

# STANDARD DETAILS OF SEWER CONSTRUCTION

FOR

ROCK CREEK PUBLIC SEWER DISTRICT  
JEFFERSON COUNTY, MISSOURI



JUNE, 2016  
REVISED APRIL 2020



STANDARD DETAILS OF SEWER CONSTRUCTION  
 ROCK CREEK PUBLIC SEWER DISTRICT  
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**GENERAL REQUIREMENTS:**

1. DESIGNS, PLANS AND SPECIFICATIONS OF ALL SEWERAGE AND DRAINAGE WORKS PROPOSED TO BE CONSTRUCTED, ALTERED OR RECONSTRUCTED BY ANY PERSON OR CORPORATION , PRIVATE OR PUBLIC, WITHIN DISTRICT BOUNDARIES, SHALL BE SUBMITTED TO THE DISTRICT FOR REVIEW, REVISION, APPROVAL OR REJECTION. SUCH DESIGNS, PLANS AND SPECIFICATIONS SHALL BE PREPARED AND SEALED BY A PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF MISSOURI, AND SHALL MEET THE MINIMUM STANDARDS OF THE DISTRICT AND MISSOURI DEPARTMENT OF NATURAL RESOURCES BEFORE APPROVAL IS GRANTED.
2. CONSTRUCTION PLAN SHEETS MUST INCLUDE TOPOGRAPHICAL INFORMATION WITH SUFFICIENT DETAIL TO SHOW PROPOSED CONTOURS, DRAINAGE DITCHES AND STREAMS.
3. COMPACTION REPORTS SHALL BE SUBMITTED TO THE DISTRICT BEFORE ANY CONSTRUCTION OF SANITARY SEWERS BEGINS.
4. IF ANYONE FAILS TO MEET THE DISTRICTS SPECIFICATIONS OR FAILS TO OBTAIN THE REQUIRED INSPECTION CRITERIA, THEY ARE SUBJECT TO DISCONNECTION FROM THE SEWER SYSTEM AT THE EXPENSE OF THE CUSTOMER OR PERSON CONDUCTING WORK FOR THE CUSTOMER. IF YOU HAVE ANY QUESTIONS PLEASE CONTACT THE DISTRICT BEFORE THE WORK BEGINS.
5. IF YOU HAVE ANY QUESTIONS REGARDING THESE SPECIFICATIONS, PLEASE CONTACT ROCK CREEK PUBLIC SEWER DISTRICT AT 636-464-3305 OR 636-461-2578.

**GENERAL REQUIREMENTS**

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

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## MANHOLE SPECIFICATIONS

1. MANHOLES SHALL BE PRECAST CONCRETE AS APPROVED BY THE DISTRICT AND CONFORM TO ASTM C-478. MANHOLES SHALL BE FABRICATED USING A WET POURED AND VIBRATED PROCESS. ALL EXTERIOR PRECAST SURFACES SHALL BE COATED WITH A BLACK BITUMINOUS WATERPROOF COATING. ALL PRECAST SECTIONS SHALL HAVE CURED UNDISTURBED A MINIMUM OF 14 DAYS PRIOR SHIPPING TO JOBSITE.
2. ALL MANHOLE PIPE CONNECTIONS SHALL BE MADE USING DISTRICT APPROVED "A-LOCK" OR "Z-LOCK" FLEXIBLE GASKET CONNECTIONS. "Z-LOCK" CONNECTIONS SHALL BE BANDED ON THE INSIDE OF THE MANHOLE.
3. STANDARD MANHOLE FRAME AND COVER SHALL BE EAST JORDAN IRON WORKS 1045Z1 FRAME AND 1040 AGS SOLID SELF-SEALING (NEOPRENE GASKET) COVER WITH CONCEALED EPIC PICK BAR, OR DISTRICT APPROVED EQUAL. MANHOLE FRAME AND COVER TO BE USED IN FLOOD-PRONE AREAS, OR WHERE REQUIRED BY DISTRICT, SHALL BE EAST JORDAN IRON WORKS 1045ZPT FRAME WITH BOLT HOLES AND 1040APT BOLT-DOWN EON LOCK (WITH NEOPRENE WASHERS), SOLID SELF-SEALING (NEOPRENE GASKET) COVER WITH CONCEALED EPIC PICK BAR, OR DISTRICT APPROVED EQUAL. THE COVER SHALL BE MARKED "SEWER". COVERS WITH NAMES FROM OTHER SEWER AGENCIES OR DISTRICTS WILL NOT BE PERMITTED.
4. OUTSIDE DROPS WILL BE REQUIRED WHEN INCOMING SEWER FLOWLINE IS GREATER THAN 24 INCHES ABOVE MANHOLE FLOWLINE.
5. MANHOLE BARREL SECTIONS SHALL HAVE A MINIMUM INSIDE DIAMETER OF 48" FOR SEWERS WITH PIPE DIAMETERS LESS THAN 24" AND A MINIMUM INSIDE DIAMETER OF 60" FOR SEWERS WITH PIPE DIAMETERS OF 24" TO 60".
6. WHEN REQUIRED BY DISTRICT, TERMINAL MANHOLES SHALL HAVE A MINIMUM 5' PIPE STUB-OUT WITH WATER-TIGHT CAP ALLOW FOR FUTURE EXPANSION OF SEWER MAIN.
7. MANHOLES UNDER CONSTRUCTION ARE TO BE COVERED AT THE END OF EACH DAY WITH DISTRICT APPROVED WOOD SHEETING TO PREVENT DEBRIS FROM FALLING INTO THE MANHOLE.
8. MANHOLE INVERTS SHALL BE GROUTED WITH HYDRAULIC NON-SHRINK CEMENT. THIS SHALL NOT TAKE PLACE UNTIL ALL VACUUM TESTING HAS BEEN COMPLETED. MASONRY OR HYDRAULIC CEMENT SHALL BE USED TO GROUT INVERTS, DROPS, AND PICK HOLES.
9. MANHOLES MAY BE CORE DRILLED, BUT MUST BE APPROVED BY THE DISTRICT PRIOR TO THE WORK BEING DONE. ROTARY HAMMERS ARE NOT ALLOWED FOR CORE DRILLING. DISTRICT APPROVED WATERTIGHT SEALS SHALL BE INSTALLED AT THESE LOCATIONS.
10. AT MANHOLE LOCATIONS WHERE A NEW MAIN LINE SEWER IS TO BE EXTENDED, THE EXISTING MANHOLE SHALL BE REMOVED AND REPLACED WITH A NEW MANHOLE.
11. ALL MANHOLES MUST BE GROUTED AROUND THE LOWER 1/2 OF THE PIPE TO ALLOW FOR A SELF-CLEANING SLOPE. NON SHRINK, NON METALLIC HYDRAULIC CEMENT SHALL BE USED.
12. UNLESS OTHERWISE APPROVED BY THE DISTRICT, THE TOP OF THE MANHOLE COVER SHALL BE SET 8" ABOVE FINISHED GRADE. THE DISTRICT WILL ONLY CONSIDER APPROVAL OF SETTING THE TOP OF THE MANHOLE COVER FLUSH WITH FINISHED GRADE IF THE SURROUNDING GROUND LINE SLOPES AWAY FROM THE MANHOLE.
13. MANHOLE MARKERS SHALL BE USED DURING CONSTRUCTION SHOWING LOCATION OF MANHOLE. THEY SHALL NOT BE REMOVED UNTIL THE CONSTRUCTION OF ALL HOMES IN THE SUBDIVISION IS COMPLETE.
14. DISTRICT INSPECTORS SHALL REJECT MANHOLES IF SEALING SURFACE IS DAMAGED OR CHIPPED. THIS DETERMINATION IS AT THE SOLE DISCRETION OF THE DISTRICT'S INSPECTOR.
15. INSIDE DROPS ARE ALLOWED IN MANHOLES WITH MINIMUM INSIDE DIAMETER 48 INCHES. REFER TO STANDARD DETAIL.
16. ALL MANHOLES LOCATED IN FLOOD PRONE AREAS AND REQUIRING A WATERTIGHT FRAME AND COVER SHALL BE CONSTRUCTED WITH A CONCRETE ANCHOR AS INDICATED ON THE STANDARD DETAILS. MANHOLE SHALL PASS VACUUM TEST PRIOR TO INSTALLING THE CONCRETE ANCHOR.
17. SEWER LINES WITH GRADES GREATER THAN 25% SHALL BE INSTALLED DIRECTLY INTO THE MANHOLE WITH A CONCRETE ABUTMENT TO KEEP THE PIPE FROM SLIDING INTO THE MANHOLE AS SHOWN IN THE STANDARD DETAILS. THIS TYPE OF CONNECTION WILL BE APPROVED BY THE DISTRICT ON A CASE BY CASE BASIS.

## MANHOLE SPECIFICATIONS

## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

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MATCH  
PAVEMENT  
GRADE & SLOPE  
OR AS DIRECTED.

ADJUST TO GRADE WITH  
APPROVED GRADE RINGS  
(2'-6" GRADE RINGS MAX.)

PRECAST CONICAL TOP SECTION  
COPOLYMER POLYPROPYLENE  
PLASTIC MANHOLE STEPS @  
16" C.C VERTICALLY

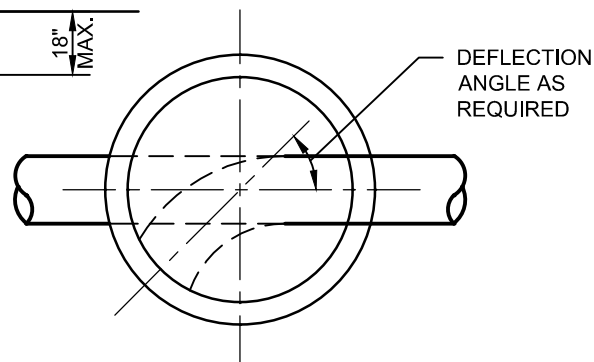
AREA OF  
CIRCUMFERENTIAL  
STEEL=.12 SQ. IN./LIN. FT.

2 ROWS OF 1"  
BUTYL ROPE

BITUMASTIC COATING  
FOR WATER PROOFING

PRECAST MANHOLE BASE  
A-LOCK OR Z-LOCK

C.I. FRAME & COVER WITH  
"SEWER" CAST IN COVER

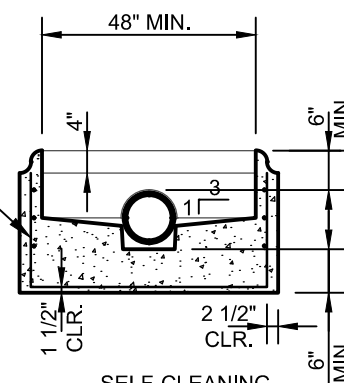


**MANHOLE BASE PLAN**

LIFTING HOLE SHALL NOT  
PENETRATE WALL. PLUG HOLES  
W/ NON-SHRINK GROUT

5" MIN.  
WALL THICKNESS

AREA OF  
REINFORCING  
STEEL = .12 SQ.  
IN./LIN. FT.



**BASE SECTION**

**(FOR SEWERS 8" AND LARGER)**

**NOTES:**

1. FLOWLINE ELEVATION OF INCOMING PIPES SHALL BE MINIMUM ONE (1) INCH HIGHER THAN THAT OF OUTGOING PIPE FOR SELF CLEANING INVERT.
2. P.V.C. PIPE ONLY, APPROVED BY ROCK CREEK PUBLIC SEWER DIST.
3. SEE A.S.T.M. C-478 FOR MIN. REQUIREMENTS.
4. TERMINAL MANHOLES SHALL HAVE A 5' STUB-OUT WITH WATERTIGHT CAP ONLY WHEN THE DISTRICT REASONABLY BELIEVES THE ADJOINING PROPERTIES WILL BE SERVED BY SUCH A STUB-OUT.

**PRECAST CONCRETE MANHOLE**

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

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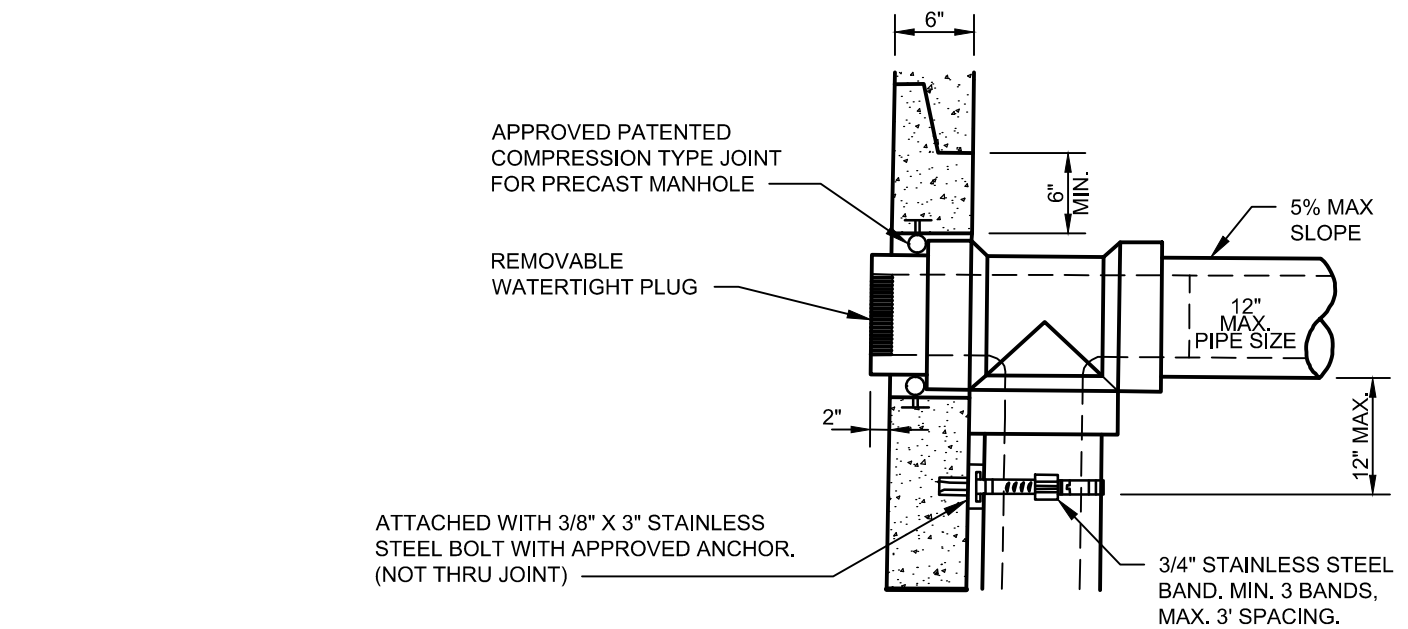
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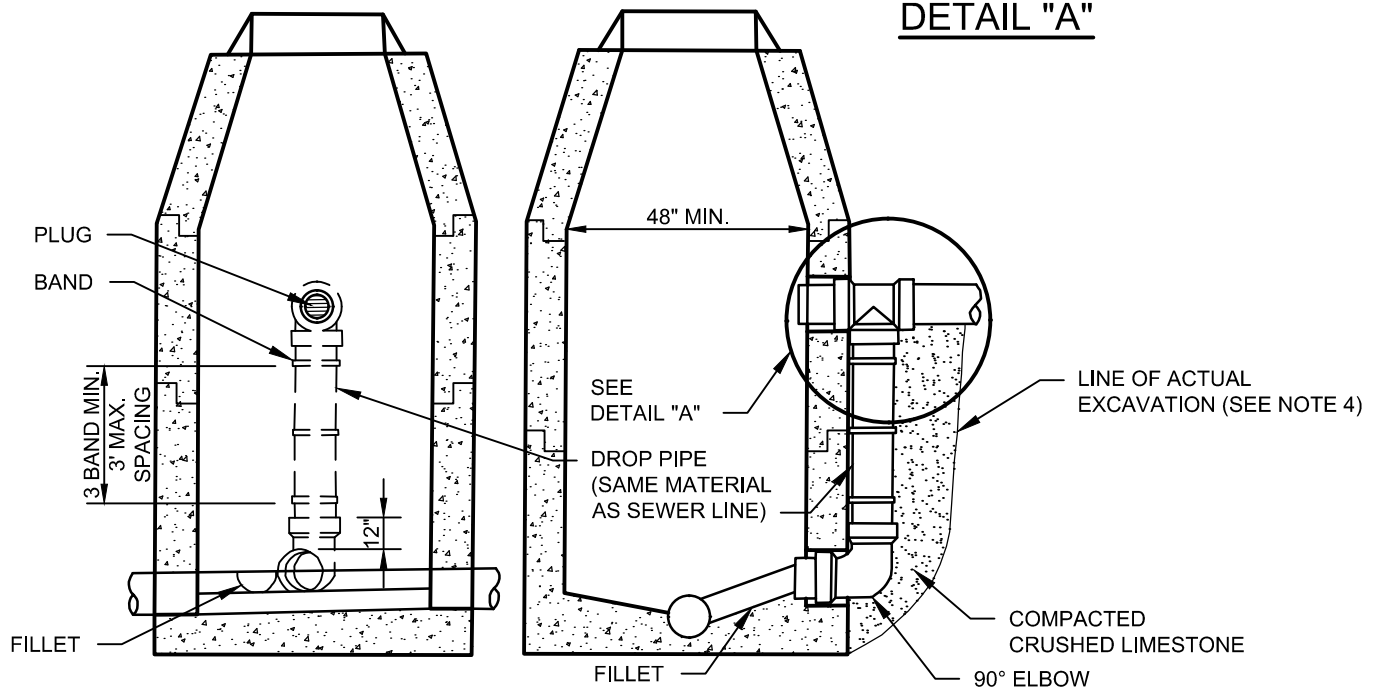
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**DETAIL "A"**



**TYPICAL SECTIONS**

N.T.S

**NOTES:**

1. THE MINIMUM INSIDE DIAMETER FOR THE BASE AND RISER SECTIONS SHALL BE 48" FOR SEWERS LESS THAN 24" AND A MINIMUM INSIDE DIAMETER OF 60" FOR ALL SEWERS OF 24" TO 36".
2. NEW OUTSIDE DROP ON EXISTING MANHOLE REQUIRES THAT THE FLOWLINE OF THE NEW DROP PIPE ELBOW BE CONSTRUCTED AT THE SAME ELEVATION AS THE SPRINGLINE OF THE EXISTING SEWER MAIN AT THE CENTER OF THE EXISTING MANHOLE. A CLASS "A" CONCRETE FILLET AND INVERT SHALL BE CONSTRUCTED FOR DROP PIPE.
3. DIAMETER OF DROP PIPE IS SAME AS INCOMING 8", 10" OR 12" PIPE SEWER UNLESS OTHERWISE SHOWN ON PROJECT PLANS. FOR SEWERS 15" THROUGH 24", A DROP IS NOT TO BE USED. RATHER, CONNECT TO MANHOLE AT OR WITHIN 24" ABOVE IT'S FLOWLINE.
4. IF EXCAVATED SPACE OUTSIDE OF DROP PIPE EXCEEDS ONE (1) FOOT, PROVIDE 6" CLASS "A" CONCRETE ENCASMENT ON INCOMING LINE FROM WALL OF MANHOLE TO A MINIMUM OF TWO (2) FEET INTO UNDISTURBED EARTH WITH A MINIMUM OF 4- #4 REBARS FOR LENGTH OF ENCASMENT OR INSTALL ONE (1) LENGTH OF D.I.P. FROM "TEE" FITTING INTO UNDISTURBED EARTH.

**OUTSIDE DROP MANHOLE**

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

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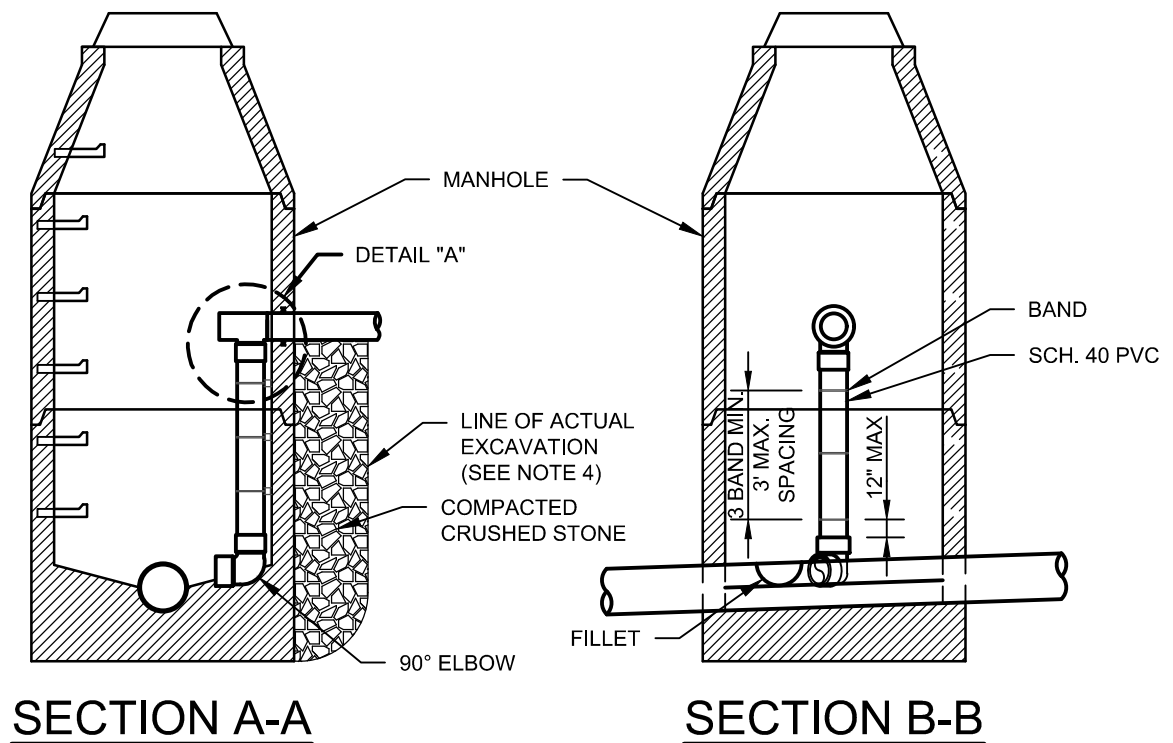
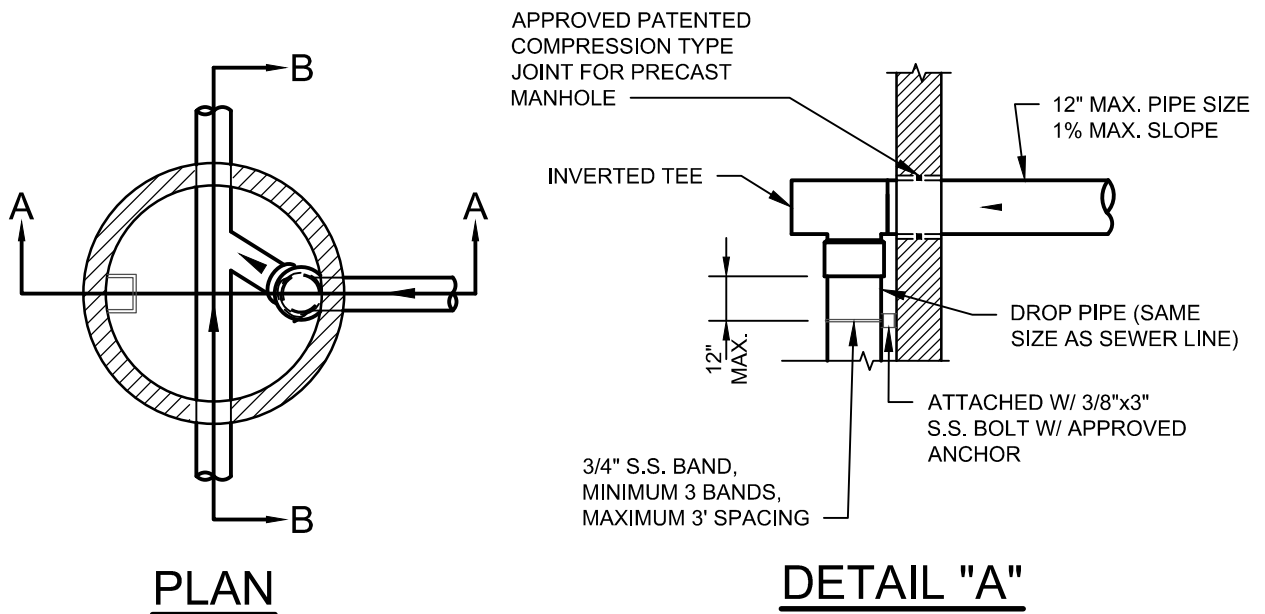
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**NOTES:**

1. NEW INSIDE DROP ON EXISTING MANHOLE REQUIRES THAT THE FLOWLINE OF THE NEW DROP PIPE ELBOW BE CONSTRUCTED AT THE SAME ELEVATION AS THE SPRINGLINE OF THE EXISTING SEWER MAIN AT THE CENTER OF THE EXISTING MANHOLE.
2. FOR NEW MANHOLES THE MINIMUM INSIDE DIAMETER FOR THE BASE AND RISER SECTIONS SHALL BE 48 INCHES FOR 8" AND 10" SEWERS AND MINIMUM INSIDE DIAMETER SHALL BE 60 INCHES FOR 12" SEWERS.
3. IF EXCAVATED SPACE OUTSIDE OF MANHOLE WALL EXCEEDS ONE FOOT, PROVIDE SIX INCHES OF CLASS "A" CONCRETE ENCASEMENT ON INCOMING LINE FROM WALL OF MANHOLE TO A MINIMUM OF TWO FEET INTO UNDISTURBED EARTH WITH A MINIMUM OF 4-#4 REBARS FOR LENGTH OF ENCASEMENT OR INSTALL ONE (1) LENGTH OF D.I.P. FROM MANHOLE INTO UNDISTURBED EARTH.

**INSIDE DROP MANHOLE**

**ROCK CREEK PUBLIC SEWER DISTRICT  
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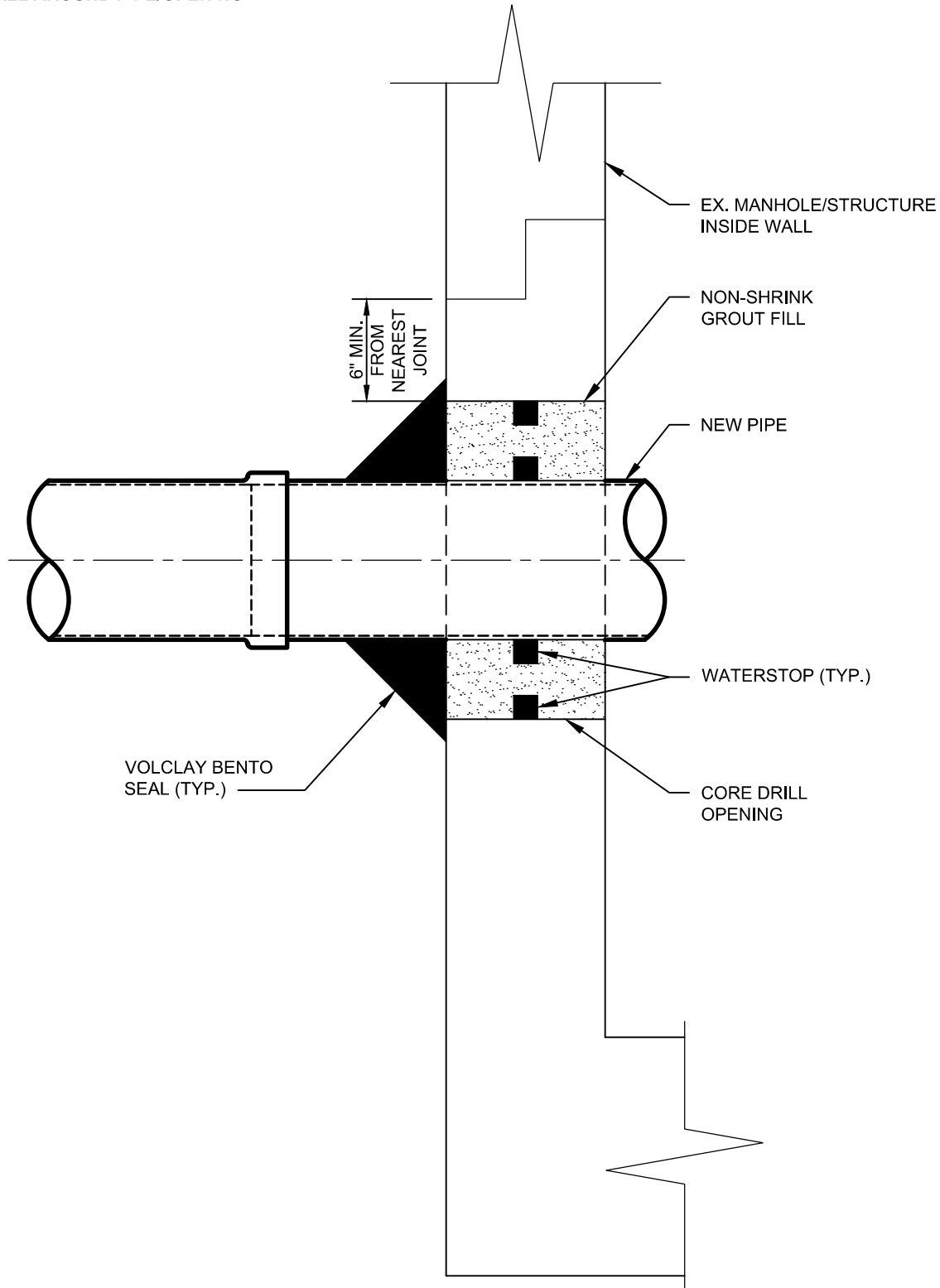
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**NOTES:**

WATERSTOPS SHALL BE "VOLCLAY WATERSTOP-RX,"  
"GREENSTREAK HYDROTITE," OR EQUAL PLACED IN CONTINUOUS  
STRIPS ALL AROUND PIPE/OPENING.



NEW PIPE CONNECTION TO EXISTING MANHOLE

NEW PIPE CONNECTION TO  
EXISTING MANHOLE

**ROCK CREEK PUBLIC SEWER DISTRICT  
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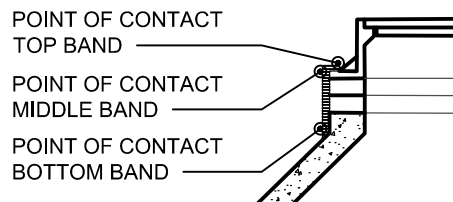
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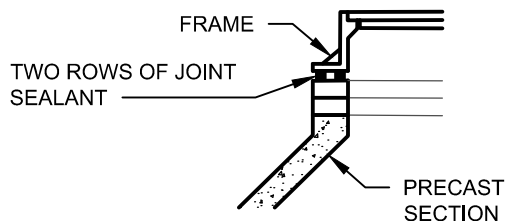
JOINT SEALANT AND AN EXTERIOR JOINT SEAL SHALL BE INSTALLED ON ALL SANITARY PRECAST CONCRETE MANHOLES AND PUMP STATIONS JOINTS AS DETAILED ON THIS SHEET TO PREVENT GROUNDWATER INFILTRATION.

1. **JOINT SEALANT** - CLEAN ALL JOINT SURFACES (REMOVE ALL DIRT, OIL, DEBRIS AND OTHER FOREIGN ITEMS) AND PROVIDE ADDITIONAL PRIMER IF RECOMMENDED BY JOINT SEALANT MANUFACTURER. THE APPROVED JOINT SEALANT MATERIAL AND MANHOLE SURFACES SHALL BE DRY DURING INSTALLATION. JOINT SEALANT SHALL BE APPLIED TO BOTH TOP AND BOTTOM JOINT SURFACES. THE JOINT SEALANT SHALL BE INSTALLED CONTINUOUSLY AROUND ALL JOINTS WITH THE ENDS PLACED BUTT TO BUTT (NOT OVERLAPPED AND NO OPEN GAPS BETWEEN SEALANTS). THE EXCESS JOINT SEALANT SHALL BE TRIMMED FLUSH TO BOTH INSIDE AND OUTSIDE SURFACES OF THE MANHOLE. TWO ROWS OF JOINT SEALANT SHALL BE APPLIED BETWEEN FRAME AND PRECAST SECTION.
2. **EXTERNAL JOINT SEAL** - THE EXTERNAL JOINT SEALS SHALL BE MAC WRAP EXTERNAL JOINT SEALERS AS MANUFACTURED BY MARMAC CONSTRUCTION PRODUCTS, INC. OR APPROVED EQUAL. EXTERNAL JOINT SEALS SHALL CONSIST OF A COLLAR A MINIMUM 12" WIDE WITH AN OUTER LAYER OF POLYETHYLENE, WITH A MINIMUM TENSILE STRENGTH OF 4000 PSI AND A MINIMUM TEAR RESISTANCE OF 1,500 PSI, AND AN UNDER LAYER OF RUBBERIZED MASTIC THAT IS REINFORCED WITH A WOVEN POLYPROPYLENE FABRIC. TWO 5/8" INCH STEEL STRAPS WITH SELF-CONTAINED TENSIONING RATCHETS SHALL BE LOCATED WITHIN THE COLLAR 3/4" INCHES FROM EACH EDGE. THE STRAPS SHALL BE CONFINED IN TUBES THAT ISOLATE THEM FROM THE MASTIC AND ALLOW THEM TO SLIP FREELY WHEN MECHANICALLY TIGHTENED AROUND MANHOLE. THE COLLAR SHALL BE FURNISHED WITH A MINIMUM 8 INCH OVERLAP AND A CLOSING FLAP TO COVER ANY REMAINING EXPOSED STRAP.
3. **EXTERNAL CHIMNEY SEAL** - THE EXTERNAL CHIMNEY SEAL SHALL BE MAR MAC CHIMNEY WRAP AS MANUFACTURED BY MAR MAC CONSTRUCTION PRODUCTS, INC. OR APPROVED EQUAL. CHIMNEY SEAL SHALL CONSIST OF A COLLAR A MINIMUM 14" WIDE WITH TWO LAYERS OF WOVEN POLYPROPYLENE FABRIC CONFORMING TO ASTM D-1682 AND RUBBERIZED MASTIC. THREE STAINLESS STEEL HOSE CLAMPS SHALL BE CONFINED IN TUBES THAT ISOLATE THEM FROM THE MASTIC AND ALLOW THEM TO SLIP FREELY WHEN MECHANICALLY TIGHTENED AROUND MANHOLE. A SECOND LAYER OF RUBBERIZED MASTIC SHALL COVER THE ENTIRE INTERNAL SURFACE OF COLLAR. THE COLLAR SHALL BE FURNISHED WITH A MINIMUM 6 INCH OVERLAP.
4. **INTERNAL CHIMNEY SEAL (ALTERNATE)** - TO BE USED WHEN EXTERNAL CHIMNEY SEAL IS LOCATED ABOVE GRADE OR WHEN PRECAST/FRAME CONFIGURATION DOES NOT ALLOW FOR PROPER INSTALLATION OF EXTERNAL CHIMNEY SEAL (I.E. FLAT TOP MANHOLE WHERE THE OUTSIDE DIAMETER DIFFERENCES EXCEED MANUFACTURE'S RECOMMENDED LIMITS.) OR AS APPROVED BY DISTRICT. THE INTERNAL CHIMNEY SEAL SHALL BE LSS INTERNAL CHIMNEY SEAL AS MANUFACTURED BY CRETEX SPECIALTY PRODUCTS OR APPROVED EQUAL. THE CHIMNEY SEAL SLEEVE SHALL BE MOLDED FROM HIGH GRADE RUBBER CONFORMING TO ASTM C-923, WITH A 1,500 PSI TENSILE STRENGTH. EXPANSION BANDS SHALL BE INTEGRALLY FORMED FROM 16 GA 304 STAINLESS STEEL WITH A LOCK MECHANISM TO SECURE BAND.

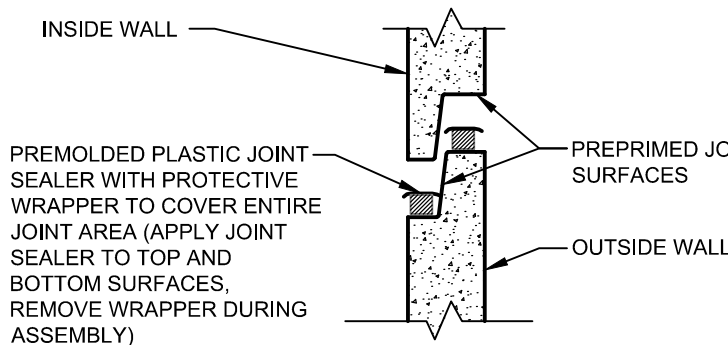
ALL SEALS SHALL BE SIZED SPECIFICALLY FOR STRUCTURES BY MANUFACTURER TO ENSURE COMPRESSION BANDS ARE PROPERLY PLACED TO MAKE A WATERTIGHT SEAL.



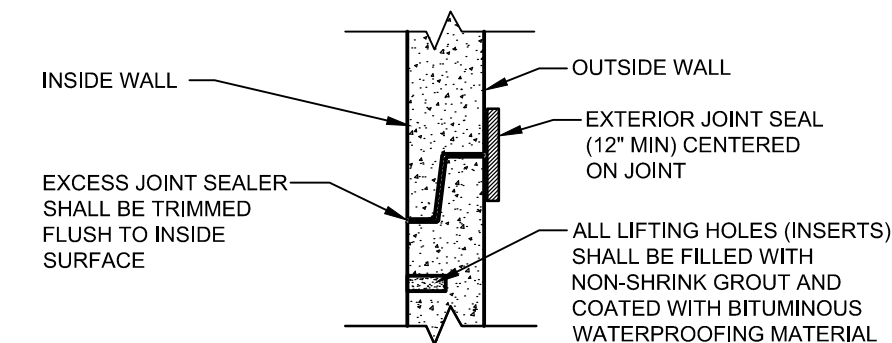
**EXTERNAL CHIMNEY SEAL DETAIL**



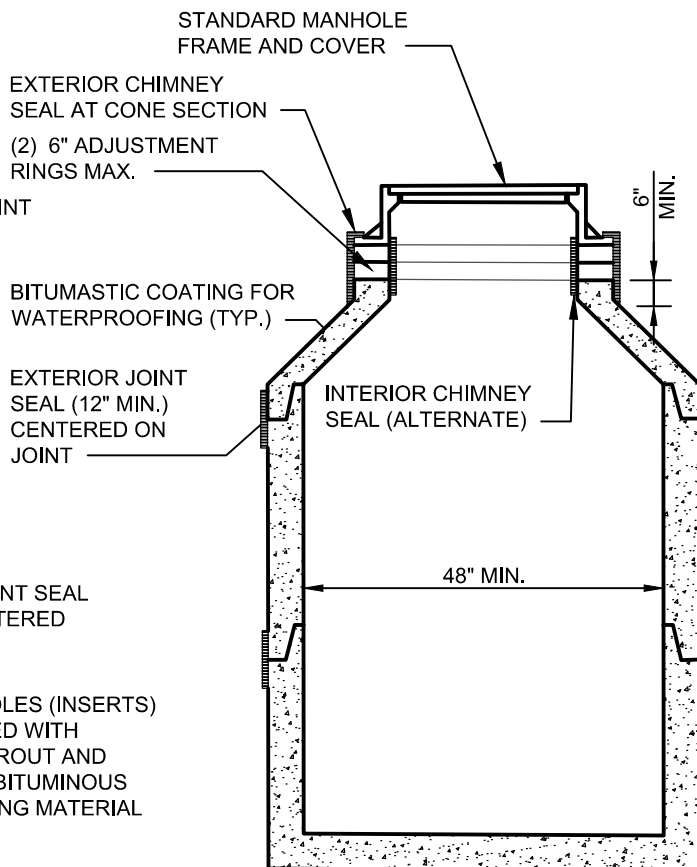
**FRAME ASSEMBLY DETAIL**



**JOINT ASSEMBLY DETAIL**



**COMPLETED JOINT DETAIL**



**PRECAST JOINT SEALANT AND  
SEALS**

**ROCK CREEK PUBLIC SEWER DISTRICT  
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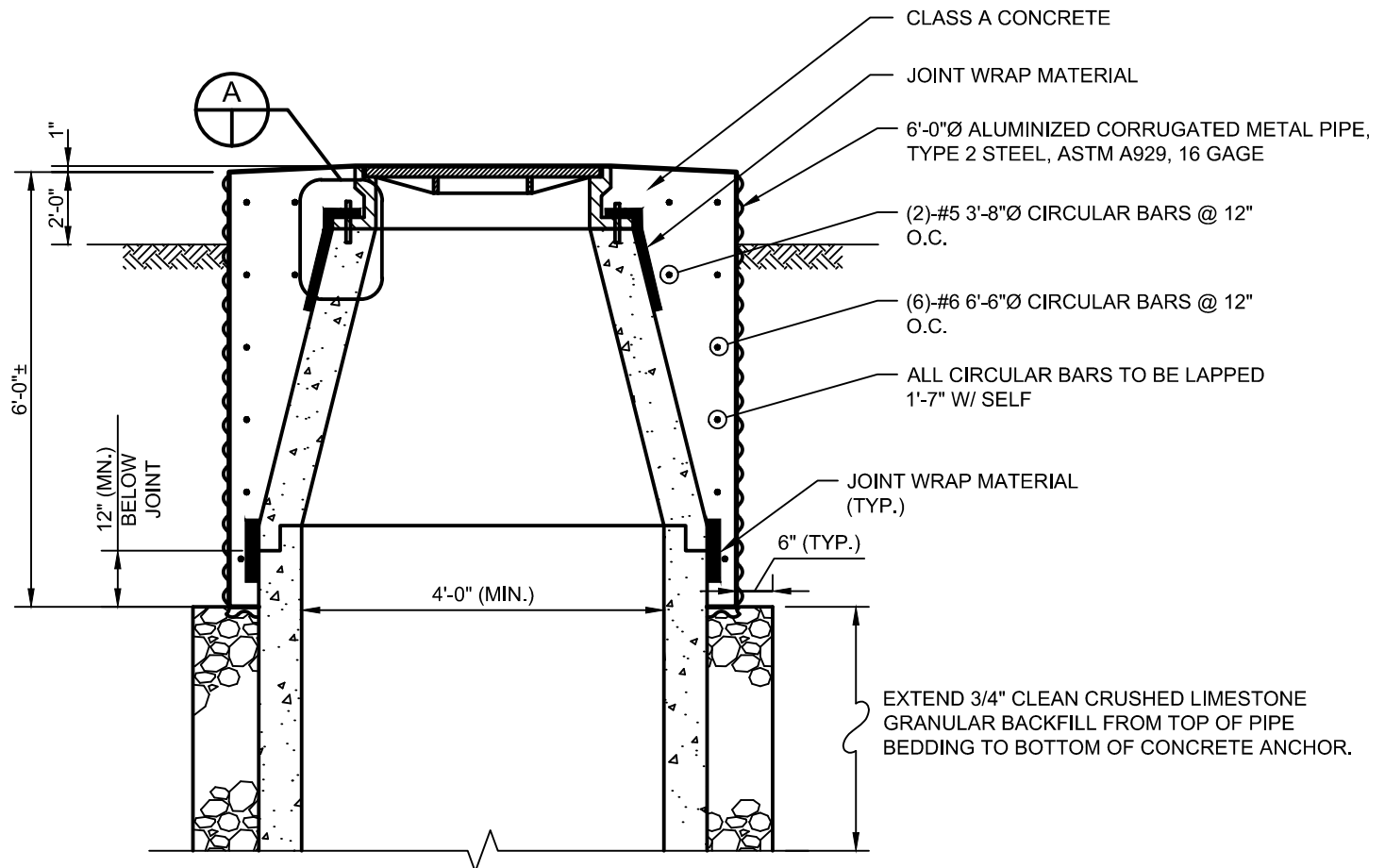
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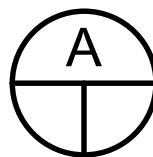
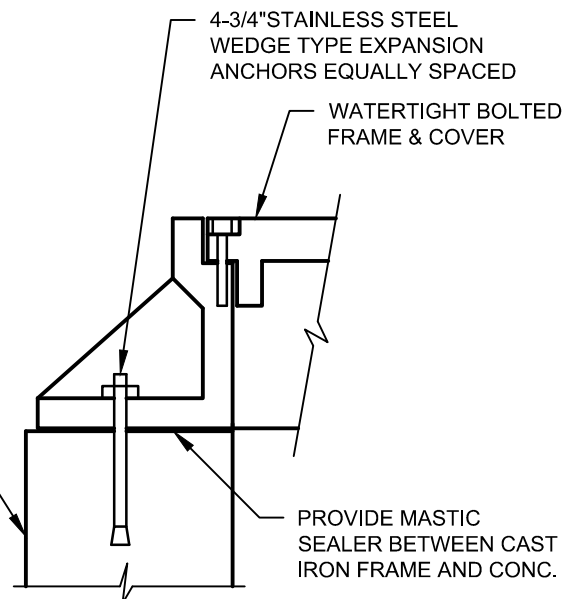
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## TYPICAL SECTION

SCALE: N.T.S.

GRADE RING SHALL NOT BE USED. BOLT FRAME FRAME DIRECTLY TO TOP OF PRECAST MANHOLE CONE SECTION



## DETAIL

SCALE: N.T.S.

### NOTE:

1. CONCRETE MANHOLE ANCHOR WITH WATER TIGHT FRAME AND COVER SHALL BE INSTALLED AT ALL LOCATIONS SUBJECT TO FLOODING FROM THE MISSISSIPPI RIVER, ROCK CREEK OR AS DIRECTED BY THE DISTRICT.

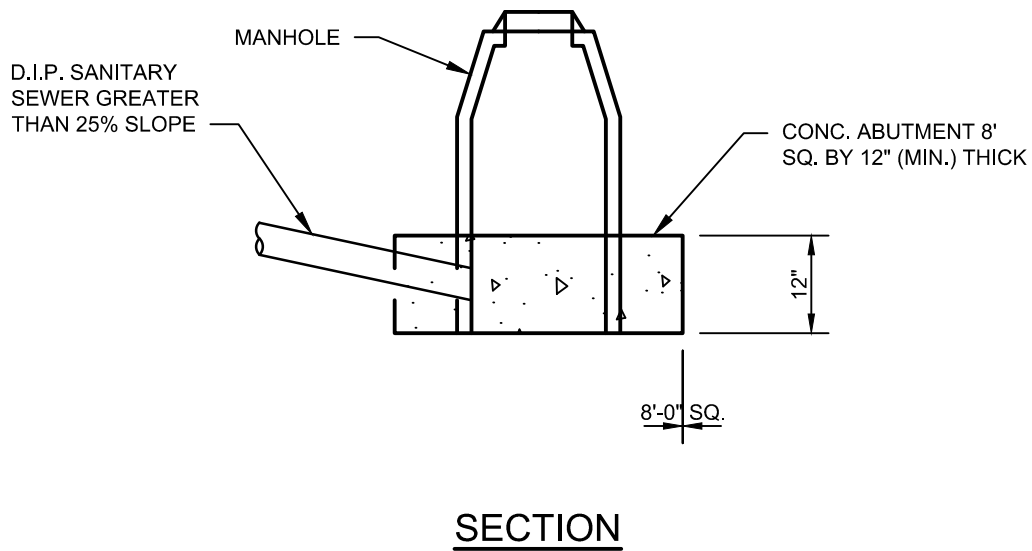
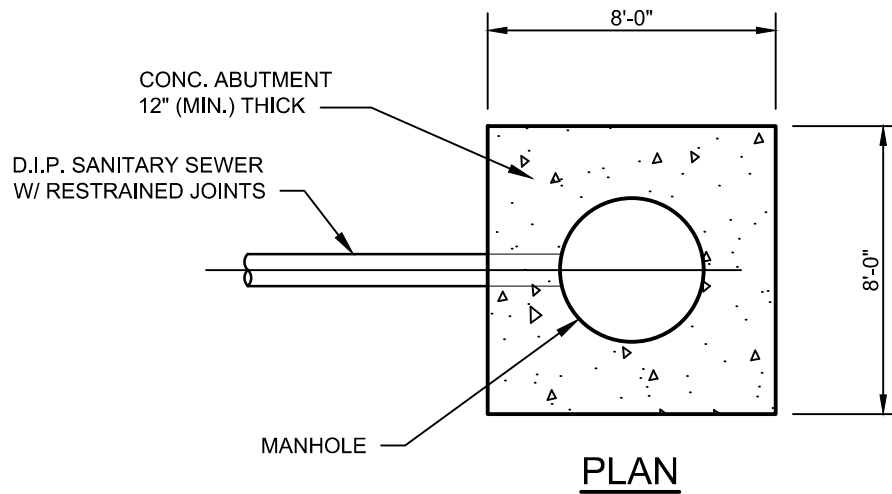
CONCRETE MANHOLE  
ANCHOR AND WATERTIGHT  
FRAME AND COVER

ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION

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## MANHOLE ABUTMENT DETAIL

SCALE: N.T.S.

MANHOLE ABUTMENT DETAIL  
(SEWERS OVER 25%)

**ROCK CREEK PUBLIC SEWER DISTRICT**  
**STANDARD DETAILS OF SEWER CONSTRUCTION**

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## SANITARY SEWER PIPING SPECIFICATIONS:

MATERIAL FOR SANITARY SEWER PIPE AND FITTINGS SHALL MEET FOLLOWING:

POLYVINYL CHLORIDE PIPE (PVC) - PVC SHALL MEET EITHER THE SEWER PIPE SPECIFICATIONS OR PRESSURE RATED PIPE LISTED BELOW DEPENDING UPON THE DEPTH OF SEWER INSTALLED.

1. GRAVITY SEWERS UP TO 15' DEEP. SDR 35 PVC UP TO 15" IN DIAMETER CONFORMING TO ASTM D-3034. PIPE WITH A DIAMETER 18" OR LARGER CONFORMING TO ASTM F-679.
2. GRAVITY SEWERS BETWEEN 15' BUT LESS THAN 30' DEEP. SDR 26 HEAVY WALL GRAVITY SEWER PIPE WITH UP TO 15" CONFORMING TO ASTM D-3034 (LATEST REVISION). PIPE 18" DIAMETER OR LARGER CONFORMING TO ASTM F-679 (LATEST REVISION) WITH MINIMUM STIFFNESS OF 115 PSI. PVC PRESSURE RATED PIPE CONFORMING TO AWWA C-900 OR AWWA C-905, PRESSURE CLASS 165.
3. GRAVITY SEWERS INSTALLED DEEPER THAN 30' DEEP. GRAVITY SEWERS INSTALLED DEEPER THAN 30' WILL BE EVALUATED BY DISTRICT ON A CASE BY CASE BASIS.
4. JOINTS FOR ALL PIPE AND FITTINGS SHALL BE EMBEDDED ELASTOMERIC GASKET JOINTS PROVIDING A WATERTIGHT SEAL CONFORMING TO ASTM D-3212.

DUCTILE IRON PIPE (DIP) - DIP SHALL BE USED IN AREAS WHERE THE MINIMUM 36" OF COVER OVER THE PIPE CANNOT BE MET; UNDER CREEK CROSSING, DEEP GRAVITY SEWER APPLICATIONS; OR AS REQUIRED BY THE DISTRICT.

1. DIP SHALL CONFORM TO ANSI A21.51 (AWWA C151) WITH MINIMUM WALL THICKNESS OF CLASS 52.
2. JOINTS SHALL BE RESTRAINED GASKETED SLIP-TYPE CONFORMING TO ANSI A21.11, EXCEPT MATERIAL SHALL BE NEOPRENE OR OTHER SYNTHETIC RUBBER.
3. FITTINGS SHALL CONFORM TO ANSI A21.10 (AWWA C110).
4. DIRECT BURIED DIP SHALL BE ENCASED IN BLACK POLYETHYLENE CONFORMING TO ANSI/AWWA A21.5/C105.

DIP SHALL HAVE EXTERIOR BITUMINOUS COATING PER MANUFACTURER'S STANDARD AND INTERIOR COATING OF PROTECTO 401 OR PERMOX-CTF.

### EXISTING A-2000 PROFILE PIPE:

1. A CONNECTION TO THE DISTRICT'S A-2000 PIPE IS NOT ALLOWED UNLESS IT IS FIRST APPROVED BY THE DISTRICT. IF THE CONNECTION IS MADE TO THE PIPE WITHOUT PRIOR DISTRICT APPROVAL BEFORE HAND, THE CONTRACTOR OR HOMEOWNER WILL REPLACE THE A-2000 PIPE AT THEIR EXPENSE.
2. IF ALLOWED BY THE DISTRICT, AN IN-SERTA- T SHALL BE USED WHEN CONNECTING TO THE DISTRICT'S A-2000 PIPE. YOU MUST HAVE THE DISTRICTS PRIOR APPROVAL BEFORE MAKING THE TAP; A SPECIAL SIZED HOLE-SAW AND GROUT MUST BE USED.

### PRIVATE SEWER LATERALS:

1. PIPE AND FITTINGS FOR PRIVATE SERVICE LATERALS / CLEANOUTS THAT CONNECT TO THE PUBLIC SEWER MAIN AT A DEPTH OF 15' OR LESS SHALL BE SDR-35, ASTM D3034 SOLID WALL PVC SEWER PIPE WITH GASKETED JOINTS OR SCHEDULE 40 PVC, ASTM D1784 WITH SOLVENT WELDED JOINTS.
2. PIPE AND FITTINGS FOR PRIVATE SERVICE LATERALS / CLEANOUTS THAT CONNECT TO THE PUBLIC SEWER MAIN AT A DEPTH GREATER THAN 15' BUT LESS THAN 20' SHALL BE SDR-26, ASTM D3034 HEAVY WALL PVC SEWER PIPE WITH GASKETED JOINTS OR SCHEDULE 80 PVC, ASTM D1784 WITH SOLVENT WELDED JOINTS.
3. PRIVATE LATERALS SHALL NOT BE CONNECTED TO PUBLIC SEWERS AT DEPTHS GREATER THAN 20'.
4. ALL RESIDENTIAL LATERALS CAN EITHER BE 4" OR 6" IN DIAMETER. ALL COMMERCIAL LATERALS SHALL BE 6" IN DIAMETER.
5. RESIDENTIAL AND COMMERCIAL LATERALS SHALL NOT CONNECT INTO A MANHOLE.
6. ALL NEW SEWER CONSTRUCTION SHALL USE A DISTRICT APPROVED IN-LINE WYE TYPE LATERAL FITTING ON THE PUBLIC SEWER MAIN. LATERAL CONNECTIONS TO EXISTING SEWER SHALL BE MADE USING DISTRICT APPROVED GASKETED SADDLE TAP WYE CONNECTION WITH TWO STAINLESS STEEL STRAPS. A HOLE SAW SHALL BE USED TO CUT THE MAIN LINE SEWER AND THE SPENT PIECE OF PIPE FROM THE MAIN LINE SHALL BE PRESENTED TO THE INSPECTOR AT THE TIME OF THE LATERAL INSPECTION. USE OF TEE TYPE SADDLES AND MAIN LINE WYE FITTINGS ARE NOT PERMITTED.
7. A PVC GLUE-TYPE TRANSITION ADAPTOR SHALL BE USED TO CONNECT THE SCHEDULE 40 TO THE SDR-35 LATERAL. FERNCO RUBBER COUPLING SHALL BE USED TO CONNECT EXISTING CLAY PIPE LATERAL TO SDR-35 PIPE.
8. PURPLE PRIMER AND ALL WEATHER GLUE SHALL BE USED ON ANY GLUED FITTING. IF THE PURPLE PRIMER GLUE IS NOT USED, THE PIPE SHALL BE REMOVED AND A NEW PIPE INSTALLED WITH THE CORRECT PRIMER AND GLUE.
9. ALL 22.5 DEGREE AND 45 DEGREE FITTINGS SHALL HAVE A GASKET, AND BOTH THE PIPE AND FITTING SHALL BE JOINED WITH PIPE LUBRICANT. GREASE, OIL, WD-40, OR ANY OTHER TYPE OF PENETRATING OIL WILL NOT BE ALLOWED.
10. A PVC GLUE-TYPE TRANSITION ADAPTOR SHALL BE USED TO CONNECT SCHEDULE 40 TO SDR-35 LATERAL PIPE. THE SDR-35 PIPE SHALL BE CUT BEHIND THE RUBBER GASKET SO THAT THE I.D. IS THE SAME ON THE SCHEDULE 40 PIPE AND THE SDR-35 PIPE. THIS WILL PROVIDE A SMOOTH TRANSITION BETWEEN THE PIPES AND WILL NOT CAUSE ANY TYPE OF RESTRICTION. THE GASKET THAT IS CUT OFF OF THE SDR-35 PIPE SHALL BE PRESENTED TO THE INSPECTOR AT TIME OF LATERAL INSPECTION.

## SANITARY SEWER PIPING SPECIFICATIONS

## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

DATE:

6/23/16

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2/3/20

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## SEWER DESIGN REQUIREMENTS:

THE FOLLOWING REQUIREMENTS SUPERSEDE MDNR SEWER DESIGN GUIDELINES.

### **GRADIENTS**

1. THE FOLLOWING MINIMUM SLOPES OF SANITARY PIPE SEWERS ARE THOSE GIVING AT LEAST THREE (3) FEET PER SECOND VELOCITIES FLOWING FULL, BASED ON MANNING'S FORMULA USING AN "N" VALUE OF 0.013 UNLESS OTHERWISE DIRECTED BY THE DISTRICT. SLOPES GREATER THAN THESE MINIMUMS SHALL BE USED WHEREVER POSSIBLE. VARIATION FROM THESE MINIMUMS WILL ONLY BE CONSIDERED BY THE DISTRICT UNDER EXTENUATING CIRCUMSTANCES DUE TO EXISTING AND UNAVOIDABLE SITE CONDITIONS.
2. FOR SEWERS WITH A DESIGN GRADE LESS THAN ONE PERCENT (1%), FIELD VERIFICATION OF THE PIPE GRADE WILL BE REQUIRED FOR EACH INSTALLED REACH OF SEWER, PRIOR TO ANY SURFACE RESTORATION OR INSTALLATION OF ANY SURFACE IMPROVEMENTS.
3. THE DISTRICT MAY REQUIRE THE SUBMITTAL OF REVISED HYDRAULIC CALCULATIONS FOR ANY SEWER REACH HAVING AN AS-BUILT GRADE FLATTER THAN THE DESIGN GRADE BY MORE THAN 0.1%. BASED ON A REVIEW OF THIS HYDRAULIC INFORMATION, THE DISTRICT MAY REQUIRE THE REMOVAL AND REPLACEMENT OF ANY PORTION OF THE SEWER REQUIRED TO ENSURE SUFFICIENT HYDRAULIC CAPACITY AND CLEANSING VELOCITY OF THE SYSTEM.

| <u>PIPE SIZE (INCH)</u> | <u>MINIMUM SLOPE IN FT. PER 100 FT. (% GRADE)</u> |
|-------------------------|---|
| 6 (HOUSE LATERAL)*      | 2.0   |
| 8                       | 1.0   |
| 10                      | 0.6   |
| 12                      | 0.6   |
| 15                      | 0.4   |
| 18                      | 0.3   |
| 21                      | 0.3   |
| 24                      | 0.2   |
| 27                      | 0.2   |
| 30                      | 0.2   |
| 36                      | 0.1   |

PIPES LARGER THAN THIRTY (36) INCHES IN DIAMETER SHALL MAINTAIN A MINIMUM CLEANSING VELOCITY OF THREE (3) FEET PER SECOND. WHERE VELOCITIES ARE GREATER THAN 15 FEET/SECOND, SPECIAL PROVISIONS TO PROTECT AGAINST DISPLACEMENT BY EROSION AND IMPACT SHALL BE MADE.

### **DEPTH AND MINIMUM COVER**

SEWER DEPTHS SHALL BE DETERMINED PRIMARILY BY THE REQUIREMENTS OF PIPE OR CONDUIT SIZE, UTILITY OBSTRUCTIONS, REQUIRED CONNECTIONS, FUTURE EXTENSIONS, AND ADEQUATE COVER. THE MINIMUM DEPTH REQUIREMENTS SHALL BE AS FOLLOWS:

1. FOR SEWERS WHICH MAY BE EXTENDED IN THE FUTURE, THE MINIMUM DEPTH SHALL BE NINE (9) FEET BELOW THE FINISH GRADE TO FLOWLINE, EXCEPT WHERE UPSTREAM TOPOGRAPHY INDICATES THAT THIS DEPTH IS NOT NECESSARY AS DETERMINED BY THE DISTRICT.
2. THE MINIMUM COVER ABOVE THE TOP OF PIPE SHALL BE NOT LESS THAN THREE (3) FEET. FOR SEWERS UNDER FOUNDATIONS, THE SEWER SHALL HAVE A VERTICAL DISTANCE FROM THE LOW POINT OF A BASEMENT OR LOW FLOOR OF NOT LESS THAN 2.5 FEET ABOVE THE TOP OF PIPE.\* THE MINIMUM DEPTH SHALL BE INCREASED AS REQUIRED TO INSURE A MINIMUM OF TWO PERCENT (2%) SLOPE AND 2.5 FEET OF COVER FOR A SIX (6) INCH HOUSE LATERAL.
3. AT STREAM AND CHANNEL CROSSINGS, A MINIMUM DEPTH OF THREE (3) FEET SHALL BE ALLOWED WHERE GREATER DEPTHS CANNOT BE ACHIEVED. REFER TO CONCRETE ENCASUREMENT SECTION OF THESE STANDARDS FOR REQUIREMENTS ON CONCRETE ENCASUREMENT. STREAM AND CHANNEL CROSSINGS MUST BE PROTECTED WITH ROCK BLANKET OR OTHER APPROVED STREAM STABILIZATION/CHANNEL PROTECTION METHODS.
4. SEWER DEPTHS AT MANHOLES SHALL BE SUFFICIENT TO ENSURE THE USE OF STANDARD MANHOLES. SPECIAL MANHOLES WILL ONLY BE ALLOWED UPON APPROVAL BY THE DISTRICT.
5. IN SITUATIONS WHERE FILL IS BEING ADDED, MINIMAL COVER IS PROPOSED, OR THE SEWER IS BEING SUBJECTED TO ADDITIONAL LIVE OR DEAD LOAD, AS DIRECTED BY THE DISTRICT THE DESIGN ENGINEER SHALL PROVIDE STRUCTURAL CALCULATIONS TO VERIFY THE SEWER IS ABLE TO SUPPORT THE PROPOSED LOADING.

## SEWER DESIGN REQUIREMENTS

## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

DATE: 2/3/2020

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PIPE BACKFILL AND COMPACTION:

1. AFTER THE PIPE HAS BEEN PROPERLY BEDDED, JOINTED AND INSPECTED, AND SUFFICIENT TIME HAS ELAPSED FOR ANY JOINT MATERIALS TO CURE, UPON PERMISSION OF THE DISTRICT, BACKFILL MAY BE PLACED.
2. BACKFILL MATERIALS SHALL BE FREE FROM DEBRIS, ORGANIC MATTER, PERISHABLE COMPRESSIVE MATERIALS, AND SHALL CONTAIN NO STONES OR LUMPS OF ROCK FRAGMENTS LARGER THAN SIX INCHES IN DIMENSION, NOR BE IN SUCH AMOUNT THAT WILL INTERFERE WITH THE CONSOLIDATING PROPERTIES OF BACKFILL MATERIAL. THE UPPER THREE FEET OF BACKFILL IN GRASS AREAS SHALL BE FREE OF SUCH ROCKS OR LUMPS LARGER THAN ONE INCH IN DIAMETER WITH THE UPPER TWELVE INCHES BEING FREE OF ALL OBJECTIONABLE MATERIAL.
3. EARTH BACKFILL SHALL BE UNIFORMLY FLOODED AND POLED OR JETTED WITH WATER BY A DISTRICT APPROVED METHOD, AND WITH CARE TO AVOID DAMAGE TO THE NEWLY LAID SEWER AND PIPE BEDDING. AFTER THE BACKFILL IN THE TRENCH HAS SUBSTANTIALLY DRIED AND COMPLETED ITS SETTLEMENT, AND PERMISSION HAS BEEN GIVEN BY DISTRICT, ANY SETTLEMENT BELOW THE FINISHED GRADE SHALL BE REFILLED WITH ADDITIONAL EARTH.
4. BACKFILL IN TRENCHES WHICH ARE IMMEDIATELY ADJACENT TO PAVED SURFACES AND IN LOCATIONS WHERE PREVENTION OF BACKFILL SETTLEMENT IS ESSENTIAL OR AS REQUIRED BY DISTRICT, EARTH BACKFILL SHALL BE THOROUGHLY COMPACTED WITH SUITABLE MECHANICAL TAMPERS TO THE DENSITY OF THE ADJACENT UNDISTURBED EARTH. BACKFILL MATERIALS SHALL BE PLACED IN 8-INCH LIFTS.

PIPE BACKFILL AND COMPACTION

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

DATE:

2/3/20

REV:

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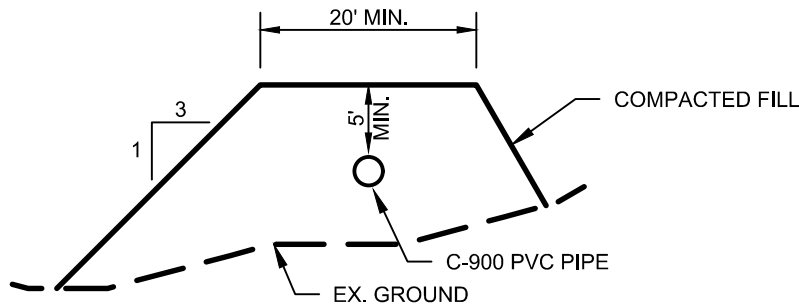
SHEET:

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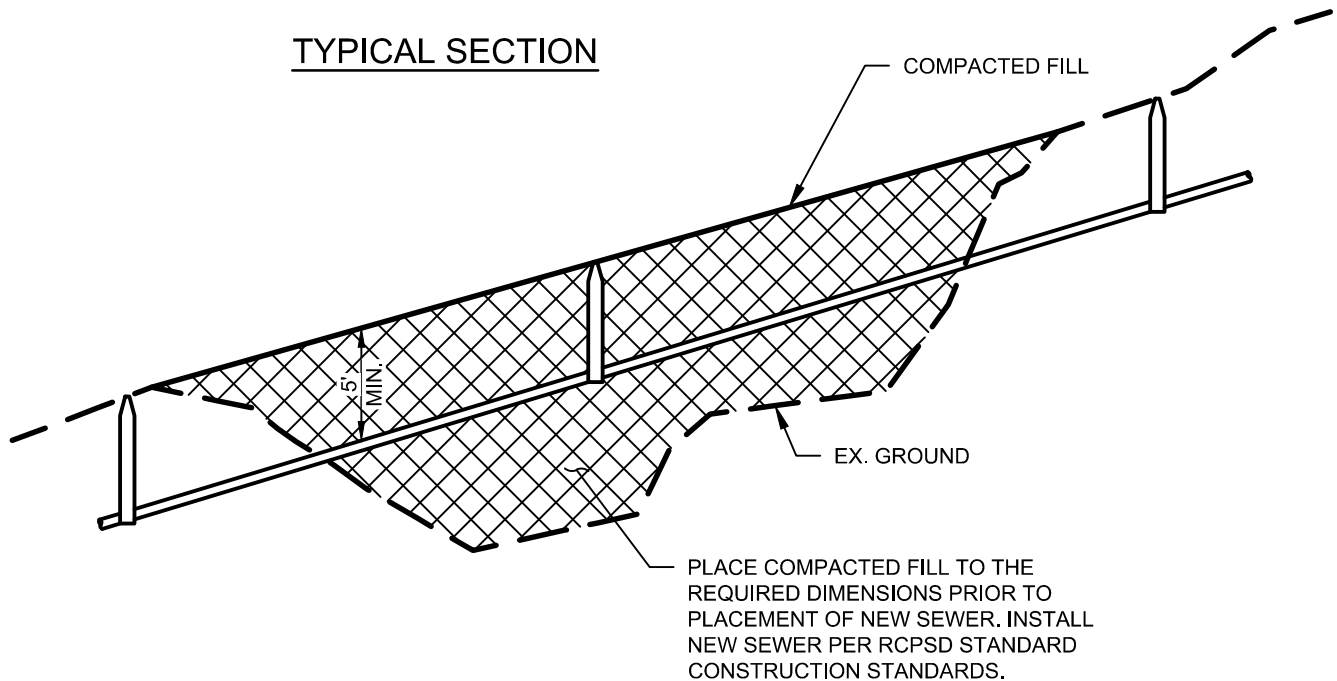
# FILL REQUIREMENTS:

THE FOLLOWING REQUIREMENTS APPLY TO FILL AREAS UNDER NEW SEWER LINES.

1. PRIOR TO PLACEMENT OF FILL, THE CONTRACTOR SHALL ENGAGE A GEOTECHNICAL ENGINEER TO CONDUCT SOIL TESTING OF THE EXISTING GROUND ALONG LENGTH OF SEWER TO CONFIRM POTENTIAL SETTLEMENT ISSUES DUE TO WEIGHT OF FILL MATERIAL. IF EXISTING SOIL IS POTENTIALLY COMPRESSIBLE DUE TO THE ADDITION OF FILL MATERIAL, CONTRACTOR SHALL ALLOW SOIL TO SETTLE PRIOR TO PLACEMENT OF NEW SEWER LINE AS RECOMMENDED BY GEOTECHNICAL ENGINEER.
2. THE AREAS TO BE FILLED SHALL BE CLEARED OF TREES, STUMPS, BRUSH, TRASH, SOD, AND ARE TO BE SCARIFIED TO PERMIT BONDING WITH THE COMPACTED FILL. THE FILL MATERIAL SHALL BE FREE OF DEBRIS, ORGANIC MATERIAL, PERISHABLE COMPRESSIBLE MATERIALS, ASHES, OR OTHER MATERIALS WHICH WILL INTERFERE WITH THE COMPACTION. FILL MATERIAL SHALL NOT CONTAIN ROCKS OR BROKEN CONCRETE.
3. FILL SHALL BE PLACED AT A MODIFIED PROCTOR DENSITY OF 90%.
4. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED SIX-INCH LIFTS BEFORE THOROUGH MECHANICAL COMPACTION. ANY EXCAVATED MATERIAL THAT IS SATURATED AND IS TO BE USED FOR FILL, SHALL BE WORKED AND DRIED TO A SUITABLE MOISTURE CONTENT PRIOR TO PLACEMENT.
5. THE CONTRACTOR SHALL OBTAIN AND FURNISH TO THE DISTRICT A MOISTURE-DENSITY CURVE DEVELOPED BY A LICENSED GEOTECHNICAL ENGINEER FOR THE MATERIAL THAT IS TO BE USED AS FILL. DURING CONSTRUCTION, DENSITY TESTS SHALL BE RUN AND SUBMITTED TO DISTRICT. THE NUMBER OF DENSITY TEST TO CONFIRM COMPACTION SHALL BE AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.



TYPICAL SECTION



## FILL REQUIREMENTS

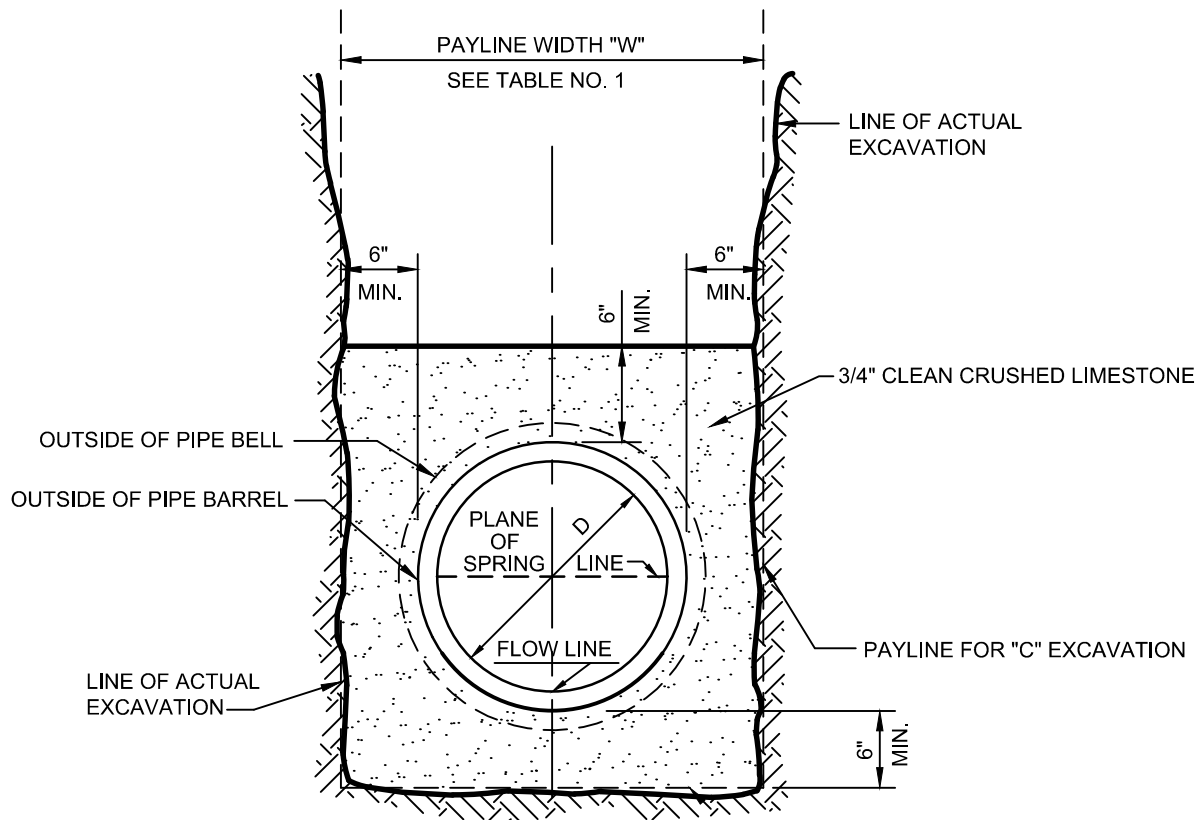
## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

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| <p align="center"><b>TABLE 1</b></p> <p align="center"><b>PAYLINE WIDTHS OF TRENCH AND</b></p> <p align="center"><b>PAY-QUANTITIES OF CONCRETE</b></p> |   |   |                                  |
|--|---|---|----------------------------------|
| INSIDE<br>DIAMETER<br>OF PIPE<br>(INCHES)  | "W" PAYLINE<br>WIDTH OF<br>TRENCH<br>(INCHES) | "W" PAYLINE<br>WIDTH OF<br>TRENCH<br>(FEET) | PAY VOLUMES<br>(CU. FT. PER FT.) |
|  |   |   | CONC.<br>ENCASEMENT              |
| 4  | 30  | 2.50  | 3.28                             |
| 6  | 30  | 2.50  | 3.59                             |
| 8  | 30  | 2.50  | 3.87                             |
| 10   | 30  | 2.50  | 4.09                             |
| 12   | 30  | 2.50  | 4.25                             |
| 15   | 36  | 3.00  | 5.55                             |
| 18   | 36  | 3.00  | 5.77                             |
| 21   | 39  | 3.25  | 6.61                             |
| 24   | 42  | 3.50  | 7.39                             |
| 27   | 45  | 3.75  | 8.18                             |
| 30   | 49  | 4.08  | 9.30                             |
| 33   | 53  | 4.42  | 10.53                            |
| 36   | 56  | 4.67  | 11.43                            |
| 42   | 63  | 5.25  | 13.38                            |
| 48   | 70  | 5.83  | 15.67                            |



## TYPICAL PIPE BEDDING

## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

DATE:

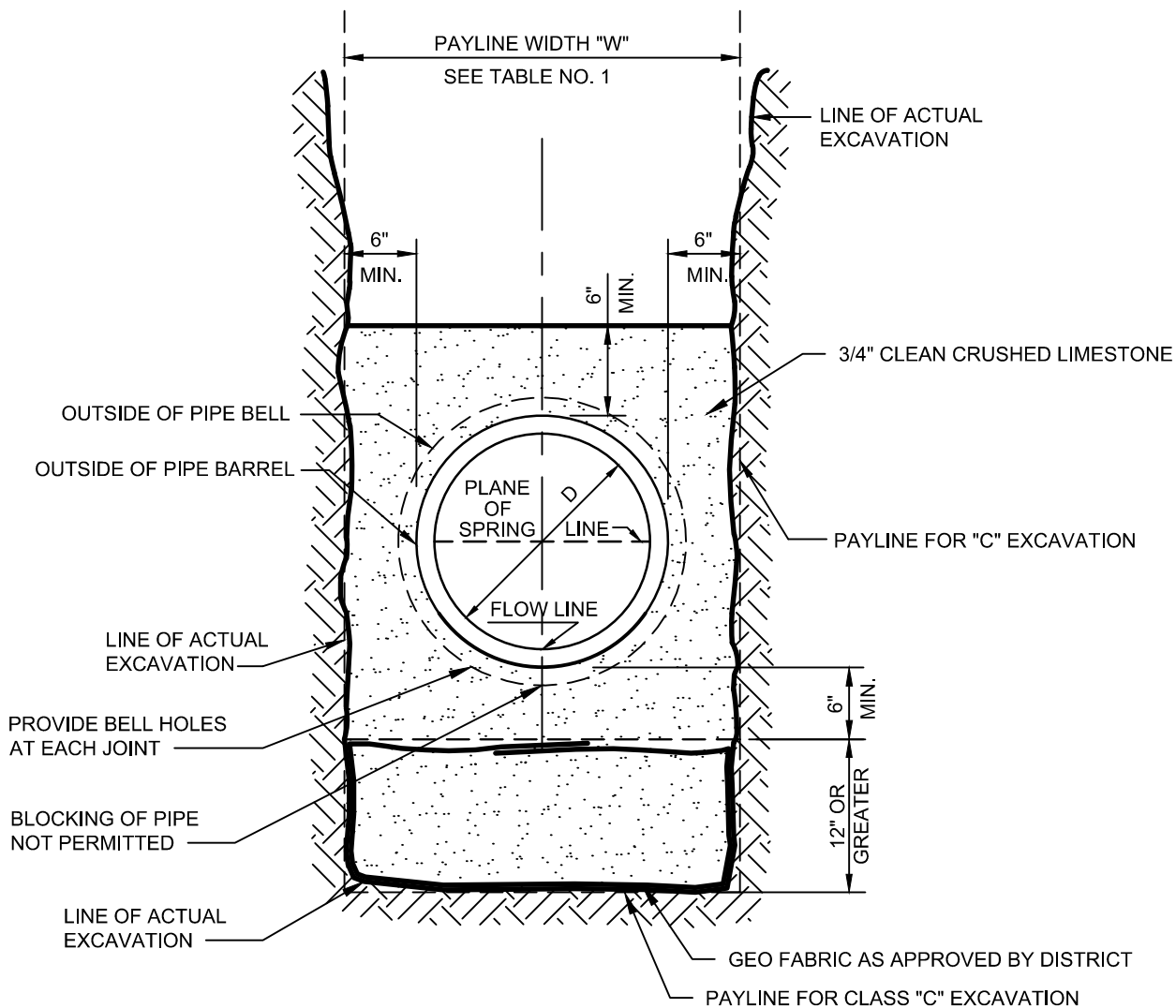
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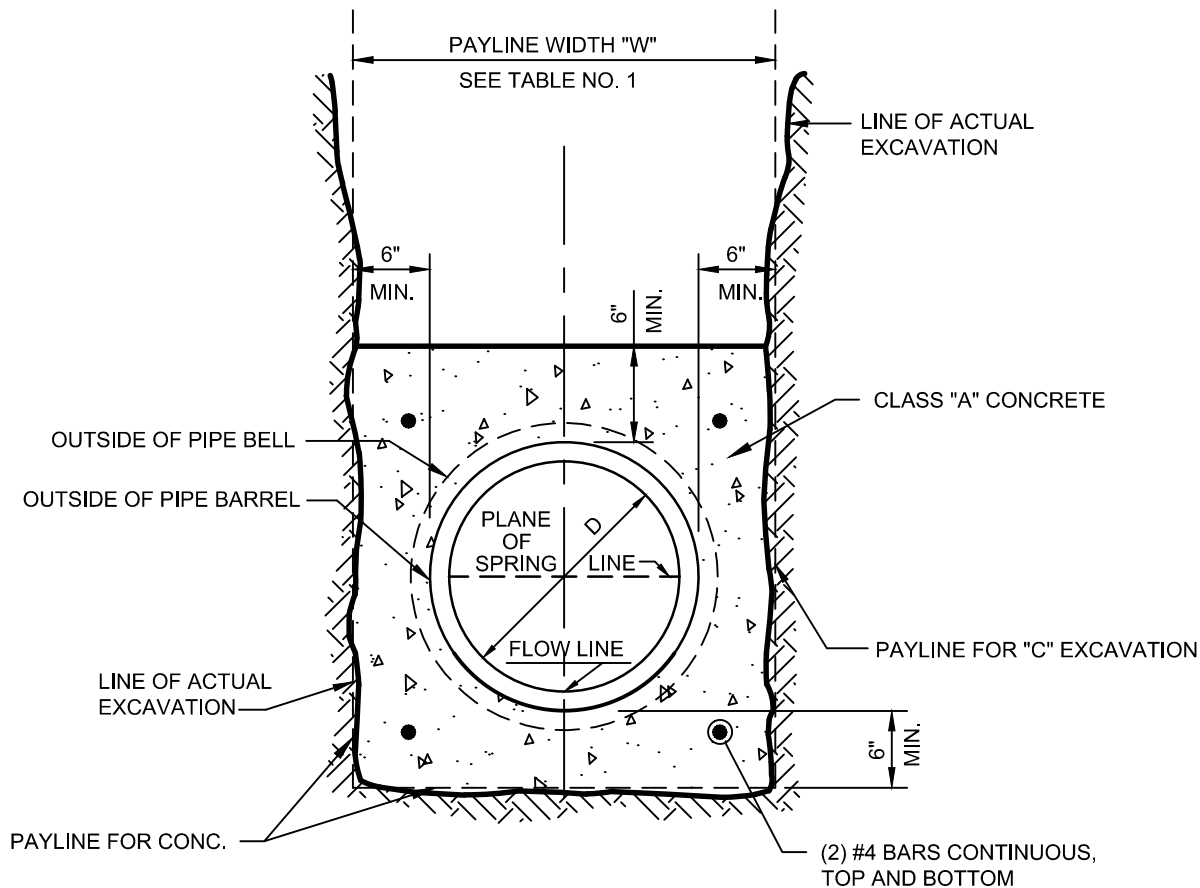
**SPECIAL PIPE BEDDING  
DETAIL FOR UNSUITABLE  
SUBGRADE REPLACEMENT**

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

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NOTES:

1. CONCRETE ENCASEMENT IS REQUIRED AT ALL CREEK, STREAM, OR DITCH CROSSINGS, OR AS DIRECTED BY DISTRICT.
2. SEWER PIPE SHALL BE DUCTILE IRON PIPE, CLASS. 52
3. SHEETING OR FORMWORK MAY BE REQUIRED FOR PLACEMENT OF CONCRETE ENCASEMENT.

CONCRETE ENCASEMENT

ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION

DATE:

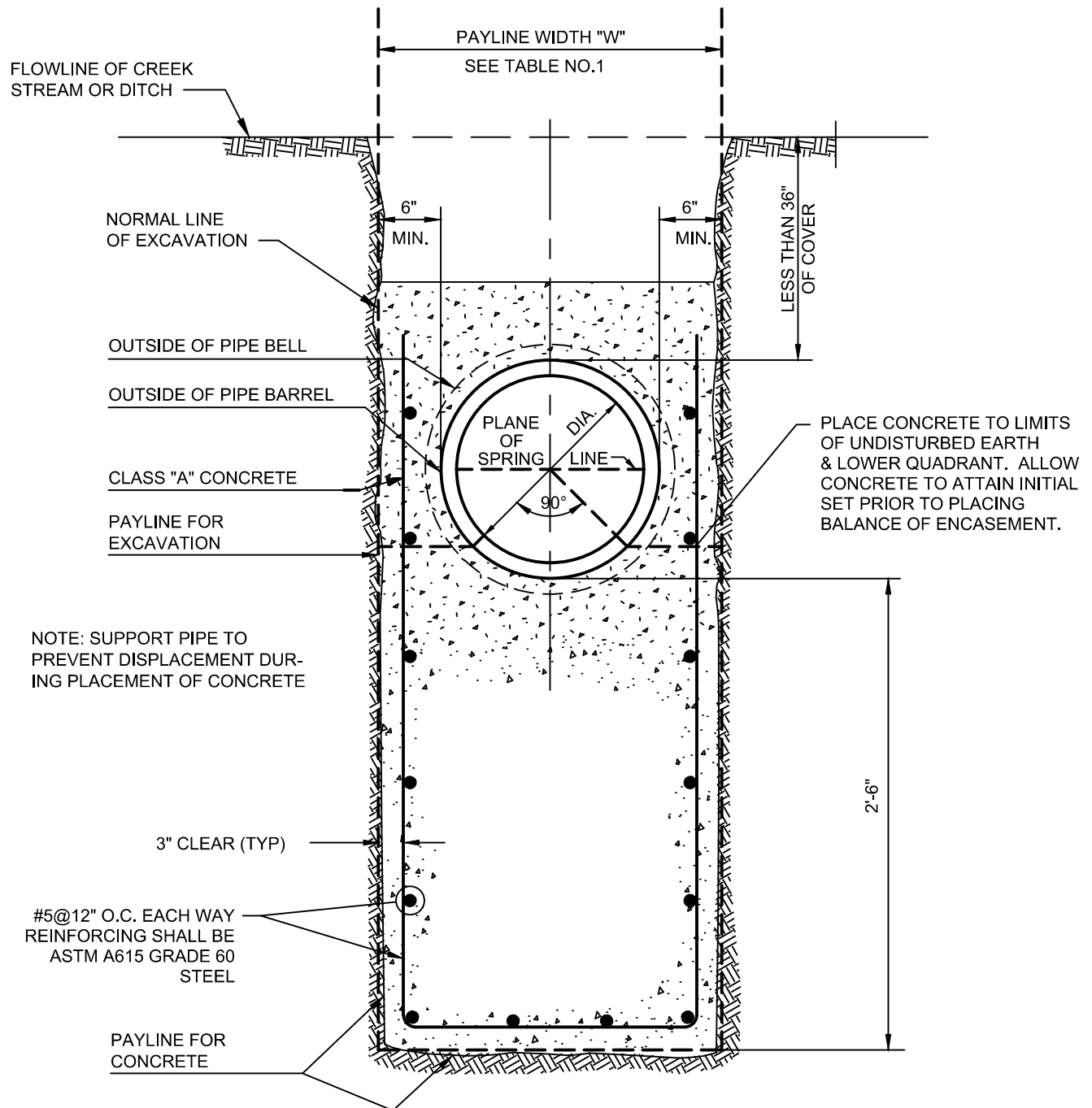
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## SPECIAL CONCRETE ENCASEMENT

NTS

### NOTE:

1. SPECIAL CONC. ENCASEMENT IS REQUIRED AT ALL CREEK, STREAM, OR DITCH CROSSINGS WHERE A MINIMUM 3' OF COVER BETWEEN TOP OF PIPE AND BOTTOM OF CREEK/STREAM/DITCH CANNOT BE MAINTAINED, OR AS DIRECTED BY DISTRICT.
2. SEWER PIPE SHALL BE DUCTILE IRON PIPE, CLASS 52.
3. SHEETING OR FORMWORK MAY BE REQUIRED FOR PLACEMENT OF CONCRETE ENCASEMENT.

SPECIAL CONCRETE ENCASEMENT

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

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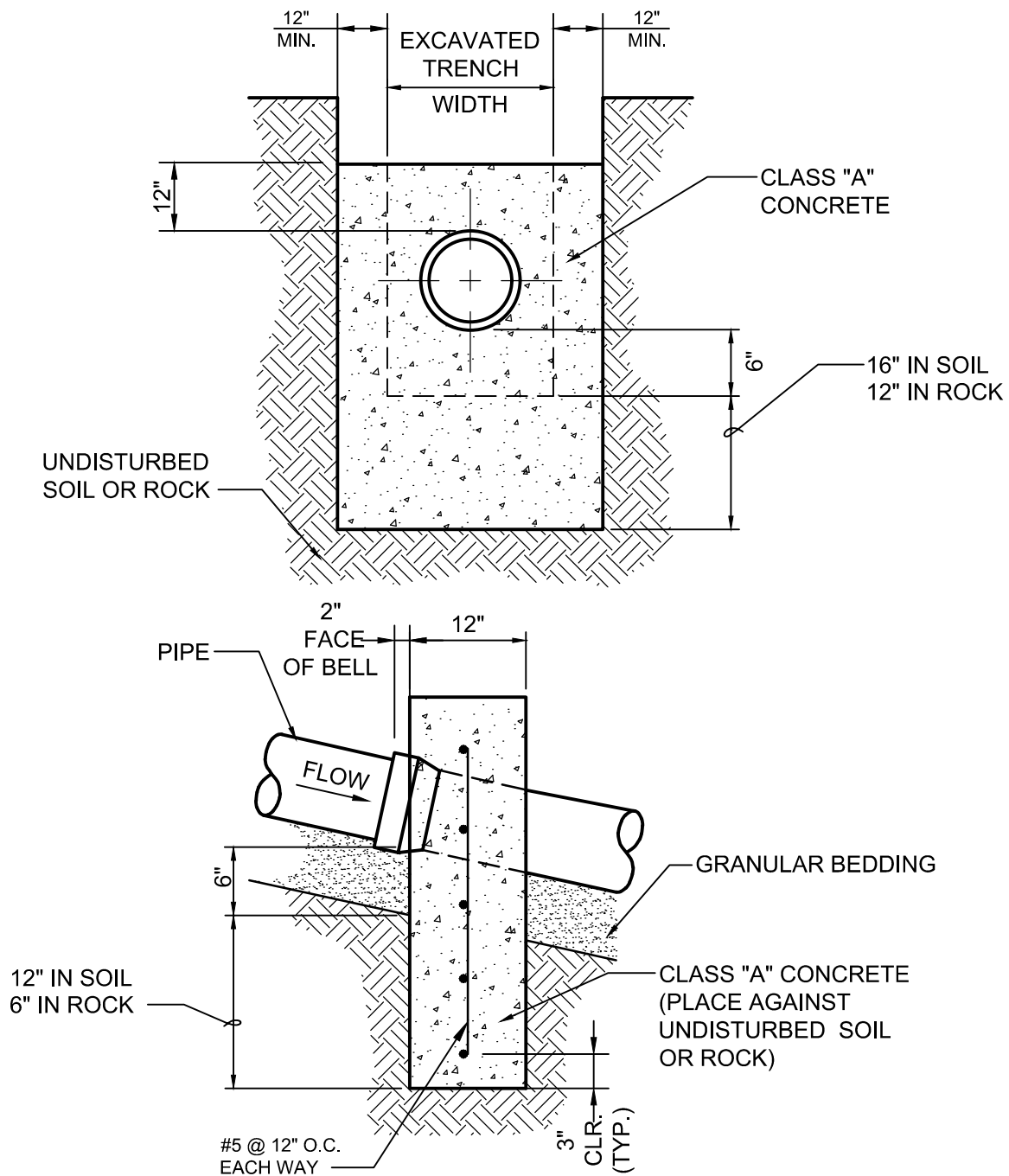
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## SIDE ELEVATION

NOTE: PIPE ANCHORS WILL NOT BE REQUIRED FOR PIPELINES INCLUDING SERVICE LATERALS UNDER 15% SLOPE. ALL OTHER PIPELINE GRADES INCLUDING SERVICE LATERALS WILL REQUIRE THE FOLLOWING:

1. 15% to 20% - ANCHORS INSTALLED EVERY OTHER PIPE SECTION
2. 20% to 25% - ANCHORS INSTALLED AT EACH PIPE SECTION
3. OVER 25% - PIPE SHALL BE DUCTILE IRON WITH CRADLES AT EACH PIPE SECTION. CONCRETE ABUTMENTS SHALL BE INSTALLED AROUND EACH MANHOLE AT TOP AND BOTTOM OF SLOPE (SEE ABUTMENT DETAIL).

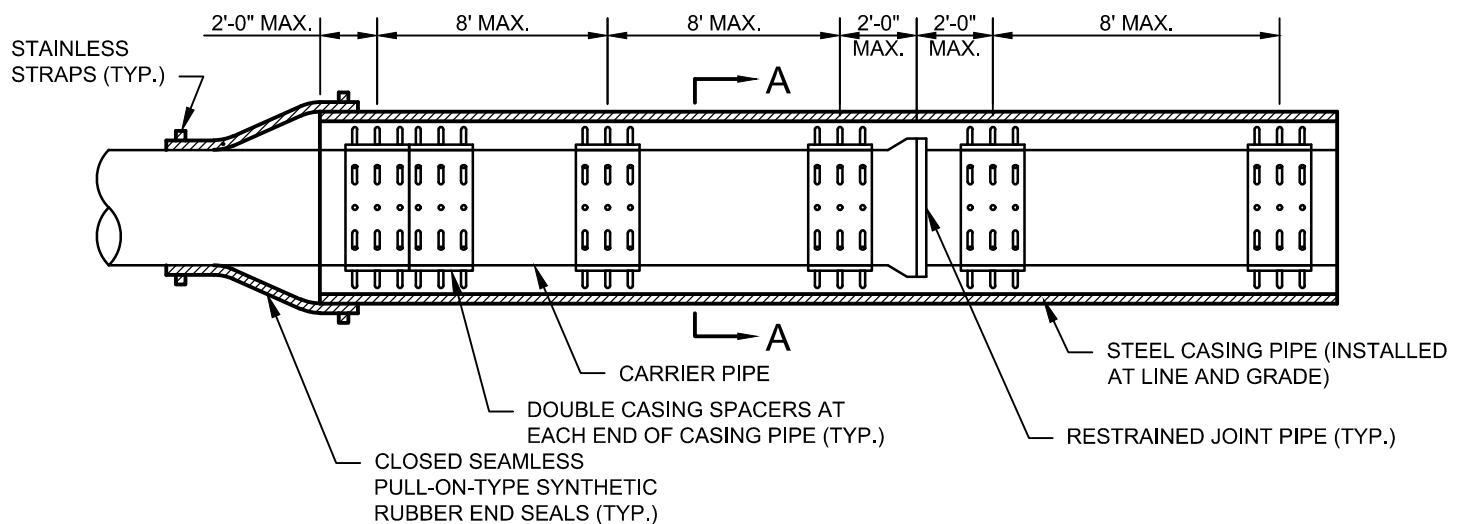
PIPE ANCHOR DETAIL

**ROCK CREEK PUBLIC SEWER DISTRICT**  
**STANDARD DETAILS OF SEWER CONSTRUCTION**

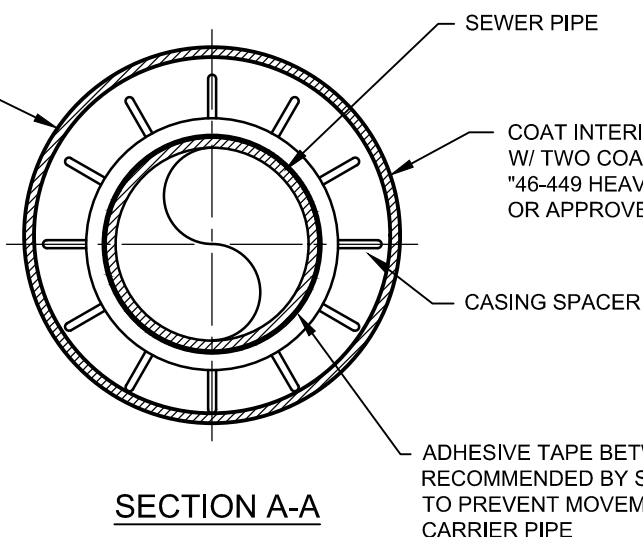
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STEEL CASING  
(CASING SHALL BE 6"  
LARGER THAN  
SEWER PIPE O.D.)



**SECTION A-A**

**NOTES:**

1. STEEL ENCASMENT PIPE SHALL BE REQUIRED AT ALL CROSSINGS OF FEDERAL, STATE, OR COUNTY ROADS AND STEEL ENCASMENT SHALL BE REQUIRED FOR SEWERS LOCATED IN THE RIGHT-OF-WAY OF SUCH ROADWAYS WHERE FUTURE REPAIR OR REPLACEMENT OF SUCH SEWERS WOULD IMPEDE TRAFFIC OR REQUIRE THE REPLACEMENT OF PAVEMENT.
2. CASING PIPE SHALL BE SMOOTH WALL WELDED STEEL PIPE, ASTM A36 OR ASTM A570 SHEET WITH MINIMUM YIELD POINT 36,000 PSI CONFORMING TO AWWA C200.
3. MINIMUM WALL THICKNESS SHALL MEET OR EXCEED REQUIREMENTS OF ROADWAY OR RAILROAD AGENCY THAT IS BEING CROSSED.
4. ALL SANITARY SEWER PIPE INSTALLED IN CASING PIPE SHALL BE CERTA-LOK RESTRAINED JOINT OR APPROVED EQUAL. PIPE SHALL BE PRESSURE P.V.C. PER DISTRICT STANDARDS AND IN COMPLIANCE WITH REGULATORY AGENCY BEING CROSSED. SEWER PIPE SHALL BE INSTALLED IN THE CENTER OF THE CASING PIPE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. SPACERS SHALL BE RACI OR APPROVED EQUAL.
5. RESTRAINT JOINT SHALL REQUIRE NO SPECIAL TOOLS OR SHIMS TO REMOVE PIPE FROM CASING IN THE FUTURE (NO FIELD LOK GASKETS ALLOWED).

**SEWERS IN CASING PIPE**

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

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## LATERAL CONNECTIONS REQUIREMENTS:

THE FOLLOWING REQUIREMENTS SHALL BE FOLLOWED TO MAKE ANY LATERAL CONNECTIONS TO THE DISTRICT SANITARY SEWER FACILITIES:

1. NEW SANITARY LATERAL CONNECTIONS MAY BE CONNECTED ONCE THE FOUNDATION WALLS HAVE BEEN ESTABLISHED. THE LATERAL CONNECTION SHALL EXTEND THROUGH THE FOUNDATION WALL AND SHALL BE STUBBED UP AT LEAST TWO FEET ABOVE THE SUB-FLOOR OF THE FOUNDATION. A CAP SHALL BE GLUED TO THE END OF THE PIPE TO PREVENT INFILTRATION AND INFLOW. THE APPROVAL OF THE SANITARY SEWER CONNECTION IS DETERMINED BY A DISTRICT INSPECTOR. THE INSPECTOR, BY HIS OR HER DISCRETION, HAS THE RIGHT TO REJECT ANY SANITARY SEWER LATERAL CONNECTION.
2. THE BUILDING PERMIT SHALL BE ON-SITE IN ORDER FOR THE SANITARY SEWER LATERAL INSPECTION TO TAKE PLACE. IF THE SANITARY LATERAL IS APPROVED, THE INSPECTOR WILL PLACE A GREEN-APPROVAL STICKER ON THE BUILDING PERMIT. IF THE PERMIT IS NOT ON-SITE AT THE TIME OF THE INSPECTION, THE INSPECTION WILL NOT TAKE PLACE. IF A SECOND INSPECTION IS NEEDED BECAUSE THE BUILDING PERMIT IS NOT ON-SITE, ROCK REEK PUBLIC SEWER DISTRICT RESERVES THE RIGHT TO CHARGE A FEE FOR THE SECOND INSPECTION.
3. ALL TAP ON FEES AND INSPECTION FEES SHALL BE PAID IN FULL, BEFORE AN INSPECTION WILL TAKE PLACE.
4. ALL INSPECTIONS REQUIRE AT LEAST A 24 HOUR NOTICE.
5. DISTRICT INSPECTORS SHALL HAVE ACCESS TO THE DITCH TO EXAMINE THE LATERAL. IF THE LATERAL IS IN A DEEP DITCH, THE WALLS OF THE DITCH MUST BE CUT BACK TO ALLOW SAFE AND EASY ACCESS OR THE DITCH MUST BE SHORED TO OSHA STANDARDS.
6. PRIOR TO THE LATERAL INSPECTION, THE TOP 1/3 OF THE PIPE SHALL BE EXPOSED FOR THE INSPECTION, INCLUDING THE CONNECTION AT THE MAIN AND AT THE HOUSE. THE TRENCH MAY NOT BE BACKFILLED UNTIL THE INSPECTION HAS BEEN COMPLETED AND THERE IS A GREEN APPROVAL STICKER ATTACHED TO THE BUILDING PERMIT.
7. ANY CONNECTIONS MADE TO THE MAIN SEWER THAT CROSSES THE PROPERTY OF ANOTHER HOME OR PROPERTY OWNER SHALL REQUIRE AN EASEMENT. THE EASEMENT SHALL BE RECORDED AT THE COUNTY COURT HOUSE. A COPY OF THE EASEMENT SHALL BE SUBMITTED TO THE SEWER DISTRICT FOR FILING PURPOSES.
8. ANYONE CONNECTING TO THE SEWER SYSTEM THAT WAS FORMERLY ON A SEPTIC TANK SYSTEM MUST: OBTAIN A PERMIT FROM THE COUNTY TO ABANDON THE SEPTIC TANK, HAVE THE SEPTIC TANK PUMPED DRY AND DEMOLISH THE TOP AND BOTTOM OF THE TANK AND BACKFILL WITH GRAVEL OR DIRT, BEFORE CONNECTION TO THE SEWER SYSTEM IS ALLOWED.
9. CLEANOUTS SHALL BE INSTALLED ON ALL LATERALS WITHIN 5' OF THE BUILDING. IN ADDITION, FOR LATERALS EXCEEDING 100' IN LENGTH, A CLEANOUT SHALL BE INSTALLED A MINIMUM OF EVERY 100'.
10. IF THE CLEANOUT IS INSTALLED IN A DRIVEWAY OR A PARKING LOT, IT SHALL HAVE A CAST IRON FRAME AND TOP WITH SEWER MARKED ON TOP OF IT. IF THE CLEANOUT IS LOCATED IN A YARD OR FLOWERBED, IT SHALL BE CUT APPROXIMATELY 4" ABOVE GRADE, AND SHALL HAVE A SOLID CAP OR PLUG. CLEANOUTS SHALL NOT BE USED AS A VENT FOR THE DWELLING OR AS A DRAIN FOR STORM WATER.
11. LATERAL CONNECTIONS SHALL NOT BE CONNECTED DIRECTLY INTO A MANHOLE. ALL CONNECTIONS ARE TO BE MADE INTO THE MAIN LINE, EITHER IN FRONT OF OR BEHIND THE MANHOLE. WHEN CONNECTING TO A MAIN LINE THAT HAS A TERMINAL MANHOLE ADJACENT TO IT, THE CONNECTION SHALL BE MADE ON THE DOWNSTREAM SIDE OF THE MANHOLE. ALL GRAVITY TYPE LATERALS SHALL HAVE THE PIPE BELLS FACING OPPOSITE OF THE FLOW DIRECTION.
12. CONCRETE SHALL NOT BE USED TO COVER THE LATERAL CONNECTION AT THE MAIN, THE CONNECTION AT THE HOUSE, OR THE TEE FITTING OF THE CLEANOUT. ALL LATERAL PIPE, FITTINGS, AND CONNECTIONS SHALL BE BACKFILLED WITH 3/4" CLEAN CRUSHED LIMESTONE AS INDICATED ON THE STANDARD DETAILS.

### LATERAL CONNECTION SPECIFICATIONS

### ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

DATE:

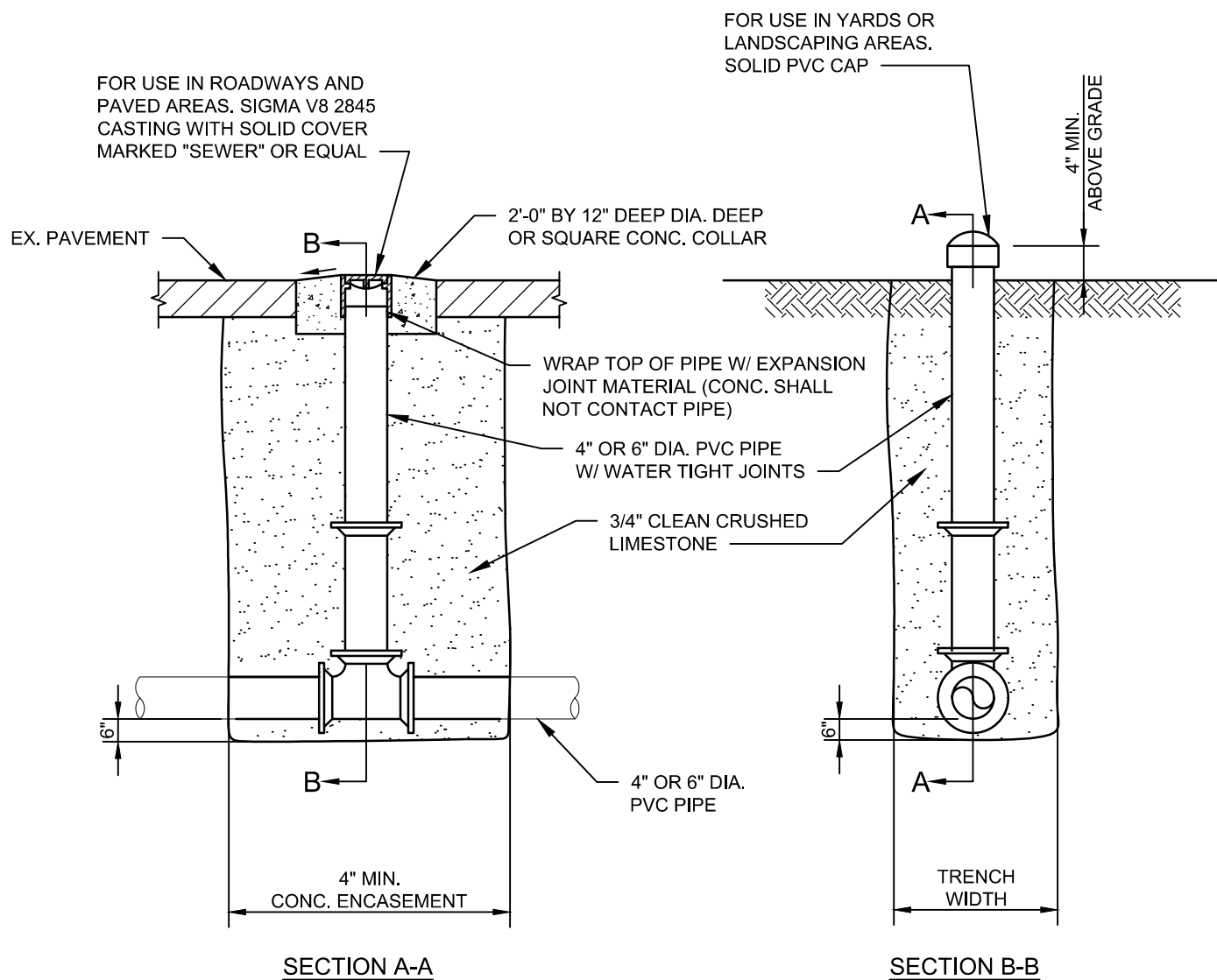
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## LATERAL CLEANOUT DETAIL

NOTE: DO NOT USE WYES

LATERAL CLEANOUT  
DETAILS

**ROCK CREEK PUBLIC SEWER DISTRICT**  
**STANDARD DETAILS OF SEWER CONSTRUCTION**

DATE: 6/23/16

REV: ---

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## ENGINEERING REPORT - DESIGN PARAMETERS:

1. DESIGN FLOWS: CONNECTIONS X 370 GALLONS/ CONNECTION
2. PEAK FLOW: 400% OF AVERAGE FLOW
3. FORCE MAIN VELOCITY: 2.0 FPS MINIMUM
4. "C" VALUE: 120
5. PROVIDE FORCE MAIN PROFILE
6. PROVIDE AIR RELEASE VALVES (ARV) AT FORCE MAIN HIGH POINTS
7. PROVIDE SYSTEM CURVE PLOTTED ON PUMP CURVE
8. PROVIDE CROSS SECTION THROUGH STORAGE TANK

## DUPLEX PUMP STATION:

1. ONE PUMP FOR PEAK FLOW, ONE PUMP FOR STAND-BY
2. PUMPS TO ALTERNATE
3. PROVIDE 24 HOUR FIBERGLASS STORAGE TANK
4. PROVIDE EMERGENCY STAND-BY GENERATOR WITH INTEGRAL BASE FOR DIESEL FUEL STORAGE TANK - 24 HOUR CAPACITY.
5. SIZE GENERATOR TO RUN FULL CAPACITY LOAD, STARTING ONE PUMP AT A TIME. DO NOT START BOTH PUMPS AT ONCE.
6. PROVIDE AUTOMATIC TRANSFER SWITCH. CONTROLS TO EXERCISE UNIT 30 MINUTES PER WEEK.
7. PROVIDE WET WELL AND VALVE VAULT PER DRAWINGS.
8. SUBMERSIBLE NON-CLOG PUMPS TO BE MANUFACTURED BY FLYGT, ABS, OR DISTRICT APPROVED EQUAL. GRINDER PUMPS TO BE MANUFACTURED BY ABS, KEEN, MYERS, DISTRICT APPROVED EQUAL.
9. PROVIDE CONTROLS IN NEMA 4 STAINLESS STEEL BOX.
10. PROVIDE ELECTRIC HOIST PROPERLY MOUNTED PER HOIST INSTRUCTIONS TO LIFT PUMPS CLEAR OF WELL.
11. PROVIDE STAINLESS STEEL CHAINS FOR LIFTING AND SS GUIDE RAILS. ALL HARDWARE ASSOCIATED WITH GUIDES, GUIDE RAILS, AND PUMP BASES SHALL BE STAINLESS STEEL.
12. ALL ELECTRICAL JUCTION BOXES SHALL BE LOCATED OUTSIDE OF WET WELL. ALL ELECTRICAL INGRESS AND EGRESS SHALL BE IN CONDUIT AND SEALED BETWEEN THE WET WELL AND THE OUTSIDE OF THE STATION. EACH PUMP SHALL HAVE ITS OWN SEPERATE CONDUIT WITH JUNCTION BOX FOR THE POWER CABLES
13. THE FLOAT SYSTEM SHALL HAVE ITS OWN CONDUIT WITH JUNCTION BOX FOR THE FLOAT SWITCHES.
14. PROVIDE T.V.S.S. ON CONTROL PANEL AND GENERATOR.

## FORCE MAIN REQUIREMENTS:

THE FOLLOWING ELEMENTS SHALL BE INCLUDED IN THE FORCE MAIN SYSTEM DESIGN:

1. FORCE MAIN PIPING AND FITTINGS SHALL BE PVC AWWA C-900/C-905, PVC ATSM D2241 SDR21, OR DISTRICT APPROVED EQUAL.
2. AIR RELIEF VALVE (ARV) AUTOMATIC COMBINATION VACUUM AIR RELIEF VALVES SHALL BE PLACED AT HIGH POINTS IN THE FORCE MAIN AS REQUIRED.
  - A. THE VALVES SHALL BE EQUIPPED WITH ALL BACKWASH ACCESSORIES.
  - B. THE BODY OF THE ARV SHALL BE SUPPORTED TO THE WALL OF THE STRUCTURE BY A 1-1/4"x1-1/4"x1/8" STAINLESS STEEL ANGLE BRACKET.
  - C. ACCEPTABLE MANUFACTURER: VAL-MATIC MODEL 801SBW, APCO MODEL 445, ARI D-025.
  - D. VALVE SHALL BE EQUIPPED W/ 2" PVC BALL VALVE FOR ISOLATION OF AIR RELEASE. BALL VALVE SHALL BE FULL PORT TRUE UNION W/ DOUBLE O-RING STEM SEALS AS MANUFACTURER BY HAYWARD, SPEARS OR ASAH.
3. CONNECTION TO GRAVITY SYSTEM FORCE MAIN SHALL DISCHARGE TO THE GRAVITY SEWER SYSTEM AT A MANHOLE. THE POINT OF CONNECTION SHALL BE NO MORE THAN ONE FOOT ABOVE THE FLOW LINE OF THE RECEIVING MANHOLE. INSIDE DROPS WILL NOT BE PERMITTED.
4. ALL INTERIOR SURFACES, INCLUDING THE INVERT OF THE FORCE MAIN CONNECTION MANHOLE AND A MINIMUM OF 2 ADDITIONAL MANHOLES DOWNSTREAM OF THE POINT OF CONNECTION SHALL BE LINED WITH "SPECTRASHIELD" MULTI-LAYERED LINER SYSTEM, MINIMUM 500 MILS THICK. MANHOLES SHALL BE CLEANED AND PREPARED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

## SITE PLAN:

1. PROVIDE OVERALL LAYOUT, MINIMUM SCALE: 1"=10'
2. SHOW ALL PROPERTY LINES, RIGHT-OF-WAY LINES AND EASEMENT LINES.
3. FENCE TO BE 6' TALL, GREEN OR BLACK VINYL COATED CHAIN LINK WITH THREE STRANDS OF GREEN OR BLACK VINYL COATED BARBED WIRE ALONG PERIMETER. PROVIDE WITH PRIVACY SLATS.
4. WARNING SIGNS SHALL BE PLACED ON EACH SIDE OF FENCE AND GATE.
5. PAVED SURFACE SHALL HAVE A MINIMUM OF 6" OF ASPHALT, 3" OF TYPE "X", AND 3" OF TYPE "C" WITH 6" OF GRANULAR BASE.
6. FORCE MAIN TO BE PVC PIPE WITH RESTRAINED FITTINGS.
7. FORCE MAIN TO HAVE TRACER WIRE WITH 6" WIDE CAUTION TAPE ON TOP.

## TELEMETRY SYSTEM:

1. PROVIDE A MODEL M-800 SERIES REAL TIME WIRELESS MONITORING AND ALARM SYSTEM MANUFACTURED BY MISSION.

## ADDITIONAL REQUIREMENTS:

1. PROVIDE ONE SPARE BACK-UP PUMP, CONTROL PANEL, AND EXTRA SET OF FLOATS FOR EACH LIFT STATION.

## PUMP STATION STANDARDS

## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

DATE:

6/23/16

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**DEFINITIONS:**

1. "INDIVIDUAL PRESSURE SYSTEM" IS A SEWERAGE SYSTEM THAT COLLECTS WASTEWATER FROM A DWELLING UNIT OR A NONRESIDENTIAL STRUCTURE AND THEN PUMPS THE WASTEWATER UNDER PRESSURE THROUGH A LATERAL TO A COMMON SEWER PIPE.
2. "COMMON SEWER PIPE" IS A SANITARY SEWER PIPE THAT IS DESIGNED OR USED TO COLLECT WASTEWATER FROM MORE THAN ONE DWELLING UNIT OR NONRESIDENTIAL STRUCTURE FOR TRANSPORTATION TO A SEWAGE TREATMENT FACILITY FOR PROPER TREATMENT.
3. "PUMP STATION" OR "LIFT STATION" IS A SEWERAGE SYSTEM THAT COLLECT WASTEWATER FROM MORE THAN ONE DWELLING UNIT OR NONRESIDENTIAL STRUCTURE AND THEN PUMPS THE WASTEWATER UNDER PRESSURE VIA A COMMON SEWER PIPE TO A SEWAGE TREATMENT FACILITY FOR PROPER TREATMENT.
4. "GRINDER PUMP" IS A SUBMERSIBLE INTEGRAL GRINDER UNIT AND PUMP WHICH IS CAPABLE OF MACERATING ALL MATERIAL NORMALLY FOUND IN DOMESTIC WASTEWATER (INCLUDING SOME FOREIGN OBJECTS SUCH AS SMALL WOOD, STICKS, PLASTIC, THIN RUBBER, SANITARY NAPKINS, TAMPONS, AND DISPOSABLE DIAPERS) INTO A SLURRY THAT WILL PASS THROUGH THE PUMP AND THE FORCE MAIN.

**APPLICATION OF REQUIREMENTS:**

1. THE PROVISIONS OF THESE SPECIFICATIONS SHALL GOVERN THE INSTALLATION OF INDIVIDUAL PRESSURE SYSTEMS DESIGNED OR USED TO SERVE ONE DWELLING UNIT AND ONE NONRESIDENTIAL BUILDING.
2. ALL PLANS FOR MULTIPLE UNIT PUMP STATION AND LIFT STATION SYSTEMS MUST BE PREPARED UNDER THE SEAL OF A MISSOURI PROFESSIONAL ENGINEER.
3. INDIVIDUAL PRESSURE SYSTEMS SHALL ONLY BE USED WHERE A RESIDENCE OR BUSINESS CANNOT BE SERVED BY GRAVITY FLOW OF SEWAGE FOR THE STRUCTURE TO A COMMON SEWER LINE.
4. IF A RESIDENCE OR BUSINESS CAN REASONABLY BE SERVED BY GRAVITY SEWERS, THEN A PRESSURE SYSTEM IS NOT ALLOWED.

**SUBMITTALS:**

1. SUBMIT PRODUCT DATA FOR LIFT STATION INCLUDING ALL COMPONENTS AND CONTROLS.
2. SUBMIT MANUFACTURER'S PUMP PERFORMANCE CURVE WITH OPERATING CONDITIONS APPLICABLE TO THIS PERMIT APPLICATION.
3. SUBMIT A SKETCH OF THE PROPOSED INSTALLATION INCLUDING METHOD OF CONTROL PANEL SUPPORT IF NOT ATTACHED TO THE DWELLING.
4. SUBMIT A CERTIFIED COPY OF THE RECORDED EASEMENT DOCUMENTS FOR THE LIFT STATION AND FORCE MAIN AND ACCESS THERETO.
5. IF THE CONNECTION OF THE FORCE MAIN FROM THIS LIFT STATION WILL DISCHARGE INTO A COMMON FORCE MAIN, INSTALLER MUST HAVE PLANS PREPARED UNDER THE SEAL OF MISSOURI PROFESSIONAL ENGINEER, PLANS, ENGINEERING REPORT, COMPLETED AND SIGNED MISSOURI DEPARTMENT OF NATURAL RESOURCES APPLICATION AND A CHECK PAYABLE TO THE "STATE OF MISSOURI" MUST BE SUBMITTED TO THE DISTRICT OFFICES FOR REVIEW, PROCESSING, APPROVAL, AND TRANSMITTAL.

**SPECIFICATIONS:**

ALL INDIVIDUAL PRESSURE SYSTEMS MUST BE IN ACCORDANCE WITH THE PROVISIONS OF THESE SPECIFICATIONS:

1. ONLY SUBMERSIBLE GRINDER PUMPS MAY BE UTILIZED IN AN INDIVIDUAL PRESSURE SYSTEM THE GRINDER PUMP MUST BE SIZED TO MEET THE ANTICIPATED DEMANDS. THE MOTOR SHALL BE AT LEAST A 2 HP PUMP. ACCEPTABLE MANUFACTURERS INCLUDE ABS, KEEN, MYERS, OR DISTRICT APPROVED EQUAL.
2. THE SEWAGE COLLECTION BASIN SHALL BE MOLDED OF FIBERGLASS REINFORCED POLYESTER RESIN MANUFACTURED BY THE LAY-UP SPRAY TECHNIQUE. TWENTY-FIVE PERCENT OF THE STRUCTURE SHALL BE GLASS FIBERS. THE INTERIOR SURFACE SHALL BE SMOOTH AND BASIN SHALL HAVE AN INTERIOR DIAMETER OF 2'-0". THE BASIN SHALL BE DESIGNED TO WITHSTAND A WALL COLLAPSE INDUCED BY HYDROSTATIC LOADING OF 120 POUNDS PER CUBIC FOOT WITH A 2.0 SAFETY FACTOR. THE MINIMUM BASIN DEPTH SHALL BE 6 FEET. OTHER MATERIALS MAY BE USED FOR THE SEWAGE COLLECTION BASIN WITH THE PRIOR PERMISSION OF THE DISTRICT.
3. THE BASIN SHALL HAVE A ONE-PIECE, SOLID CONSTRUCTED COVER OF POLYPROPYLENE HAVING A MINIMUM THICKNESS OF 0.375 INCH. THE COVER SHALL BE BOLTED TO THE BASIN USING STAINLESS STEEL FASTENERS (BOLTS OR SCREWS). THE COVER SHALL HAVE A CLOSED-CELL, HIGH DENSITY NEOPRENE FOAM GASKET.
4. THE BASIN SHALL HAVE A LIFT-OUT RAIL SYSTEM WHICH SHALL PERMIT THE INSTALLATION AND REMOVAL OF THE GRINDER PUMP AND LOWER CHECK VALVE WITHOUT THE NECESSITY OF PERSONNEL ENTERING THE BASIN.
5. DISCHARGE PIPING IN BASIN SHALL BE POLYVINYLCHLORIDE SCHEDULE 80 PIPE. ONLY GLUED FITTINGS ARE ALLOWED. PIPING OUTSIDE OF BASIN SHALL FOLLOW DISTRICT STANDARDS FOR FORCE MAIN. DISCHARGE PIPE SHALL BE IN A MINIMUM 8" WIDE TRENCH. PIPE SHALL BE PLACED WITH A DEPTH OF NOT LESS THAN 30" FROM THE SURFACE. PIPE SHALL BE BEDDED IN 1" CLEAN ROCK. THE PIPE SHALL BE BEDDED IN ROCK WITH A MINIMUM OF 4" OF ROCK BELOW THE PIPE, SIX INCHES OF ROCK OVER THE PIPE, ROCK ON THE SIDES OF THE PIPE. THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY. TRACE WIRE SHALL MARK THE ENTIRE LOCATION OF THE DISCHARGE PIPE TO THE COMMON COLLECTOR LINE. A 6" WIDE MARKING TAPE SHALL BE INSTALLED 12" ABOVE PIPE WHICH SHALL CONTAIN A WARNING THAT A BURIED SEWER LINE IS BELOW. DISCHARGE PIPING SHALL BE MINIMUM 1'-1/2" AND SIZED BASED ON HYDRAULIC PROPERTIES OF SYSTEM.
6. A CHECK VALVE SHALL BE ATTACHED TO PREVENT THE FLOW WASTEWATER INTO THE SYSTEM FROM THE DISCHARGE SIDE OF THE SYSTEM.
7. INTERNAL JUNCTION BOX SHALL BE STRUCTURE PLASTIC CONFORMING TO NEMA 6 STANDARDS. 7
8. LEVEL CONTROL SHALL BE PROVIDED BY THREE UL/CSA LISTED MERCURY TUBE FLOAT SWITCHES SUSPENDED FROM A STEEL BRACKET. CABLE SHALL BE SUFFICIENT LENGTH TO EXTEND FROM THE ASSIGNED FLOAT ELEVATION TO THE JUNCTION BOX WITHOUT A SPLICE,
9. THE CONTROL PANEL SHALL BE HOUSED IN AN ENCLOSURE MOLDED OF GLASS REINFORCED POLYESTER RESINS TO NEMA 4X STANDARDS. THE ENCLOSURE SHALL BE ONE-PIECE CONSTRUCTION AND SHALL BE UL LISTED AS AN ASSEMBLY.
10. AN ALARM LIGHT SHALL BE MOUNTED ON TOP OF THE CONTROL PANEL AND SHALL ENERGIZED IN THE EVENT THE HIGH WATER FLOAT SENSOR SWITCH IS ACTIVATED.
11. THE BASIN SHALL BE SECURED TO BE RESISTANT TO BUOYANT FORCES BY THE PLACEMENT OF PORTLAND CEMENT CONCRETE BALLAST EITHER AS A BASE OR A COLLAR. A MINIMUM OF 2.0 CUBIC FEET OF CONCRETE SHALL BE PROVIDED FOR EACH FOOT OF BASIN DEPTH. THE MINIMUM SLAB BENEATH THE BASIN SHALL BE 3' DIAMETER, 10" THICK OR 2'8" DIAMETER, 12" THICK. THE CONCRETE FILL AROUND THE BASIN SHALL BE: MINIMUM SLAB BELOW STATION 6" THICK, 4' DIAMETER, 8" THICK; OR 3' DIAMETER, 1' 6" THICK.
12. AN AGGREGATE SHALL BE USED TO PROVIDE A STABLE BASE FOR THE BASIN OF 1" CLEAN, 8" THICK AND EXTEND TO THE LIMITS OF THE EXCAVATION.

**RESIDENTIAL PRESSURE SEWER  
SYSTEM SPECIFICATIONS**

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

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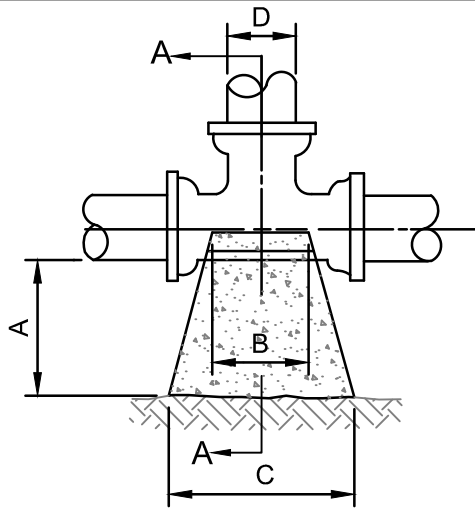
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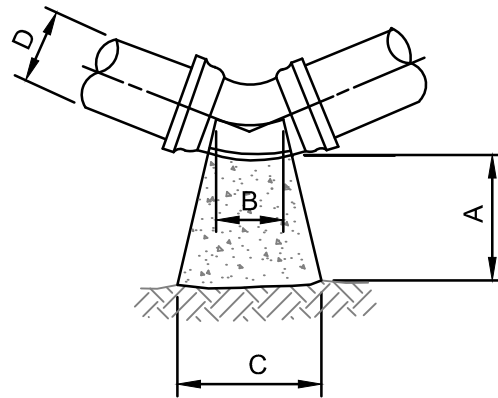
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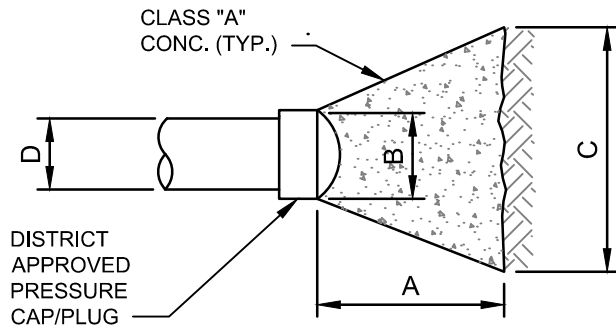
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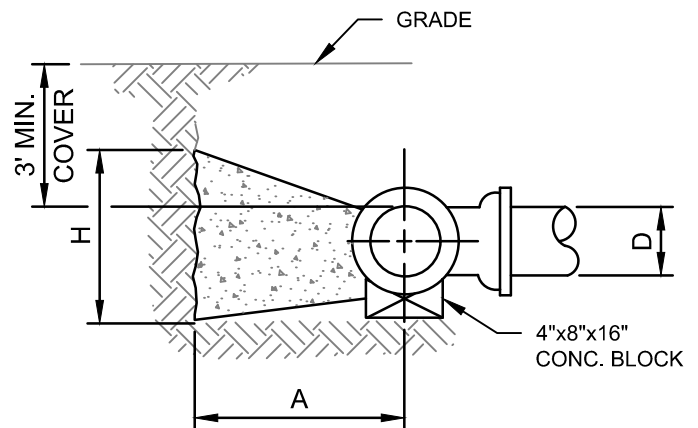
**PLAN VIEW  
TEE OR WYE BRANCH**



**PLAN VIEW  
90° BEND - 45° BEND - 22 1/2° BEND**



**PLAN VIEW  
END CAP OR PLUG**



**SECTION A-A**

**THRUST BLOCK DIMENSIONS (INCHES)**

| PIPE SIZE |    |       | TEE, WYE,<br>END CAP |    | 22 1/2° BEND |    | 45° BEND |    | 90° BEND |    |
|-----------|----|-------|----------------------|----|--------------|----|----------|----|----------|----|
| D         | A  | B     | C                    | H  | C            | H  | C        | H  | C        | H  |
| 1 1/2     | 6  | 1 1/2 | 4                    | 4  | 4            | 2  | 3        | 3  | 12       | 6  |
| 2         | 8  | 2     | 9                    | 3  | 4            | 2  | 5        | 3  | 16       | 8  |
| 2 1/2     | 10 | 3     | 14                   | 5  | 6            | 3  | 7        | 5  | 20       | 10 |
| 3         | 10 | 3     | 20                   | 9  | 10           | 5  | 15       | 8  | 24       | 12 |
| 4         | 14 | 4     | 26                   | 13 | 16           | 8  | 24       | 12 | 30       | 15 |
| 6         | 22 | 6     | 36                   | 18 | 24           | 12 | 32       | 16 | 44       | 22 |
| 8         | 29 | 8     | 50                   | 25 | 30           | 15 | 42       | 21 | 58       | 29 |
| 10        | 37 | 10    | 62                   | 31 | 40           | 20 | 55       | 27 | 74       | 37 |
| 12        | 44 | 12    | 74                   | 37 | 46           | 23 | 65       | 33 | 88       | 44 |
| 14        | 52 | 14    | 86                   | 43 | 54           | 27 | 76       | 38 | 103      | 52 |
| 16        | 58 | 15    | 98                   | 49 | 60           | 30 | 86       | 43 | 118      | 58 |
| 18        | 66 | 16    | 112                  | 56 | 70           | 35 | 98       | 49 | 134      | 66 |

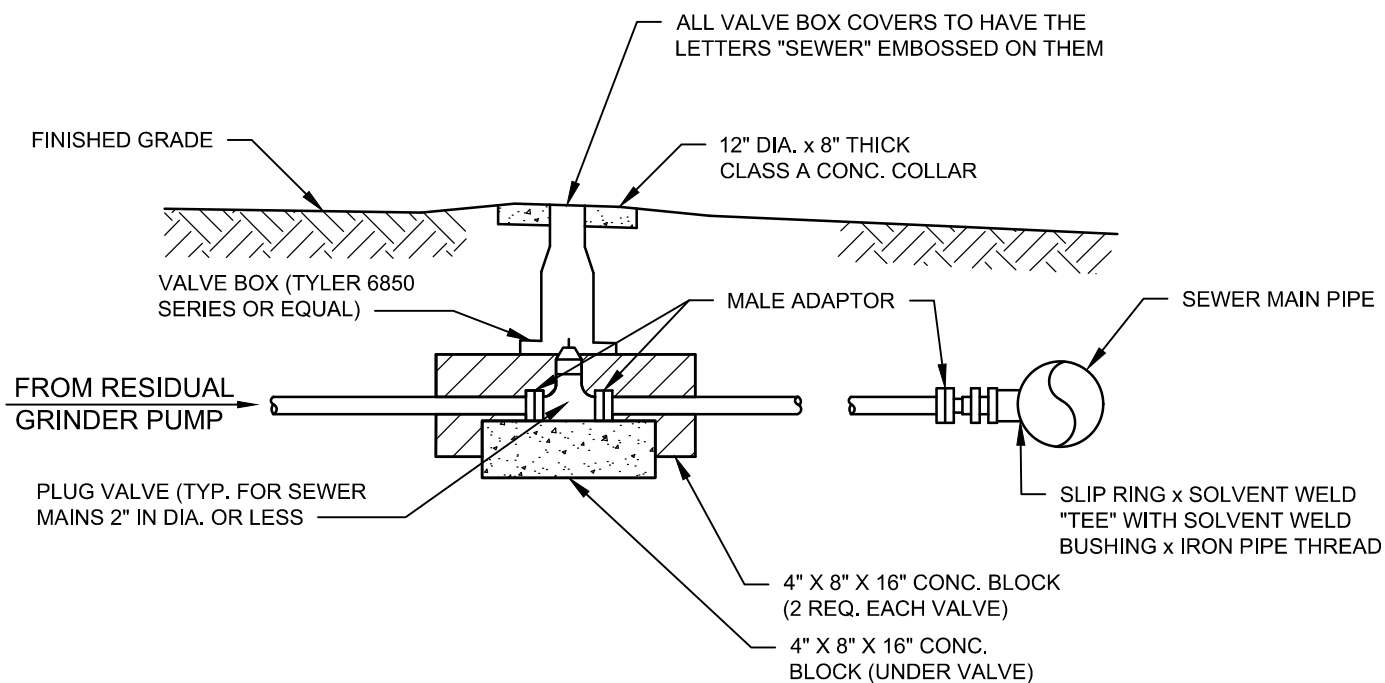
**FORCE MAIN THRUST  
BLOCK DETAILS**

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

DATE: 6/23/16

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### MAIN CONNECTION AND VALVE DETAIL

RESIDENTIAL MAIN CONNECTION  
AND VALVE DETAIL

**ROCK CREEK PUBLIC SEWER DISTRICT**  
**STANDARD DETAILS OF SEWER CONSTRUCTION**

DATE: 6/23/16

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## MATERIALS

### GENERAL

1. ALL TRACE WIRE AND TRACE WIRE PRODUCTS SHALL BE DOMESTICALLY MANUFACTURED IN THE U.S.A.
2. ALL TRACE WIRE SHALL HAVE HDPE INSULATION INTENDED FOR DIRECT BURY, GREEN COLOR COATED PER APWA STANDARD FOR SANITARY SEWER AND FORCE MAIN.

### TRACE WIRE

1. OPEN TRENCH - TRACE WIRE SHALL BE #12 AWG COPPER CLAD STEEL, HIGH STRENGTH WITH MINIMUM 450 LB. BREAK LOAD, WITH MINIMUM 30 MIL HDPE INSULATION THICKNESS.
2. DIRECTIONAL DRILLING/BORING - TRACE WIRE SHALL BE #12 AWG COPPER CLAD STEEL, EXTRA HIGH STRENGTH WITH MINIMUM 1,150 LB. BREAK LOAD, WITH MINIMUM 30 MIL HDPE INSULATION THICKNESS.
3. TRACE WIRE - PIPE BURSTING/SLIP LINING - TRACE WIRE SHALL BE 7 X 7 STRANDED COPPER CLAD STEEL, EXTREME STRENGTH WITH 4,700 LB. BREAK LOAD, WITH MINIMUM 50 ML HDPE INSULATION THICKNESS.

### CONNECTORS

1. ALL MAINLINE TRACE WIRES MUST BE INTERCONNECTED IN INTERSECTIONS, AT MAINLINE TEES AND MAINLINE CROSSES. AT TEES, THE THREE WIRES SHALL BE JOINED USING A SINGLE 3-WAY LOCKABLE CONNECTOR. AT CROSSES, THE FOUR WIRES SHALL BE JOINED USING A 4-WAY CONNECTOR. USE OF TWO 3-WAY CONNECTORS WITH A SHORT JUMPER WIRE BETWEEN THEM IS AN ACCEPTABLE ALTERNATIVE.
2. DIRECT BURY WIRE CONNECTORS - SHALL INCLUDE 3-WAY LOCKABLE CONNECTORS AND MAINLINE TO LATERAL LUG CONNECTORS SPECIFICALLY MANUFACTURED FOR USE IN UNDERGROUND TRACE WIRE INSTALLATION. CONNECTORS SHALL BE DIELECTRIC SILICON FILLED TO SEAL OUT MOISTURE AND CORROSION, AND SHALL BE INSTALLED IN A MANNER SO AS TO PREVENT ANY UNINSULATED WIRE EXPOSURE.
3. NON LOCKING FRICTION FIT, TWIST ON OR TAPED CONNECTORS ARE PROHIBITED.

### TERMINATION/ACCESS

1. ALL TRACE WIRE TERMINATION POINTS MUST UTILIZE AN APPROVED TRACE WIRE ACCESS BOX (ABOVE GROUND ACCESS BOX OR GRADE LEVEL/IN-GROUND ACCESS BOX AS APPLICABLE), SPECIFICALLY MANUFACTURED FOR THIS PURPOSE.
2. ALL GRADE LEVEL/IN-GROUND ACCESS BOXES SHALL BE APPROPRIATELY IDENTIFIED WITH "SEWER" CAST INTO THE CAP AND BE COLOR CODED GREEN.
3. A MINIMUM OF 2 FT. OF EXCESS/SLACK WIRE IS REQUIRED IN ALL TRACE WIRE ACCESS BOXES AFTER MEETING FINAL ELEVATION.
4. ALL TRACE WIRE ACCESS BOXES MUST INCLUDE A MANUALLY INTERRUPTIBLE CONDUCTIVE/CONNECTIVE LINK BETWEEN THE TERMINAL(S) FOR THE TRACE WIRE CONNECTION AND THE TERMINAL FOR THE GROUNDING ANODE WIRE CONNECTION.
5. GROUNDING ANODE WIRE SHALL BE CONNECTED TO THE IDENTIFIED (OR BOTTOM) TERMINAL ON ALL ACCESS BOXES.
6. SERVICE LATERALS - TRACE WIRE MUST TERMINATE AT AN APPROVED ABOVE-GROUND TRACE WIRE ACCESS BOX, AFFIXED TO THE BUILDING EXTERIOR DIRECTLY ABOVE WHERE THE UTILITY ENTERS THE BUILDING, AT AN ELEVATION NOT GREATER THAN 5 VERTICAL FEET ABOVE FINISHED GRADE, OR TERMINATE AT AN APPROVED GRADE LEVEL/IN-GROUND TRACE WIRE ACCESS BOX, LOCATED WITHIN 2 LINEAR FEET OF THE BUILDING BEING SERVED BY THE DISTRICT.
7. LONG-RUNS, IN EXCESS OF 500 LINEAR FEET WITHOUT SERVICE LATERALS - TRACE WIRE ACCESS MUST BE PROVIDED UTILIZING AN APPROVED GRADE LEVEL/IN-GROUND TRACE WIRE ACCESS BOX, LOCATED AT THE EDGE OF THE ROAD RIGHT-OF-WAY, AND OUT OF THE ROADWAY. THE GRADE LEVEL/IN-GROUND TRACE WIRE ACCESS BOX SHALL BE DELINEATED USING A MINIMUM 48" POLYETHYLENE MARKER POST, COLOR CODED GREEN PER APWA STANDARD.

### GROUNDING

1. TRACE WIRE MUST BE PROPERLY GROUNDED AT ALL DEAD ENDS/STUBS.
2. GROUNDING OF TRACE WIRE SHALL BE ACHIEVED BY USE OF A DRIVE-IN MAGNESIUM GROUNDING ANODE ROD WITH A MINIMUM OF 20FT OF #14 RED HDPE INSULATED COPPER CLAD STEEL WIRE CONNECTED TO ANODE (MINIMUM 1.5 LB.) SPECIFICALLY MANUFACTURED FOR THIS PURPOSE, AND BURIED AT THE SAME ELEVATION AS THE SEWER PIPE OR FORCE MAIN.
3. WHEN GROUNDING THE TRACE WIRE AT DEAD ENDS/STUBS, THE GROUNDING ANODE SHALL BE INSTALLED IN A DIRECTION 180 DEGREES OPPOSITE OF THE TRACE WIRE, AT THE MAXIMUM POSSIBLE DISTANCE.
4. WHEN GROUNDING THE TRACE WIRE IN AREAS WHERE THE TRACE WIRE IS CONTINUOUS AND NEITHER THE MAINLINE TRACE WIRE OR THE GROUNDING ANODE WIRE WILL BE TERMINATED AT/ABOVE GRADE, INSTALL GROUNDING ANODE DIRECTLY BENEATH AND IN-LINE WITH THE TRACE WIRE. DO NOT COIL EXCESS WIRE FROM GROUNDING ANODE. IN THIS INSTALLATION METHOD, THE GROUNDING ANODE WIRE SHALL BE TRIMMED TO AN APPROPRIATE LENGTH BEFORE CONNECTING TO TRACE WIRE WITH A MAINLINE TO LATERAL LUG CONNECTOR.
5. WHERE THE ANODE WIRE WILL BE CONNECTED TO A TRACE WIRE ACCESS BOX, A MINIMUM OF 2 FT. OF EXCESS/SLACK WIRE IS REQUIRED AFTER MEETING FINAL ELEVATION.

## INSTALLATION

### GENERAL

1. TRACE WIRE INSTALLATION SHALL BE PERFORMED IN SUCH A MANNER THAT ALLOWS PROPER ACCESS FOR CONNECTION OF LINE TRACING EQUIPMENT, PROPER LOCATING OF WIRE WITHOUT LOSS OR DETERIORATION OF LOW FREQUENCY (512HZ) SIGNAL FOR DISTANCES IN EXCESS OF 1,000 LINEAR FEET, AND WITHOUT DISTORTION OF SIGNAL CAUSED BY MULTIPLE WIRES BEING INSTALLED IN CLOSE PROXIMITY TO ONE ANOTHER.
2. TRACE WIRE SYSTEMS MUST BE INSTALLED AS A SINGLE CONTINUOUS WIRE, EXCEPT WHERE USING APPROVED CONNECTORS. NO LOOPING OR COILING OF WIRE IS ALLOWED.
3. ANY DAMAGE OCCURRING DURING INSTALLATION OF THE TRACE WIRE MUST BE IMMEDIATELY REPAIRED BY REMOVING THE DAMAGED WIRE, AND INSTALLING A NEW SECTION OF WIRE WITH APPROVED CONNECTORS. TAPING AND/OR SPRAY COATING SHALL NOT BE ALLOWED.
4. TRACE WIRE SHALL BE INSTALLED AT THE BOTTOM HALF OF THE PIPE AND SECURED (TAPED/TIED) AT 5' INTERVALS.
5. TRACE WIRE MUST BE PROPERLY GROUNDED AS SPECIFIED.
6. TRACE WIRE ON ALL SERVICE LATERALS/STUBS MUST TERMINATE AT AN APPROVED TRACE WIRE ACCESS BOX LOCATED DIRECTLY ABOVE THE SEWER PIPE. (SEE TRACE WIRE TERMINATION/ACCESS)
7. AT ALL MAINLINE DEAD-ENDS, TRACE WIRE SHALL GO TO GROUND USING AN APPROVED CONNECTION TO A DRIVE-IN MAGNESIUM GROUNDING ANODE ROD, BURIED AT THE SAME DEPTH AS THE TRACE WIRE. (SEE GROUNDING)
8. MAINLINE TRACE WIRE SHALL NOT BE CONNECTED TO EXISTING CONDUCTIVE PIPES. TREAT AS A MAINLINE DEAD- END, GROUND USING AN APPROVED WATERPROOF CONNECTION TO A GROUNDING ANODE BURIED AT THE SAME DEPTH AS THE TRACE WIRE.
9. ALL SERVICE LATERAL TRACE WIRES SHALL BE A SINGLE WIRE, CONNECTED TO THE MAINLINE TRACE WIRE USING A MAINLINE TO LATERAL LUG CONNECTOR, INSTALLED WITHOUT CUTTING/SPLICING THE MAINLINE TRACE WIRE.
10. IN OCCURRENCES WHERE AN EXISTING TRACE WIRE IS ENCOUNTERED ON AN EXISTING UTILITY THAT IS BEING EXTENDED OR TIED INTO, THE NEW TRACE WIRE AND EXISTING TRACE WIRE SHALL BE CONNECTED USING APPROVED SPLICE CONNECTORS, AND SHALL BE PROPERLY GROUNDED AT THE SPLICE LOCATION AS SPECIFIED.
11. A MAINLINE TRACE WIRE MUST BE INSTALLED, WITH ALL SERVICE LATERAL TRACE WIRES PROPERLY CONNECTED TO THE MAINLINE TRACE WIRE, TO ENSURE FULL TRACING/LOCATING CAPABILITIES FROM A SINGLE CONNECTION POINT.
12. LAY MAINLINE TRACE WIRE CONTINUOUSLY, BY-PASSING AROUND THE OUTSIDE OF MANHOLES/STRUCTURES ON THE NORTH OR EAST SIDE.
13. TRACE WIRE ON ALL SANITARY SERVICE LATERALS MUST TERMINATE AT AN APPROVED TRACE WIRE ACCESS BOX COLOR CODED GREEN AND LOCATED DIRECTLY ABOVE THE SERVICE LATERAL.

### PROHIBITED PRODUCTS AND METHODS

THE FOLLOWING PRODUCTS AND METHODS SHALL NOT BE ALLOWED OR ACCEPTABLE

1. UNINSULATED TRACE WIRE
2. TRACE WIRE INSULATIONS OTHER THAN HDPE
3. TRACE WIRES NOT DOMESTICALLY MANUFACTURED
4. NON LOCKING, FRICTION FIT, TWIST ON OR TAPED CONNECTORS
5. BRASS OR COPPER GROUND RODS
6. WIRE CONNECTIONS UTILIZING TAPING OR SPRAY-ON WATERPROOFING
7. LOOPED WIRE OR CONTINUOUS WIRE INSTALLATIONS, THAT HAS MULTIPLE WIRES LAID SIDE-BY-SIDE OR IN CLOSE PROXIMITY TO ONE ANOTHER
8. TRACE WIRE WRAPPED AROUND THE CORRESPONDING UTILITY
9. BRASS FITTINGS WITH TRACE WIRE CONNECTION LUGS
10. WIRE TERMINATIONS WITHIN THE ROADWAY, I.E. IN VALVE BOXES, CLEANOUTS, MANHOLES, ETC.
11. CONNECTING TRACE WIRE TO EXISTING CONDUCTIVE UTILITIES

### TESTING

1. ALL NEW TRACE WIRE INSTALLATIONS SHALL BE LOCATED BY CONTRACTOR USING TYPICAL LOW FREQUENCY (512HZ) LINE TRACING EQUIPMENT AND WITNESSED BY THE DISTRICT PRIOR TO ACCEPTANCE OF OWNERSHIP.
2. THIS VERIFICATION SHALL BE PERFORMED UPON COMPLETION OF ROUGH GRADING AND AGAIN PRIOR TO FINAL ACCEPTANCE OF THE PROJECT.
3. CONTINUITY TESTING IN LIEU OF ACTUAL LINE TRACING SHALL NOT BE ACCEPTED.

### ACCEPTABLE PRODUCTS

TRACE WIRE PRODUCTS SHALL BE AS FOLLOWS OR DISTRICT APPROVED EQUAL:

#### COPPER CLAD STEEL (CCS) TRACE WIRE

1. OPEN TRENCH - COPPERHEAD #12 HIGH STRENGTH PART # 1230-HS
2. DIRECTIONAL DRILLING/BORING - COPPERHEAD EXTRA HIGH STRENGTH PART # 1245\*EHS
3. PIPE BURSTING/SLIP LINING - COPPERHEAD SOLOSHOT EXTREME STRENGTH 7 X 7 STRANDED PART # PBX-50 CONNECTORS
1. COPPERHEAD 3-WAY LOCKING CONNECTOR PART # LSC1230\*
2. DRYCONN 3- WAY DIRECT BURY LUG: COPPERHEAD PART # 3WB-01 TERMINATION/ACCESS
1. BOXES TO BE PROVIDED WITH 2-TERMINAL CONNECTION LID WHERE BOTH GROUND AND TRACE WIRES ARE PRESENT. COPPERHEAD PART # SP-LID-2
2. NON-ROADWAY ACCESS BOXES APPLICATIONS: TRACE WIRE ACCESS BOXES GRADE LEVEL COPPERHEAD ADJUSTABLE LITE DUTY PART # LD14\*TP
3. CONCRETE / DRIVEWAY ACCESS BOX APPLICATIONS: TRACE WIRE ACCESS BOXES GRADE LEVEL COPPERHEAD PART # CD14\*TP 14"
4. ROADWAY ACCESS BOX APPLICATIONS: TRACE WIRE ACCESS BOXES GRADE LEVEL COPPERHEAD PART # RB14\*TP. GROUNDING
5. ABOVE GRADE ACCESS BOX: COPPERHEAD PART # T2.
1. DRIVE IN MAGNESIUM ANODE: COPPERHEAD PART # ANO-1005 (1.5 LB)

## TRACER WIRE SPECIFICATIONS (2)

## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

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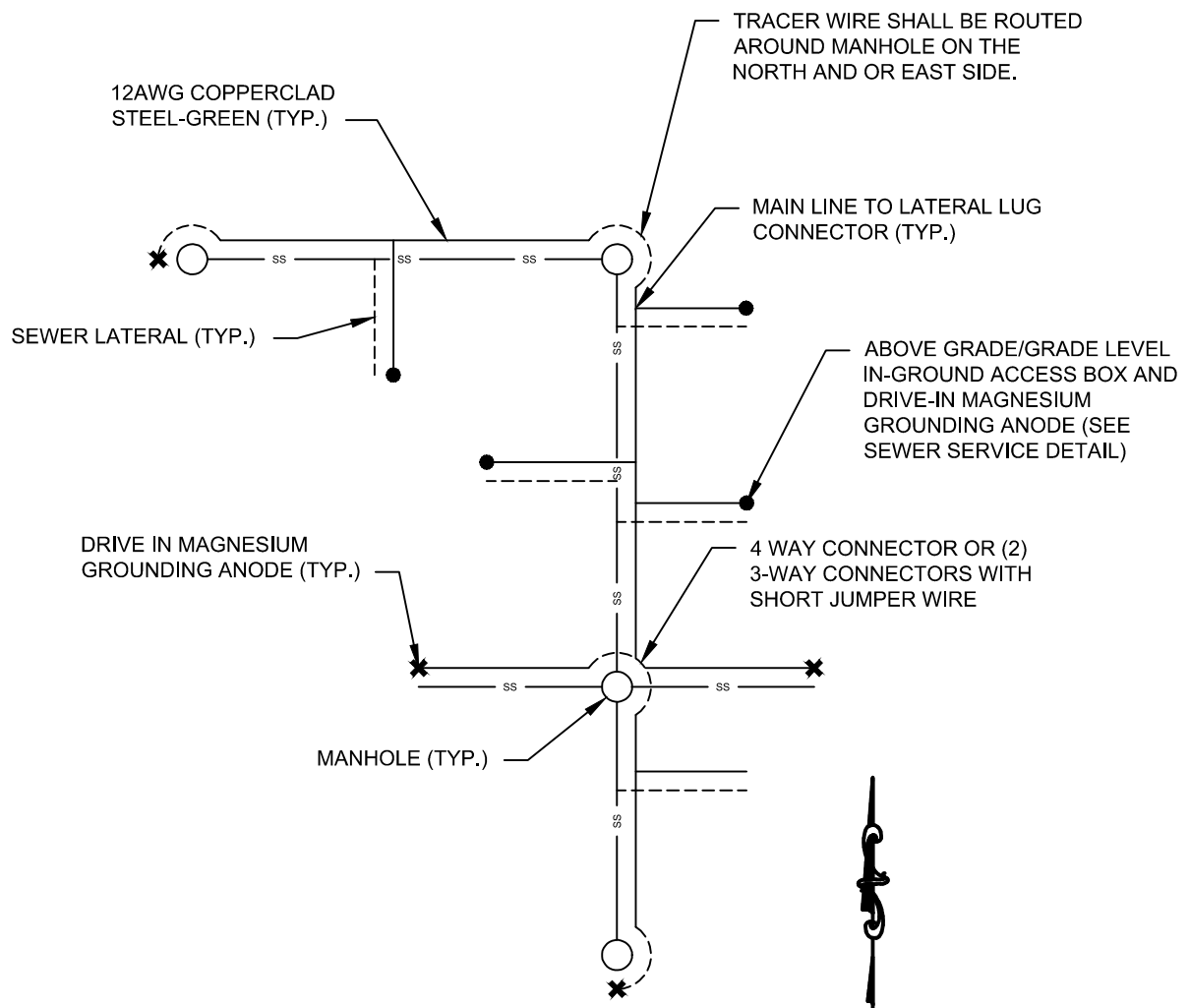
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NOTES:

1. WIRE SHOWN AWAY FROM PIPE FOR CLARITY. WIRE SHALL BE INSTALLED ON THE BOTTOM SIDE OF THE PIPE BELOW THE SPRING LINE. THE WIRES SHALL BE FASTENED TO THE PIPE WITH TAPE OR PLASTIC TIES AT 5' INTERVALS.

TRACER WIRE PLAN

ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION

DATE:

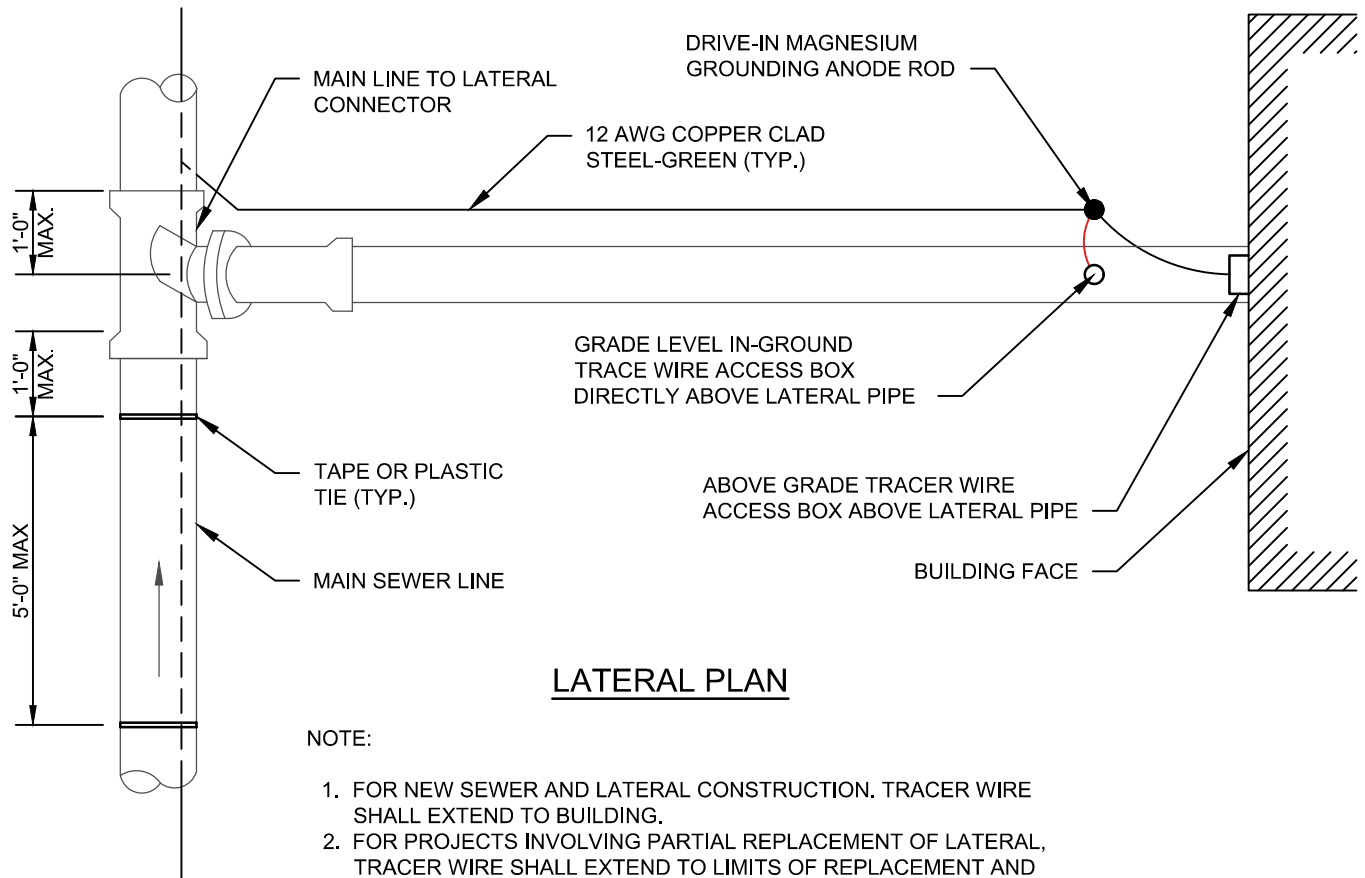
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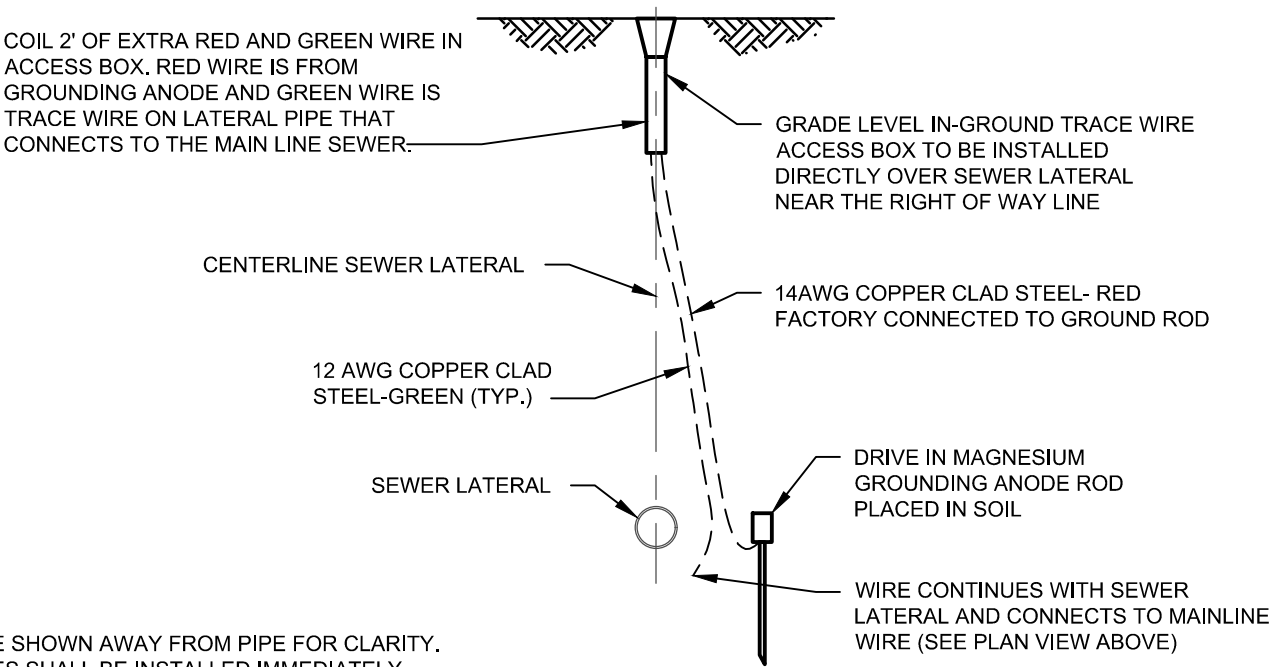
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### LATERAL PLAN

- NOTE:
1. FOR NEW SEWER AND LATERAL CONSTRUCTION, TRACER WIRE SHALL EXTEND TO BUILDING.
  2. FOR PROJECTS INVOLVING PARTIAL REPLACEMENT OF LATERAL, TRACER WIRE SHALL EXTEND TO LIMITS OF REPLACEMENT AND TERMINATE WIRE AT AN IN-GROUND ACCESS BOX. A NEW CLEANOUT SHALL BE INSTALLED ON LATERAL AT THIS LOCATION.



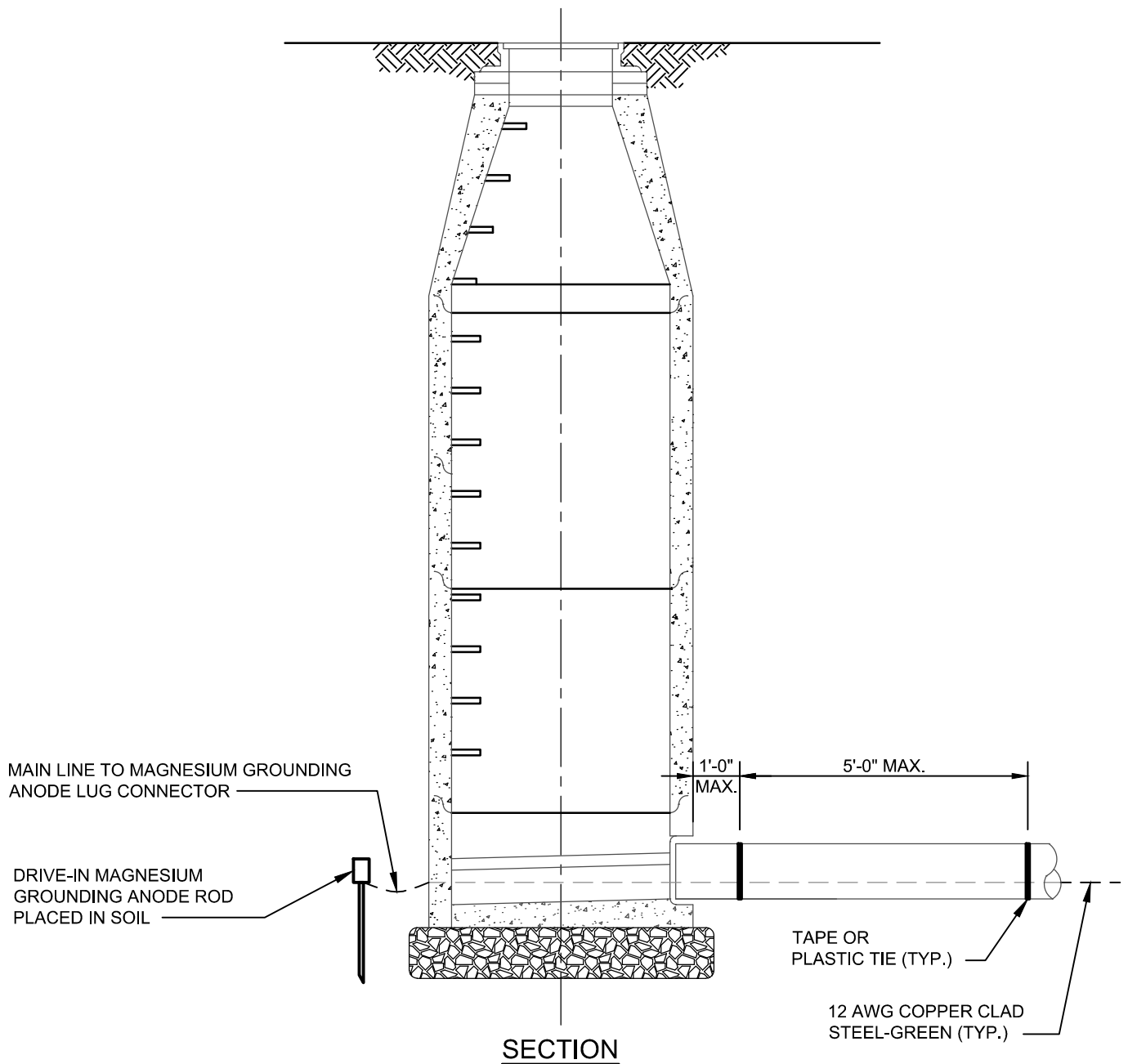
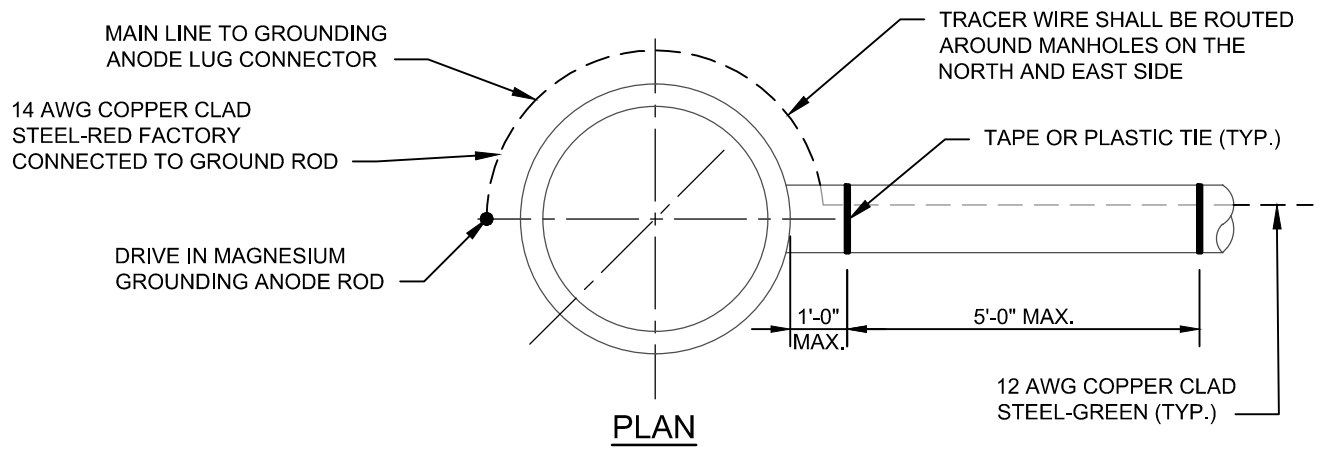
### SECTION

- NOTE:
1. WIRE SHOWN AWAY FROM PIPE FOR CLARITY. WIRES SHALL BE INSTALLED IMMEDIATELY ADJACENT TO LATERAL PIPE. THE WIRE SHALL BE FASTENED TO THE PIPE WITH TAPE OR PLASTIC TIES AT 5'-0" INTERVALS

## TRACER WIRE AT LATERAL

## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

|       |         |      |        |        |    |
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TRACER WIRE AT MANHOLE

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

DATE:

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GENERAL:

AFTER THE SEWER SYSTEM HAS BEEN COMPLETED AND FLUSHED, THE MANHOLES SHALL BE VACUUM TESTED AND THE SEWER LINES AND LATERALS SHALL BE LOW-PRESSURE AIR TESTED IN THE PRESENCE OF A RCPSD INSPECTOR. SEWER LINES SHALL ALSO BE REQUIRED TO COMPLETE A DEFLECTION TEST. FORCE MAINS SHALL BE HYDROSTATICALLY TESTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR INSTALLING THE SEWER SYSTEM TO PROVIDE ALL EQUIPMENT AND MATERIAL NECESSARY TO COMPLETE THE REQUIRED TESTING AND TO CONDUCT THE TESTING IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION AND ALL REQUIRED SAFETY STANDARDS. NO SEWER SYSTEM WILL BE APPROVED OR ACCEPTED AND NO ESCROW SHALL BE AUTHORIZED TO BE RELEASED THAT HAS NOT PASSED THE MINIMUM TESTING AS REQUIRED HEREIN. ALTERNATE TESTING METHODS MAY BE UTILIZED PROVIDED SUCH TESTING IS APPROVED IN ADVANCE BY THE DISTRICT AND MEET THE MINIMUM STANDARDS ADOPTED BY THE MISSOURI DEPARTMENT OF NATURAL RESOURCES. AS A MINIMUM, ALL TESTING SHALL CONFORM TO THE FOLLOWING:

DEFLECTION TESTING:

1. NOT LESS THAN THIRTY (30) DAYS AFTER FINAL BACKFILL, THE CONTRACTOR SHALL PERFORM A DEFLECTION TEST WITH A RCPSD INSPECTOR PRESENT. TESTING SHALL BE COMPLETED BY USING A RIGID BALL OR MANDRELS WITH DIAMETERS EQUAL TO NINETY-FIVE PERCENT (95%) OF THE DIAMETER OF THE PIPE. TEST SHALL BE PERFORMED WITHOUT MECHANICAL PULLING DEVICES. NO PIPE SHALL EXCEED A DEFLECTION OF FIVE PERCENT (5%).

LOW-PRESSURE AIR TESTING:

1. ALL TESTING MUST BE COMPLETED IN ACCORDANCE WITH ASTM F 1417. AFTER COMPLETION OF THE SYSTEM BUT PRIOR TO THE CONNECTION OF RESIDENTIAL UNITS, LOW-PRESSURE AIR TESTING SHALL BE PERFORMED ON SEWER LINES AND LATERALS. ISOLATE THE SECTION OF SEWER LINE TO BE TESTED. ALL BRANCHES, LATERALS, TEES, AND WYES MUST BE PLUGGED AND BRACED ADEQUATELY TO WITHSTAND THE TEST PRESSURE. AIR PRESSURE MUST BE INTRODUCED INTO THE SYSTEM TO ACHIEVE FOUR (4) PSI AND THEN STABILIZED TO A MINIMUM OF THREE AND ONE-HALF (3 1/2) PSI IN EXCESS OF GROUND WATER PRESSURE ABOVE THE TOP OF THE SEWER FOR AT LEAST TWO (2) MINUTES AND THEN THE AIR SUPPLY DISCONNECTED. THE TIME-PRESSURE DROP METHOD SHALL BE USED AND SHALL CONFORM TO THE FOLLOWING:

| SPECIFIED TIME ALLOWED FOR A ONE PSI DROP IN PRESSURE FOR SIZE AND LENGTH OF PIPE INDICATED. ONE (1.0) PSI PRESSURE CANNOT DROP FASTER THAN |              |          |          |          |         |          |          |
|---|--------------|----------|----------|----------|---------|----------|----------|
| PIPE DIA.<br>(IN.)  | MIN.<br>TIME | 100 FEET | 150 FEET | 200 FEET | 300FEET | 350 FEET | 400 FEET |
| 8"  | 7: 34        | 7: 34    | 7: 34    | 7: 34    | 7: 36   | 8: 52    | 10: 08   |
| 10"   | 9: 26        | 9: 26    | 9: 26    | 9: 53    | 11: 52  | 15: 49   | 17: 48   |

VACUUM TESTING:

1. ALL TESTING MUST BE COMPLETED IN ACCORDANCE WITH ASTM C-1244. AFTER COMPLETION OF THE SYSTEM BUT PRIOR TO THE CONNECTION OF RESIDENTIAL UNITS, A VACUUM TEST SHALL BE PERFORMED ON MANHOLES. SEWER LINES AND LATERAL LINES WITHIN THE MANHOLE MUST BE PLUGGED DURING THE TESTING. A VACUUM OF TEN (10) INCHES OF MERCURY SHALL BE DRAWN ON THE MANHOLE, THE VALVE ON THE VACUUM LINE TEST HEAD SHALL BE CLOSED, AND THE VACUUM PUMP SHUT OFF. THE TIME SHALL BE MEASURED FOR THE VACUUM TO DROP TO 9 INCHES OF MERCURY. TEST PASSES IF VACUUM REMAINS AT 10 INCHES OF HG OR DROPS TO NOT LESS THAN 9 INCHES OF HG IN ONE (1) MINUTE.

HYDROSTATIC TESTING:

1. AFTER BACKFILLING HAS BEEN COMPLETED, THE FORCE MAIN SHALL BE TESTED TO A PRESSURE OF 50 PSI ABOVE THE NORMAL OPERATING PRESSURE OF THE SYSTEM, UNLESS OTHERWISE SPECIFIED. THE LEAKAGE SHALL BE MEASURED BY PUMPING INTO THE LINE WITH A PUMP CAPABLE OF MAINTAINING THE REQUIRED PRESSURE AND METERING THE AMOUNT OF WATER NECESSARY TO SUSTAIN THE PRESSURE FOR A PERIOD OF 4 HOURS. THE TEST WHEN SO CONDUCTED, SHALL INDICATE A LEAKAGE OF NOT MORE THAN 50 GALLONS PER INCH OF PIPE DIAMETER PER MILE PER DAY AND NO LEAKS SHALL BECOME APPARENT ON THE SURFACE OF THE GROUND. SHOULD SURFACE LEAKS BECOME APPARENT, OR SHOULD THE LEAKAGE EXCEED THAT SPECIFIED, THE LEAKS SHALL BE LOCATED AND REPAIRED AND THE LINE RETESTED UNTIL IT FULFILLS THE ABOVE REQUIREMENTS.

NOTES:

1. SANITARY SEWERS SHALL NOT BE CONNECTED TO A LIVE SEWER LINE UNTIL AFTER THE SEWER SYSTEM HAS BEEN INSPECTED AND APPROVED BY ROCK CREEK PUBLIC SEWER DISTRICT IN ACCORDANCE WITH THE ABOVE PROVISIONS.
2. ALL PIPING, BOTH MAIN LINE AND LATERALS SHALL BE INSPECTED BY THE DISTRICT BEFORE THE PIPE IS BACK FILLED WITH ROCK. IF THE PIPE IS BACKFILLED WITHOUT BEING INSPECTED, IT WILL HAVE TO BE UNCOVERED SO THE DISTRICTS INSPECTOR CAN SEE THE ENTIRE PIPING AND THE CONNECTIONS TO THE MAIN LIEN AND THE HOME.
3. THE SEWER CONTRACTOR SHALL FLUSH ALL SEWER LINES AFTER TESTING AND THE MANHOLES HAVE BEEN GROUTED. A DISTRICT INSPECTOR MUST BE PRESENT.
4. MAIN LINE INSPECTION FEES HAVE BEEN RAISED TO \$30.00 PER HOUR DURING NORMAL WORKING HOURS. MAIN LINE INSPECTIONS SHALL BE \$45.00 PER HOUR AFTER NORMAL DISTRICT HOURS, WEEKENDS, AND HOLIDAYS. DISTRICT HOURS ARE 7:00 AM TO 4:30 PM.
5. IF BLASTING OF HOME SITES OCCURS AFTER THE MAIN LINE SEWER HAS BEEN TESTED AND APPROVED BY THE DISTRICT, THE ENTIRE SEWER SYSTEM SHALL BE RE-TESTED BEFORE ANY TAPS ARE ALLOWED.
6. ALL TAP ON FEES AND INSPECTIONS FEES SHALL BE PAID IN FULL, BEFORE AND INSPECTION WILL TAKE PLACE.

STANDARD TESTING  
REQUIREMENTS FOR SANITARY  
SEWERS AND MANHOLES

ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION

DATE:

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**AS-BUILT REQUIREMENTS:**

UPON COMPLETION OF SEWER CONSTRUCTION AND ALL WORK IS APPROVED BY THE DISTRICT, THE CONTRACTOR SHALL PROVIDE THE FOLLOWING AS-BUILT MEASUREMENTS OF THE COMPLETED MANHOLES:

1. NORTH AND EAST COORDINATES OF THE CENTER OF THE MANHOLE LID
2. TOP ELEVATION OF THE MANHOLE COVER
3. SIZES, MATERIAL, AND INVERT ELEVATIONS OF ALL CONNECTING PIPES.

ALL MEASUREMENTS SHALL BE CERTIFIED BY EITHER A LAND SURVEYOR OR ENGINEER REGISTERED IN THE STATE OF MISSOURI AND SUBMITTED TO THE DISTRICT IN THE FOLLOWING FORMAT: N,E,Z,D (NORTHING, EASTING, ELEVATION, DESCRIPTION). SUBMITTED POINT FILES SHALL BE DIGITAL MICROSOFT EXCEL OR COMMA DELINEATED (CSV) TEXT FILE FORMAT. HORIZONTAL AND VERTICAL ACCURACY SHALL BE SUB CENTIMETER USING GPS OR TRADITIONAL SURVEY METHODS.

THE DISTRICT'S SURVEY CONTROL SYSTEM IS ESTABLISHED AS FOLLOWS:

1. HORIZONTAL CONTROL: MISSOURI STATE PLANE EAST-NAD 83 (FEET)
2. VERTICAL DATUM: NAVD 88 (FEET)

NOTE: AS-BUILT DRAWINGS SHALL BE PROVIDED UPON COMPLETION OF CONSTRUCTION. ONE SET OF PAPER DRAWINGS AND ONE SET OF MYLAR REPRODUCIBLES SHALL BE SUBMITTED. GPS COORDINATES SHALL BE PROVIDED FOR EACH MANHOLE ON THE AS-BUILT PLANS.

AS BUILT REQUIREMENTS

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

DATE: 6/23/16

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## GENERAL

1. COMMERCIAL CUSTOMERS MUST CONTACT THE SEWER DISTRICT BEFORE CONNECTING TO THE SEWER SYSTEM, TO ASCERTAIN IF A GREASE TRAP IS NEEDED. DISHWASHERS SHALL NOT BE CONNECTED TO THE GREASE TRAP. FOOD PREPARATION SINKS AND THREE COMPARTMENT SINKS SHALL BE CONNECTED TO THE GREASE TRAP. COMMERCIAL CUSTOMERS MUST CONTACT THE SEWER DISTRICT TO VERIFY WHICH FLOOR DRAIN (IF ANY), SHOULD BE CONNECTED TO THE GREASE TRAP.
2. ALL PLANS FOR COMMERCIAL ESTABLISHMENTS MUST DISCLOSE THE TYPE OF BUSINESS TO DETERMINE IF A GREASE TRAP IS NECESSARY.
3. THERE ARE MANY DIFFERENT TYPES AND TECHNIQUES TO REMOVE GREASE FROM COMMERCIAL ESTABLISHMENTS. SOME OF THE NAMES OF THE SYSTEMS INCLUDE GREASE TRAPS, GREASE REMOVAL DEVICES, AND GREASE INTERCEPTORS. ROCK CREEK PUBLIC SEWER DISTRICT WILL USE GREASE TRAPS AND GREASE REMOVAL DEVICES TO SPECIFY WHAT TYPE OF GREASE UNITS WILL BE USED AT THE DIFFERENT COMMERCIAL ESTABLISHMENTS WITHIN THE DISTRICT.

## NEW, NON-FRYING ESTABLISHMENTS, GREASE REMOVAL DEVICES

ROCK CREEK PUBLIC SEWER DISTRICT RECOGNIZES NON-FRYING ESTABLISHMENTS AS COMMERCIAL CUSTOMERS THAT DO NOT USE FRYING EQUIPMENT IN THEIR PLACE OF BUSINESS. NON-FRYING ESTABLISHMENTS ARE THOSE, BUT NOT LIMITED TO, DAY CARE FACILITIES, SANDWICH SHOPS, AND GAS STATION SHOPS WHO SERVE PRE-PACKAGED MEATS. EXAMPLES OF THIS TYPE OF FACILITY WOULD BE QUIZNOS, SUBWAY, AND 7-11. ROCK CREEK PUBLIC SEWER DISTRICT REQUIRES THAT THIS TYPE OF COMMERCIAL ESTABLISHMENT WILL USE A GREASE REMOVAL DEVICE. THIS DEVICE WOULD SERVE ONE (1) THREE COMPARTMENT SINK, PREP SINK, AND RINSE SINK BEFORE THE DISHWASHER. IF MORE THAN ONE PREP SINK, THREE COMPARTMENT SINK, AND RINSE SINK IS USED IN THE ESTABLISHMENT, A SECOND GREASE REMOVAL DEVICE WOULD BE REQUIRED.

## NEW, FRYING ESTABLISHMENTS, GREASE TRAPS

ROCK CREEK PUBLIC SEWER DISTRICT RECOGNIZES FRYING ESTABLISHMENTS AS COMMERCIAL CUSTOMERS THAT USE FRYING EQUIPMENT IN THEIR PLACE OF BUSINESS. FRYING ESTABLISHMENTS ARE THOSE, BUT NOT LIMITED TO, ESTABLISHMENTS THAT FRY OR COOK THEIR PRODUCTS AT TEMPERATURES ABOVE 100 DEGREES. EXAMPLES OF THIS TYPE OF ESTABLISHMENT WOULD BE MCDONALDS, BURGER KING, AND RUBY TUESDAY. ROCK CREEK PUBLIC SEWER DISTRICT REQUIRES THAT THIS TYPE OF COMMERCIAL ESTABLISHMENT WILL USE A 2,750 GALLON OUTDOOR, UNDERGROUND GREASE TRAP. IF DEEMED, IN THE SOLE DISCRETION OF THE DISTRICT, THAT THE 2,750 GALLON OUTDOOR, UNDERGROUND GREASE TRAP IS NOT MEETING THE EFFLUENT LIMITS SET BY THE DISTRICT, THE COMMERCIAL ESTABLISHMENT SHALL INSTALL A GREASE REMOVAL DEVICE SO THAT IT WILL CATCH THE WATER FROM THE PREP SINK, THREE COMPARTMENT SINK, AND RINSE SINK LOCATED IN THE ESTABLISHMENT. IF DEEMED, IN THE SOLE DISCRETION OF THE DISTRICT, THAT THE 2,750 GALLON OUTDOOR AND THE GREASE REMOVAL DEVICE IS NOT MEETING EFFLUENT REQUIREMENTS, A SECOND 2,750 GALLON OUTDOOR, UNDERGROUND GREASE TRAP SHALL BE REQUIRED.

## INDUSTRIAL COMMERCIAL ESTABLISHMENTS, GREASE TRAPS

ROCK CREEK PUBLIC SEWER DISTRICT RECOGNIZES INDUSTRIAL COMMERCIAL ESTABLISHMENTS AS COMMERCIAL CUSTOMERS THAT MAY COLLECT SAND, GRIT, OR OIL TYPE PRODUCTS IN THEIR PLACE OF BUSINESS. INDUSTRIAL COMMERCIAL ESTABLISHMENTS ARE THOSE WHO OPERATE A CAR WASH FACILITY, OIL CHANGE FACILITY, PAINT SHOP, AND ROUTINE MAINTENANCE TO AUTOMOBILES. ROCK CREEK PUBLIC SEWER DISTRICT REQUIRES THAT THIS TYPE OF COMMERCIAL ESTABLISHMENT WILL USE A 2,750 GALLON OUTDOOR, UNDERGROUND GREASE TRAP. IF DEEMED, IN THE SOLE DISCRETION OF THE DISTRICT, THAT THE 2,750 GALLON OUTDOOR, UNDERGROUND GREASE TRAP IS NOT MEETING EFFLUENT LIMITS A SECOND 2,750 GALLON OUTDOOR, UNDERGROUND GREASE TRAP SHALL BE INSTALLED.

## ESTABLISHED COMMERCIAL CUSTOMERS

ESTABLISHED COMMERCIAL CUSTOMERS WHO OPERATE NON-FRYING OR FRYING TYPE ESTABLISHMENTS AND CURRENTLY HAVE AN UNDER THE COUNTER GREASE TRAP, OTHER THAN A GREASE REMOVAL DEVICE OR 2,750 OUTSIDE, UNDERGROUND GREASE TRAP, SHALL BE REQUIRED TO INSTALL A GREASE REMOVAL DEVICE. THE GREASE REMOVAL DEVICE SHALL BE LOCATED TO CATCH THE WATER FROM THE PREP SINK, THREE COMPARTMENT SINK, AND THE RINSE SINK. COMMERCIAL ESTABLISHMENTS USING A GREASE REMOVAL DEVICE SHALL SEND OR MAKE AVAILABLE TO THE DISTRICT UPON REQUEST, A RECEIPT OR HAULING TICKET INDICATING THE AMOUNT OF GREASE HAULED AWAY FOR FINAL DISPOSAL.

## EFFLUENT LIMITATIONS

THE MAXIMUM EFFLUENT OF FATS, OILS, AND GREASE (FOGS) THAT CAN BE DISCHARGED FROM THE GREASE TRAP INTO ROCK CREEK PUBLIC SEWER DISTRICTS SEWER SYSTEM IS 200 MG/L. AT ANY TIME THE EFFLUENT FROM THE COMMERCIAL ESTABLISHMENT EXCEEDS THE 200 MG/L LIMITATION, ROCK CREEK PUBLIC SEWER DISTRICT SHALL DISCONNECT THE COMMERCIAL ESTABLISHMENT FROM THE MAIN SEWER SYSTEM, IMPOSE FINES, OR BOTH. THE FINES ASSOCIATED TO THE 200 MG/L EFFLUENT LIMITATION SHALL NOT EXCEED \$500.00 PER DAY.

## PIPING OF THE GREASE TRAP

THE ONLY MATERIAL THAT SHOULD BE DIRECTED TO THE GREASE REMOVAL DEVICE OR THE 2,750 OUTDOOR, UNDERGROUND GREASE TRAP IS FROM THE PREP SINK, THREE COMPARTMENT SINK, AND RINSE BEFORE THE DISHWASHER. FLOOR DRAINS, DISHWASHER, AND DOMESTIC WASTE SHALL NOT DISCHARGE INTO THE GREASE TRAP. IN ANY INSTANCE WHERE THE GREASE REMOVAL DEVICE IS TO BE INSTALLED FOR NEW CONSTRUCTION, THE PLUMBING SHALL BE CONSTRUCTED IN A MANNER THAT WILL FACILITATE THE INSTALLATION OF A 2,750 GALLON UNDERGROUND GREASE TRAP AT A LATER DATE WITHOUT HAVING TO EXCAVATE THE FLOOR. PLUMBING PLANS SHALL BE SUBMITTED TO THE DISTRICT, AND APPROVED BY THE DISTRICT, PRIOR TO ANY CONSTRUCTION AT THE COMMERCIAL ESTABLISHMENT. A SAMPLING PORT SHALL BE PROVIDED FOR THE DISTRICT OUTSIDE THE ESTABLISHMENT OR WHERE THE DISTRICT DEEMS NECESSARY.

## DISPOSAL OF COLLECTED GREASE

THE GREASE THAT IS COLLECTED IN THE GREASE COLLECTION CONTAINER OF THE GREASE REMOVAL SYSTEM SHALL BE DISPOSED OF INTO A DRUM LIKE DEVICE LOCATED INSIDE OR OUTSIDE THE COMMERCIAL ESTABLISHMENT. AT NO TIME SHALL THE GREASE THAT IS COLLECTED FROM THE GREASE REMOVAL SYSTEM BE POURED INTO THE FLOOR DRAIN OR INTO ROCK CREEK PUBLIC SEWER DISTRICT'S SEWER SYSTEM ADJACENT TO THE COMMERCIAL ESTABLISHMENT. THE COMMERCIAL ESTABLISHMENT SHALL MAKE AVAILABLE TO THE DISTRICT UPON REQUEST, RECEIPTS, HAULING TICKETS, AND A LOG OF HOW MUCH GREASE WAS REMOVED FROM THE COMMERCIAL ESTABLISHMENT ON A MONTHLY BASIS. IT IS RECOMMENDED BY THE DISTRICT, THE COMMERCIAL ESTABLISHMENT KEEPS A WEEKLY LOG OF THE GREASE REMOVED AND DISPOSED OF FROM THE GREASE COLLECTION CONTAINER.

## FATS, OILS AND GREASE REDUCTION PRODUCTS PROHIBITED

CHEMICALS, ENZYMES AND ALL OTHER EMULSIFIERS ARE PROHIBITED FROM BEING USED IN ANY GREASE TRAP, GREASE INTERCEPTOR OR GREASE REMOVAL DEVICE. BACTERIA THAT DIGESTS FATS, OILS AND GREASE MAY BE USED WITH THE PRIOR AUTHORIZATION OF THE DISTRICT.

## GREASE TRAP SPECIFICATIONS

## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

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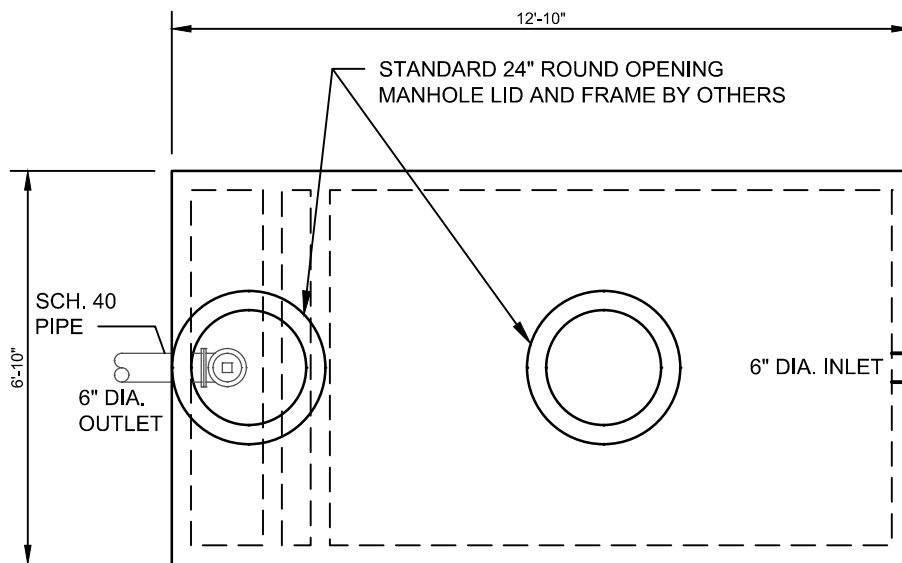
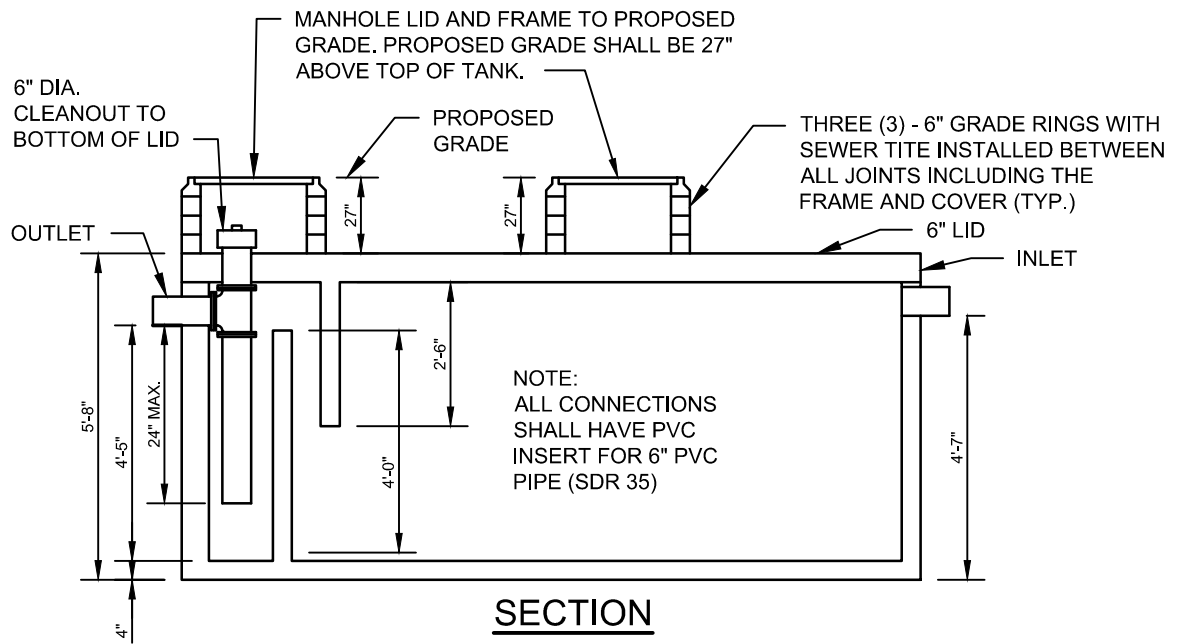
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NOTE:

1. OIL AND GREASE INTERCEPTOR SHALL AS APPROVED BY ROCK CREEK PUBLIC SEWER DIST. PRIOR TO INSTALLATION
2. IF THE OIL AND GREASE INTERCEPTOR IS WITHIN A ROADWAY OR PARKING AREA, THE TANK MUST BE REINFORCED.
3. GREASE TRAPS ARE TO BE SET ON A MINIMUM OF 6" 3/4" CLEAN CRUSHED LIMESTONE.

**2,750 GALLON CAPACITY**

OUTDOOR OIL AND GREASE  
INTERCEPTOR

**ROCK CREEK PUBLIC SEWER DISTRICT  
STANDARD DETAILS OF SEWER CONSTRUCTION**

DATE:

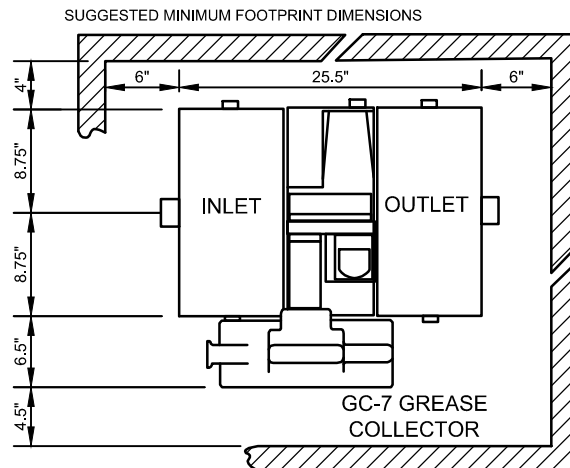
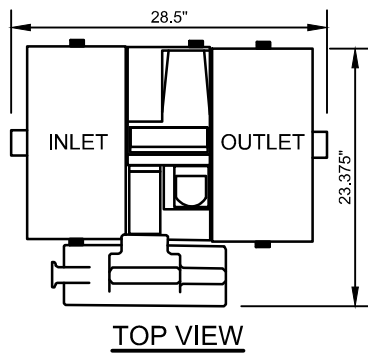
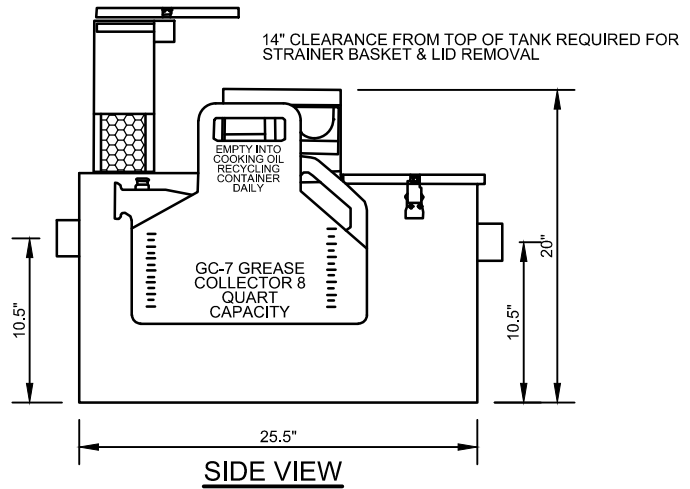
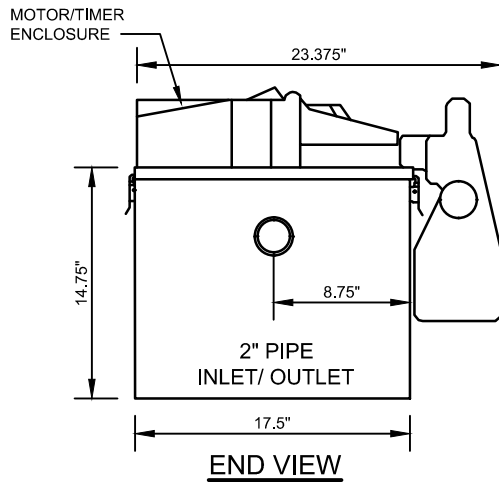
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- NOTE:
1. INDOOR GREASE REMOVAL DEVICE SHALL BE THE BIG DIPPER W-250-IS OR EQUIVALENT.

## INDOOR OIL AND GREASE INTERCEPTOR

## ROCK CREEK PUBLIC SEWER DISTRICT STANDARD DETAILS OF SEWER CONSTRUCTION

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