SECTION 03460 – PRECAST CONCRETE SEWER MANHOLES

PART 1 - GENERAL

1.1 DESCRIPTION

The CONTRACTOR shall provide precast concrete sewer manholes, also referred to as access holes, complete and in place, in accordance with the AGENCY standard drawings.

1.2 RELATED WORK SPECIFIED ELSEWHERE

The Work of the following Section applies to the Work of this Section. Other Sections, not referenced below, shall also apply to the extent required for proper performance of this Work.

1. Section 01300 – Record Drawings and Submittals
2. Section 03300 – Cast in Place Concrete
3. Section 09801 – Manhole Lining
4. Section 15065 – Polyvinyl Chloride (PVC) Gravity Sewer Pipe
5. City of Oceanside Water, Wastewater, and Recycled Water Design and Construction Manual (Water Utilities Manual)

1.3 SUBMITTALS

A. Submit shop drawings in accordance with the standard specifications.

B. Shop drawings shall show dimensions, locations, lifting inserts, reinforcement, and joints.

C. Submit manufacturer's data sheets on ductile iron pipe, joints, and fittings including dimensions, wall thickness, weight, coating, lining, and deflections at push-on and mechanical joints.

1.4 QUALITY ASSURANCE

After installation, the CONTRACTOR shall demonstrate that manholes have been properly installed, level, with tight joints, at the correct elevations and orientations, and that the backfilling has been carried out in accordance with the Contract Documents.

PART 2 - MATERIALS

2.1 MANHOLES

A. The CONTRACTOR shall provide precast manhole sections and conical sections conforming to ASTM C 478 and the requirements of this Section. Adjusting rings shall be standard items from the manufacturer of the manhole sections. Minimum wall thickness of rings shall be 1/8 of the internal diameter of the riser or largest cone diameter.

B. Axial length of sections shall be selected to provide the correct total height with the fewest joints.

C. Conical sections shall be designed to support cast iron frames and covers under an H-20 loading, unless indicated otherwise.

D. Sewer manhole sections shall be cast without ladder rungs.

E. Design Criteria: Manhole walls, transitions, conical sections, and base shall be designed per ASTM C 478 for the depths indicated and the following:

1. AASHTO H-20 loading applied to the cover.
2. Unit weight of soil of 120 pcf located above all portions of the manhole.
3. Lateral soil pressure based on saturated soil producing 100 pcf acting on an empty manhole.
4. Internal fluid pressure based on weight of 63 pcf with manhole filled from invert to cover with no balancing external soil pressure.
5. Dead load of manhole sections fully supported by the base and transition.
6. The minimum allowable steel shall be hoops of No. 4 wire. Add reinforcing steel in walls to transfer stresses at openings.
7. The minimum clear distance between the edges of any 2 wall penetrations shall be 12-inches or one-half of the diameter of the smaller penetration, whichever is greater.
8. All manholes on sewer pipelines, all drop manholes, regardless of size and all forcemain terminal manholes shall be coated with Sancon 100, Zebron, or approved equal, including the bench.

F. Joint sealing compound shall be a mastic-type material in a flexible rope or rolled form with removable wrapper sized to fit into the key manhole sections.

G. Concrete for base and channel formation shall be concrete conforming to the standard specifications.

H. Barrel section to sewer pipe connections shall be sealed with manhole stop rings complying with ASTM C 923, not extruded, as manufactured Newby Rubber Inc., or approved equal.

I. Drop manholes, if approved by the AGENCY, shall conform to the applicable provisions for precast manholes as specified herein.

J. An approved seal or water-stop shall be placed over the plastic sewer main at the manholes per AGENCY standard drawings.

K. Manhole Manufacturers, or approved equal

1. Oldcastle
2. Mar-Con Products
3. Ameron

2.2 MANHOLE FRAMES AND COVERS

A. Manhole frames shall be 36” in diameter with two concentric covers, made of cast-iron in accordance with ASTM A 48 Class 30 and the Standard Drawings. Covers shall incorporate a “pic-hole” for lifting purposes.

1. Locking frames and covers may be required in areas located outside the public right of way, in remote areas or when determined by the AGENCY.

B. Frames and covers shall be designed for H-20 highway wheel loading.

C. Covers shall be cast with the words “CITY OF OCEANSIDE” and “SEWER”. No other lettering will be permitted on the top portion of the cover.

D. Casting shall be smooth, clean, and free from blisters, blowholes, and shrinkage. Mating surfaces of the frame and cover shall be machined smooth and true to prevent rocking and lateral movement of the lid. Frames and covers shall be match marked in sets before shipping to the site.

E. All castings shall be dipped twice in a preparation of asphalt or coal tar and oil applied at a temperature of not less than 290 degrees F nor more than 310 degrees F and in such a manner as to form a firm and tenacious coating.

F. Castings Manufacturers, or approved equal.

1. Alhambra Foundry
2. South Bay Foundry

2.3 MANHOLE LINING

A. New manholes shall be lined in accordance with the standard specifications.

PART 3 - EXECUTION

3.1 GENERAL

A. Pre-cast concrete sections shall be transported and handled with care in accordance with the manufacturer’s written recommendations. Where lifting devices are provided in pre-cast sections, such lifting devices shall be used as intended. Where no lifting devices are provided, the CONTRACTOR shall follow the manufacturer’s recommendations for lifting procedures to provide proper support during lifting.

B. The manhole base shall be poured in place against a minimum of 6-inches of 3/4” crushed rock base situated on undisturbed soil. The manhole stubs and sewer main shall be set before the concrete is placed and shall be rechecked for alignment and grade before the concrete has set. The various sized inlets and outlets to the manhole shall be located as indicated on the Approved Plans. The manhole base shall extend 9 inches below the bottom of the lowest pipe. Invert elevations of connecting sewers may vary depending upon sizes. When

intercepting flows from smaller pipelines in manholes, set invert of the smaller mains at ¾ of the depth of the larger main.

C. The invert of the manhole base shall be hard worked so as to provide channels conforming in size and shape to the lower portions of the inlets and outlets. The channel shall vary uniformly in size and shape from inlet to outlet and be constructed higher than pipe as indicated on the Approved Plans. The manhole invert channels shall be smooth and accurately shaped. Channels may be formed directly in the concrete base. All transitions shall be smooth and of the proper radius to give an uninterrupted transition of flow. The concrete base shall be shaped with a wood float and shall receive a hard-steel trowel finish prior to the concrete setting.

D. In the event additional mortar is required after initial set has taken place, the surface to receive the mortar shall be primed and the mortar mixed with “Willhold Concrete Adhesive” in the amounts and proportions recommended. The bases shall set a minimum of 24 hours before the manhole construction is continued.

E. Straight through channels in manholes with no tributaries may have SDR 35 PVC pipe installed though the manhole. The top section of pipe shall be removed flush with top of shelf. All cuts shall be neat and dressed minimizing burrs and rough edges.

F. Each manhole section shall be sealed with butyl rubber sealant rope to make a watertight joint, shall be neatly banded on the inside and outside and shall be set plumb. All manholes shall be vacuum tested in accordance with the procedures specified herein in Paragraph 3.3 of this Section.

G. Sections of various height grade rings shall be used in order to bring the top of the manhole ring and cover to the elevation on the Approved Plans, but limited to a maximum of 18 inches of grade ring. The precast concrete manhole rings shall be jointed with a minimum thickness of ½ inch of Portland cement mortar along with butyl rubber sealant rope. Mortar shall be composed of one part Portland cement to two parts clean well-graded sand of such size that all pass a No. 8 sieve. Preformed, cold applied ready-to-use plastic joint sealing compound may be substituted for mortar between units and shall be used when ground water is encountered.

H. The finished elevations at which the manhole frames and covers are to be set shall conform to the requirements set forth in the Approved Plans. Where the frame and cover are in existing pavement or in the traveled way of the existing road shoulder, it is to be placed flush with the existing surface. When the structure is outside the limits of the traveled shoulder but not in the roadside ditch, it should be placed 1/10-foot above the existing ground surface.

I. Where the manhole cover falls in the existing roadside ditch or easement right-of-way “offsite”, it is to be placed approximately 6-inches above the existing ground surface. Manhole frames shall be set at the required grade and shall be securely attached to the top precast manhole shaft unit with a cement-mortar bed and fillet. After the frames are securely set in place, covers shall be installed and all

necessary cleaning and scraping of foreign materials from the frames and covers shall be accomplished to ensure a satisfactory fit.

1. Damp-proof material shall be applied, when ground water is present or anticipated and at the discretion of the AGENCY, to the exterior surfaces of manholes in accordance with the manufactures recommendations. The material shall be applied to all exterior surfaces below a point one foot above the water table or indications of seepage or moisture as directed by the AGENCY. Use water-proofing material for exterior surface when below ground water, or as required by AGENCY.
2. Selected clean backfill material shall be used around all manholes. It shall be compacted by pneumatic tampers unless shown otherwise on the Approved Plans.
3. A concrete ring shall be cast around manhole frames to within 3” of finished grade and capped with asphalt, as shown on the Approved Plans. The ring shall be placed after the final grading or paving together with the final cleanup.

3.2 WATER-TIGHTNESS OF MANHOLES

All manholes and appurtenances shall be water tight and free from infiltration. All manhole joints shall use butyl rubber sealant material to provide a water tight seal and shall comply with the vacuum test requirements specified herein in Paragraph 3.3 of this Section. Sections of manholes below ground water levels or anticipated ground water levels shall have sealant material installed on the external surface.

3.3 VACUUM TESTING OF MANHOLES

A. All sewer manholes shall be vacuum tested in accordance with the requirements specified herein.

B. Vacuum testing equipment shall be as manufactured by P.A. Glazier, Inc. or approved equal.

C. Manholes shall be tested after assembly and prior to mortaring the joints or backfilling. In case of manholes incorporating a PVC liner, the testing is to take place prior to mortaring the joints, welding the liner seams between sections, and backfilling.

D. All lift holes shall be plugged with an approved grout prior to testing. All pipes entering the manhole shall be plugged and bracing installed to prevent the plug from being drawn into the manhole. The test head shall be placed inside the top of the cone section and the seal inflated in accordance with the manufacture’s recommendations. A vacuum of 10 inches of mercury shall be drawn. The time shall be measured for the vacuum to drop 9-inches. The manhole shall pass the test if the time taken for the drop is greater than 60 seconds. If the manhole fails the test, necessary repairs shall be made and the test repeated until acceptable results are obtained. The leak(s) shall be located and repaired, according to the type of leak, with material in-kind.

END OF SECTION