SECTION 33 05 13.16
PRECAST MANHOLES, FRAMES AND COVERS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A This section specifies precast cementious concrete manholes. Furnish all labor, materials and equipment required to install precast concrete manholes, grade rings, frames and covers, and appurtenances as specified.

B Manholes shall be constructed and installed per GDOT and as specified.

1.2 REFERENCE STANDARDS

A This section contains references to the following documents. They are a part of this section as specified and modified. Where a referenced document contains references to other standards, those documents are included as references under this section as if referenced directly. In the event of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

B Unless otherwise specified, references to documents shall mean the documents in effect at the time of Advertisement for Bids or Invitation to Bid (or on the effective date of the Agreement if there were no Bids). If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, regardless of whether the document has been superseded by a version with a later date, discontinued or replaced.

1. New and replacement manholes shall be constructed and installed per GDOT and the Contract Drawings.
2. Occupational Safety and Health Administration (OSHA).

1.3 SUBMITTALS

A Procedures: Section 01 33 00 - Submittal Procedures.

B Action Submittals:

1. Shop drawings, product data, materials of construction, and details of installation shall be submitted in accordance with Section 01 33 00 - Submittal Procedures. Submittals shall include the following:
2. Design calculations, sealed by a Professional Engineer licensed in the State of _____, indicating adequate strength to resist the vertical and lateral loadings including “H-20” wheel loadings, and buoyancy forces.
3. Base sections, riser sections, eccentric and concentric conical top sections, flat slab tops, grade rings with notarized certificate indicating compliance with ASTM C478.
4. Concrete mix design.
5. Detail of pipe connection(s) to manhole.
6. Manhole frame and cover style and finish with notarized certificate indicating compliance with ASTM A48, Class 30.
7. Method of repair for minor damage to precast concrete sections.

8. Design data for precast concrete structures: sectional plan(s) and elevations showing dimensions, reinforcing steel placement, manhole covers, steps, baffle plates, and accessories.

C Informational Submittals:
1. Test reports for precast concrete structures: concrete test cylinder reports from an approved testing laboratory certifying conformance with specifications.
2. Manufacturers Installation (or Application) Instructions
3. Operation and Maintenance Data

D Close-Out Submittals:
1. Per Section 01 78 39 - Project Record Documents.

1.4 QUALITY ASSURANCE

A All material shall be new and unused.

B Materials' quality, manufacturing process and finished sections are subject to inspection and approval by Owner - DO NOT USE!!! Use "Owner's Spec Term" GT. Inspection may be made at place of manufacture, at work site following delivery, or both.

C Materials will be examined for compliance with ASTM specifications, these Specifications and approved manufacturer's drawings. Additional inspection criteria shall include: appearance, dimensions(s), blisters, cracks and soundness.

D Materials shall be rejected for failure to meet any Specification requirement. Rejection may occur at place of manufacture, at work site, or following installation. Mark for identification rejected materials and remove from work site immediately. Rejected materials shall be replaced at no cost to Owner - DO NOT USE!!! Use "Owner's Spec Term" GT.

E Repair minor damage to precast concrete sections by approved method, if repair is authorized by Owner - DO NOT USE!!! Use "Owner's Spec Term" GT.

1.5 WARRANTY

A All materials supplied under this section shall be warranted for a period of 2-years by the manufacturer and the Contractor-DO NOT USE!!! Use "Contractor's Spec Term" GT. Warranty period shall commence upon formal acceptance of the project by the OWNER.

B The materials shall be warranted to be free from defects in workmanship, design and materials. If the materials should fail during the warranty period, it shall be replaced or restored to service at no expense to the Owner - DO NOT USE!!! Use "Owner's Spec Term" GT.

C The manufacturer's warranty period shall run concurrently with the Contractor-DO NOT USE!!! Use "Contractor's Spec Term" GT’s warranty period. No exception to this provision shall be allowed.

PART 2 - PRODUCTS

2.1 GENERAL

A Reference to a manufacturer's name and model or catalog number is for the purpose of establishing the standard of quality and general configuration desired.

B Like items of materials/equipment shall be the end products of one manufacturer in order to provide standardization for appearance, operation, maintenance, spare parts and manufacturer's service.

C Provide lifting lugs or holes in each precast section for proper handling.

2.2 PRECAST CONCRETE MANHOLE SECTIONS

A Precast concrete base sections, riser sections, transition top sections, flat slab tops and grade rings shall conform to ASTM C478, Local DOT or city/county agency reference and meet the following requirements:

1. Bottom slab thickness shall equal the riser wall thickness or flat slab top thickness, whichever is greater.
2. Unless otherwise specified, top section shall be eccentric cone where cover over pipe exceeds 4 feet; top section shall be flat slab where cover over top of pipe is 4 feet or less, or where shown.
3. Base, riser and transition top sections shall have tongue and groove joints.
4. Sections shall be cured by an approved method.
5. Ship precast concrete only after concrete has attained 3,000 psi compressive strength.
6. Design precast concrete base, riser, transition top, flat slab top and grade ring for a minimum H-20 loading plus earth load. Calculate earth load with a unit weight of 130 pcf. Calculate buoyancy forces based on groundwater depth 1-foot below the ground surface.
7. Mark date of manufacture, name and trademark of manufacturer on the inside of each precast section.
8. Construct and install precast concrete base as shown on the Drawings.
9. Portland cement shall be ASTM C150, Type II.

2.3 MANHOLE FRAME AND COVER

A Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30, and Local DOT or city/county agency reference.

B Manhole covers shall be _____, or equal. Manhole frames shall be _____. See manhole cover drawing at the end of this specification. See Figure 1.

C The letters “CLIENT OR LOCAL AGENCY” and “CONFINED SPACE”, of size and letter type acceptable to the Owner - DO NOT USE!!! Use "Owner's Spec Term" GT, shall be cast into each manhole lid.

2.4 JOINTING PRECAST MANHOLE SECTIONS AND STRUCTURES

A Seal tongue and groove joints of precast manhole and structure sections with either rubber “O“-ring gasket or preformed flexible joint sealant. “O“-ring gasket shall conform to ASTM C443.

B Preformed flexible joint sealant shall be Kent Seal No. 2 as manufactured by Hamilton-Kent; Ram-Nek as manufactured by K.T. Snyder Company or equal.

C Completed joint shall withstand 15 psi internal water pressure without leakage or displacement of gasket or sealant.

2.5 PIPE CONNECTIONS TO MANHOLE

A Connect pipe to manhole in the following ways:

1. Precast manhole connections shall be watertight in accordance with ASTM C-923.
2. Flexible Sleeve
   a. Integrally cast sleeve in precast manhole section or install sleeve in a formed or cored opening. Fasten pipe in sleeve with stainless steel clamp(s). Coat stainless steel

clamp(s) with bitumous material to protect from corrosion. Flexible sleeve shall be Lock Joint Flexible Manhole Sleeve; Kor-N-Seal connector; PSX Press-Seal Gasket or equal.

3. Compression Gasket
   a. Integrally cast compression gasket in precast manhole section. Insert pipe into compression gasket. Compression gasket shall be A-Lok, or equal.

2.6 CORROSION PROTECTION

PART 3 - EXECUTION

3.1 GENERAL

A All excavation, temporary shaft supports, sheeting and shoring, foundation cushion, concrete and grout required to support the walls of shafts and necessary to construct the manholes as shown on the Contract Drawings shall be provided.

B All sheeting and shoring inclusive of liner plates shall be cut off 2 feet below ground surface and left in place.lump sum prices stipulated in the Bid

C Excavated materials shall be disposed of by the Contractor-DO NOT USE!!! Use "Contractor's Spec Term" GT as described in Section 31 23 00 of the specifications and the cost of which shall be included in the various lump sum prices stipulated in the bid.

3.2 GENERAL MASONRY CONSTRUCTION

A Brick shall be laid regularly and truly to line, with joints not exceeding 1/2 inch in thickness on the face, and with joints completely filled with mortar as each brick is pushed into place, and no subsequent filling of said joints will be allowed except for circular walls.

B The exposed faces of brick masonry shall have all mortar projecting beyond the surface of the brick scraped off and the brick work shall be thoroughly cleaned and the joints pointed immediately after placing. No broken or cut brick will be allowed to be used except where absolutely necessary as closures. Where cuffing of brick is necessary, such faces as are exposed in the same must be accurately trimmed to the contour of the face of the work in which the bricks are laid.

C All brick work shall be bonded as may be directed, and adjoining courses shall break joints one-half a brick as nearly as practicable. Brick work shall be executed straight and vertical, or regularly curved or battered, as shown or specified. Whenever brick masonry is left for the night or is left unfinished for any reason, the masonry surface shall be raked off or toothed as directed, and all mortar removed from the exposed surfaces of the bricks. When new work is joined to work previously laid, the old brick work must first be thoroughly scraped free from adhering mortar or earth and thoroughly washed with water. When new brick work is to be joined to existing brick work, it is to be toothed to provide proper tie of new work to old.

D Backfill and foundation shall conform to specification section 31 23 00 and as shown on drawings.

3.3 PRECAST MANHOLES

A Precast concrete manhole riser sections shall be installed plumb and true on the precast concrete base sections as shown on the Contract Drawing. Before placing the O-ring gasket in the spigot groove, the gasket and all bearing surfaces of the tongue and groove shall be wiped clean, and a lubricant as recommended by the manufacturer shall be applied to the gasket and the inside bell surface. Care shall be taken when lowering any precast unit into the trench that no dirt gets on the gasket or into the joint. Top sections of precast manholes shall be flat slab-type or eccentric

cone sections cast to the proper dimensions to receive the manhole casting shown on the Contract Drawings.

B All manhole riser section joints more than 20 feet below the manhole rim shall be provided with an exterior joint collar and be installed according to the manufacturer's recommendations. After removing the protective paper, the band shall be placed around the manhole riser, mastic side to the riser and spanning the joint. The steel straps shall be secured with the proper tools. The closing flap shall cover all remaining exposed strap.

C The top of the wall of all manholes shall be properly leveled off with mortar so as to form a flat surface upon which the manhole rim is to rest, and manholes shall be carried to such height above the sewer as shown, as necessary to meet grade or as ordered, but shall not be left in a depression to act as an area drain.

D When there is not enough room for a full length of precast concrete riser section to be installed under the manhole frame, precast reinforced concrete grade rings and mortar shall be used for sanitary manholes. The use of brick masonry on sanitary manholes is prohibited.

E In order to allow for a future adjustment of roadway grade or widening of existing roadway, shorter lengths of riser sections when used should be installed immediately below the cone section. Also, a minimum of one precast concrete grade ring will be required on top of the cone or flat slab top section to effect the proper elevation for the manhole rim. The total height of precast concrete grade rings and mortar shall not exceed 12 inches.

F Precast bottom sections with integral bases when used shall be set plumb on a firm foundation in the trench. Height of the bottom section shall be provided to admit the various pipes at the elevations shown on the drawings and still contain sufficient material for structural integrity across the top of these openings. Pipe openings shall be cast into the unit at the time of manufacture. All pipe connections to precast concrete manholes shall be made with resilient connectors conforming to ASTM C923.

G Cast-in-place non-reinforced concrete manhole bottom sections shall be built in accordance with the dimensions indicated on the Contract Drawings. Forming and finishing shall be done per Local DOT or city/county agency reference Standard Specifications.

H Manholes shall have steps (rungs) built into the precast and cast-in-place concrete manhole sections and shall be securely embedded in the precast concrete manhole wall at the time of manufacture. Steps shall be placed as shown on the Contract Drawings. The Contractor-DO NOT USE!!! Use "Contractor's Spec Term" GT shall arrange the various components that will become part of the manhole so that the vertical step spacing is consistent and the frame and cover is situated as oriented in plan on the Contract Drawings.

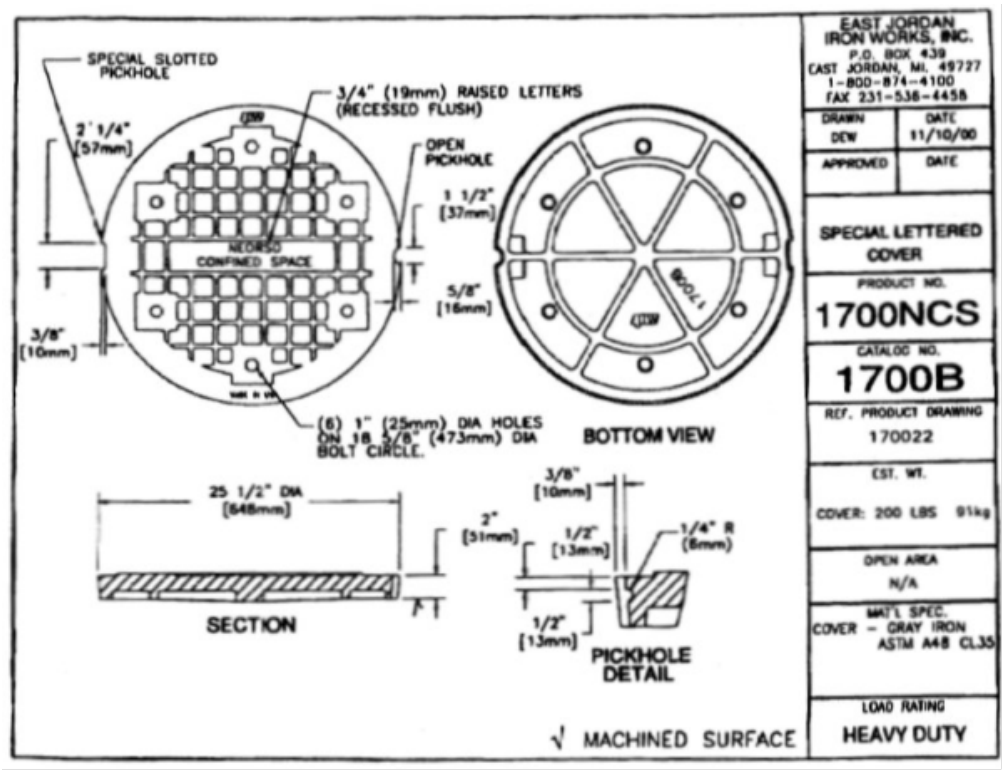
I The manhole frames shall be properly set in place in a full bed of mortar and so adjusted as to make the top of the rim a few inches higher than the surrounding ground so as not to act as a surface drain, or flush with paved surfaces.

3.4 CLEANING

A Thoroughly clean all new manholes of all silt, debris and foreign matter of any kind, prior to final inspections.

3.5 LEAKAGE TESTING

Figure 1. Manhole Cover



END OF SECTION