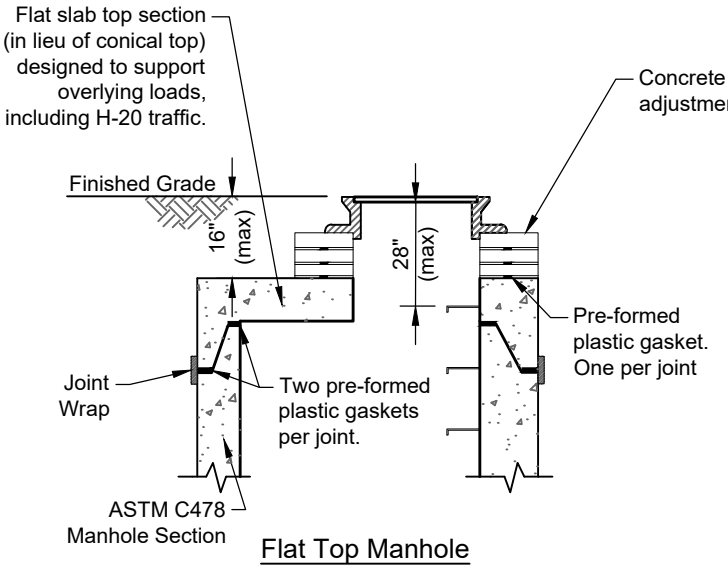
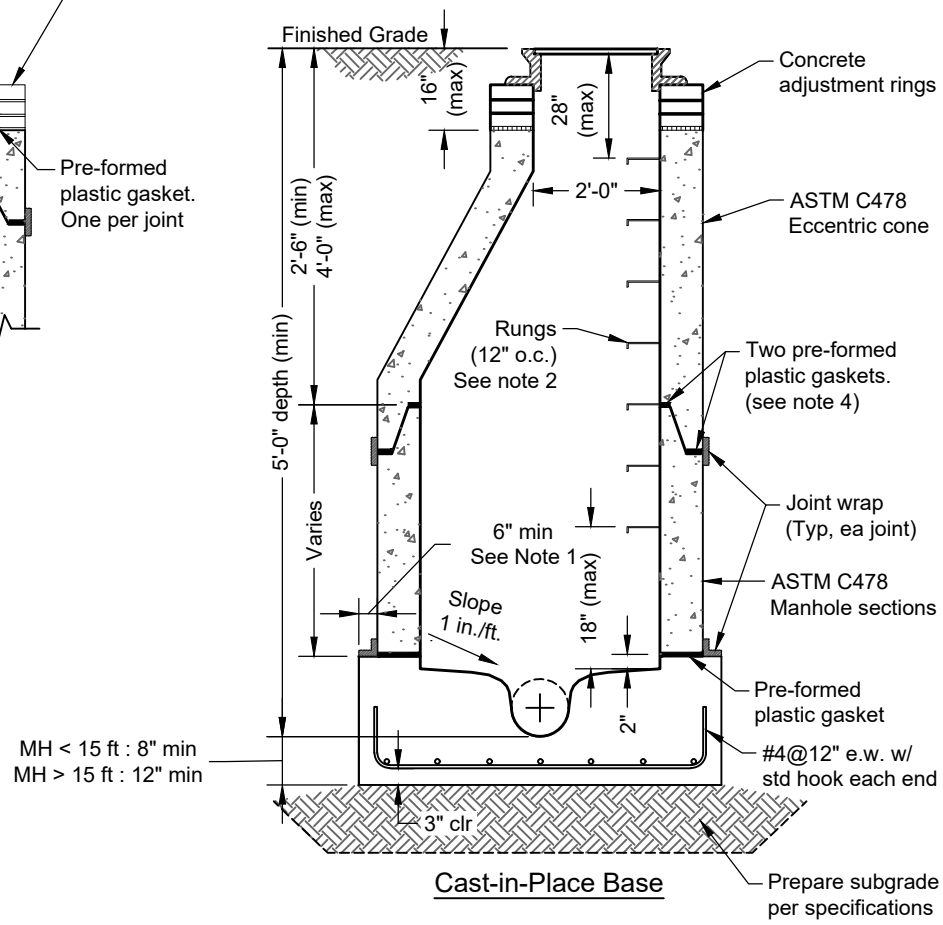
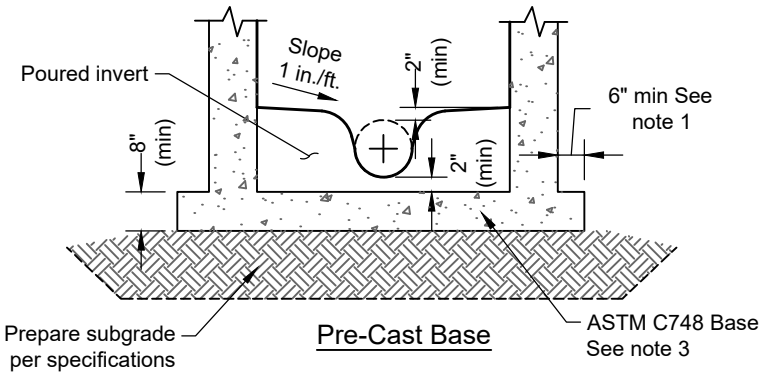


Flat Top Manhole



Cast-in-Place Base

Pipe Size	Manhole Diameter (min)	Manhole Wall Thickness (min)
15 in or less	48 in	5 in
18 in to 30 in	60 in	6 in
Over 30 in	72 in	7 in



Pre-Cast Base

Notes:

1. Base shall be at least 6" wider than barrel outside radius. Design engineer shall determine if a wider base is required to prevent flotation.
2. Manhole steps shall not be installed over any flow channel.
3. Pre-cast manhole base shall be sized and reinforced by manufacturer based on diameter and depth.
4. Lifting holes must be grouted, and if fully penetrating the barrel, must also be taped on the outside.

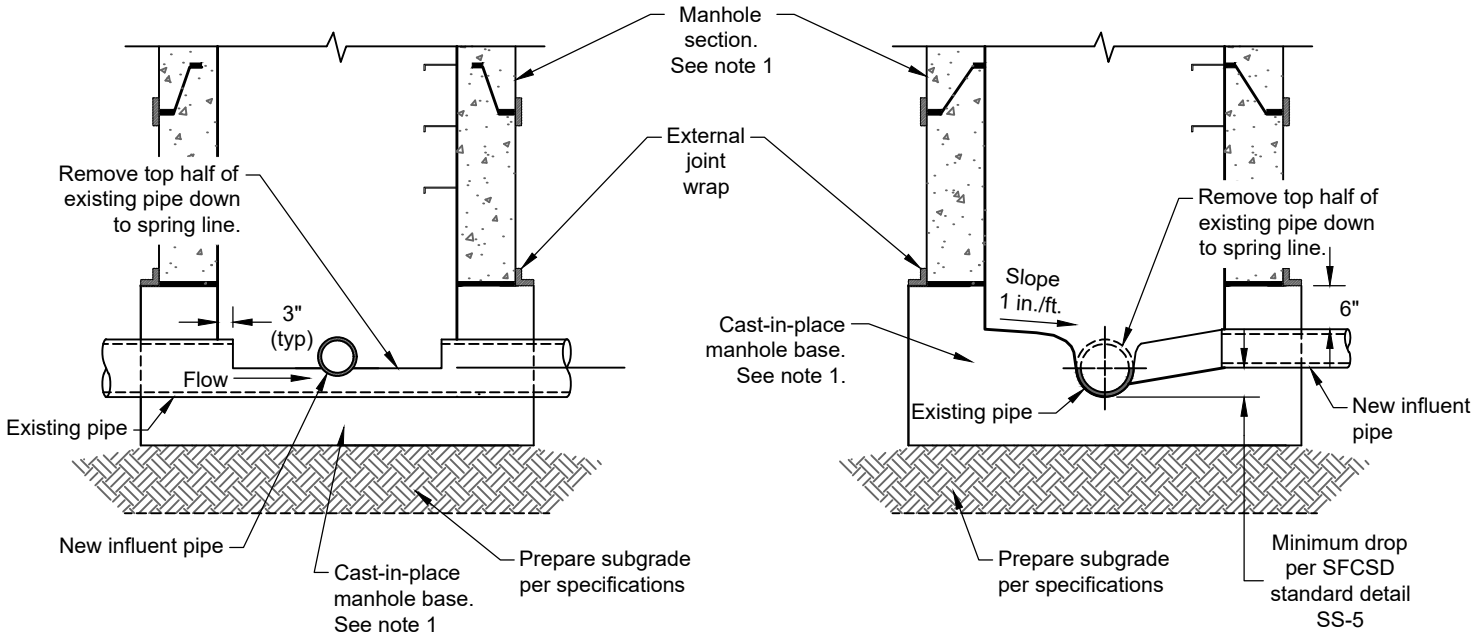
South Fort Collins Sanitation District Water Reclamation

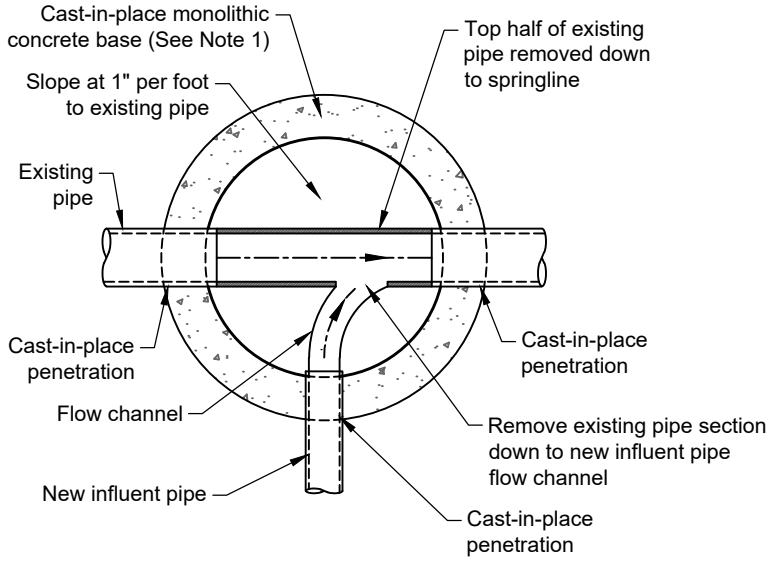
Standard Sanitary Sewer Manhole

SS-1

September 2023

Not to scale





Notes:

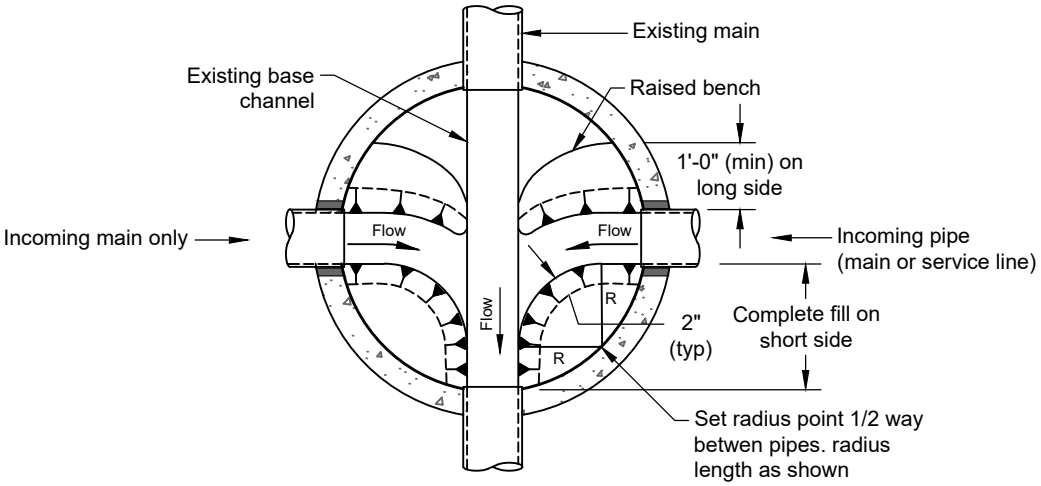
1. Manhole shall meet all requirements of a standard cast-in-place manhole as shown on SFCSD standard detail SS-1.
2. New influent pipe diameter must not exceed existing pipe diameter.

South Fort Collins Sanitation District Water Reclamation

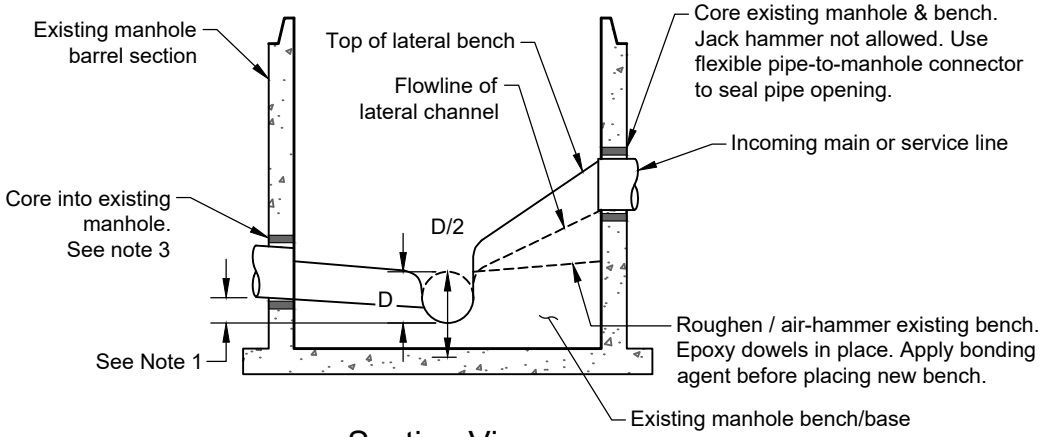
Manhole Over Existing Sanitary Sewer Line

SS-2

September 2023 | Not to scale



Plan View



Section View

Notes:

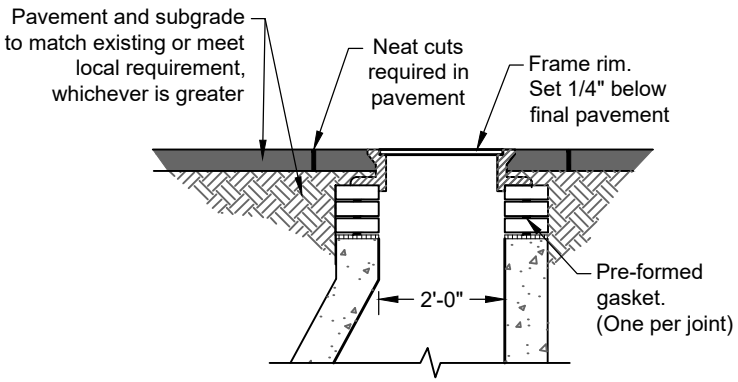
1. Channels shall be concrete, shaped to fully contain the full height of the incoming pipe at the manhole wall, sloping to half the pipe diameter at the main channel.
2. Invert shaping shall be direct flow toward the downstream end of the manhole.
3. Core existing manhole. Jack hammering not allowed. Use flexible pipe to manhole connector to seal opening. Remove existing interior bench and repair benches and channels.
4. The District must verify the condition of the base after removal of the bench to determine if structural integrity has been compromised during removal. If structural integrity has been compromised, the entire base section shall be replaced.
5. See SFCSD standard detail SS-5 for required invert drops. Drop manholes shall be used for invert drops greater than 24" above the main channel bench.
6. Concrete shall be ready-mixed with a minimum 28-day compressive strength of 3000 psi.
7. Special permission must be received from the District before commencing any work on existing manholes.

South Fort Collins Sanitation District Water Reclamation

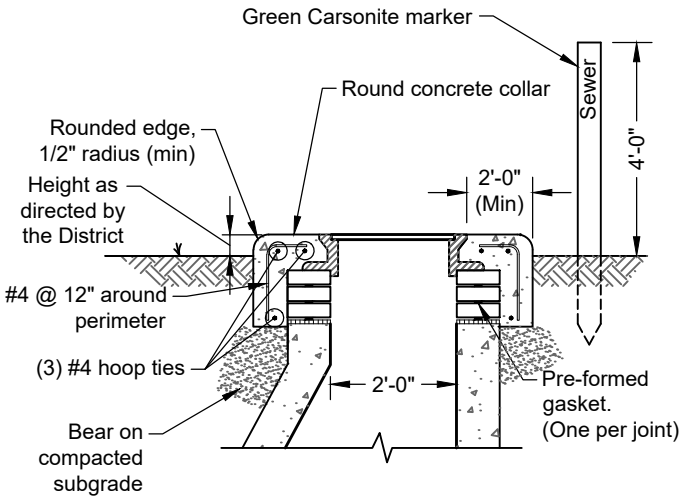
Connection to Existing Manhole

SS-3

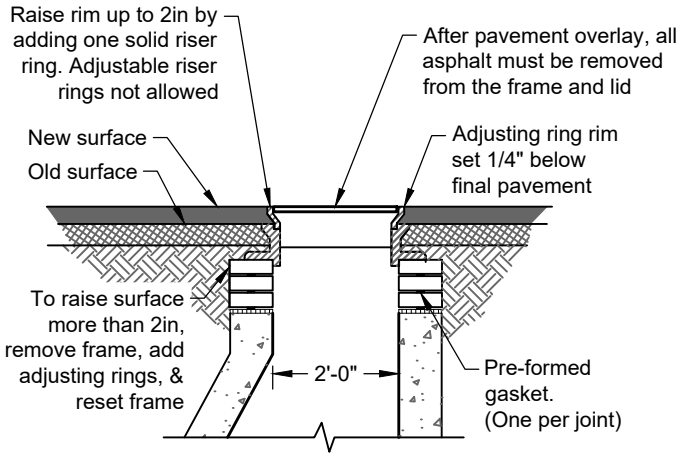
September 2023 | Not to scale



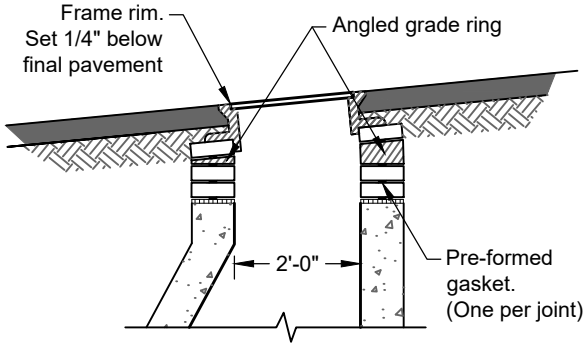
Manhole in Pavement



Manhole in Unpaved Areas



Adjusting Manhole to Raised Grade (Including Pavement Overlay)



Manhole in Sloped Surface

Notes:

1. All pavement and subgrade shall, at a minimum, meet the requirements of the County, City, or Town having jurisdiction.
2. At a minimum, concrete thickness shall be:
   a. For patios and sidewalks: 4 inches
   b. For driveways, slabs, gutters, paver base and any driving surface: 6 inches
   c. For cross pans: 8 inches
3. Adhesive is permitted to substitute for a gasket where synthetic grade rings are used.
4. All manhole assemblies to meet H-20 load rating at a minimum.

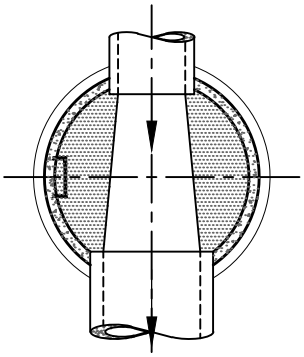
South Fort Collins Sanitation District Water Reclamation

Manhole Surface Completions

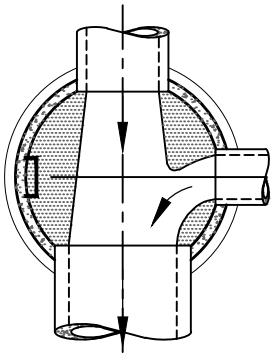
SS-4

September 2023

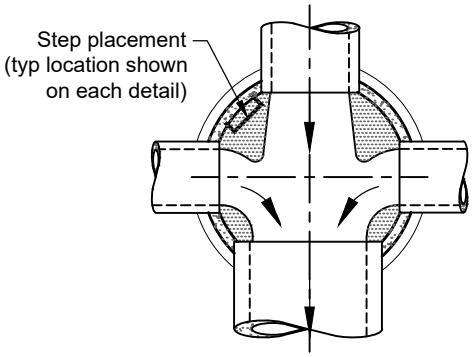
Not to scale



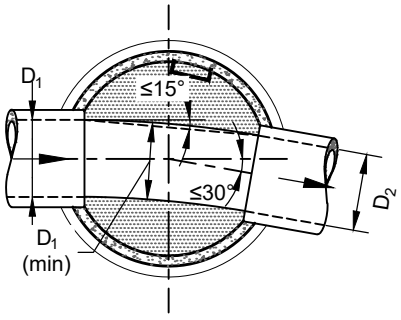
Through Pipe



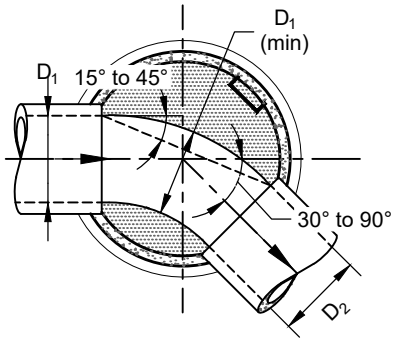
Through Pipe - One Lateral



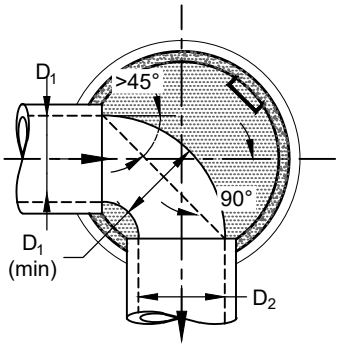
Through Pipe - Two Laterals



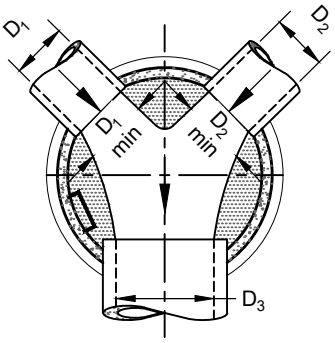
Slight Angle



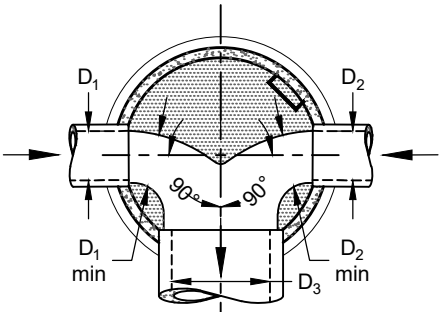
Medium Angle



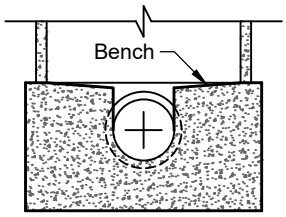
Sharp Angle



Angled Laterals



Opposed Laterals



Ideal MH Channel Section

Notes:

1. Details shown are typical only for installations with all inverts at relative elevations within District specifications. For excessive elevation difference between inverts, etc., special base/channel details shall be shown on plans.
2. Vertical drops in excess of 2 feet require an outside drop.
3. Channels shall be formed smooth meeting the requirements in the District specifications.
4. All benches shall have a skid-resistant broom finish.
5. Elevation drop required between each inlet invert relative to outlet invert:
   a. <45°, 0.1 ft
   b. 45° - 75°, 0.2 ft
   c. 75° - 90°, 0.3 ft

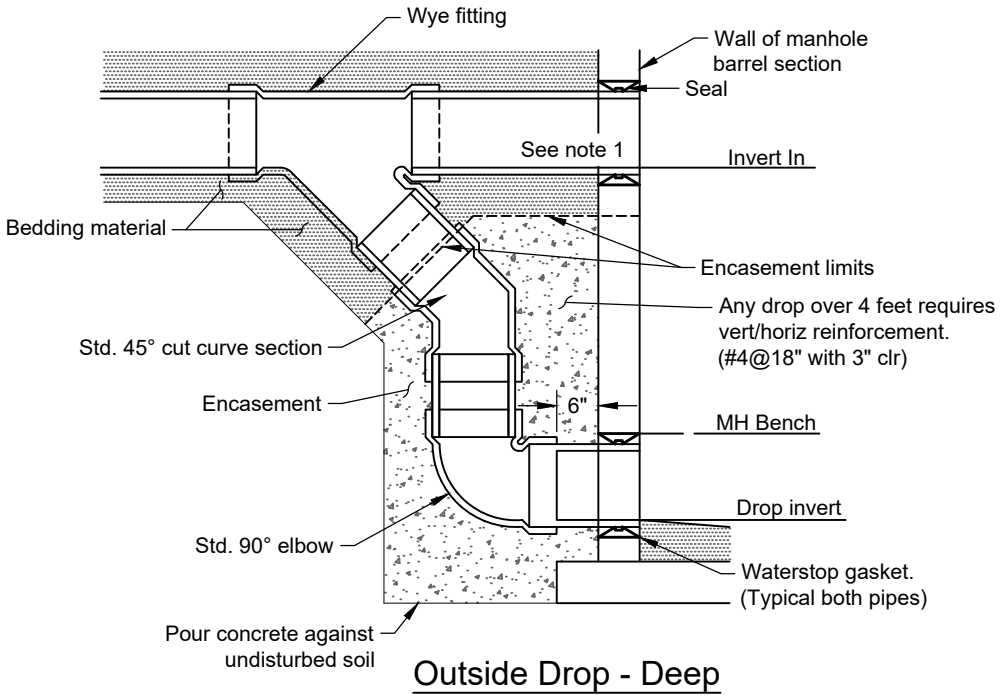
South Fort Collins Sanitation District
Water Reclamation

Typical Manhole Base Channelization

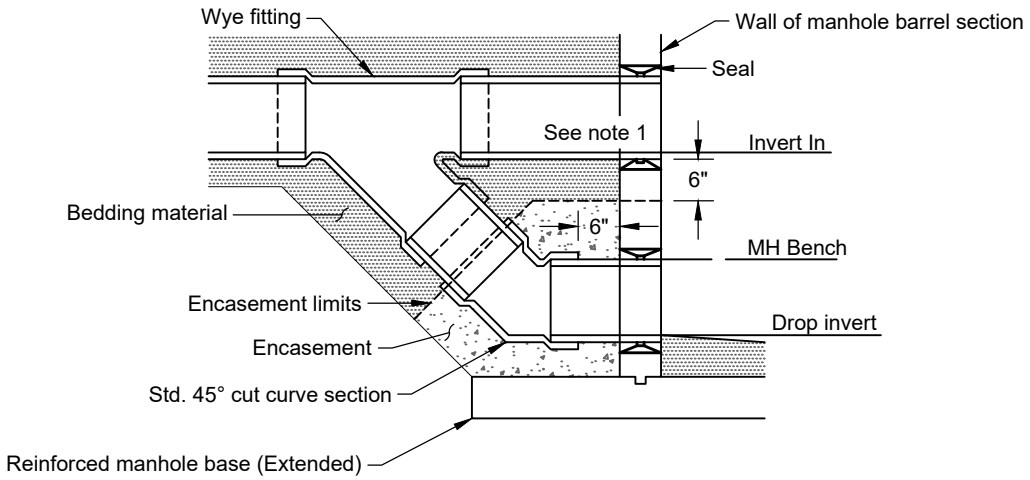
SS-5

September 2023

Not to scale



Outside Drop - Deep



Outside Drop - Shallow

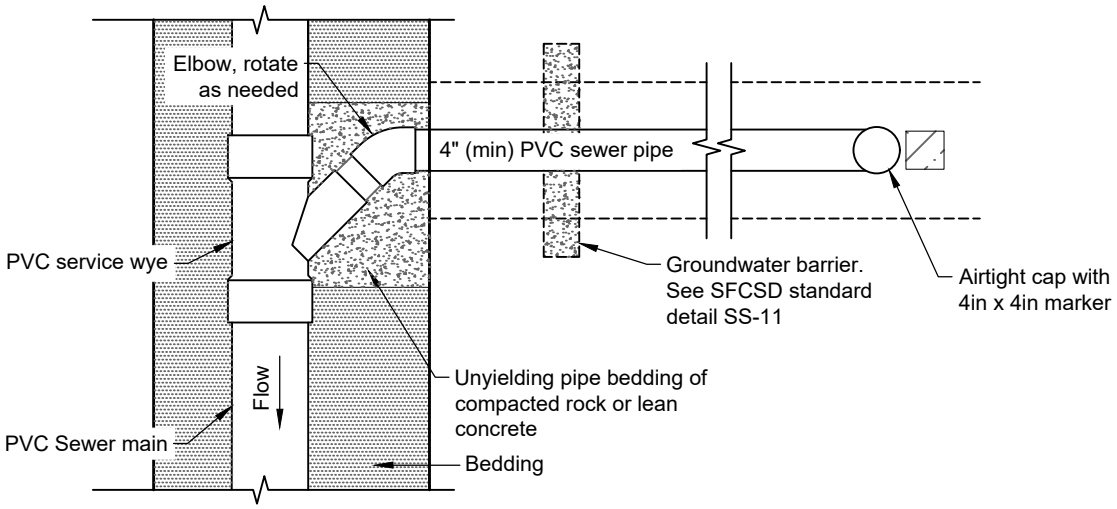
Notes:

1. **Jack-hammering is not allowed.** All manhole openings shall be precast block-outs or core drilled.
2. For 18in diameter and larger pipe, outside drops shall be a special design.
3. Outside drop shall be constructed of C900 PVC.
4. Concrete encasement shall be a minimum of 6 inches thick all around.
5. An outside drop is required for any drop greater than two feet.

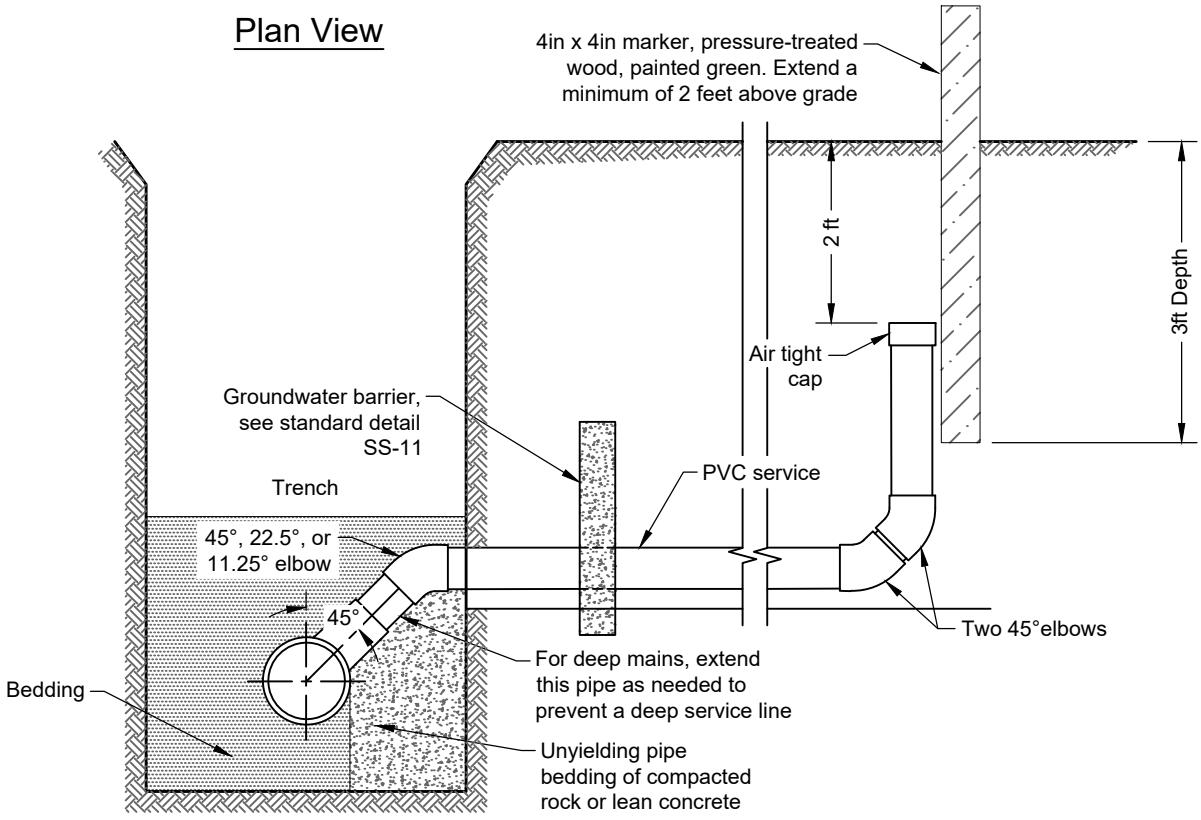
South Fort Collins Sanitation District Water Reclamation

Manhole Outside Drops
(Drop Through Manholes > 2 feet)
SS-6

September 2023 | Not to scale



Plan View



Section View

Notes:

1. Services shall be no closer than three feet from other service connections, or from bell or spigot end of sewer main pipe.
2. 4in sewer service minimum slope: 2%
3. 6in sewer service minimum slope: 1%
4. Service line shall be constructed on the shortest and straightest route possible with a minimum of one cleanout per 100 ft. See standard detail SS-9.
5. Sewer service lines shall be no closer than 10ft horizontally from any water service lines.
6. The District shall observe all service connections to the main, including the service support bedding, before burial. Schedule with the District at least three working days in advance.

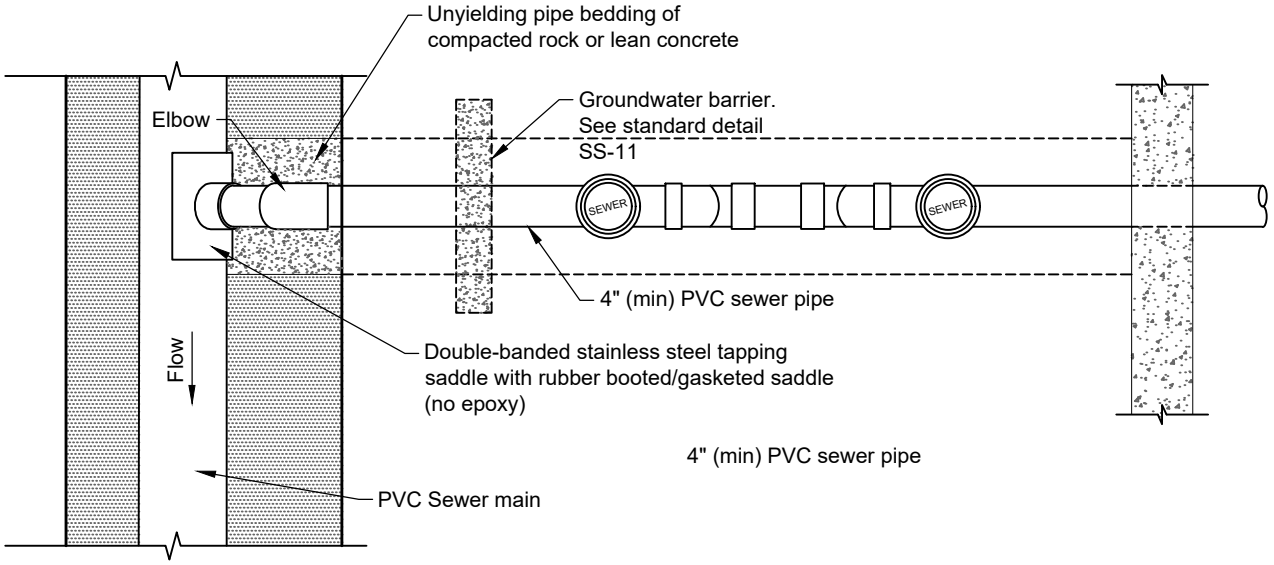
South Fort Collins Sanitation District Water Reclamation

Service - New Construction

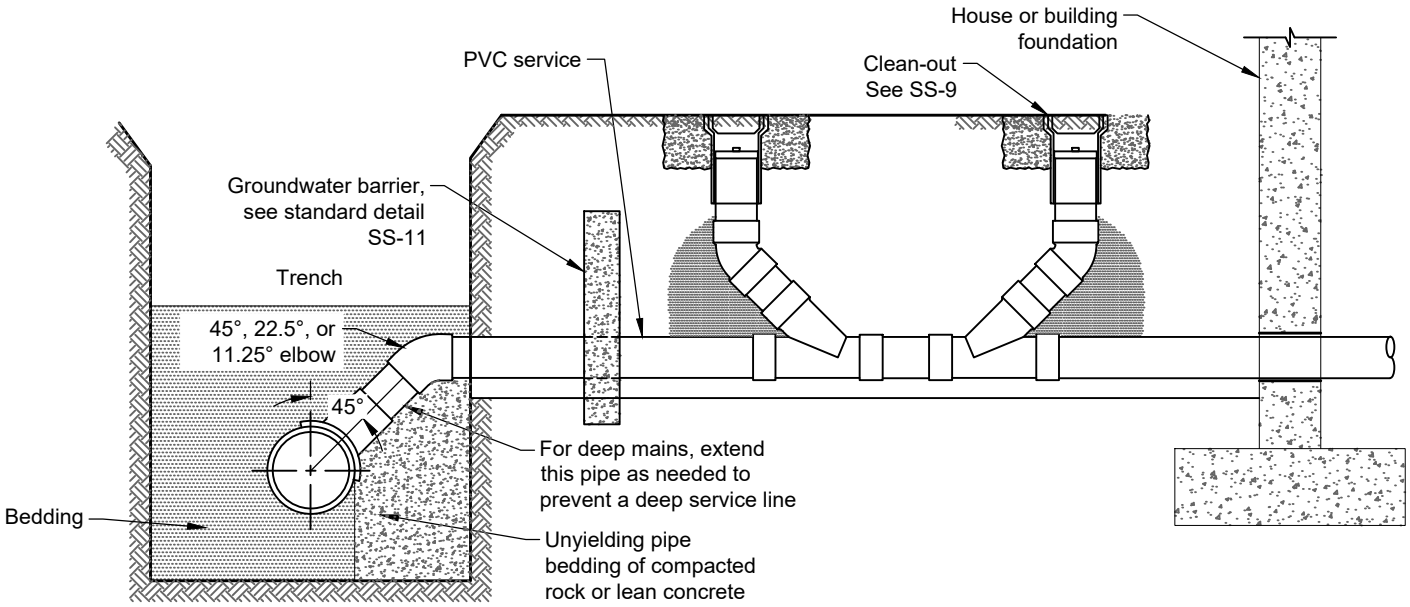
SS-7

September 2023

Not to scale



Plan View



Section View

Notes:

1. Services shall be no closer than three feet from other service connections, or from bell or spigot end of sewer main pipe.
2. 4in sewer service minimum slope: 2%
3. 6in sewer service minimum slope: 1%
4. Service line shall be constructed on the shortest and straightest route possible with a minimum of one cleanout per 100 ft. See standard detail SS-9.
5. Sewer service lines shall be no closer than 10ft horizontally from any water service lines.
6. The District shall observe all service connections to the main, including the service support bedding, before burial. Schedule with the District at least three working days in advance.
7. Tapping saddle bands shall be fully stainless steel, including band, screw, and screw cage.

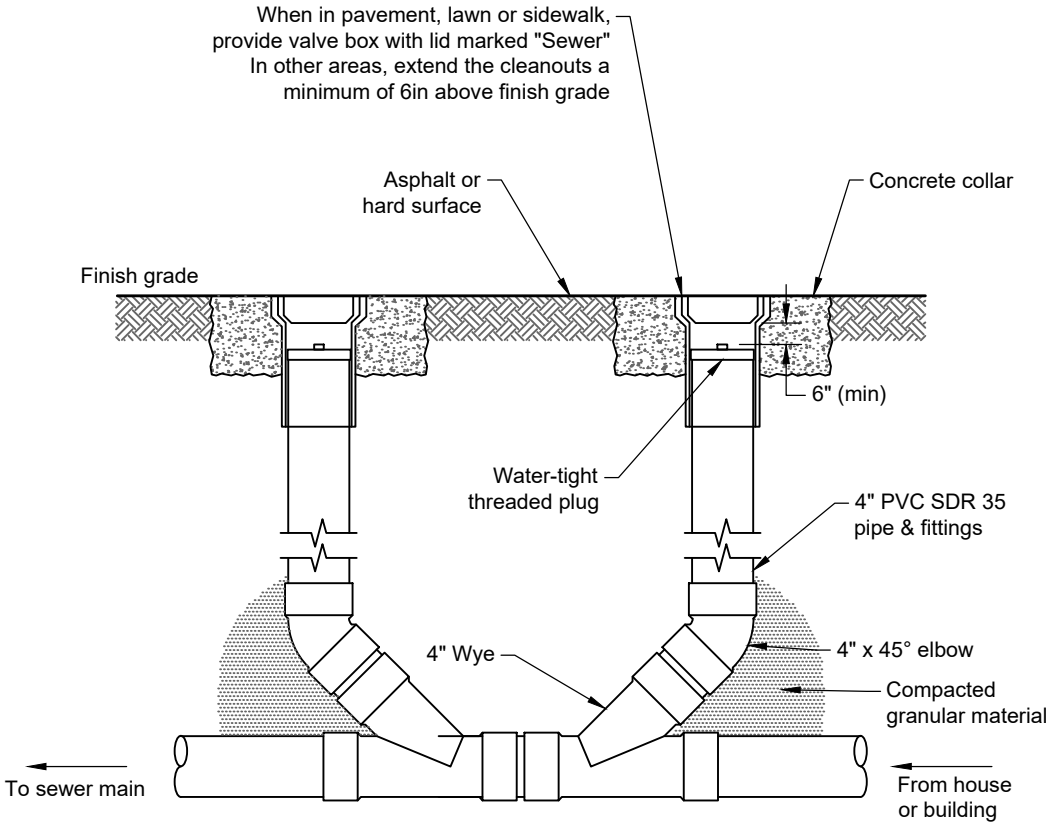
South Fort Collins Sanitation District
Water Reclamation

Service - Connection to Existing Main

SS-8

September 2023

Not to scale



Section View

Notes:

1. Sewer service clean-outs shall be installed as near as practical to connection with the building, and additional cleanouts at a maximum spacing of 100ft. No single bend greater than 45° shall be allowed.
2. Clean-outs shall meet all requirements of the latest version of the International Plumbing Code.
3. A complete clean-out assembly includes both wyes and risers shown above.

South Fort Collins Sanitation District Water Reclamation

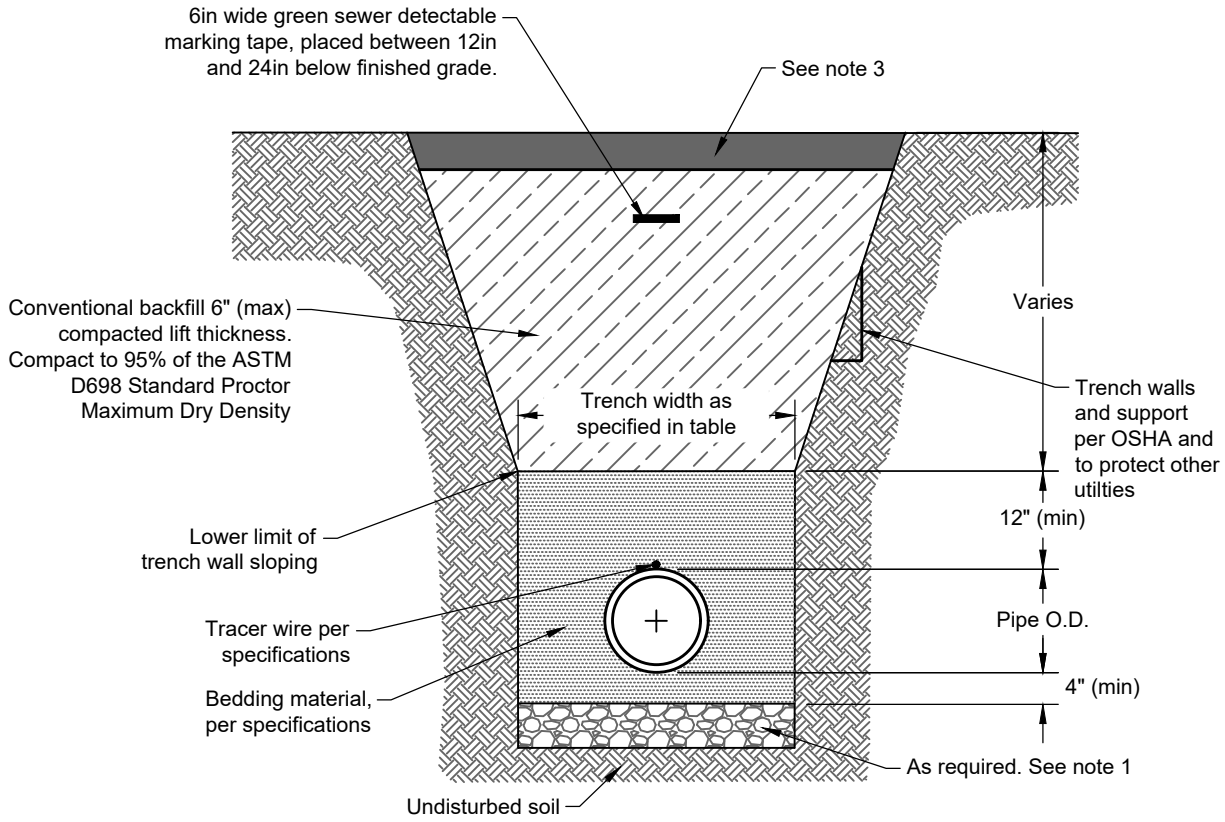
Service Clean-Out

SS-9

September 2023

Not to scale

Trench Width (note 4)		
Pipe Diameter	Minimum Width	Maximum Width
4"	1'-4"	2'-4"
6"	1'-6"	2'-6"
8"	1'-8"	2'-8"
12"	2'-0"	3'-0"
16"	2'-4"	3'-4"
20"	2'-8"	3'-8"
24"	3'-0"	4'-0"
> 24"	Engineered	Engineered



Notes:

1. Stabilization material may be required to replace a determined depth of the pipe subgrade. Install geotextile fabric between the stabilization material and pipe bedding.
2. Where the surrounding soils are non-expansive, flowable fill meeting District requirements may be substituted for backfill material.
3. Surface restoration to match existing conditions or re-pavement requirements of the applicable state, county, city or town.
4. Trench widths exceeding maximums require a concrete cradle and/or arch design approved by the District.

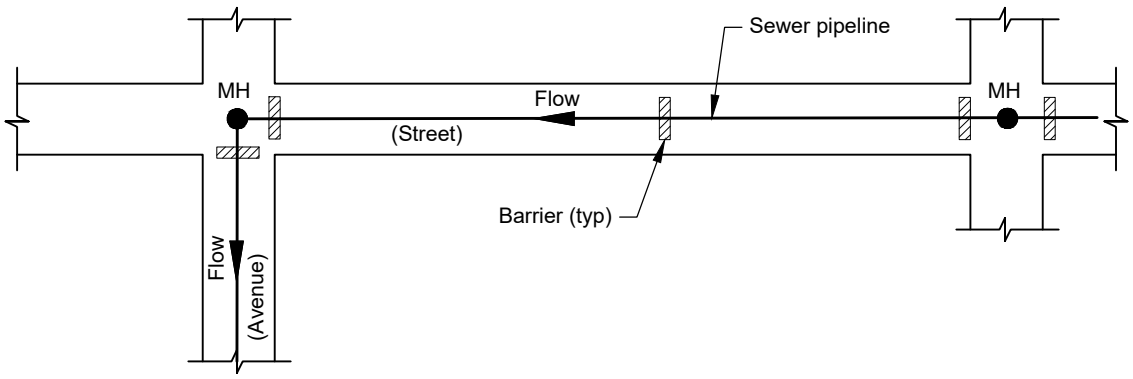
South Fort Collins Sanitation District
Water Reclamation

Sanitary Sewer Main Trench Requirements

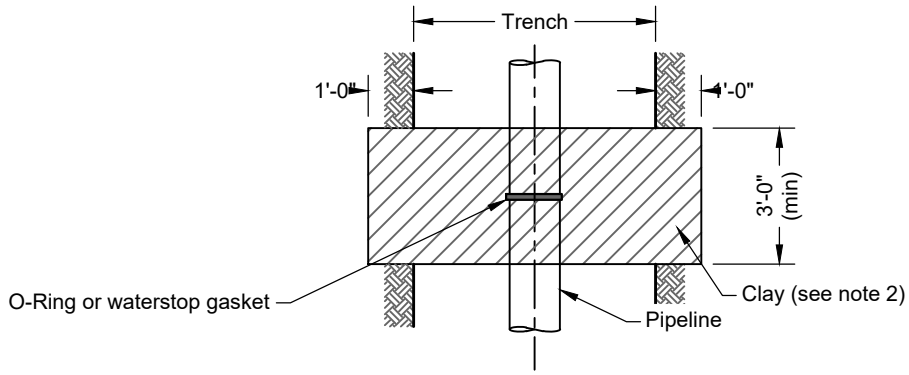
SS-10

September 2023

Not to scale

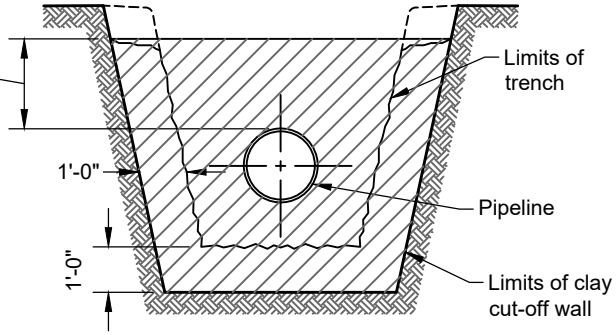


Typical Groundwater Barrier Layout



Plan View

Top of Clay Wall shall be the maximum of:
1. One foot above top of pipe bedding
2. Two feet above top of pipe
3. Two feet above maximum seasonal groundwater table elevation as determined by the Design Engineer



Section View

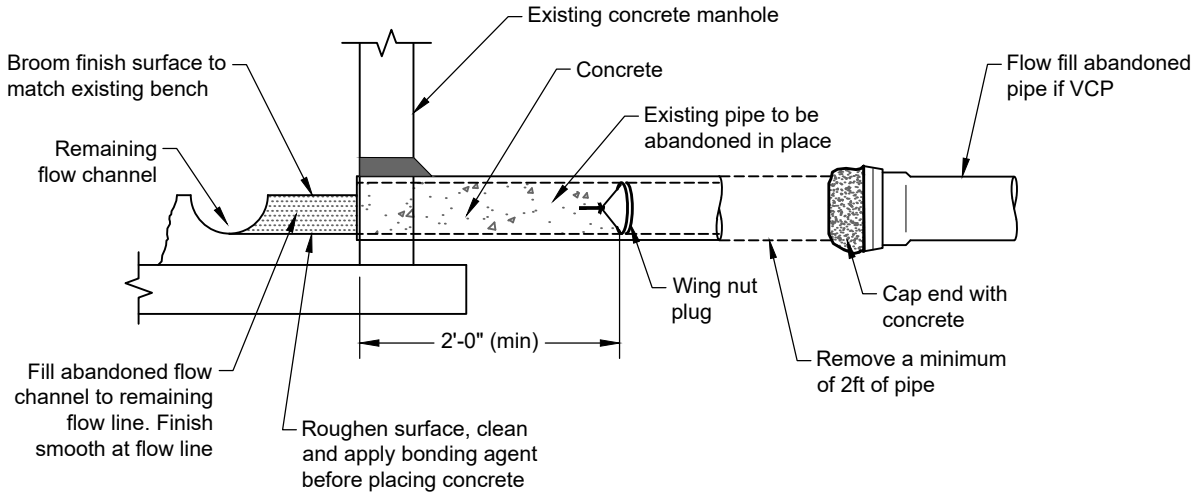
Notes:
1. Clay wall extends a minimum of 1'-0" into undisturbed soil on each side and on bottom of trench.
2. Acceptable clay material classified as SC, CL, or CH.
3. 3000psi concrete may be used instead of clay material, if a reinforcement design is approved by the District.
4. Nominal spacing is ±300 feet, typically at midblock, on each service line, and each side of cross street, or as specified on plans or as directed by the state, county, city or town.
5. Add barriers on steep slopes as needed to prevent groundwater surfacing under all groundwater conditions.

South Fort Collins Sanitation District
Water Reclamation

Groundwater Barrier

SS-11

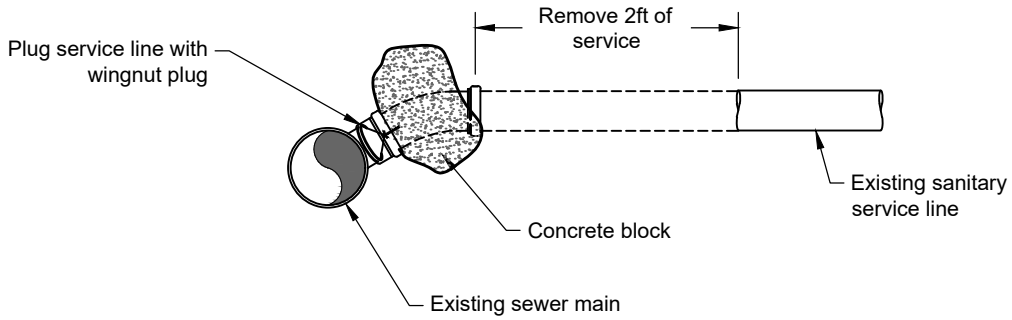
September 2023 | Not to scale



Sewer Main Abandonment

Sanitary Sewer Main Abandonment Notes:

1. Existing sanitary sewer mains and services abandoned in manholes shall have a wing nut plug placed 2 feet outside of manhole & have concrete placed from inside the manhole to the wing nut plug.
2. Abandoned flow channels in manholes shall be filled as noted on the drawing.
3. Any vitrified clay pipe (VCP) shall be flow filled completely. All other pipe materials shall be capped on both ends with concrete.
4. Sanitary sewer main abandonment must be scheduled with the District at least three working days in advance.



Sewer Service Abandonment

Sanitary Sewer Service Abandonment Notes:

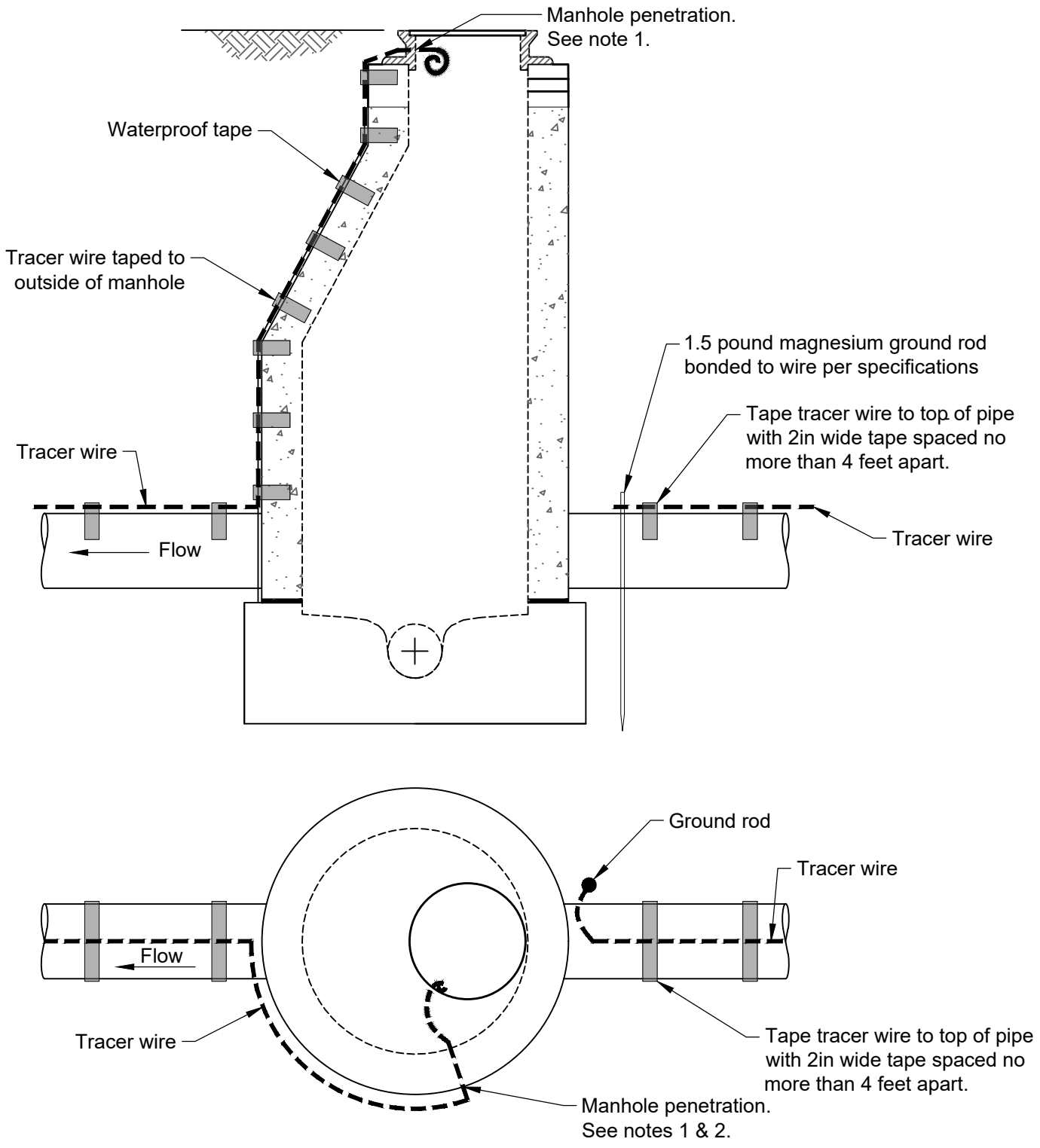
1. All sewer services shall be plugged at the sewer main.
2. Contractor to install concrete block behind the wing nut plug.
3. Sanitary sewer service abandonment must be scheduled with the District at least three working days in advance.

South Fort Collins Sanitation District Water Reclamation

Sanitary Sewer Abandonment

SS-12

September 2023 | Not to scale



Notes:

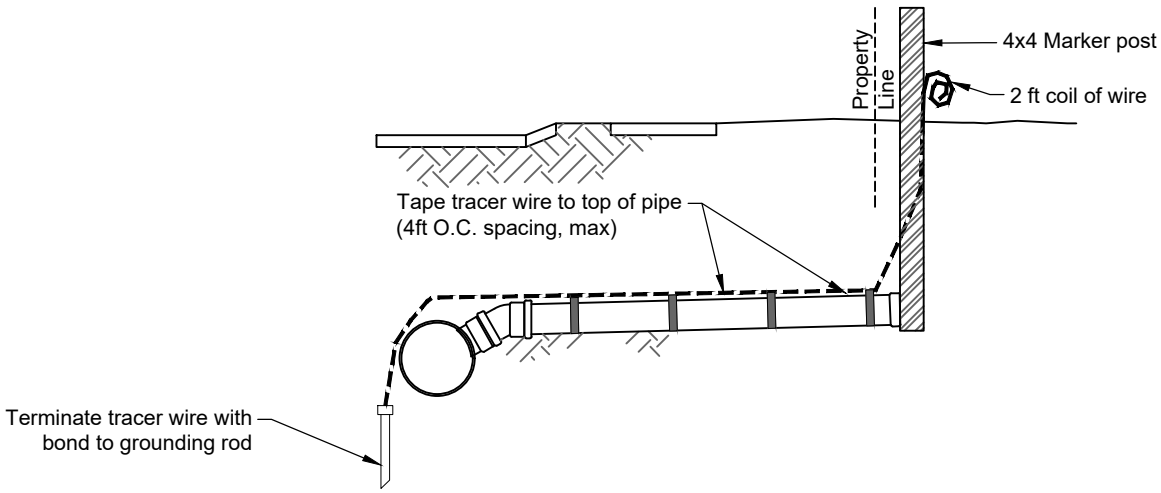
1. Wire to penetrate through steel manhole frame via a 1/4" drilled hole below the lid support and extend 12 inches into the manhole. The wire must have green insulation with only 1 inch stripped. Wire must not penetrate manhole frame above the stairs.
2. Manhole penetration to be no more than 1/4 inch diameter hole, filled with pliable gasket material and covered with waterproof tape.
3. Tracer wire system must meet the requirements of Senate Bill 18-167 or any update.

South Fort Collins Sanitation District
Water Reclamation

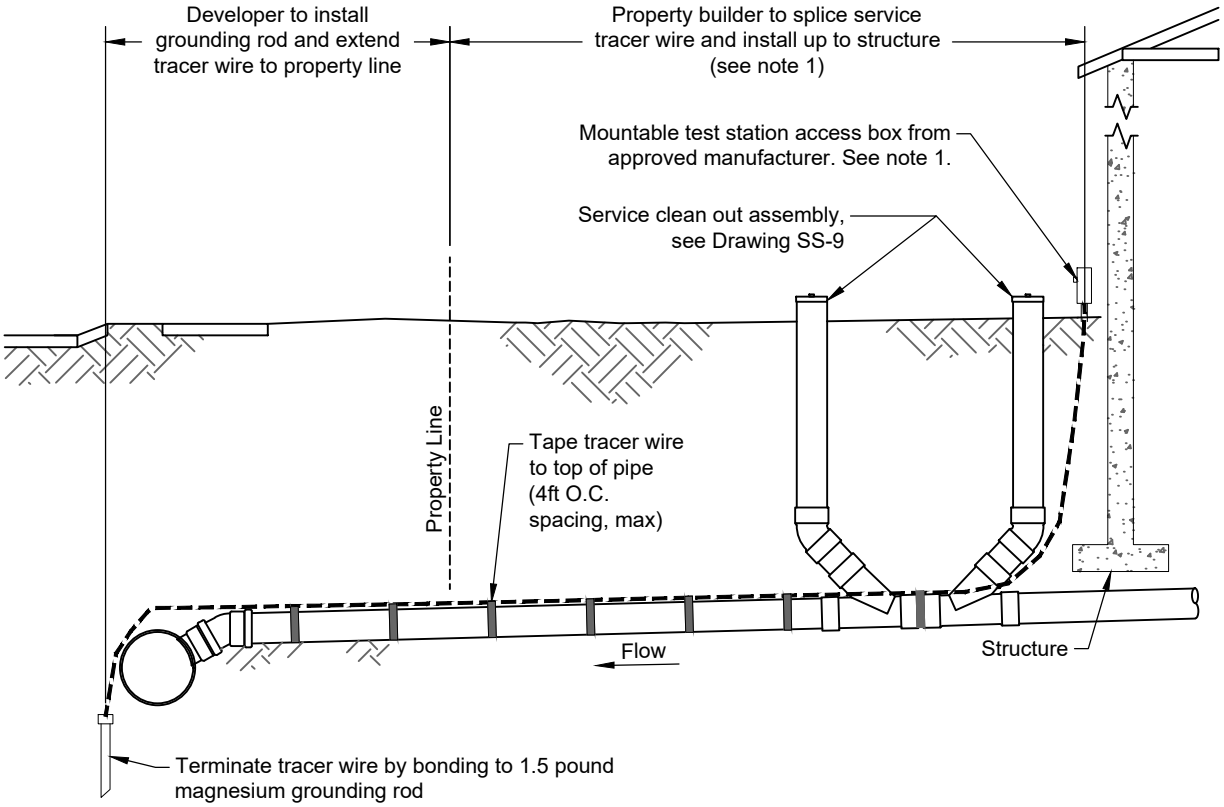
Sewer Main and Manholes Tracer Wire

SS-13

September 2023 | Not to scale



Tracer Wire Installation - Development



Tracer Wire Installation - Building Construction

Notes:

1. Property builder to splice sanitary sewer service tracer wire at the property line and install up to structure, terminating at the service cleanout with an approved test station access box. Test station access box shall be mounted to the structure within 18" of the SS service cleanout and installed according to the test station manufacturer specifications.
2. Tracer wire system must meet requirements of Senate Bill 18-167 or any update.

South Fort Collins Sanitation District
Water Reclamation

Sanitary Service Tracer Wire

SS-14

September 2023 | Not to scale