

PART 1 GENERAL

1.1 SCOPE:

- A. This item includes the work necessary for the construction and installation of sanitary sewer manholes.
- B. The Contractor may, at his option, use cast-in-place type manholes, provided the Engineer approves all details of construction.

1.2 PRIVATE SEWER LIFT STATIONS:

- A. All private sanitary sewer lift stations shall be inspected and approved prior to connection to municipal system at the connection point.

1.3 REFERENCE SPECIFICATIONS:

- A. Shoring and dewatering for construction of all sanitary sewer manholes shall conform to Articles H.5 and H.6, respectively, of the General Conditions for the City of Woodburn, OR.

PART 2 PRODUCTS

2.1 AGGREGATES:

- A. Aggregates shall conform to the requirements of Section 2300, Aggregates, of the Standard Construction Specifications.

2.2 PORTLAND CEMENT AND PORTLAND CEMENT CONCRETE (PCC):

- A. Concrete used in the construction of the manhole base and other structures specified shall be so proportioned and mixed as to meet Class 3300. There shall be a minimum of 6-sacks of cement per cubic yard of concrete.
- B. Portland cement and PCC shall conform to the requirements of Section 2000, Concrete, of the Standard Construction Specifications.

2.3 METAL REINFORCEMENT:

- A. Metal reinforcement shall conform to the requirements of ASTM A 615, grade 60, deformed bars and otherwise conform to Section 3100, Reinforcement, of the Standard Specifications.

2.4 FORMS:

- A. Exterior surfaces shall be formed with steel or plywood. Other surfaces shall be formed with matched boards, plywood, or other approved material. Trench walls, rock, or earth will not be an acceptable form material.

2.5 PRECAST MANHOLES:

- A. Precast man hole shall conform to Standard Detail No.6510-3.
- B. Prior to delivery of precast manhole sections to the job site, yard permeability tests may be required at the point of manufacture. The precast sections to be tested will be selected at random from the stockpiled material that is to be supplied to the project. All test specimens will be mat tested, and shall meet the permeability test requirements of ASTM C14.
- C. Precast manhole sections shall consist of circular sections in standard nominal inside diameters of 48, 54, 60, 72, 84, or 96-inches, as specified. Heights of sections shall be multiples of 12-inches. Heights of manhole section 72-inches through 96-inches in diameter shall be as required to fit site conditions. Other sections shall be 24-inch riser and flattop sections.

2.6 PRECAST BASES:

- A. Precast manhole bases may be used provided all the details of construction are approved prior to construction.

2.7 MANHOLE FRAME AND COVERS:

- A. Manhole frames and covers shall be East Jordan Iron Works Model No.2600 Frame and 2603 Cover or approved equal and as shown in Standard Detail No.6510-3.
- B. OUTSIDE DROP MH: Shall conform to Standard Detail No.6510-2.

2.8 JOINT MATERIALS:**A. MORTAR:**

- 1. Mortar shall conform Section 2050 of these specifications.

B. NON-SHRINK GROUT:

- 1. Non-shrink grout shall be as specified in Section 2050 of these specifications.

C. PREFORMED PLASTIC GASKETS:

- 1. Preformed plastic gaskets shall meet all the requirements of Federal Specifications SS-S-00210.

D. RUBBER GASKETS:

- 1. Materials shall conform to ASTM C443.

2.9 MANHOLE STEPS:

- A. Manhole steps shall conform to the requirements as listed below:

Structural Steel Galvanized	ASTM M111 and A123
Reinforcing Steel Galvanized	ASTM A615 and A123
Plastic with Reinforcing Steel	ASTM C478 and A615

2.10 PIPE ANCHORS:

- A. Anchor bolts and anchor straps for inside drop pipe connections shall be stainless steel.

2.11 PIPE AND FITTINGS:

- A. Pipe and fittings shall conform to the applicable portions of Section 6200, Sanitary Sewer Line Installation. Tees, ells and other fittings for drop manholes shall be of the same material as the pipe in the adjacent trench.

2.12 PIPE STUB-OUTS FOR SERVICE CONNECTIONS:

- A. Pipe stub-outs for service connections shall conform to the applicable portions of Section 6200, Sanitary Sewer Line Installation, and are to be of the same size and kind of material as the service connection pipes.

2.13 PIPE STUB-OUTS FOR FUTURE SEWER CONNECTIONS

- A. Pipe Stub-outs shall be the same type as approved for use in the lateral, main or trunk sewer construction. Strength classification shall be the same class as in adjacent trenches. Where there are two different classes of pipe at a manhole, the higher strength pipe will govern classification. Watertight plugs shall be furnished with each stub-out and shall be adequately braced against hydrostatic or air pressures.
- B. A Fernco® CMA or approved equal shall be installed as shown in Standard Detail No.6510-3.

PART 3 EXECUTION**3.1 FOUNDATION STABILIZATION:**

- A. If, in the opinion of the Engineer, unstable material exists that will not support the manhole or other structure, the Contractor shall excavate below grade and backfill with foundation stabilization material.

3.2 PIPE CONNECTIONS:

- A. Special care shall be taken to see that the openings through which pipes enter the structure are completely watertight. All pipe shall be connected to manholes according to the manufacturer's recommendations. All rigid non-reinforced pipe entering or leaving the manhole shall be

provided with flexible joints within 1-foot of the manhole structure and shall be placed on firmly compacted bedding.

- B. Concrete pipe connections to sanitary manholes shall be grouted water tight with non-shrink grout conforming to subsection 2.8(B).
- C. PVC pipe shall be connected to sanitary manholes using an approved adaptor specifically manufactured for the intended service. PVC pipe adapters shall be Fernco CMA, Romac LCT, Tylox Manhole Adapters, Vassally Series 32850, Kor-N-Seal, Sealtite, Z-Lok-XP, or approved equal commercial products. Field-fabricated water stops or improvised adapters shall not be used. Adapters requiring the use of grout for installation shall be anchored and finished using non-shrink grout conforming to subsection 2.8(B).

3.3 PRECAST CONCRETE MANHOLES:

A. GENERAL

- 1. Precast manhole components may be used to construct standard, drop, and carry-through manholes. Sanitary manholes less than 6-feet in depth measured from the spring line of the pipe to the bottom of the lower riser ring shall be flattop manholes as shown in Standard Detail No.6510-3.

B. BASES

- 1. If bases are cast in place, the concrete shall be consolidated by mechanical vibration. The concrete shall be screeded off in such a manner that the first manhole section to be placed has a level uniform bearing for the full circumference.
- 2. If bases are precast, the base section shall be carefully placed on the prepared bedding so as to be fully and uniformly supported at true grade and alignment.
- 3. The invert shall be constructed to a section identical with that of the sewer pipe. Where the size of sewer pipe is changed at the manhole, the invert shall be constructed to form a smooth transition without abrupt breaks or unevenness of the invert surfaces. Where a full section of concrete sewer pipe is laid through the manhole, the top shall be broken out to the spring line of the pipe for the full width of the manhole, and the exposed edge of the pipe completely covered with mortar. During construction, the Contractor shall divert existing flows of water or sewage from new concrete or mortar surfaces to prevent damage to the fresh concrete or mortar until the initial set has been achieved.

C. SECTIONS

- 1. All lift holes shall be thoroughly wetted, then completely filled with mortar, and smoothed and pointed both inside and out to ensure water tightness.
- 2. Preformed plastic or rubber gaskets shall be used on all sanitary manholes. All mortar joints between precast elements shall be thoroughly wetted, then completely filled with mortar.

3.4 GRATES, FRAMES, AND COVERS:

- A. Manhole frames, grates and covers shall be installed in such a manner as to prevent infiltration of surface or ground water between the frame and the concrete of the manhole section. All mortared sanitary sewer manhole necks and all riser ring joints made with mortar shall be constructed using an approved commercial concrete bonding agent applied to all cured concrete surfaces being mortared. No joints, necks or frames on sanitary manholes shall be mortared without an approved bonding agent.
- B. Manhole frames shall be installed flush with finished grade when in improved streets and covers shall fit flat.

3.5 OUTSIDE DROP MANHOLES:

- A. Outside drop manholes shall be constructed at the location shown and as detailed on the Plans. Where the difference in inverts at the manhole exceeds 24-inches and where indicated on Plans, outside drops shall be constructed.
- B. Manhole invert shall be formed for continuity of flow.
- C. When PVC pipe is used a positive contact between concrete and PVC must be provided, utilizing an adaptor as specified in subsection 3.2(C).

3.6 MEASUREMENT AND PAYMENT:

- A. Payment will be made at the unit price indicated in the Bid for Man Holes installed, completed and tested as measured in the field for the standard diameters indicated to a depth of 6-feet.
- B. Extra depth of MH construction will be paid to the nearest 0.1 LF at the unit price indicated in the Bid for depths over 6-feet for standard MHs installed, complete and tested as measured in the field.

PART 4 TESTING**4.1 GENERAL:**

- A. Manhole testing shall be accomplished by means of vacuum test methods as conforms to ASTM C828 and is herein specified.
- B. All sewer lines shall be securely plugged.
- C. Apply 10-inches Mercury (Hg) to the sealed manhole and track the time it takes the vacuum to drop to 9-inches Hg.
- D. Acceptance of the individual manhole will be based on the following chart in Table D-1;

TABLE D-1			
	TEST TIME PER MANHOLE DIAMTER (Seconds)		
DEPTH (Feet)	48"	60"	72"
6	11	13	18
8	14	18	23
10	17	23	28
12	21	28	34
14	25	32	40
16	28	37	45
18	32	41	51
20	35	46	57
22	39	51	62

- E. Manholes shall be sealed, resealed and tested until they pass vacuum testing as described and observed by the Engineer.

END OF SECTION