

The following standard specification is intended to be edited according to the specifics of the project. Brackets [] and areas shaded in gray [e.g. format] indicate requirements that are optional depending upon the type of system being provided or per instructions associated with the [] and project requirements. Consult with University's Representative and campus stakeholders.

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SECTION 33 05 13 MANHOLES AND STRUCTURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Modular precast concrete manhole bases, sections with tongue-and-groove joints, covers, and accessories for sanitary sewer and storm drain systems. Section also includes cast in place manhole bases.

1.2 RELATED SECTIONS

- A. Section 01 33 23 Shop Drawings, Product Data and Samples
- B. Section 01 43 00 Quality Assurance
- C. Section 01 57 23 Storm Water Pollution Prevention
- D. Section 09 99 00 Painting and Coating
- E. Section 30 20 00 Earthwork
- F. Section 31 23 33 Trenching and Backfilling

1.3 REFERENCES

- A. American Concrete Institute (ACI) 308 - Standard Specification for Curing Concrete
- B. ACI 318 - Building Code Requirements for Structural Concrete
- C. American Society for Testing and Materials (ASTM) A48/A48M - Standard Specification for Gray Iron Castings
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- E. ASTM C150 - Standard Specification for Portland Cement
- F. ASTM C443 REV A- Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
- G. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections
- H. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile
- I. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals
- J. ASTM C891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures
- K. ASTM C1244 - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill
- L. Corps of Engineers Specification No. CRD-C572 - Handbook for Concrete and Cement Corps of Engineers Specification for Polyvinylchloride Waterstop.
- M. The term "State Standard Specifications" is understood to refer to the Standard Specifications, State of California, Business, Transportation and Housing Agency, Department of Transportation

(CALTRANS), May 2006 edition. In cases of conflict between the State Standard Specifications and these specifications, these specifications shall govern.

1. Any provisions for measurement and payment specified within the State Standard Specifications shall be disregarded and the provisions of this contract shall govern.

1.4 SUBMITTALS

- A. See Section 01 33 23 Shop Drawings, Product Data and Samples for submittal procedures.
- B. Product Data: Submit product technical data acknowledging that products meet requirements of standards referenced.
- C. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.
- D. Laboratory Testing: Submit results of laboratory compression testing on precast concrete.

PART 2 - PRODUCTS

2.1 MANHOLE SECTIONS, BASES, RISERS AND TOPS

- A. Concrete: State Standard Specifications, CALTRANS Section 90-10, Minor Concrete, conforming to ACI 308, ACI 318, and ASTM C150.
- B. Manhole sections, bases, risers and tops: Precast reinforced concrete per ASTM C478, with resilient connectors per ASTM C923.

The following paragraph relates to University's Standard Detail SS-01 coordinate usage with Drawings.

- C. Provide precast reinforced manholes, frame and cover as indicated on Drawings and as detailed. Inside dimensions, depth, clear lid opening, and pipe penetrations shall be as indicated on the Drawings. Cone section shall be eccentric.
- D. Cast-in-place concrete bases may be used as an alternative to a precast concrete bases. Concrete shall conform to CALTRANS Section 90 and shall be Class "A" containing six packs of Portland Cement per cubic yard of concrete with a minimum design compressive strength of 3,000 psi after 28-days. Reinforcing bars shall be of intermediate grade billet steel conforming to ASTM A615 and shall be the size shown on the Drawings. Provide waterstop for cast-in-place bases in accordance with manufacturer's instruction. PVC waterstops shall be manufactured from virgin polyvinyl chloride conforming to the Corps of Engineers Specification No. CRD-C572.
- E. For pipe penetrations through manholes, core through, install gasket around pipe, grout penetration on both sides and install a minimum of 6 inches (thickness and distance) around collar outside of the manhole or inlet structure penetration. Connections shall be A-lok for ductile iron pipe, Kor-n-seal for PVC pipe, or equal.

Note to specifier: if groundwater level is in close proximity to manhole, add water proofing sealer text below to prevent infiltration into manhole.

- F. Manhole water proofing sealers shall be applied to the exterior concrete and shall be TREMproof 60 as manufactured by Tremco, 10701 Shaker Blvd., Cleveland, Ohio 44104; Duramem V500 as manufactured by Pecora Corporation, 2601 Oakland Avenue, Garland, Texas 75040; Thiodeck C.F. as manufactured by Toch/Carboline Company, 350 Hanley Industrial Court, St. Louis, Missouri 63144; or equal.

2.2 MANHOLE FRAME AND COVER

- A. Frame and Cover: Cast iron per ASTM A48 Class 35B and conforming to Section 55-2.03 and 75-1.02 of the CALTRANS Standard Specifications. Manhole frame and cover shall be D&L Supply A-1024, South Bay Foundry SBF 1900 CPH, or equal.

The following paragraph relates to University's Standard Detail SS-02 coordinate usage with Drawings.

- B. Provide Frame and Cover as detailed and shall be H-20 traffic rated.

2.3 MANHOLE SEALANT GASKETS

- A. Precast reinforced concrete sewer manhole sections shall be joined with rubber gaskets conforming to ASTM C443. Sealant gaskets shall be Ram-Nek, Kent Seal, or equal. Use of mortar will not be allowed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation of manhole structures shall conform to ASTM C478 and ASTM C891.

Note to specifier: coordinate with Section 30 20 00 Earthwork and Section 31 23 33 Trenching And Backfilling

- B. Excavation and backfill for manholes shall conform to the applicable provisions of Section 30 20 00, Earthwork and Section 31 23 33, Trenching and Backfilling.
- C. Place concrete base pad, trowel top surface level. Set precast manhole base unit level on the base material or concrete work slab as specified herein for a cast-in-place base.
- D. Place manhole sections plumb and level, trim to correct elevations, anchor to base pad. Place manhole cylinder plumb and level, to correct dimensions and elevations.
- E. Cut and fit for pipe.
- F. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour as required.
- G. Set cover frames and cover level without tipping, to correct elevations.
- H. Installation shall comply with requirements of Section 01 57 23 Storm Water Pollution Prevention.

Note to specifier: if groundwater level is in close proximity to manhole, add water proofing sealer installation text below.

- I. Water Proofing Sealer
 - 1. Elastomeric waterproofing sealer shall be applied according to manufacturer's recommendations. Thoroughly sandblast the section of the manhole frame over which the sealer is to be applied, the manhole header, extension and cone and the top 12 inches of the manhole riser.
 - 2. All surfaces shall be free of dust, oil, rust, loose materials and other contaminants. Take necessary precautions to prevent rebound from the sandblasting operation to enter the sewer system.
 - 3. A plastic barrier shall be applied on top of sealer to prevent sealer from rubbing off during backfilling.

Note to specifier: for manholes where a sewer force main discharges, corrosion protection shall be added with text below.

- J. To prevent concrete corrosion, a protective coating shall be applied to the interior concrete surface of the manhole. Coating shall be Sauereisen Sewerguard No. 210S or equal and applied per manufacturer's recommendations.

3.2 TESTING

- A. Precast, reinforced, concrete manhole bases, risers and tops shall be tested in accordance with ASTM C497 by an approved testing laboratory, for concrete compression tests on cores drilled from 5 percent of the lot.
- B. When the groundwater table is too low to permit visual detection of leaks, 20 percent of the total of all manholes shall be hydrostatically tested. The test shall consist of plugging all inlets and outlets

and filling the manhole with water to a height determined by the University's Representative. Leakage in each manhole shall not exceed 0.2 gallon per hour per foot of head above the invert over a period of 30 minutes. A manhole may be filled 24 hours prior to time of testing, if desired, to permit normal absorption into the pipe walls to take place. Repair all manholes that do not meet the leakage test, or are unsatisfactory from visual inspection, to conform to the requirements herein, at no additional cost to the University. If more than 25 percent of the manholes tested fail the hydrostatic test, the Contractor will be required to test all or as many manholes as the University's Representative may deem necessary.

- C. Manhole vacuum testing per ASTM C1244 will be acceptable as an alternative to hydrostatic testing. A minimum of 9 inches of mercury shall be held for a minimum time of one minute.
- D. Perform field inspection and testing in accordance with Section 01 43 00 Quality Assurance.
- E. Precast, reinforced, concrete manhole bases, risers and covers shall be subject to rejection for failure to conform to any of the Specification requirements. In addition, individual sections of manhole risers and covers may be rejected for any of the following reasons:
 - 1. Fracture or cracks passing through the wall, except for a single end crack that does not exceed the depth of the joint.
 - 2. Defects that indicate imperfect proportioning, mixing, or molding.
 - 3. Surface defects indicating honeycombed or open texture.
 - 4. Damaged ends, where such damage would prevent making a satisfactory joint as determined by the University's Representative.
 - 5. The internal diameter of the manhole section varying more than 1 percent from the nominal diameter.
 - 6. Any continuous crack having a surface width of 0.01 inch or more and extending for a length of 12 inches or more, regardless of the position in the section wall.

END OF SECTION 33 05 13