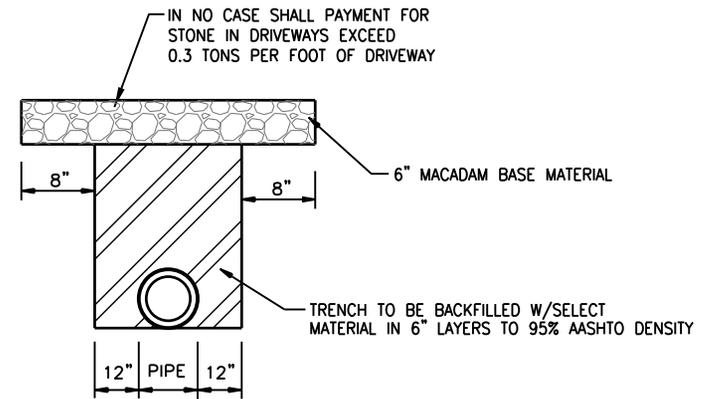
1. ALL PAVEMENT CUTS SHALL BE REPAIRED WITHIN A MAXIMUM OF THREE (3) DAYS FROM THE DATE THE CUT IS MADE. IF CONDITIONS DO NOT PERMIT A PERMANENT REPAIR WITHIN THE GIVEN TIME LIMIT, PERMISSION TO MAKE A TEMPORARY REPAIR MUST BE OBTAINED FROM THE CITY ENGINEER.
2. CONCRETE TRENCH CAP ON ASPHALT STREETS 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. SURFACE COURSE AND BASE COURSE MUST MEET SPECIFIED NCDOT REQUIREMENTS.
7. WHEN ASPHALT IS CUT INSIDE NCDOT ROADWAY CONTRACTOR IS TO MILL AND RESURFACE ENTIRE LANE WIDTH FROM A MINIMUM OF 15' FROM BOTH SIDES OF PAVEMENT CUT.



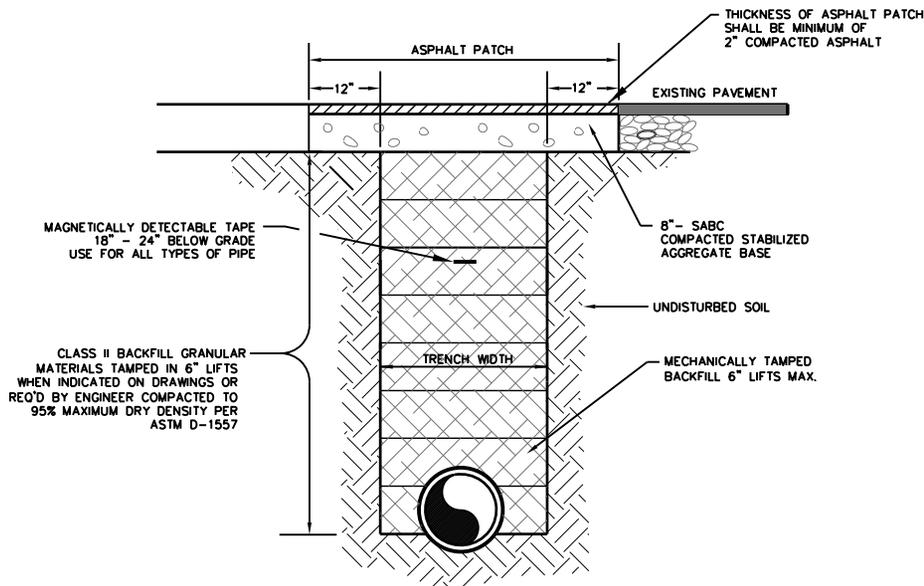
**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**OPEN-CUT & REPAIR
(NCDOT ROADWAY)**

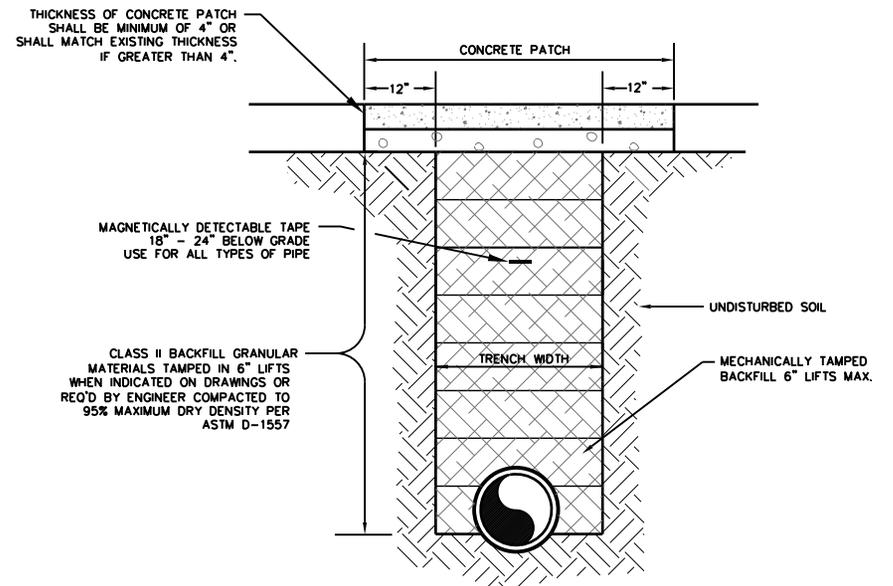
STD. NO		DATE
6.16		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



GRAVEL DRIVEWAY



ASPHALT DRIVEWAY



CONCRETE DRIVEWAY



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**OPEN-CUT & REPAIR
(DRIVEWAYS)**

STD. NO		DATE
6.17		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION

RESTRAINT JOINT TABLE

**RESTRAIN ALL JOINTS WITHIN THESE LENGTHS
(IN L.F. EACH SIDE OF THE BEND)**

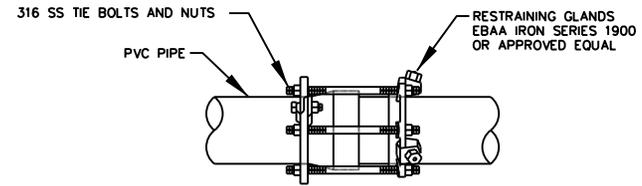
SIZE	11 1/4'	22 1/2'	45'	90'	TEE BRANCH	DEAD END	REDUCER
4"	2	4	7	16	30	30	22
6"	3	5	10	23	42	42	24
8"	3	6	13	30	56	56	24
10"	4	8	15	36	67	67	24
12"	5	9	18	43	80	80	45
16"	6	11	23	55	105	105	45
20"	7	14	67	90	128	128	46
24"	8	16	33	78	152	152	65

NOTES:

THE FOLLOWING CONDITIONS WERE USED TO CALCULATE THE RESTRAINED LENGTHS:

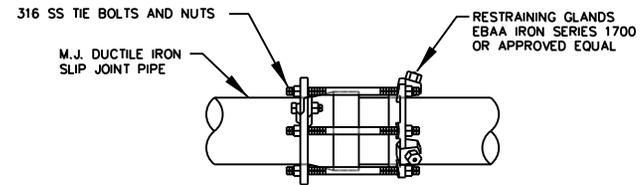
- LAYING CONDITION IS TYPE 3;
- SOIL DESIGNATED AS CLAY;
- DEPTH IS 3 FT.;
- DESIGN PRESSURE (TEST) IS 150 PSI;
- SAFETY FACTOR IS 1.5.

FOR THE TEE BRANCH AND REDUCER, LENGTHS ARE BASED ON BRANCHING AND REDUCING FROM THE NEXT LARGER SIZE IN THE TABLE. DEVIATIONS FROM THESE CONDITIONS MUST BE BASED ON THE ABOVE PARAMETERS.



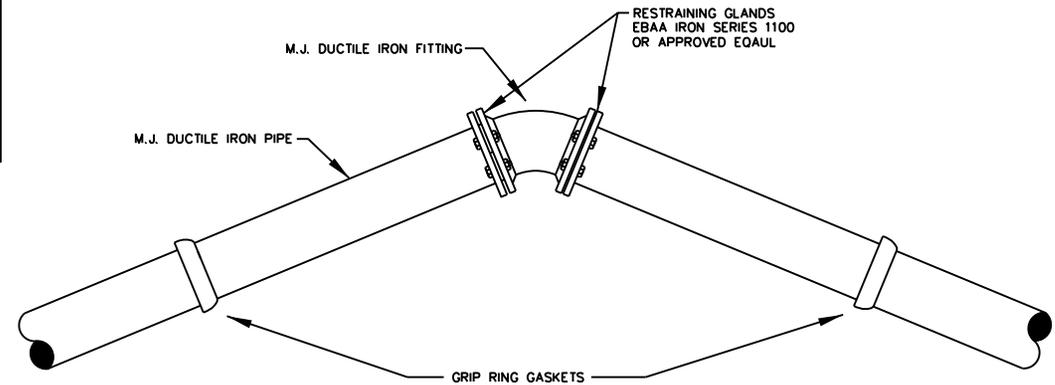
NOTE: CLAMP ASSEMBLY TO BE POLYWRAPPED AND TAPED.

PVC BELL JOINT RESTRAINT



NOTE: CLAMP ASSEMBLY TO BE POLYWRAPPED AND TAPED.

D.I. BELL JOINT RESTRAINT



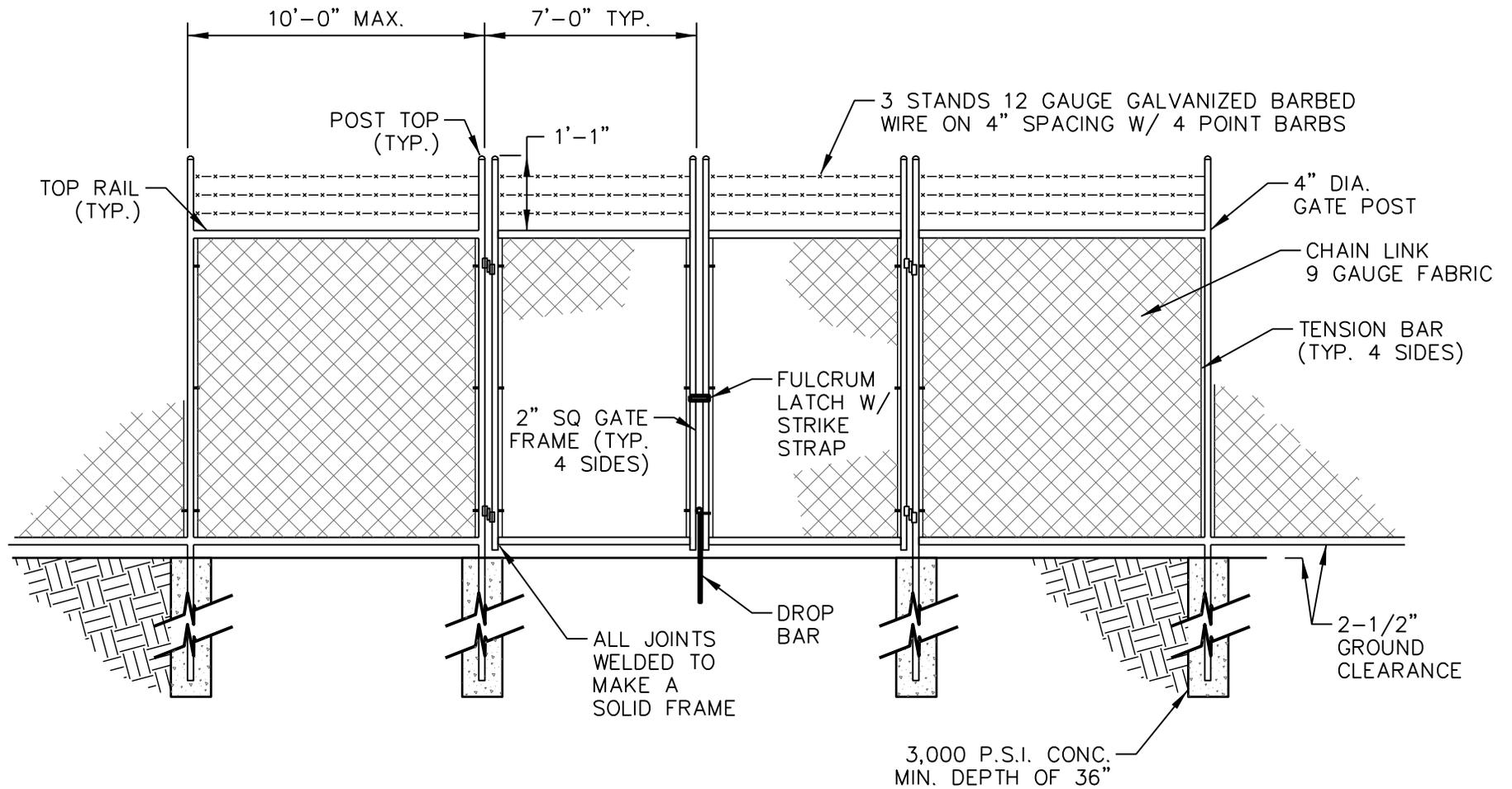
RESTRAINED JOINT



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

**RESTRAINED JOINT
STANDARD DETAIL**

STD. NO		DATE
6.18		1/1/2021
REVISIONS		
NO	DATE	DESCRIPTION



**CITY OF KINGS MOUNTAIN
WATER RESOURCES
STANDARDS**

CHAIN LINK FENCING STANDARD DETAIL

STD. NO

DATE

7.01

1/1/2021

REVISIONS

NO	DATE	DESCRIPTION