

CHAPTER 7 - MANHOLES

7.1 GENERAL

This division covers the requirements for manhole materials and installation. Manholes shall be installed at the locations and at the depth shown on the drawings. Manholes shall be furnished complete with cast-iron rings and covers. No steps shall be installed in any manhole.

7.1.1 Manhole Sizing:

Minimum manhole interior diameter is four (4) feet for manholes with one inlet and one outlet pipe. Manholes with two or more inlet pipes and one outlet pipe shall be a minimum of five (5) feet in diameter.

7.2 CONCRETE BASE

Unless otherwise noted manhole bases shall be precast and shall have pipe inverts and a resilient connection between pipe and manhole for each pipe connecting to the manhole.

Where sewer lines pass through or enter manholes, the invert channels shall be smooth and semi-circular in cross section, conforming to the details shown on the Drawings. Changes of direction of flow within the manholes shall be made with a smooth curve with as long a radius as possible. The floor of the manhole outside the flow channels shall be smooth and slope toward the channel at not less than one-half inch (1/2") per foot.

Concrete for manhole bases shall comply with the requirements of Chapter 9, Portland Cement Concrete, of these Specifications.

7.3 WALL AND CONE SECTIONS

All manholes shall be precast, sectional, reinforced concrete pipe forty-eight-inch (48") diameter, or larger, as specified. Both cylindrical and taper sections shall conform to all requirements of ASTM Designation C478-88 (or latest revision) for Precast Reinforced Concrete Manhole Sections.

All joint surfaces of precast sections and the face of the manhole base shall be thoroughly cleaned and wet prior to setting precast sections. All joints, including grade rings, shall be set in mastic or equal butyl rubber gasket. The joints shall be sealed with a rubber gasket that is permanently flexible and non-shrinking. Gasket must meet or exceed all requirements of AASHTO M-198 and ASTM C 990 section 6.2.1, Butyl rubber sealants. All joints shall be water tight and free from appreciable irregularities in the interior wall surface.

7.4 DROP MANHOLES

When the difference in elevation of an incoming sewer is twenty-four inches (24") or greater a drop manhole shall be used. The drop manhole shall be constructed as shown in the Standard Drawings. The drop pipe assembly (outside of the manhole) shall be PVC pipe with appropriate fittings.

When the difference in elevation of an incoming sewer is less than twenty-four inches (24") the invert channel shall be smooth and semi-circular in cross section, conforming to the details shown on the Standard Drawings.

7.5 MANHOLE RINGS AND COVERS

All iron casting shall conform to the requirements of ASTM Designation A48 (Class 35) for grey iron castings, free from blowholes and shrinkage defects. Castings shall be free from fins and burrs and shall be shot-blasted to remove sand and other foreign matter.

Rings and covers shall be equal to the twenty-four inch (24") Standard circular, with machined bearing surfaces, gravity, solid, non-rocking type. The minimum weight of the cover shall be one hundred sixty (160) pounds. The

minimum weight of the ring shall be two hundred eighty (280 lbs.). No flat rings and covers shall be allowed unless approved by the City Engineer / Public Works Representative. The tops of the cover and ring shall be flush and there shall be 1/8-inch clearance between the cover and the ring. In addition to the foundry name and year of manufacture, the cover shall be marked "SEWER."

7.5.1 Setting of Manhole Frames and Covers and Placement of Concrete Collars

Covers shall be set to the finished grade and contour of the street. Rings and covers shall be protected during backfilling and compaction of the road base and during the placing or replacing of road surfaces. Any rings or covers damaged or broken shall be replaced by the Developer/Contractor at its expense. Prior to paving, the manhole ring and cover shall be GPS-located by the Developer / Contractor (shot at the center of the ring) and set below the finished road base elevation. After paving the asphalt shall be removed, and the manhole ring and cover shall be raised to match the grade and slope of the finished road surface and shall use the WHIRLYGIG manhole riser/collar system.

Road base around the manhole ring and cover shall be recompacted, and the concrete collar placed. Manholes placed in asphalt surfacing shall be constructed such that the cast iron ring is one-quarter inch (1/4") lower than the pavement. The top of all cone sections shall be a minimum of eight inches (8") and a maximum of twelve-inches (12") below the finished road surface. Manholes must be cleaned of all debris after setting of collar.

See Standard Drawings for Concrete collar details.

7.6 CONNECTIONS TO EXISTING SEWER MAINS

Manholes used to connect to existing sewer lines shall be plumb and centered on the existing pipe. Care shall be taken not to disturb the alignment of the existing sewer main.

A four-foot (4') manhole section (of the appropriate diameter based on the size or number of the sewer lines to be connected) shall be notched and placed over the existing sewer main. The notch in the manhole section shall be large enough such that the bottom of the manhole section is six-inches (6") below the bottom of the existing pipe. Sufficient support shall be placed below the manhole section such that the manhole section does not rest on the existing pipe. Concrete shall then be placed inside the manhole section around the existing pipe to form the manhole base to the springline of the existing pipe.

The cutting of the existing sewer pipe shall be done in the presence of the City Engineer / Public Works Representative. The cut shall be full area of the new base and shall be finished so as to leave no projections that will restrict the flow or catch solids.

Every precaution shall be taken to prevent any material from entering the sewer main. Any such materials entering the sewer shall be removed.

7.7 CONNECTIONS TO EXISTING SEWER MANHOLES

All connections to existing manholes shall be made by coring the manhole. A new trough shall form through the manhole base (via the coring process) such that the new sewer pipe flowline elevation matches the existing trough flowline elevation. The new pipe connection to the manhole shall be made via a rubber boot as previously described in these specifications.

7.8 GREASE INTERCEPTORS

All food facilities that generate grease, or have kitchen equipment that has the potential to produce grease including but not limited to restaurants, institutions, fast food establishments, and camps, are required to install a grease interceptor. Grease interceptors are required to be sized according to the latest Uniform Plumbing Code (adopted by the Springville City) at the time of plan check and approval. Minimum size requirement for a grease interceptor is

1000 gallons. The interceptor should be installed as close to the grease source as possible. Proper setbacks should be maintained from structures, property lines, etc. to comply with all codes. Location of the interceptor should be dependent upon easy pump truck access to allow for proper maintenance and should be approved by the ENGINEER. Toilets, urinals, and other similar fixtures shall not waste through the interceptor. All grease waste shall enter the interceptor through the inlet pipe only. The inlet, outlet, and baffle fittings should be designed for grease retention. To allow for proper maintenance, manholes sections to finished grade shall be provided. The manhole covers should be of gas-tight construction with a minimum opening dimension of 24 inches designed for a minimum H20 loading.

7.9 POLYMER MANHOLES - HYDROGEN SULFIDE PROTECTION

Corrosion of exposed concrete from the bacterial oxidation of hydrogen sulfide gas to sulfuric acid in the sewer system has become an issue in several areas of the City. Sulfuric acid is highly corrosive to the cement paste in concrete and causes tremendous damage to manholes when exposed in high concentrations. In areas where high concentrations of hydrogen sulfide gas have been noted and/or are expected such as where manholes receive pumped sewage, experience low sewer flows, experience low velocity sewer flows or experience other conditions that create hydrogen sulfide gas, the City may require the installation of polymer manholes that are resistant to hydrogen sulfide corrosion. The polymer manholes shall be Geneva Polymer Manhole Systems or approved equal.