

WASTEWATER COLLECTION SYSTEM STANDARDS AND SPECIFICATIONS

TIMPANOGOS SPECIAL SERVICE DISTRICT

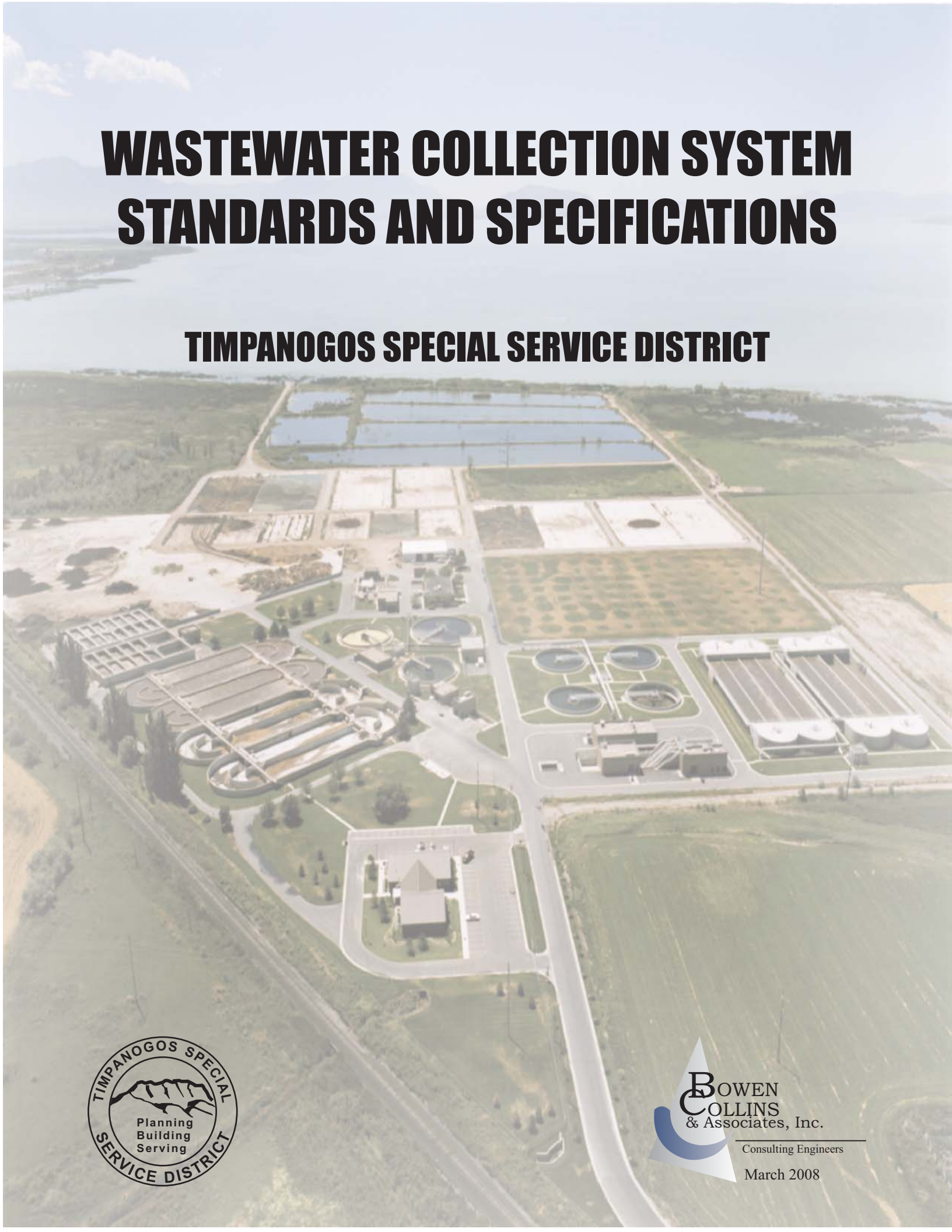


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TSSD SERVICE AREA & SEWER OUTFALL LINE MAP

DIVISION 1

INTRODUCTION

SECTION 00100

INTRODUCTION

The Timpanogos Special Service District (TSSD) provides wastewater treatment for American Fork, Pleasant Grove, Lehi, Alpine, Highland, Eagle Mountain, Saratoga Springs, Cedar Hills, Vineyard, and sections of South Valley Sewer District. The Cities or Districts are responsible for collection of wastewater within their respective City limits or District boundaries and discharge their flows into TSSD sewer pipelines. All persons, parties, or agencies desiring to make a connection to a pipeline owned by TSSD, activating an existing sewer stub connected to a TSSD sewer line, installing a sewer meter vault or installing a pretreatment structure such as a sampling manhole or grease trap must submit the request to the City or District providing sewer service in the area. The City or District must then complete and submit an application to TSSD with all applicable fees. TSSD will not receive or process applications by persons, parties, or agencies other than the appropriate City or District. The application shall be submitted for approval to the TSSD Manager at Timpanogos Special Service District Wastewater Treatment Plant. The site address is 6400 North 5050 West, Utah County, Utah. The mailing address is P.O. Box 923 American Fork, Utah 84003 and the phone number is (801) 756-5231.

The following standards and specifications outline the requirements to connect to a TSSD sewer line or to construct pretreatment structures. While your compliance with these regulations is required, it is also appreciated.

DIVISION 2

ADMINISTRATIVE REQUIREMENTS

SECTION 00200

ADMINISTRATIVE REQUIREMENTS

PART 1 – GENERAL

1.1 SECTION INCLUDES:

- A. Application and Construction Drawing Submittal
- B. Shop Drawings
- C. Project Coordination / Inspection
- D. Permits, Regulations and Fees
- E. Land, Right-of-Way and Easements
- F. Changes in the Work
- G. TSSD Inspector's Authority
- H. Indemnification.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 APPLICATION AND CONSTRUCTION DRAWING SUBMITTAL

- A. A copy of the Application to Perform Work Affecting Timpanogos Special Service District is found in the Appendix in these Standards and Specifications.
- B. Three copies of the application signed by the City Official and three copies of the construction drawings stamped by a professional engineer licensed in the State of Utah shall be submitted to the TSSD Manager for approval.
- C. One application is required for each proposed project.
- D. A review and inspection fee of \$150 payable to TSSD shall be included with the submission of the application.
- E. The application and associated construction drawings will be reviewed for approval by TSSD within 15 working days.
- F. Where required by the TSSD Manager, detailed computations, including hydraulic calculations showing depth of flow, velocity, water surface profiles and gradients shall be submitted with the plans.
- G. Final approval is granted when the application and the construction drawings have been reviewed and approved both by the City Official of which the Work is being performed and by the TSSD Manager.
- H. Final approval from TSSD is required prior to the commencement of any construction.

3.2 SHOP DRAWINGS

- A. Five copies of shop drawings are required for review and acceptance by TSSD prior to manufacturing or construction of sewer manholes, sampling manholes, metering vaults, and grease traps. Shop drawings are not required for connections to existing manholes.
- B. Shop drawings and related data covering equipment and fabricated materials shall be submitted to the TSSD Manager or his or her designee for review prior to fabrication and in ample time to permit satisfactory progress of the Work.
- C. The TSSD Manager will check and review only for general conformance with the design concept of the Project and general compliance with the information given in these Standards and Specifications.
- D. The Contractor shall make such changes in the fabrication and equipment drawings as may be found necessary by the TSSD Manager to make the same conform to these Standards and Specifications.
- E. Prior to review and acceptance of such drawings by the TSSD Manager, no Work shall begin.
- F. TSSD will not be responsible for any expense incurred by others for changes to make Work conform to the drawings as finally approved.
- G. The TSSD Manager's approval of any shop drawings shall not release the Developer / Contractor from responsibility for deviations from these Standards and Specifications.
- H. A written notice to the Contractor / Developer shall evidence the acceptance of any shop drawings or state the deficiencies which have resulted in nonconformance.
- I. Corrections or comments made on shop drawings during the TSSD Manager's review shall not relieve the Contractor from the duty to comply with requirements of these Standards and Specifications.

3.3 PROJECT COORDINATION / INSPECTION

- A. The Contractor / Developer shall comply with the TSSD Inspector's procedures for intra-project communications, submittals, reports and records, schedules, coordination of drawings, recommendations and resolution of ambiguities and conflicts.
- B. The Contractor / Developer shall coordinate scheduling of the Work with the TSSD Inspector prior to commencement of any Work. Contractor / Developer shall schedule inspections with the TSSD Inspector at least 48 hours (two business days) in advance. No Work shall be completed outside of the TSSD regular business hours or on TSSD holidays, without prior written permission of the TSSD Inspector. After permission is granted in writing, Contractor / Developer shall pay any required fees for additional inspection outside of the TSSD regular business hours.

3.4 PERMITS, REGULATIONS AND FEES

- A. The TSSD Review and Inspection Fee must be paid to TSSD prior to commencement of any Work.
- B. All required permits shall be secured prior to commencement of any Work.
- C. Permits and licenses of a temporary nature necessary for the execution of the Work shall be secured and paid for by the Contractor.
- D. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Developer, unless otherwise specified.
- E. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the Work as drawn and specified.
- F. If the Contractor observes that these Standards and Specifications are at variance with any laws, ordinances, rules and regulations, the Contractor shall promptly notify the TSSD Manager in writing, and any necessary changes shall be made as provided here in.
- G. The Developer / Contractor shall obtain all applicable building and inspection permits for this Work as required by the City on which the Work is located.

3.5 LAND, RIGHT-OF-WAY AND EASEMENTS

- A. The Developer shall obtain all land, rights-of-way and easements necessary for carrying out and for the completion of the Work to be performed pursuant to these Standards and Specifications, unless otherwise mutually agreed.
- B. The Developer shall provide to the Contractor information, which delineates and describes the lands owned, and rights-of-way and easements acquired. Copies of the easements and permits that have been acquired by the Developer will be available to the Contractor.
- C. The Contractor shall provide without liability to TSSD any additional land, access and easements thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.
- D. It shall be the Contractor's responsibility to determine the adequacy of the easements obtained in every case and to abide by all requirements and provisions of the easements.
- E. The Contractor shall confine construction operations to within the easement limits or public rights-of-way; or shall make special arrangements with the property owners or appropriate public agency for the additional area required.
- F. The required easements and access permits shall be obtained before construction is commenced.

3.6 CHANGES IN THE WORK

- A. TSSD may at any time, as the need arises, request changes in the scope of the Work. If such changes increase or decrease the amount due under the agreement between the Developer and the Contractor, an adjustment shall be worked out between these two parties, unless otherwise mutually agreed to by TSSD and the Developer and/or the Contractor.
- B. When the Developer or Contractor requires change(s) in the Work, said change(s) shall be submitted for review by and approved by the TSSD Manager prior to construction of said changes. Proposed changes in the Work shall conform to these Standards and Specifications. If such changes increase or decrease the amount due under the agreement between the Developer and the Contractor, adjustments shall be worked out between these two parties, unless otherwise mutually agreed to by TSSD and the Developer and/or Contractor.

3.7 TSSD INSPECTOR'S AUTHORITY

- A. The TSSD Inspector shall act as the TSSD representative during the construction period.
- B. The TSSD Inspector shall interpret the intent of these Standards and Specifications in a fair and unbiased manner.
- C. The TSSD Inspector will make visits to the site and determine if the Work is proceeding in accordance with the Standards and Specifications.
- D. The Contractor will be strictly held to the requirements of the Standards and Specifications in regard to the quality of materials, workmanship and execution of the Work.
- E. If deemed necessary, inspections may be made at the factory or the source of material supply by TSSD or its representative.
- F. The TSSD Inspector will not be responsible for construction means, controls, techniques, sequences, procedures, or construction safety.
- G. The TSSD Inspector shall make decisions relative to interpretation of the Standards and Specifications.
- H. The decisions or actions of the TSSD Inspector shall not relieve the Contractor of any of Contractor's responsibilities.
- I. The TSSD Inspector shall have the right to reject any Work, which does not conform to these Standards and Specifications. Such Work shall be promptly removed, replaced and retested at no cost to TSSD.
- J. The TSSD Inspector shall have the right to determine when and where all testing shall be preformed.

3.8 INDEMNIFICATION

- A. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless TSSD and its officers, agents, representatives and employees from and against all claims, damages, losses and expense including, but not limited to attorneys' fees arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use and any consequential damages resulting therefrom, and (b) is caused in whole or in part by any negligent or intentional act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused by a party indemnified hereunder.

END OF SECTION

DIVISION 3
DESIGN STANDARDS

SECTION 00300
DESIGN STANDARDS

PART 1 – GENERAL

1.1 SECTION INCLUDES:

- A. Codes and Standards
- B. Design Standards.

1.2 SUBMITTALS

- A. Submittal requirements are described in the Administrative Requirements, Section 00200.

1.3 CODES AND STANDARDS

- A. Design shall be based on the following:

- 1. ASCE Manual and Reports on Engineering Practice No. 60, Gravity Sanitary Sewer Design & Construction
- 2. Utah State Department of Health Code of Waste Disposal Regulations
- 3. Utah Division of Water Quality Administrative Rules for Design Requirements for Wastewater Collection, Treatment and Disposal Systems
- 4. Uniform Plumbing Code, Current Edition

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 DESIGN STANDARDS

- A. General

- 1. All connections to existing TSSD sewer outfall lines must conform to these TSSD Standards and Specifications.
- 2. TSSD must approve the locations of all new sewer connections.
- 3. Where feasible, multiple connections shall first be collected by a City sewer line and then connected to the TSSD sewer outfall line with one connection.
- 4. Connections to an existing TSSD sewer outfall line shall only be made by either connecting to an existing manhole or by constructing a new manhole on the existing sewer pipe. Nose on connections are not allowed.

5. Drop manholes are not allowed without prior approval from the TSSD Manager.
6. The invert of the new sewer line shall tie into the TSSD manhole at the 0.75 depth point of the TSSD outfall line, except where otherwise approved by the TSSD Manager.
7. The maximum allowable drop, between inlet and outlet inverts, through a manhole is two feet.

B. Connection to an Existing Manhole

1. See TSSD standard drawing Connection to Existing Manhole for connection details and requirements.

C. Sewer Manholes

1. Five-foot diameter manholes are required for 18-inch sewer outfall lines.
2. Six-foot diameter manholes are required for 21-inch to 36-inch sewer outfall lines and at three-way intersections where the deflection angle in the manhole exceeds 90 degrees.
3. Seven-foot diameter manholes are required for 42-inch to 48-inch sewer outfall lines.
4. The design for manholes connecting to pipes larger than 48 inches shall be reviewed and approved by the TSSD Manager on a case by case basis.
5. When physically possible, manholes located in the street shall have a minimum of five feet between the edge of manhole collar and the edge of street pavement.
6. New manholes connected to outfall lines containing Dynastone® manholes, or as required by the TSSD Manager, shall be constructed of Dynastone® or approved equal.

D. Metering

1. Each City or District within the TSSD is required to have a flow meter station downstream of the last connection in its service area. The metering station is owned and maintained by TSSD. If a metering station requires relocation due to growth downstream of the existing metering station, it is the responsibility of the appropriate City or District to relocate the metering station at its own expense. The TSSD Service Area Map found in the Appendix shows existing flow meter locations. The City or District must receive TSSD approval for new flow meter locations.
2. The flow meter design shall comply with TSSD Standards and Specifications.
3. Wherever possible, TSSD requires the flow meter to be a Parshall flume with a flow transducer constructed inside a concrete vault. An electrical pad above

ground is required to house the RTU panel and power meter panel (see the Sewer Meter Vault and Electrical Pad standard detail drawings for design and construction requirements).

4. The design engineer shall take into account existing and future flows of the outfall line and design the Parshall flume to operate under free flow conditions.

E. Pretreatment

1. All commercial and industrial land development shall comply with the Code of Federal Regulations, Title 40, Part 403 – General Pretreatment Regulations for Existing and New Sources of Pollution.
2. All commercial and industrial land development sewer plans shall be submitted to the TSSD Manager and Pretreatment Coordinator for review and approval per the Application and Construction Drawing Submittal requirements, Section 00200.
3. Grease Trap and Sampling Manhole standard detail drawings are included in Division 5 of these Standards and Specifications.

END OF SECTION

DIVISION 4
CONSTRUCTION SPECIFICATIONS

SECTION 02495

PRECAST CONCRETE VAULTS

PART 1 – GENERAL

1.1 THE REQUIREMENT

- A. The CONTRACTOR shall provide precast concrete vaults, complete and in place, in accordance with the Contract Documents.

1.2 SPECIFICATIONS, CODES AND STANDARDS

A. Commercial Standards

ASTM A 48	Gray Iron Castings
ASTM C 150	Portland Cement
ASTM C 443	Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	Precast Reinforced Concrete Manhole Sections
ASTM C 923	Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

1.3 CONTRACTOR SUBMITTALS

- A. General: Furnish submittals in accordance with Section 00200 – Application and Construction Drawing Submittal.
- B. Shop Drawings:
1. Show dimensions, locations, lifting inserts, reinforcement, and joints.
 2. Structural design calculations for vaults, signed by a registered engineer.
- C. Manufacturer's Certification for Vaults: Written certification that the vault complies with the requirements of this Section.
- D. Manufacturer's Test Results: Pull out force for manhole steps.

1.4 QUALITY ASSURANCE

- A. Inspection: After installation, the CONTRACTOR shall demonstrate that vaults 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 governing agency's backfill standards and specifications.

PART 2 – PRODUCTS

2.1 FRAMES AND COVERS

- A. Castings: Castings for manhole frames and covers shall be non-rocking and shall conform to the requirements of ASTM A 48, Class 30B. Unless otherwise indicated, cast iron covers and frames shall be heavy traffic type, 30 inches in diameter, with embossed lettering saying "Sewer". Frame and cover shall be designed for H-20 traffic loading.
- B. Castings Manufacturers, or Equal
 - 1. D & L Supply
 - 2. Neenah Foundry Co.
 - 3. Olympic Foundry

2.2 VAULTS

- A. The CONTRACTOR shall provide precast vaults designed for the indicated applications and of the sizes indicated.
- B. The minimum structural member thickness for vaults shall be 5-inches. Cement shall be Type V or Type II modified portland cement as specified in ASTM C 150. The minimum 28-day concrete compressive strength shall be 4,000 psi. All reinforcing steel shall be embedded in the concrete with a minimum clear cover as recommended by ACI 318.
- C. Design Loading: Vaults in areas subject to vehicular traffic shall be designed for H-20 traffic loading. Vaults in other areas shall be designed for a vertical live load of 300 psf. Lateral loads on vaults in all areas shall be calculated from:
 - $L = 90 h$, plus surcharge of 240 psf in areas of vehicular traffic
 - Where L loading in psf
 - h = depth of fill in feet.
- D. Where joints are designed in pre-cast concrete vaults, such joints shall be interlocking to secure proper alignment between members and prevent migration of soil through the joint. Structural sections at joints shall be sized sufficiently to reinforce the section against localized distress during transportation and handling and against excess contact bearing pressures through the joint. All openings through the precast structure shall be reinforced to transfer loads.
- E. Where openings for access to the vault are required, the full clear space opening indicated shall be provided, without obstructions from brackets or supports. For large openings where brackets or supports are designed to protrude into the opening for support of required covers, such brackets or supports shall be designed to be easily removed and replaced with a minimum of effort and without cutting or welding.
- F. Covers for access openings shall be provided. Frames for covers shall be fabricated from steel, galvanized after fabrication, and shall be integrally cast into the vault

concrete sections. All covers shall be tight fitting to prevent the entrance of dirt and debris. Where edge seams are permitted, no gaps greater than 1/16-inch between edges will be accepted. All covers, except round, heavy-weight, cast iron manhole covers, shall have securing mechanisms to hold the covers firmly in place against the effects of repetitious live loads such as pedestrian or vehicle traffic.

- G. Where penetration of the pre-cast concrete vault are required for piping, conduit, or ducts, such penetrations shall be accommodated through pre-cast openings or thin-wall knock-out sections. All openings for penetrations shall be smooth and free of surface irregularities and without exposed steel reinforcing. Vaults need not be designed to resist thrust from piping passing through the vault.
- H. Lifting holes shall be plugged with a precast concrete plug sealed with a non-shrink grout.
- I. Vault Manufacturers, or Equal
 - 1. AMCOR Precast, Ogden, Ut
 - 2. Geneva, Orem, Ut
 - 3. Duracrete, Salt Lake, Ut

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. Buried pre-cast concrete vaults shall be assembled and placed in excavations on properly compacted soil foundations as indicated. Pre-cast concrete vaults shall be set to grade and oriented to provide the required dimensions and clearances from pipes and other structures.
- C. Prior to backfilling, all cracks and voids in pre-cast concrete vaults shall be filled with non-shrink grout or polyurethane sealant, or both. Around pipe and conduit penetrations, openings shall be sealed with polyurethane sealant. With the authorization of the ENGINEER, grout or a closed-cell flexible insulation may be used as filler material prior to placing a final bed of polyurethane sealant.
- D. Steps shall be driven into tapered holes formed in the concrete by inserts from the step manufacturer or 1-inch holes drilled 3-3/4-inches deep into the manhole wall in the field. No more than 6-1/8 inches of plastic arm, measured on the inside of the step, shall be exposed outside the concrete.
- E. Steps shall be installed 12-inches on centers vertically, not more than 1/2 inch out of plumb. The top step shall be no more then 12-inches below the manhole cover.

END OF SECTION

SECTION 02533
SEWER MANHOLES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Connection of sewer pipe to existing manholes.
- B. Cast-in-place concrete manholes with masonry or precast transition to lid frame, covers, anchorage, and accessories.
- C. Modular precast concrete manhole sections, with precast or cast in place bases, with tongue-and-groove joints, masonry or precast transition to lid frame, covers, anchorage, and accessories.

1.2 REFERENCES

- A. ASTM A 48 - Standard Specification for Gray Iron Castings; 1994a.
- B. ASTM C 478 - Standard Specification for Precast Reinforced Concrete Manhole Sections; 1996.
- C. ASTM C 923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals; 1996.

1.3 SUBMITTALS

- A. See Section 000200 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate manhole locations, elevations, piping sizes and elevations of pipe inverts.
- C. Product Data: Provide manhole covers, component construction, manhole steps, features, configuration, and dimensions.

1.4 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with at least three years of documented experience.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Amcor, Inc.
- B. D & L Supply Company
- C. Geneva Pipe Company
- D. Olympic Foundry

2.2 COMPONENTS

- A. Manhole Base: precast concrete manhole base of appropriate size.
 - 1. Provide appropriate size flexible sleeves of synthetic rubber, with stainless steel clamps and bolts, for all pipe openings in base section.
 - 2. Construct poured-in-place manhole base where manhole is to be constructed over existing sewer pipeline, as directed by the District Inspector. Manhole base shall be constructed as indicated on the drawings.
- B. Manhole Rise Sections: Precast riser sections of appropriate size and length, extending from top of base section to bottom of top section.
- C. Manhole Sections: Reinforced precast concrete in accordance with ASTM C 478 (ASTM C 478M), with gaskets in accordance with ASTM C 923 (ASTM C 923M).
- D. Manhole Top Section: Precast eccentric cone section of appropriate size, with 30-inch diameter top opening.
 - 1. Flat slab top sections can be used only where indicated on the plan drawings and accepted by the District Inspector; designed for H-20 live loading.
- E. Joints: Base section, riser sections, and top section shall have lipped male/female ends, which shall provide uniform and continuous interior wall surface.
 - 1. Joints shall be sealed with pre-lubricated rubber gaskets, conforming to requirements of ASTM C 443 and C 361; Forsheda No. 114 Seal, manufactured by Forsheda Pipe Seal Company, or equal.
- F. Grade Rings: precast grade rings, as required, to adjust height of manhole lid and frame.
 - 1. Grade rings shall use mastic sealer to insure watertight installation.
- G. Lid and Frame: ASTM A 48, Class 30B Cast iron construction, machined flat bearing surface, removable lid with cleated surface and pick holes, lockable lid if indicated, vented lid design in improved areas and solid lid design in unimproved areas, H-20 highway load rating; lid molded with "Sewer" imprinted on lid; Provide Model A-1180 manufactured by D & L Supply., or acceptable equal.
- H. Manhole Steps: Formed, copolymer polypropylene-encased, steel rungs; 3/4-inch diameter minimum. Cast-in-place or vibrate into green concrete. Model PSI-FF manhole steps, manufactured by M. A. Industries, Inc., or acceptable equal.
- I. Collars: constructed of concrete or bituminous as indicated on the drawings.
- J. In locations where other existing sewer manholes in the existing sewer outfall line are manufactured with Dynastone® and in locations where required by the District

Superintendent, concrete materials shall be manufactured with Dynastone® in conformance with applicable specifications and standards.

2.3 CONFIGURATION

- A. Manholes shall be constructed as indicated on the Standard Manhole Detail drawing.
- B. Shaft Construction: Concentric with eccentric cone top section; lipped male/female joints; sleeved to receive pipe sections.
- C. Shape: Cylindrical.
- D. Clear Inside Dimensions: 60 inch, 72-inch or 84-inch diameter, as indicated.
- E. Design Depth: As indicated.
- F. Clear Lid Opening: 30-inch diameter, as indicated.
- G. Pipe Entry: Provide openings for all pipes entering manhole, as indicated.
- H. Steps: Install at 12 inches on center vertically, set into manhole wall directly under opening.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify items provided by other sections of Work are properly sized and located.
- B. Verify that built-in items are in proper location, and ready for roughing into Work.
- C. Verify excavation for manholes is correct.

3.2 PREPARATION

- A. Where native material encountered at foundation depth of manhole is considered unsuitable, remove unsuitable material; and place and compact bedding material, to limits directed by District Inspector.

3.3 CONNECTIONS TO EXISTING SEWER MANHOLE

- A. Connection of Project pipe into existing manhole includes:
 - 1. All excavating required for the connection; and backfilling excavations after the connection is completed, and compacting backfill as required.
 - 2. Removing existing pipes where and if required.
 - 3. Cutting hole through wall and base of existing manhole with appropriate size coring machine, as required and as directed.

4. Installing new pipe in place and connecting to manhole wall with appropriate type flexible coupling, as recommended by the coupling manufacturer.
 5. Reforming manhole floor and invert channel to provide smooth channel transitions to accommodate new connected pipes.
 6. Sealing around new pipe where it intersects manhole wall; make connection watertight.
 7. Perform all other operations necessary to restore existing manhole to condition acceptable to the District Inspector.
- B. If existing manhole does not have steps, connection shall also include furnishing and installing new manhole steps per these Connection Standards and Specifications.
- C. Connections to existing manholes shall not be completed until new pipelines have been cleaned, tested, and accepted by the District's Inspector.
- D. No debris and rubbish from new pipelines or manholes shall be flushed into existing District sewer pipelines.

3.4 CONNECT PROJECT PIPE TO STUB AT EXISTING SEWER MANHOLE

- A. Connection of Project pipe to stub at existing manhole includes:
1. All excavating required for the connection; and backfilling excavations after the connection is completed, and compacting backfill as required.
 2. Removing plug from end of existing pipe stub and cleaning end of pipe as required.
 3. Connecting new pipe to end of pipe stub with appropriate rigid type coupling, connection to be watertight.
 4. Perform all other operations necessary to restore existing manhole to condition acceptable to the District Inspector.
- B. If existing manhole does not have steps, connection shall also include furnishing and installing new manhole steps per these Connection Standards and Specifications.
- C. Connections to existing manholes shall not be completed until new pipelines have been cleaned, tested, and accepted by the District's Inspector.
- D. No debris and rubbish from pipe lines or manhole shall be flushed into District's existing pipelines.

3.5 MANHOLES

- A. Install precast concrete manhole base level on a compacted foundation

- B. Construct cast-in-place manhole base over existing sewer lines, as acceptable to the District Inspector. Manhole base shall be constructed as indicated on the standard detail drawings.
1. After new manhole has been completed, saw-cut into top of existing sewer pipe, remove section of pipe as required, and dispose of the removed material; construct watertight grout invert channels through new manhole, between new pipe and existing pipe line, as directed. Invert channel shall be formed to direct sewage flows through the manhole as indicated.
 2. Divert existing sewage flows around work area to allow connection to existing pipeline to be made.
- C. Place manhole riser sections plumb and level, from the manhole base to the top section, as indicated and according to manufacturer's instructions; anchor to base; align steps perpendicular to sewer line, and seal joints.
- D. Place top section, cone section or flat slab, on top riser section, with opening positioned over steps. Top of cone section or flat slab shall be from 10-inches to 18-inches below final surface elevation, as directed by the District Inspector.
- E. Install grade rings, as required, to adjust top of lid and frame to match finish elevation. Maximum height of grade rings shall be 12 inches.
- F. Connect pipe to manhole with appropriate type flexible coupling as recommended by manufacturer. Provide pipe joint or flexible coupling on all pipes approximately 18-inches from outside of manhole. Grout around pipe after installation is complete. Make connections watertight.
- G. Grout inside of manhole base sections to form channel between connected pipes, as indicated. Trowel smooth. Top of channel shall be a same elevation as top of outlet pipe.
- H. Set cover frames and lids to match street elevation and slope. After placement, grout around the exterior of frame from top of concrete top section to top of frame, as indicated, to ensure watertight condition.
- I. After manhole base has been completed, furnish and install temporary pipe plugs to seal all interior pipe openings; plugs to be Brandt DuoSeal Pipe Plug by Burke Rubber Company, Cherne Pipe Plug by Cherne Manufacturing Company, or acceptable equal. Pipe plugs shall remain in place until final review and acceptance of completed sewer. Plugs shall then be removed; and shall be property of Contractor.
- J. In paved areas, collars shall be constructed around manhole covers as indicated. Collars shall be constructed of either concrete or bituminous asphalt; and shall be constructed after new pavement has been placed and accepted by the District Inspector and/or Governing Agency. Concrete collars shall contain synthetic fiber reinforcement.
- K. Coordinate with other sections of work to provide correct size, shape, and location.

- L. Drop manholes shall not be constructed without written approval by the District Manager. Where approved, drop manholes shall be constructed as indicated on the Outside Drop Manhole Detail drawings.
- M. One-foot manhole rise sections will not be allowed unless accepted by the District Inspector.

3.6 QUALITY CONTROL

- A. Manholes shall be tested, by an independent testing company, using vacuum test method to demonstrate integrity of installed materials and construction procedures. Method and material for repair shall be as acceptable to the District Inspector.
 - 1. Each manhole shall be tested after assembly and backfilling.
 - 2. Plug all lift holes with an acceptable non-shrink grout.
 - 3. Plug all pipes entering manhole; securely brace plugs during test.
 - 4. Test head shall be placed at inside top of cast iron frame, or as accepted by District Inspector; and the seal shall be inflated in accordance with manufacturer's recommendations.
- B. Testing shall conform to ASTM C 1244, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.
- C. If manhole fails initial test, make all necessary repairs on the outside of manhole with non-shrink grout, or other acceptable material. Manhole shall be re-tested until satisfactory test is obtained.
- D. Pour-in-place manholes to be constructed of Dynastone® shall be overseen by the District Inspector and a quality assurance representative from the manhole supplier and/or manufacturer.

END OF SECTION

**SECTION 03300
CAST-IN-PLACE CONCRETE**

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Concrete formwork.
- B. Floors and slabs on grade.
- C. Concrete foundation walls and vaults.
- D. Concrete reinforcement.
- E. Joint devices associated with concrete work.
- F. Miscellaneous concrete elements, including equipment pads, thrust blocks, and other miscellaneous items.
- G. Concrete curing.

1.2 REFERENCES

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991.
- B. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International; 1996.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 1989.
- D. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 1991.
- E. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 1988.
- F. ACI 308 - Standard Practice for Curing Concrete; American Concrete Institute International; 1992.
- G. ACI 309R - Guide for Consolidation of Concrete; American Concrete Institute; 1992.
- H. ACI 318 - Building Code Requirements for Reinforced Concrete; American Concrete Institute International; 1995.
- I. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute; 1992.
- J. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement; 1994.

- K. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 1996a.
- L. ASTM C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- M. ASTM C 33 - Standard Specification for Concrete Aggregates; 1993.
- N. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 1996.
- O. ASTM C 94 - Standard Specification for Ready-Mixed Concrete; 1996.
- P. ASTM C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
- Q. ASTM C 150 - Standard Specification for Portland Cement; 1996.
- R. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete; 1997.
- S. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 1994a.
- T. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete; 1995.
- U. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 1997.
- V. ASTM C 494 - Standard Specification for Chemical Admixtures for Concrete; 1992.
- W. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete; 1996a.
- X. ASTM C 881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 1990.
- Y. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 1997.
- Z. ASTM C 1116 - Standard Specification for Fiber-Reinforced Concrete and Shotcrete; 1995.
- AA. ASTM D 994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 1994.
- AB. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 1983 (reapproved 1991).
- AC. COE CRD-C 572 - Corps of Engineers Specifications for Polyvinylchloride Waterstop; 1974.

1.3 SUBMITTALS

- A. See Section 00300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products.
- C. Samples: Submit one, four-inch long samples of waterstops and construction joint devices, as directed.
- D. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent construction for concrete accessories.
- E. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.4 QUALITY ASSURANCE

- A. Perform Work of this Section in accordance with ACI 301 and ACI 318.
- B. Acquire cement from same source and aggregate from same source for entire Project.
- C. Follow recommendations of ACI 305R when concreting during hot weather.
- D. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 – PRODUCTS

2.1 FORMWORK

- A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 - 1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.
 - 2. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
 - 3. Form Ties: Snap-Off type that will leave no metal within 1-1/2 inches of concrete surface. Use of tie wire as form ties will not be permitted.

2.2 REINFORCEMENT

- A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420).
 - 1. Deformed billet-steel bars.
 - 2. Unfinished.
- B. Welded Steel Wire Fabric: ASTM A 185, plain type.
 - 1. Coiled Rolls or flat sheets.

2. Mesh Size and Wire Gage: As indicated on drawings.

C. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide galvanized or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C 150, Type IIA - Air Entraining Portland type.
- B. Cement: ASTM C 150, Type V - Sulfate Resistant Portland type. when exposed to sewage.
- C. Dynastone®: Sulfate Resistant Concrete where required by the TSSD Manager.
- D. Fine and Coarse Aggregates: ASTM C 33.
- E. Fly Ash: ASTM C 618, Class F.
- F. Calcined Pozzolan: ASTM C 618, Class N.
- G. Water: Clean and not detrimental to concrete.
- H. Synthetic Fiber Reinforcement: Comply with ASTM C 1116; 1/2-inch length.

2.4 ADMIXTURES

- A. Air Entrainment Admixture: ASTM C 260.
- B. Chemical Admixtures: ASTM C 494, Type D - Water Reducing and Retarding.
 1. Provide products manufactured by Sika Chemical Corporation or acceptable equal.

2.5 CONCRETE ACCESSORIES

- A. Epoxy Bonding System: ASTM C 881, type as required by Project conditions.
- B. Non-Shrink Grout: ASTM C 1107; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
 1. Minimum Compressive Strength at 48 Hours: 2,400 psi.
 2. Minimum Compressive Strength at 28 Days: 7,000 psi.
- C. Moisture-Retaining Cover: ASTM C 171; clear polyethylene or white burlap-polyethylene sheet.

D. Liquid Curing Compound: ASTM C 309, Type 1, clear or translucent.

2.6 JOINT DEVICES AND MATERIALS

A. Waterstops: PVC type, COE CRD-C 572.

B. Joint Filler: ASTM D 1751; Asphalt impregnated fiberboard or felt, 1/2 inch thick; tongue and groove profile.

2.7 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

C. Fibrous Reinforcement: Where indicated, add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific Project conditions.

D. Normal Weight Concrete:

1. Compressive Strength, per ASTM C 39 at 28 days: 4,000 psi.
2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
3. Calcined Pozzolan Content: Maximum 10 percent of cementitious materials by weight.
4. Cement Content: Minimum 592.2 lb. per cubic yard; 6.3 bag mix.
5. Water-Cement Ratio: Maximum 48 percent by weight.
6. Total Air Content: 4 to 8 percent for concrete exposed to freezing and thawing; and 2 to 4 percent for other concrete; per ASTM C 173.
7. Slump: 4 to 2 inches for structures; 3 to 1 1/2 inches for blocks and pavement.
8. Maximum Aggregate Size: one inch.

2.8 MIXING

A. Transit Mixers: Comply with ASTM C 94.

B. During hot weather or under other conditions contributing to rapid setting of concrete, mixing times will be reduced as follows:

1. When air temperature is between 85 and 90 degrees (F), reduce mixing time and delivery time from 90 minutes to 75 minutes.
2. When air temperature is above 90 degrees (F), reduce mixing time and delivery time to 60 minutes.

C. Provide batch ticket for each batch used in the Work. Ticket shall indicate Project identification name and number, date, mix type, mix time, quantity, and amount of water added.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify lines, levels, and dimensions before proceeding with Work governed by this Section.

3.2 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Forms shall be mortar tight, properly aligned, as indicated, to produce concrete surfaces meeting the surface requirements specified herein.
- C. Forms shall be constructed so they can be removed without hammering on or prying against concrete, and without damaging concrete in any way.
- D. Verify that forms are clean before applying release agent.
- E. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.
- F. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- G. In locations where new concrete is doweled to existing Work, drill holes in existing concrete, clean holes of dust and debris, fill holes with epoxy bonding agent, and insert steel dowels.
- H. The TSSD Inspector's review of formwork will not relieve the Contractor from any responsibility as to the adequacy of the formwork, shoring and bracing design. All formwork installed by the Contractor shall be solely at his risk. The TSSD Inspector's review will not lessen or diminish the Contractor's liability..
- I. Alignment and Tolerances. Formwork shall be designed and constructed so that concrete surfaces of finished structures will comply with the tolerances specified in ACI 347; and will conform to the following:
 - 1. Vertical Alignment: maximum allowable variation, from bottom to top of a wall, is plus or minus 3/8 inch.
 - 2. Plumb: maximum allowable variations as follows:
 - a. In plumb and surfaces of columns and walls is plus or minus 1/4 inch in any 10-feet of length; and a maximum of one-inch for entire length.
 - b. In plumb for exposed corner, control-joint grooves, or other conspicuous lines is plus or minus 1/4 inch in any 20-feet of length; and a maximum of 1/2-inch for the entire length..
 - 3. Wall Thickness: shall not vary more than minus 1/8 inch or plus 1/2 inch.

4. Level or Grade: maximum variation from level or grade indicated shall not exceed plus or minus 1/4 inch in any 10-feet of length; or plus or minus 3/8-inch in any 20-feet of length.
5. Distance: maximum variation in distance between walls, columns, or other members shall not exceed plus or minus 1/4 inch in any 10-feet of length; and not more than one-inch total variation.

3.3 INSTALLING REINFORCEMENT

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install wire fabric in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.4 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify TSSD Inspector not less than 48 hours prior to commencement of placement operations. No concrete shall be placed until all formwork, construction joints, reinforcing steel, and other items have been completed and accepted by the TSSD Inspector.
- D. Before placing concrete, inspect and complete formwork installations, reinforcing steel placement, and items to be embedded or cast-in.
- E. Notify other crafts involved in ample time to permit installation of their work; cooperate with other trades in setting such work.
- F. All dirt, chips, sawdust, debris, mud, water and other foreign matter shall be removed from within forms or within excavated areas adjacent to forms before any concrete is placed.
- G. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- H. Separate slabs on grade from vertical surfaces with 1/4-inch thick joint filler.
- I. Install joint devices in accordance with manufacturer's instructions.
- J. Concrete shall be conveyed from mixer to forms as rapidly as possible within specified time limits; and by methods that will prevent segregation of concrete mix.

- K. Concrete shall be placed within 15 minutes after it has been discharged from mixer.
- L. Provide adequate equipment and labor for conveying concrete to ensure a continuous flow of concrete at delivery point.
- M. Concrete shall be deposited as close as possible to its final position in the forms; there shall be no vertical drop greater than 8 feet, except where suitable equipment is provided to prevent segregation of concrete and where specifically authorized.
- N. Deposit concrete so that it will be effectively consolidated in horizontal layers not more than 12 inches thick; except that all slabs shall be placed in single layer.
- O. Where placement consists of several layers, place each layer while the preceding layer is still plastic to avoid cold joints, and within 30 minutes after placement of preceding layer.
- P. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- Q. Place concrete continuously between predetermined expansion, control, and construction joints.
- R. Do not interrupt successive placement; do not permit cold joints to occur.
- S. Do not use concrete which becomes non-plastic or unworkable, does not meet the required quality control limits, or which has become contaminated by foreign materials. Do not use re-tempered concrete. Remove rejected concrete from the Project site and dispose of in an acceptable manner.
- T. Place floor slabs in checkerboard or saw cut pattern indicated.
- U. Saw cut joints within 24 hours after placing. Use 3/16-inch thick blade, cut into 1/4 depth of slab thickness.
- V. Screed floors and slabs on grade level, maintaining surface flatness of maximum variation of 1/4 inch in 10 ft.
- W. Concrete shall not be placed in water; nor shall water be allowed to rise over freshly placed concrete until the concrete has set sufficiently to prevent its being damaged thereby.

3.5 CONSOLIDATING

- A. Consolidate each layer of concrete immediately after placement with internal vibrators in accordance with ACI 309, except for slabs 4 inches thick or less.
- B. Vibrators shall be inserted vertically at uniform spacing over entire area of placement; spacing to be approximately 1-1/2 times radius of action of vibrator. Vibrators shall penetrate rapidly to bottom of layer being placed, and at least 6 inches into the preceding layer.

- C. Vibrators shall be supplemented by hand spading adjacent to forms on exposed surfaces. Concrete shall be compacted and well worked into all corners and angles in forms, and around reinforcement and embedded items.

3.6 FORM REMOVAL

- A. Forms shall be removed in a manner that will prevent damage to concrete and ensure complete safety of the structure.
- B. Forms shall not be removed until the District Inspector gives approval.
- C. Formwork for columns, walls and other members not supporting weight of concrete may be removed when concrete has attained sufficient strength to resist damage from removal operation; but not before at least 48 hours after concrete placement.
- D. Formwork for columns, walls, roof slabs, and other members supporting weight of concrete may not be removed until concrete has attained sufficient strength to carry imposed loads as determined by compression tests, and when directed by the TSSD Inspector.

3.7 CONCRETE FINISHING

- A. Repair and patch surface defects, including tie holes, on all surfaces immediately after removing formwork.
- B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4-inch or more in height.
- C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4-inch or more in height. Provide finish as follows:
 - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
 - 2. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
- D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Wood float surfaces that will receive trowel finish or other finishes, as indicated.
 - 2. Steel trowel surfaces that will be left exposed.
 - 3. Broom-finish exterior concrete to provide non-slip finish.
- E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:50 nominal.
- F. All exposed edges to be chamfered; 3/4 inches minimum.

3.8 CURING AND PROTECTION

- A. Comply with requirements of ACI 308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than 7 days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.
- D. Surfaces Not in Contact with Forms:
 - 1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-fog spray, or saturated burlap, as acceptable to the TSSD Inspector.
 - 2. Begin final curing after initial curing but before surface is dry.
 - a. Moisture-retaining cover: Seal in place with waterproof tape or adhesive.
 - b. Curing compound: Apply in two coats at right angles, using application rate recommended by manufacturer.

3.9 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01400.
- B. Provide free access to concrete operations at Project site and cooperate with appointed firm.
- C. Submit proposed mix design to the TSSD Inspector and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.
- E. Compressive Strength Tests: ASTM C 39. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 50 cu yd or less of concrete placed each day.
- F. Take two additional test cylinders during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. Perform one slump test for each load at point of discharge; and perform slump test with each set of test cylinders taken.
 - 1. If maximum slump for the application is exceeded, it will be assumed that the water content is excessive and the load shall be rejected.
 - 2. If slump is less than the minimum for the application, a measured quantity of water may be added to the mix; quantity shall not exceed 1/6 gallon of water per bag of cement.

3. Water shall be added only in the presence of the TSSD Inspector and after a slump test has been made.
 4. If concrete has been mixed for more than one hour, the loss of slump shall be considered as being caused by setting of concrete; water shall not be added, and the load shall be rejected.
- H. Perform test to determine air content in accordance with ASTM C 231; a minimum of one test shall be done each time a slump test is made. Air content shall be within specified limits.

3.10 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to TSSD Inspector and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- C. The TSSD Inspector will determine repair or replacement of defective concrete. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of TSSD Inspector for each individual area.

3.11 SCHEDULE - CONCRETE TYPES AND FINISHES

- A. Structure Not Exposed to View: 4,000-psi 28 day concrete; form finish surface, with honeycomb and holes filled and repaired.
- B. Exposed Structures: 4,000 psi 28 day concrete; air entrained, smooth rubbed finish.

END OF SECTION

SECTION 11050

PARSHALL FLUME LINERS

PART 1 – GENERAL

1.1 GENERAL

A. This section includes Parshall flume liners.

1.2 SUBMITTALS

A. Shop Drawings:

1. Make, model, and weight of each equipment assembly.
2. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
3. Detailed structural fabrication drawings showing dimensions, size, locations of connections, and weights.
4. Sizing calculations for the Parshall flume liner showing accuracy for the specified flow range.

B. Quality Control Submittals:

1. Special shipping, storage and protection, and handling instructions.
2. Manufacturer's printed installation instructions.
3. Manufacturer's Certificate of Proper Installation.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Plasti-Fab.

B. Tracom

2.2 SERVICE CONDITIONS

A. Suitable for exposure to raw sewage containing high concentrations of hydrogen sulfide.

B. See Design Standards (Section 00300) for flow requirements.

2.3 PARSHALL FLUME LINER

A. The Parshall flume liner shall be of a size and type shown on the Drawings.

B. Corrosion Resistance: The Parshall flume liner shall be resistant to raw sewage containing high concentrations of hydrogen sulfide.

C. Equipment Description:

1. Each flume shall be constructed of corrosion-resistant fiberglass-reinforced polyester resin laminate with a minimum glass content of 30 percent by weight and a resin-rich white surface layer suitable for the specified service conditions.
 2. The fiberglass-reinforced polyester resin laminate shall include a UV inhibitor.
 3. Flume minimum wall and bottom thickness shall be the following:
 - 1/4" for flume sizes up to 36"
 - 5/16" for flume sizes from 36" to 48"
 - 3/8" for flume sizes 48" and above.
 4. The inside surfaces of the flumes shall be smooth and free of irregularities or blemishes.
 5. Flume shall be self-supporting and shall require no additional external supporting structure. Sufficient flanges, reinforcing ribs, and/or anchor ribs shall be provided to prevent distortion during shipment, installation, and operation as well as providing permanent anchorage in the concrete channel.
 6. Flume shall be furnished with fiberglass braces across the top of the flume to retain the vertical sidewalls during concrete placement. The braces shall be removed after construction is completed.
 7. Flume shall be furnished with adjustable T-304 stainless steel support bracket to mount a flow transducer (provided by TSSD) over the waterway.
 8. Flume shall be furnished with inlet and outlet adapters with pipe stubs, neoprene boots and stainless steel straps.
- D. Flume shall have accurate internal dimensions conforming to those shown in the United States Department of Agriculture Circular 843 (1950).
- E. Flume shall be molded in one integral piece containing the converging throat, and diverging sections.
- F. Head Gauge:
1. Each flume shall be provided with a head gauge attached at the 2/3 location on both sides of the converging section sidewalls. The gauge shall span the full sidewater depth and be graduated in tenths and hundredths of a foot. The gauge shall have 3/4" high black numerals at each tenth of a foot.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. In strict accordance with manufacturer's written instructions.

END OF SECTION

DIVISION 5
STANDARD DETAIL DRAWINGS

IN PAVED AREAS SET COLLAR AROUND MH RING 1/8" LOWER THAN FINISH GRADE AT OUTER EDGE AND INNER EDGE.
 IN UNPAVED AREAS, SET SMH LID 6" ABOVE EXISTING GROUND OR AS DIRECTED BY DISTRICT INSPECTOR

D&L A-1180 MANHOLE RING AND COVER TO BE 1/8" BELOW TOP OUTER EDGE OF CONCRETE OR ASPHALT COLLAR

PROVIDE PRECAST RINGS (MAXIMUM OF 2 RINGS) TO BRING COVER TO PROPER ELEV. RINGS CANNOT BE USED TO ADJUST MH COVER MORE THAN 1 FOOT

GROUT RINGS IN PLACE WITH CONCRETE AND SEAL WITH RUBBERIZED SEAL (KENT SEAL, RAM NECK OR EQUIVALENT)

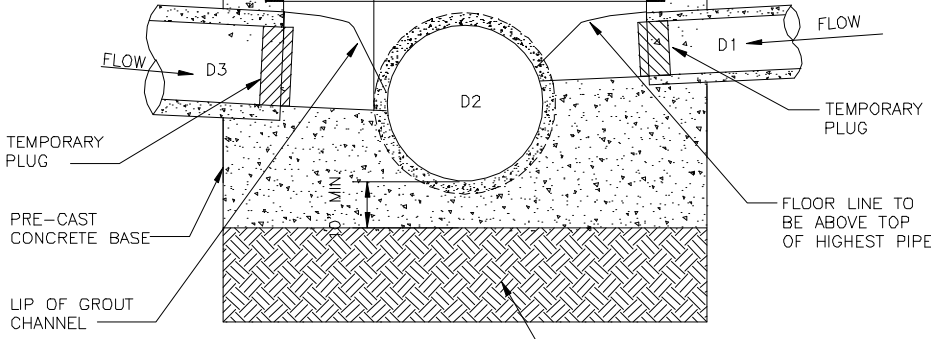
STRAIGHT BACK PRECAST MANHOLE CONE

POLYPROPYLENE STEP UNIFORMLY SPACED @ 1'

RUBBERIZED GASKETS (RAM NECK OR KENT SEAL)

WALL THICKNESS (T)	
SMH DIA	T (INCHES)
5'	6"
6'	7"
7'	8"

STANDARD PRECAST MANHOLE SECTIONS (DEPTH VARIES)



SECTION

NOTES:

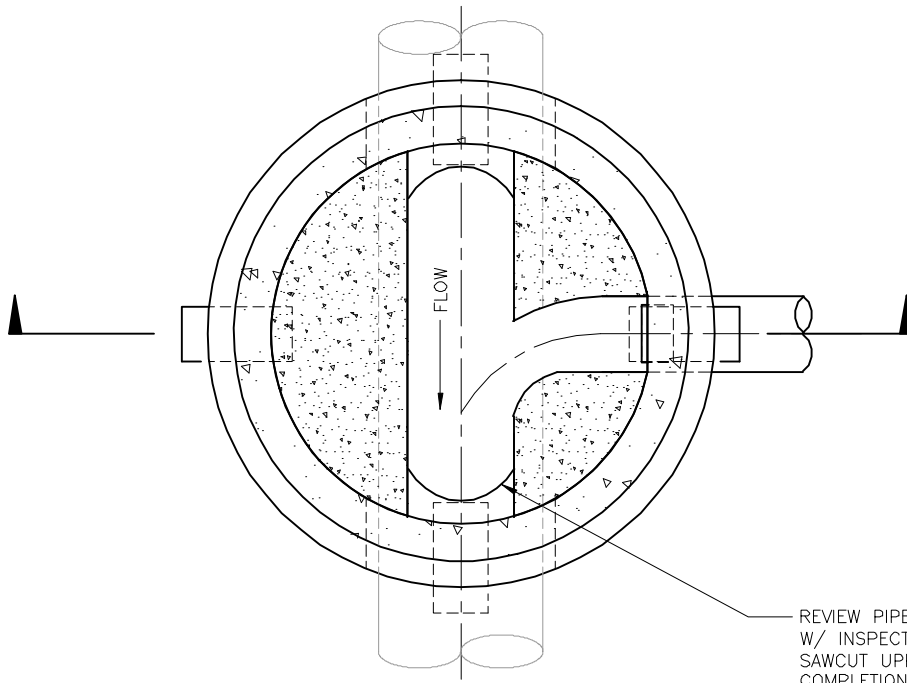
- IF GRADE ALLOWS INVERTS OF D1 & D3 SHALL MATCH THE 0.75 DEPTH POINT OF D2. OTHERWISE, MATCH TOP OF PIPE FOR D1 & D3 TO TOP OF PIPE OF D2 AS APPROVED BY DISTRICT.
 - AFTER ALL GRADING AROUND MANHOLE HAS BEEN COMPLETED AND FINAL SURFACING IS IN PLACE, REMOVE DEBRIS AND TEMPORARY PLUGS OR PLYWOOD FROM INSIDE OF MANHOLES.
 - IF MANHOLE IS TO BE POURED IN PLACE, FOLLOW SAME PATTERN AS SHOWN EXCEPT USE 10" MIN WALL THICKNESS.
 - SET MANHOLE FRAME AND COVER TO 1/8" BELOW FINISH GRADE AFTER FINAL STREET GRADING IS COMPLETE.
 - CONE AND WALL SECTIONS TO CONFORM TO ASTM C-478.
 - PLUG OUTLET OF DOWNSTREAM MANHOLE UNTIL CONSTRUCTION IS COMPLETE.
 - CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
 - STUBS FOR FUTURE CONNECTIONS SHALL BE PLUGGED UNTIL ACTIVATION FOR SERVICE IS APPROVED BY TSSD.
- PROVIDE 12" THICK MIN. COMPACTED GRAVEL BASE UNDER MH BASE.



5					
4					
3					
2					
1					
NO	DATE	REVISION	BY	CHK	APP

TIMPANOGOS SPECIAL SERVICES DISTRICT
STANDARD MANHOLE

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE: AUG 07	FILE NAME:	DRAWING NAME: D-1	



PLAN VIEW

REVIEW PIPE OPENING SIZE W/ INSPECTOR PRIOR TO CUTTING. SAWCUT UPPER 1/3 OF PIPE AFTER COMPLETION OF MANHOLE. SAWCUT FOR NEW PIPES AS APPROVED BY TSSD.

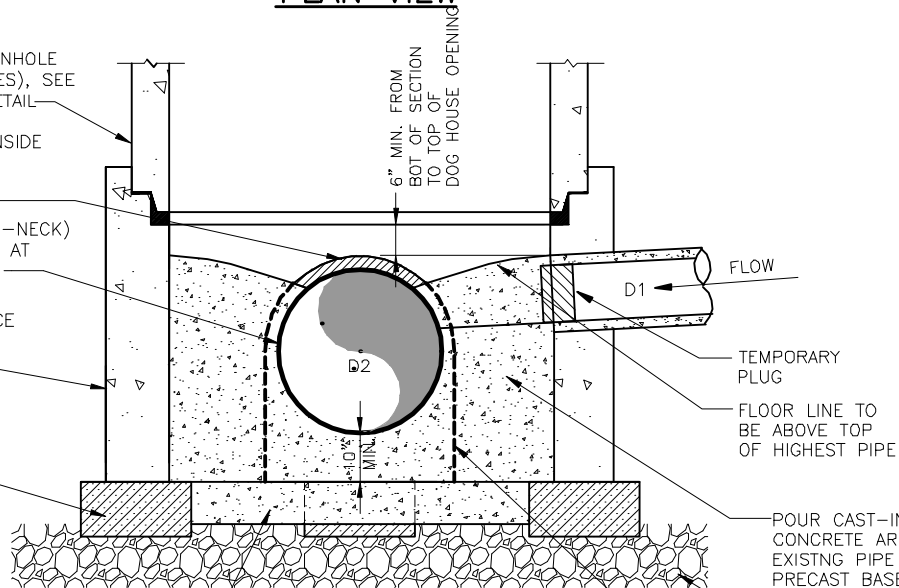
STANDARD PRECAST MANHOLE SECTIONS (DEPTH VARIES), SEE STANDARD MANHOLE DETAIL

NON-SHRINK GROUT INSIDE DOGHOUSE OPENING AROUND TOP OF EXISTING PIPE

WRAP KENT SEAL (RAM-NECK) AROUND EXISTING PIPE AT MANHOLE PENETRATION

PRECAST DOG HOUSE BASE OR CAST IN PLACE BASE AS REQUIRED BY INSPECTOR

SET DOGHOUSE BASE ON 8X8X16 SOLID CONCRETE BLOCKS, TYP OF 4



SECTION

ALLOW CONCRETE TO FLOW A MINIMUM OF 1 FT BEYOND BASE OF STRUCTURE

POUR CAST-IN-PLACE CONCRETE AROUND EXISTING PIPE INSIDE PRECAST BASE

12" MIN THICK GRAVEL OR AS DIRECTED BY TSSD INSPECTOR BASED ON SOIL CONDITIONS

DOGHOUSE OPENING SHALL BE PERFORMED BY MANUFACTURER OR SAW CUT TO FIT PIPE OUTSIDE DIAMETER PLUS 6 INCHES.

NOTES:

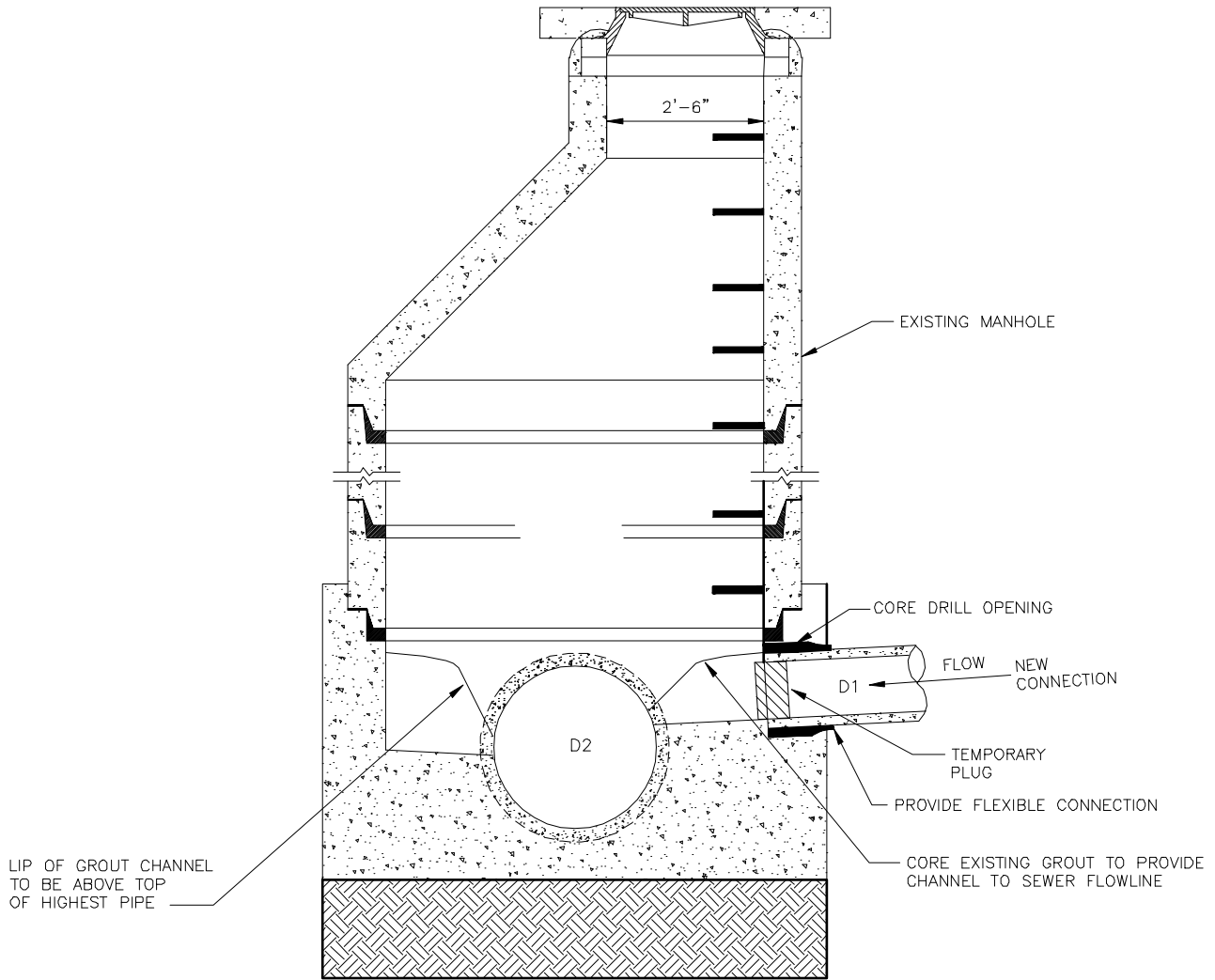
- IF GRADE ALLOWS, INVERT D1 SHALL MATCH THE 0.75 DEPTH POINT OF D2. OTHERWISE, MATCH TOP OF PIPE FOR D1 TO TOP OF PIPE OF D2 AS APPROVED BY DISTRICT.
- AFTER ALL GRADING AROUND MANHOLE HAS BEEN COMPLETED AND FINAL SURFACING IS IN PLACE, REMOVE DEBRIS AND TEMPORARY PLUGS OR PLYWOOD FROM INSIDE OF MANHOLES.
- IF MANHOLE IS TO BE POURED IN PLACE, FOLLOW SAME PATTERN AS SHOWN EXCEPT USE 10" MIN WALL THICKNESS.
- CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
- STUBS FOR FUTURE CONNECTIONS SHALL BE PLUGGED UNTIL ACTIVATION FOR SERVICE IS APPROVED BY TSSD.



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NO	DATE	REVISION	BY	CHK	APP

**TIMPANOGOS SPECIAL SERVICES DISTRICT
MANHOLE ON EXISTING PIPE**

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE: AUG 07	FILE NAME:	DRAWING NAME: D-2	



NOTES:

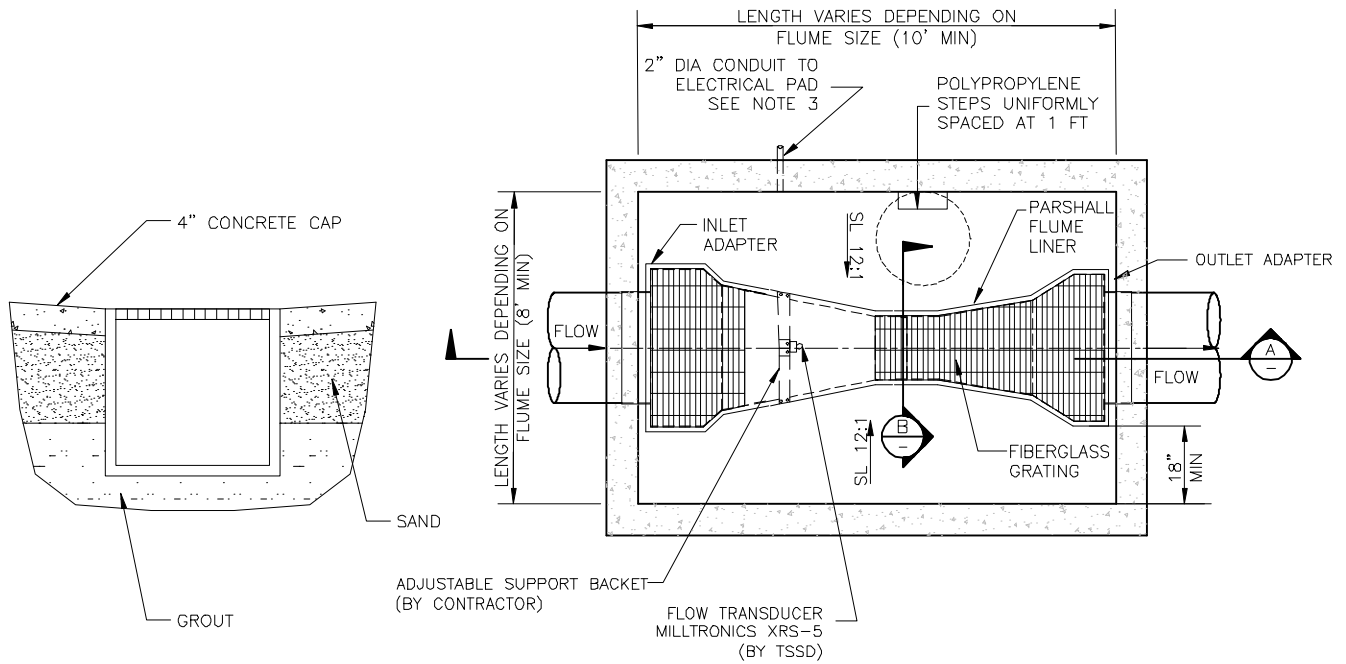
1. IF GRADE ALLOWS, INVERT D1 SHALL MATCH THE 0.75 DEPTH POINT OF D2. OTHERWISE, MATCH TOP OF PIPE FOR D1 TO TOP OF PIPE D2 AS APPROVED BY DISTRICT.
2. AFTER ALL GRADING AROUND MANHOLE HAS BEEN COMPLETED AND FINAL SURFACING IS IN PLACE, REMOVE DEBRIS AND TEMPORARY PLUGS OR PLYWOOD FROM INSIDE OF MANHOLE.
3. PLUG OUTLET OF NEW CONNECTION PIPE UNTIL CONSTRUCTION IS COMPLETED.
4. CORE DRILL HOLE THROUGH WALL AND BASE OF EXISTING MANHOLE WITH APPROPRIATE SIZE CORING MACHINE, AS REQUIRED AND AS DIRECTED.
5. INSTALL NEW PIPE IN PLACE AND CONNECT TO MANHOLE WALL WITH APPROPRIATE TYPE FLEXIBLE COUPLING, AS RECOMMENDED BY THE COUPLING MANUFACTURER.
6. REFORM MANHOLE FLOOR AND INVERT CHANNEL TO PROVIDE SMOOTH CHANNEL TRANSITIONS TO ACCOMMODATE NEW CONNECTED PIPES.
7. SEAL AROUND NEW PIPE WHERE IT INTERSECTS MANHOLE WALL; MAKE CONNECTION WATERTIGHT.
8. PERFORM ALL OTHER OPERATIONS NECESSARY TO RESTORE EXISTING MANHOLE TO CONDITION ACCEPTABLE TO THE DISTRICT INSPECTOR.
9. BACKFILL AND COMPACT EXCAVATIONS PER THE REGULATING AGENCY. RESTORE ASPHALT AS REQUIRED.
10. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO ALL CONSTRUCTION.
11. STUBS FOR FUTURE CONNECTIONS SHALL BE PLUGGED UNTIL ACTIVATION FOR SERVICE IS APPROVED BY TSSD.



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NO	DATE	REVISION	BY	CHK	APP

TIMPANOGOS SPECIAL SERVICES DISTRICT
CONNECTION TO EXISTING MANHOLE

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE: AUG 07	FILE NAME:	DRAWING NAME: D-3	

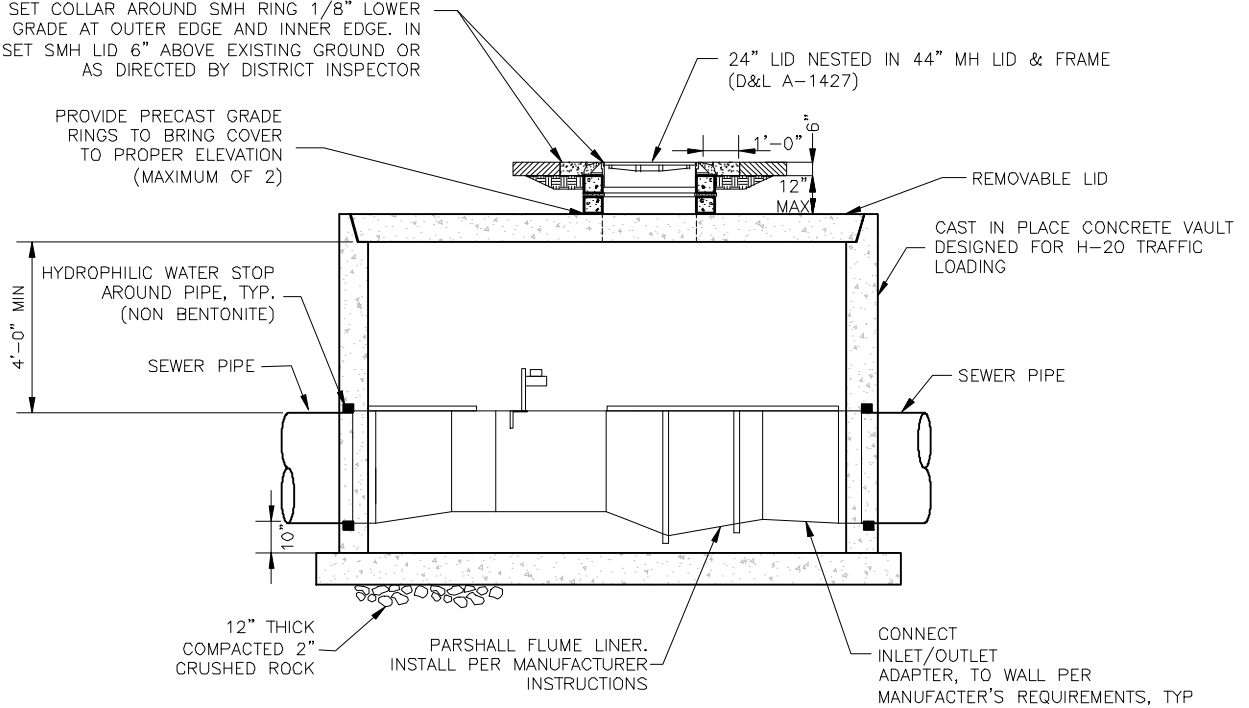


SECTION VIEW



PLAN VIEW

IN PAVED AREAS, SET COLLAR AROUND SMH RING 1/8" LOWER THAN FINISHED GRADE AT OUTER EDGE AND INNER EDGE. IN UNPAVED AREAS, SET SMH LID 6" ABOVE EXISTING GROUND OR AS DIRECTED BY DISTRICT INSPECTOR



ELEVATION VIEW



NOTES:

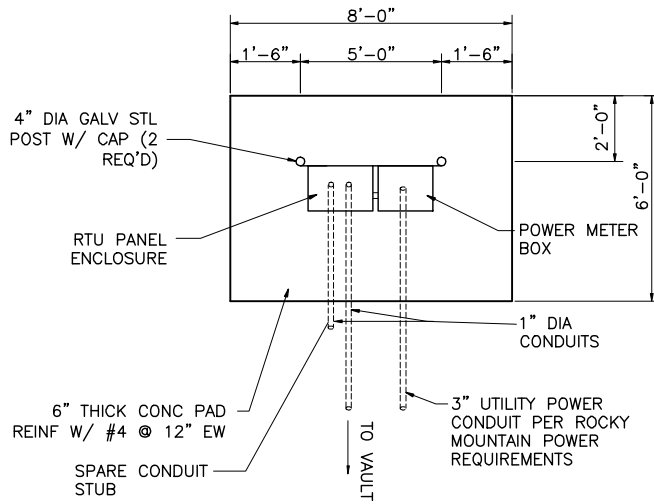
1. THE CAST-IN-PLACE CONCRETE VAULT PLANS SHALL BE DESIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF UTAH.
2. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
3. SEWER METER VAULT REQUIRES ELECTRICAL PAD (SEE TSSD STANDARD DWG D-5).



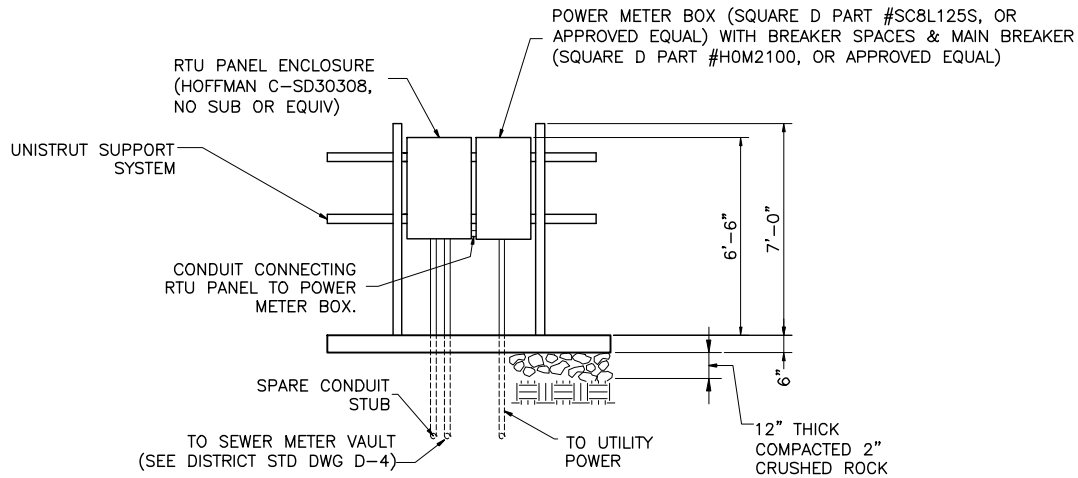
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NO	DATE	REVISION	BY	CHK	APP

TIMPANOGOS SPECIAL SERVICES DISTRICT
SEWER METER VAULT

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE: FEB 08	FILE NAME:	DRAWING NAME: D-4	



PLAN



SECTION

NOTES:

1. CONTRACTOR SHALL ACQUIRE AND INSTALL CONCRETE PAD, CONDUITS, UNISTRUT SUPPORT SYSTEM, RTU PANEL ENCLOSURE, POWER METER BOX AND PROVIDE POWER SERVICE.
2. TSSD SHALL ACQUIRE AND INSTALL RTU PANEL INTERIOR AND FLOW TRANSDUCER (INSIDE SEWER METER VAULT). PRIOR TO CONSTRUCTION, PROJECT OWNER SHALL ENTER AN AGREEMENT WITH TSSD TO REIMBURSE TSSD THE COST OF THE RTU PANEL INTERIOR, FLOW TRANSDUCER AND ASSOCIATED ELECTRICAL AND METERING EQUIPMENT.
3. ELECTRICAL PAD SHALL BE LOCATED NEAR THE FLOW METER IN A SAFE ACCESSIBLE LOCATION APPROVED BY TSSD, WITHIN THE STREET PUBLIC RIGHT-OF-WAY OR WITHIN AN EASEMENT GRANTED TO TSSD BY THE PROPERTY OWNER.
4. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.

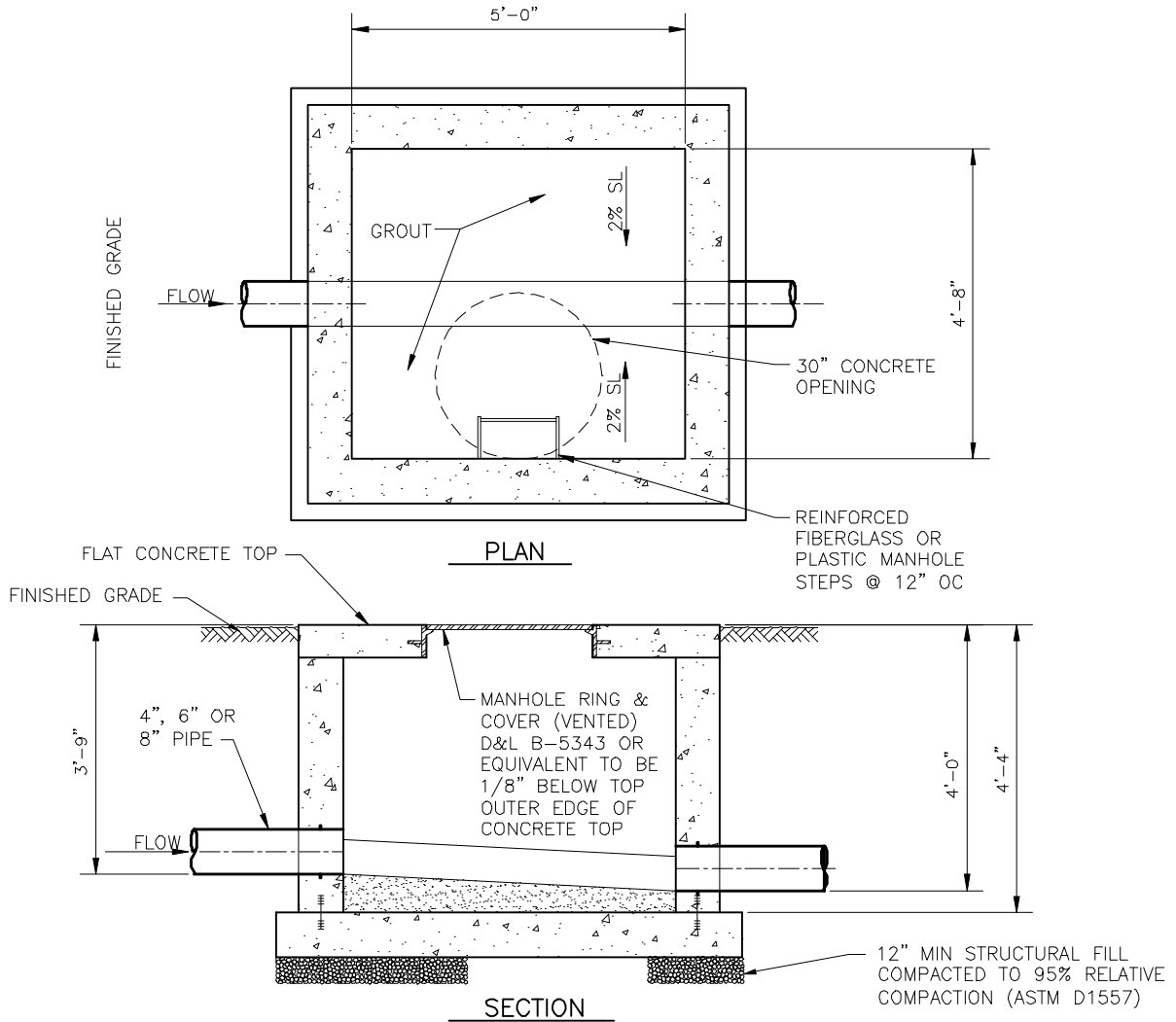


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TIMPANOGOS SPECIAL SERVICES DISTRICT

SEWER METER VAULT ELECTRICAL PAD

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE: MAR 08	FILE NAME:	DRAWING NAME: D-5	



- NOTES:
1. CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI.
 2. REINFORCING STEEL SHALL BE ASTW A615 GRADE 60.
 3. THE CONCRETE COVER OVER THE REINFORCING STEEL SHALL BE A MINIMUM OF 1½-INCH.
 4. THE STRUCTURE SHALL BE DESIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF UTAH.
 5. THE STRUCTURE SHALL AT MINIMUM MEET THE FOLLOWING DESIGN CRITERIA:
 - a) WALLS DESIGNED FOR SATURATED EQUIVALENT FLUID AT-REST SOIL PRESSURE OF 120 PCF PLUS TRUCK SURCHARGE.
 - b) TRUCK LOADING USING AN AASHTO H-20 TRUCK LOAD.
 6. PIPING PER CITY OR DISTRICT REQUIREMENTS.
 7. ALL MANHOLES SHALL HAVE REINFORCED FIBERGLASS OR PLASTIC MANHOLE STEPS.
 8. ALL MANHOLES MUST HAVE ROUND, NOTCHED, VENTED LIDS WITH PICK HOLES FOR REMOVAL.
 9. THE MINIMUM WIDTH OF CHANNEL WITHIN MANHOLE TO BE DIAMETER OF PIPE.
 10. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.



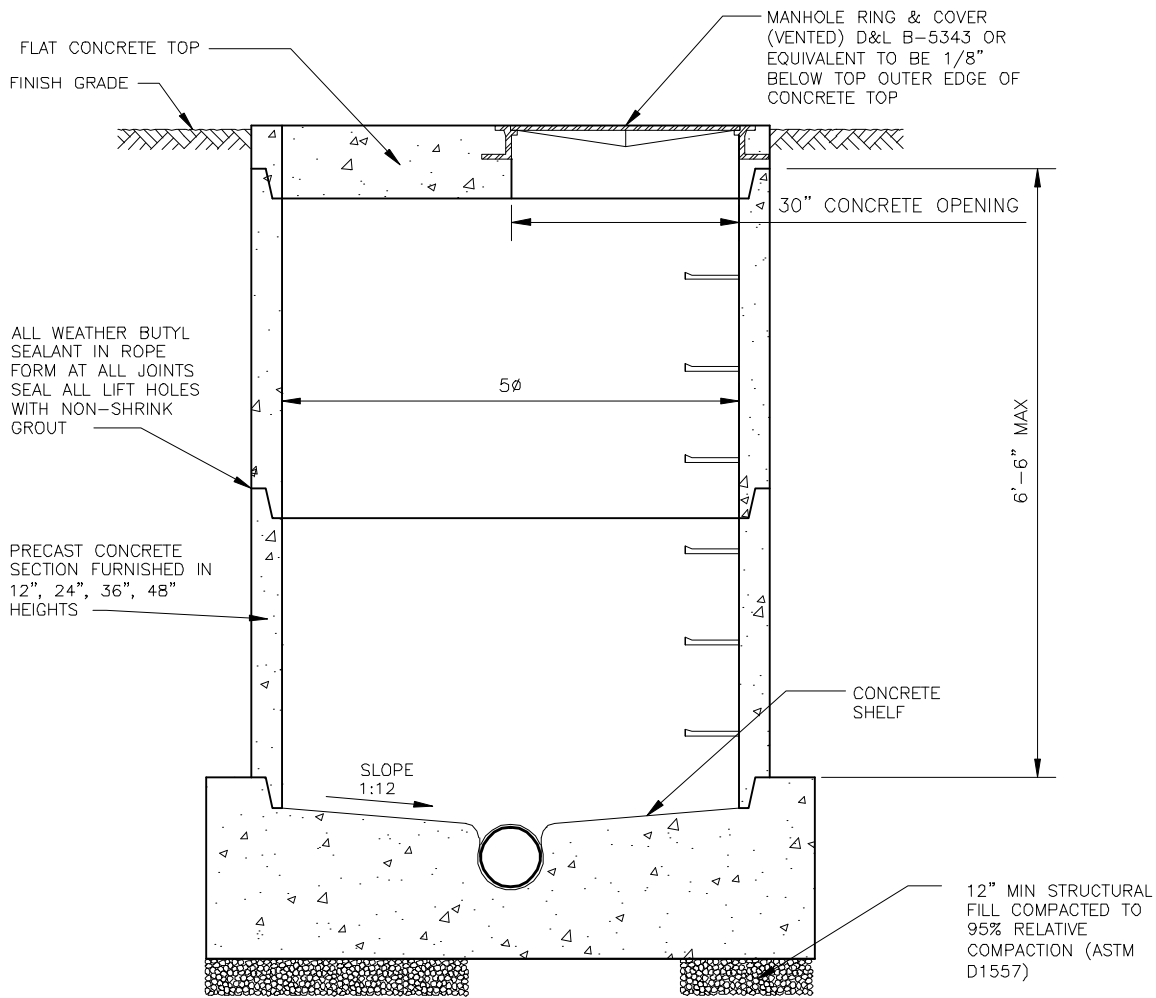
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TIMPANOGOS SPECIAL SERVICES DISTRICT

SAMPLING MANHOLE

4FT OR LESS

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE:	FILE NAME:	DRAWING NAME:	
AUG 07		D-6	



SECTION

NOTES:

1. CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI.
2. REINFORCING STEEL SHALL BE ASTM A615 GRADE 60.
3. THE CONCRETE COVER OVER THE REINFORCING STEEL SHALL BE A MINIMUM OF 1½-INCH.
4. THE STRUCTURE SHALL BE DESIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF UTAH.
5. THE STRUCTURE SHALL AT A MINIMUM MEET THE FOLLOWING DESIGN CRITERIA.
 - a) WALLS DESIGNED FOR SATURATED EQUIVALENT FLUID AT-REST SOIL PRESSURE OF 120 PCF PLUS TRUCK SURCHARGE.
 - b) TRUCK LOADING USING AN AASHTO H-20 TRUCK LOAD.
6. PIPING PER CITY OR DISTRICT REQUIREMENTS.
7. ALL MANHOLES SHALL HAVE REINFORCED FIBERGLASS OR PLASTIC MANHOLE STEPS.
8. ALL MANHOLES MUST HAVE ROUND, NOTCHED, VENTED LIDS WITH PICK HOLES FOR REMOVAL.
9. THE MINIMUM WIDTH OF CHANNEL WITHIN MANHOLE TO BE DIAMETER OF PIPE.
10. THE CHANNEL WITHIN THE MANHOLE SHALL SLOPE GRADUALLY DOWNWARD SUCH THAT THE OUTLET IS 3 INCHES LOWER THAN THE INLET.
11. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.

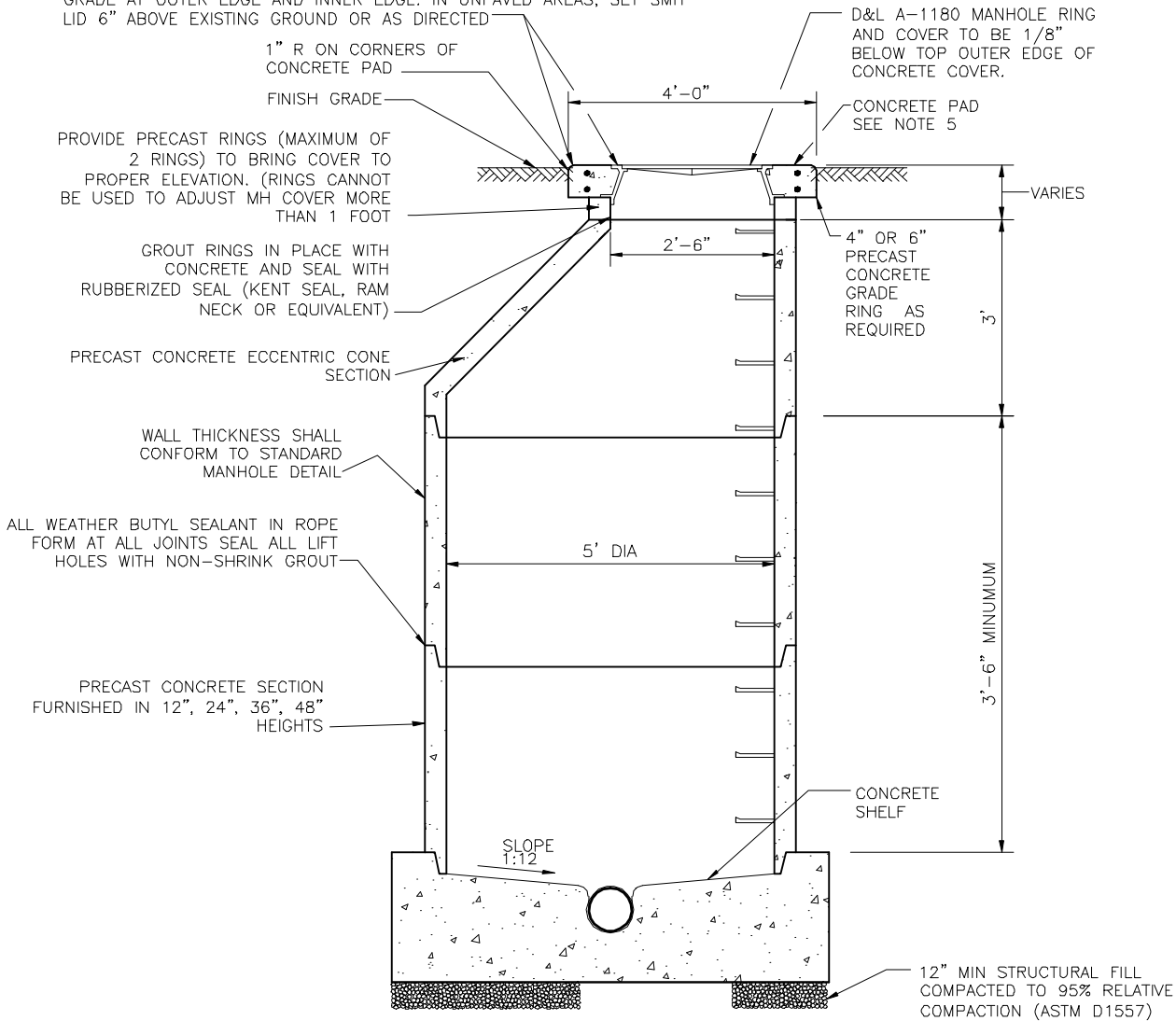


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**TIMPANOGOS SPECIAL
SERVICES DISTRICT**
SAMPLING MANHOLE
4-FT TO 7-FT DEEP

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE: AUG 07	FILE NAME:	DRAWING NAME: D-7	

IN PAVED AREAS SET COLLAR AROUND MH RING $\frac{3}{8}$ " LOWER THAN FINISH GRADE AT OUTER EDGE AND INNER EDGE. IN UNPAVED AREAS, SET SMH LID 6" ABOVE EXISTING GROUND OR AS DIRECTED



NOTES:

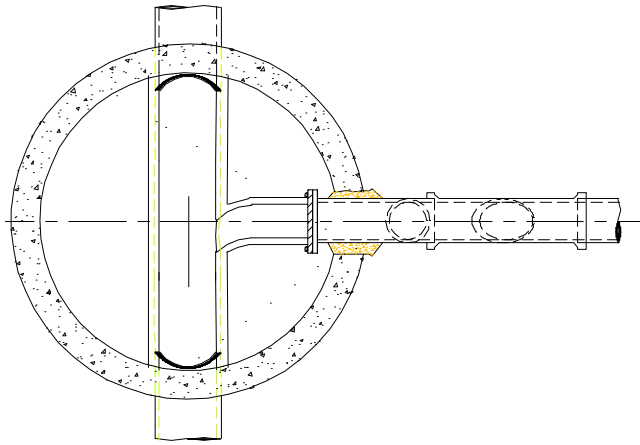
1. CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI.
2. REINFORCING STEEL SHALL BE ASTW A615 GRADE 60.
3. THE CONCRETE COVER OVER THE REINFORCING STEEL SHALL BE A MINIMUM OF $1\frac{1}{2}$ -INCH.
4. THE STRUCTURE SHALL BE DESIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED IN THE STATE OF UTAH.
5. THE STRUCTURE SHALL AT A MINIMUM MEET THE FOLLOWING DESIGN CRITERIA.
 - a) WALLS DESIGNED FOR SATURATED EQUIVALENT FLUID AT-REST SOIL PRESSURE OF 120 PCF PLUS TRUCK SURCHARGE.
 - b) TRUCK LOADING USING AN AASHTO H-20 TRUCK LOAD.
6. PIPING PER CITY OR DISTRICT REQUIREMENTS.
7. ALL MANHOLES SHALL HAVE STAINLESS STEEL OR PLASTIC STEPS.
8. ALL MANHOLES MUST HAVE ROUND, NOTCHED LIDS WITH PICK HOLES FOR REMOVAL.
9. THE MINIMUM WIDTH OF CHANNEL WITHIN MANHOLE TO BE DIAMETER OF PIPE.
10. THE CHANNEL WITHIN THE MANHOLE SHALL SLOPE GRADUALLY DOWNWARD SUCH THAT THE OUTLET IS 3 INCHES LOWER THAN THE INLET.
11. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.



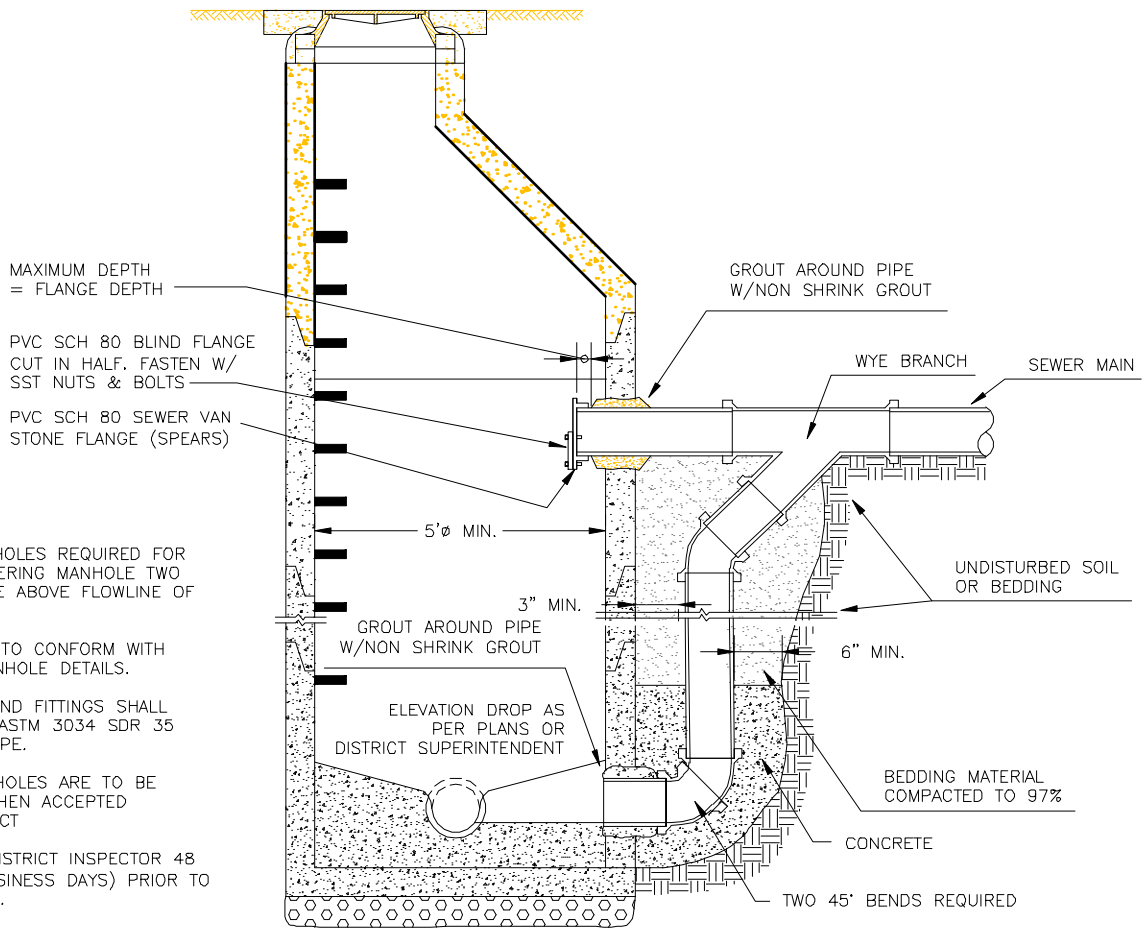
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TIMPANOGOS SPECIAL SERVICES DISTRICT
SAMPLING MANHOLE
7-FT OR DEEPER

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE:	FILE NAME:	DRAWING NAME:	
AUG 07		D-8	



PLAN VIEW



NOTES:

1. DROP MANHOLES REQUIRED FOR ANY LINE ENTERING MANHOLE TWO FEET OR MORE ABOVE FLOWLINE OF MAIN LINE.
2. MANHOLES TO CONFORM WITH STANDARD MANHOLE DETAILS.
3. ALL PIPE AND FITTINGS SHALL CONFORM TO ASTM 3034 SDR 35 PVC SEWER PIPE.
4. DROP MANHOLES ARE TO BE USED ONLY WHEN ACCEPTED BY THE DISTRICT
5. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.

SECTION VIEW

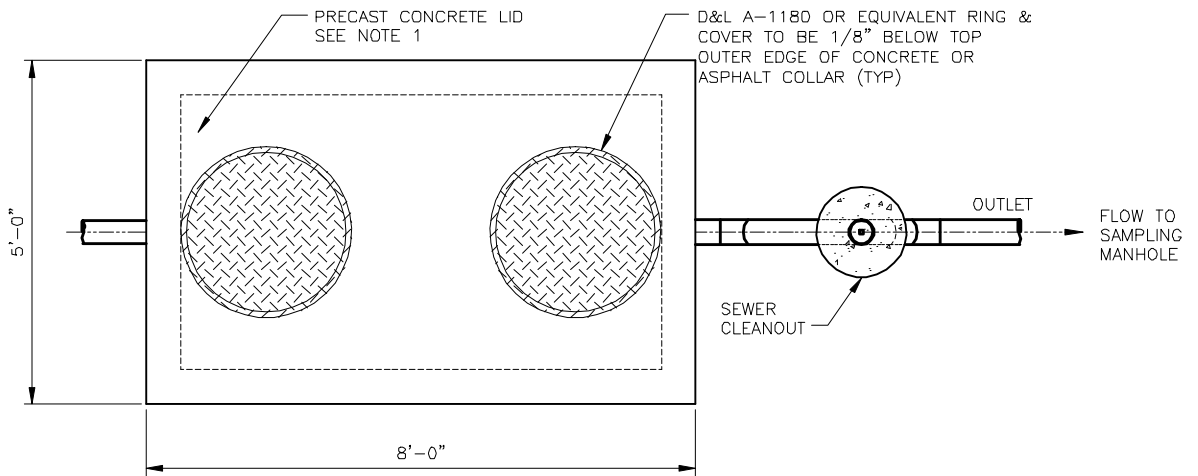


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TIMPANOGOS SPECIAL SERVICES DISTRICT

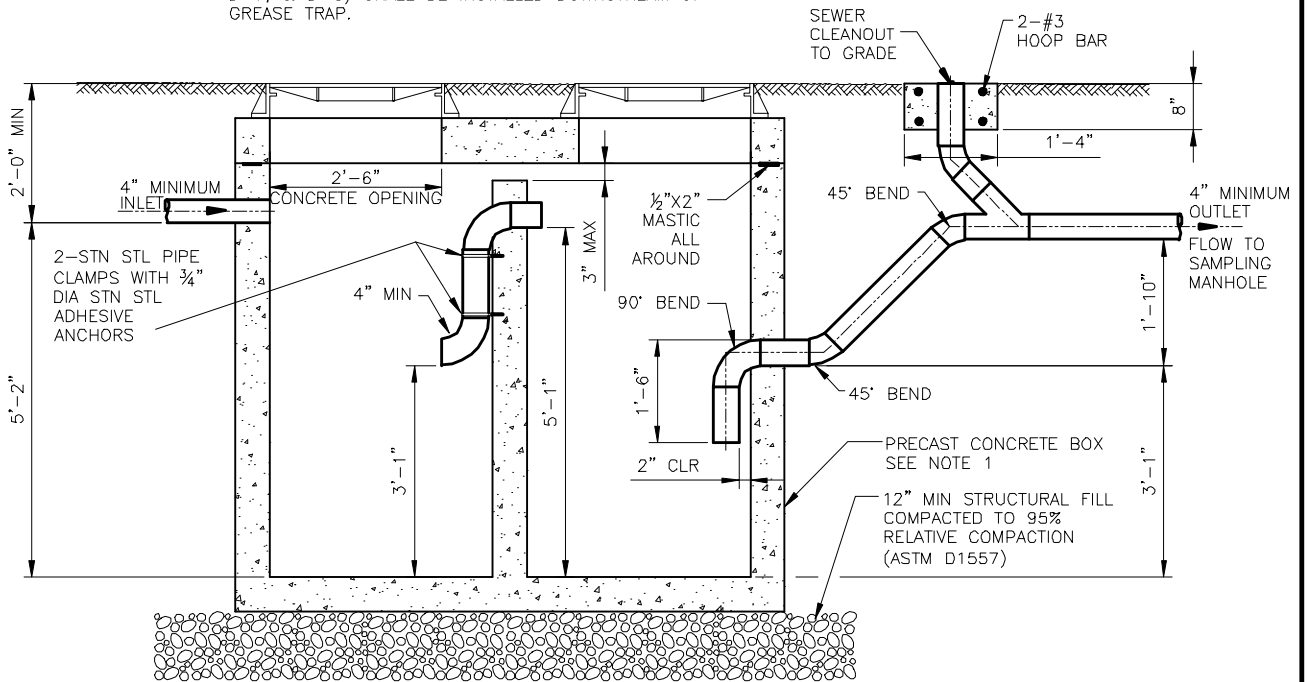
OUTSIDE DROP MANHOLE

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE:	FILE NAME:	DRAWING NAME:	
AUG 07		D-9	



PLAN

- NOTES:
1. THE SUPPLIER OF THE PRECAST BOX, SHALL DESIGN AND PROVIDE DRAWINGS AND CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF UTAH AND SUBMITTED TO TSSD FOR REVIEW.
 2. SUPPLIER SHALL COORDINATE WITH OWNER THE SIZE AND LOCATION OF ALL PIPE PENETRATIONS PRIOR TO FABRICATION.
 3. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
 4. SAMPLING MANHOLE (SEE STANDARD DETAILS D-6, D-7, & D-8) SHALL BE INSTALLED DOWNSTREAM OF GREASE TRAP.



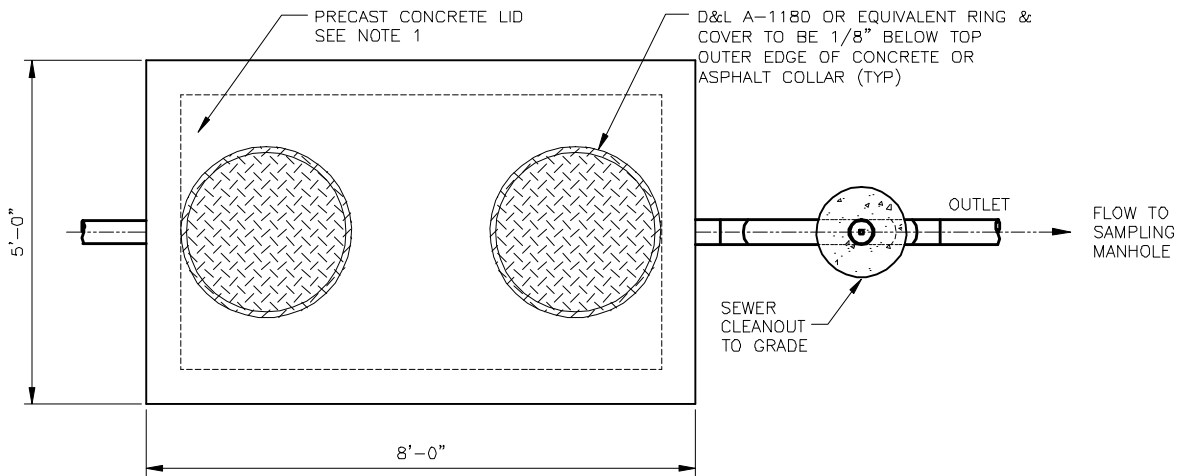
SECTION



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TIMPANOGOS SPECIAL SERVICES DISTRICT
1000 GALLON STANDARD GREASE TRAP

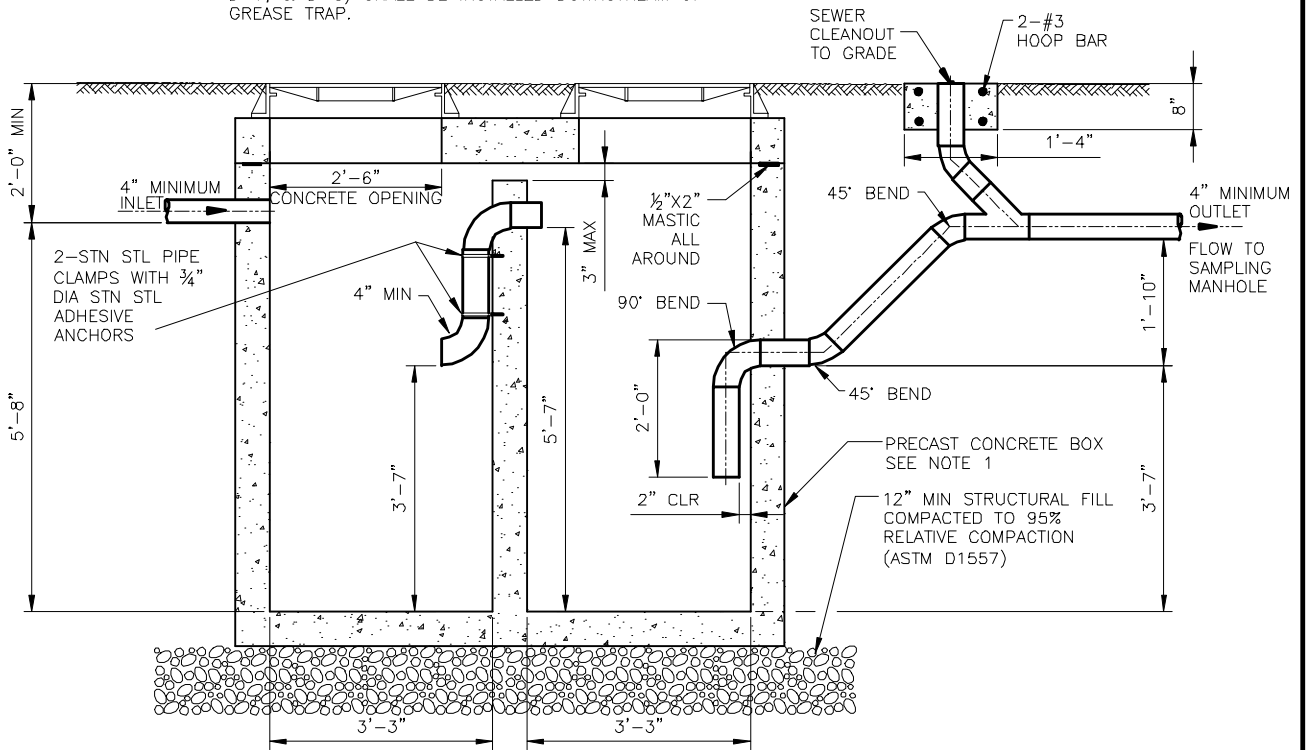
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AUG 07		D-10	



PLAN

NOTES:

1. THE SUPPLIER OF THE PRECAST BOX, SHALL DESIGN AND PROVIDE DRAWINGS AND CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF UTAH AND SUBMITTED TO TSSD FOR REVIEW.
2. SUPPLIER SHALL COORDINATE WITH OWNER THE SIZE AND LOCATION OF ALL PIPE PENETRATIONS PRIOR TO FABRICATION.
3. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
4. SAMPLING MANHOLE (SEE STANDARD DETAILS D-6, D-7, & D-8) SHALL BE INSTALLED DOWNSTREAM OF GREASE TRAP.



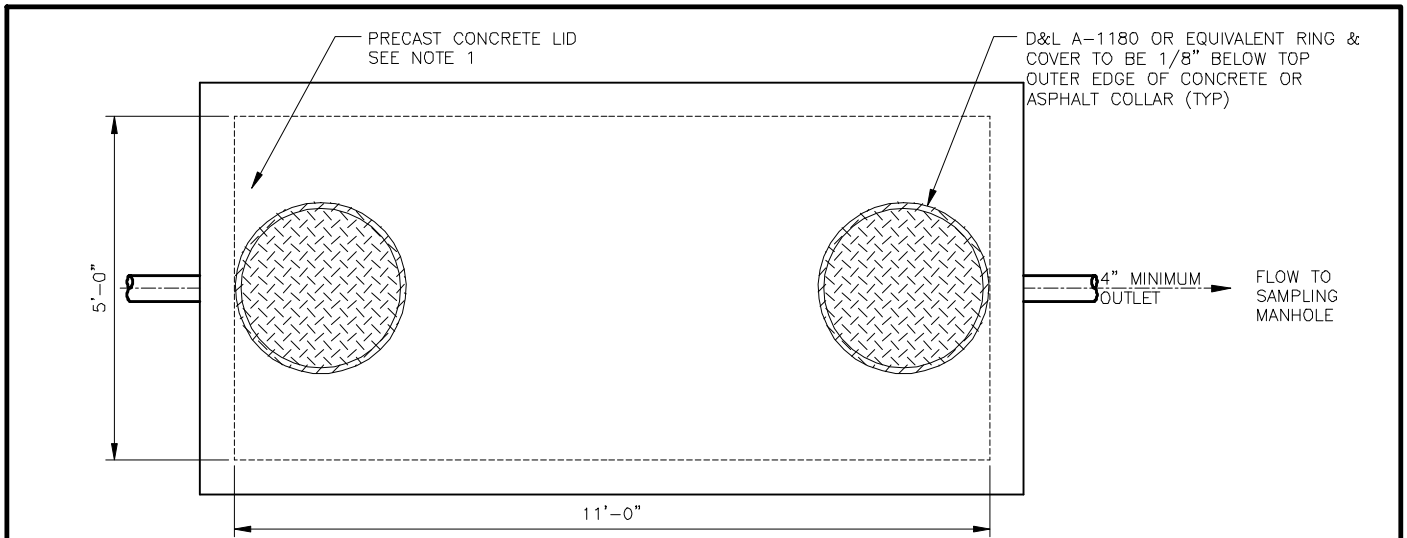
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TIMPANOGOS SPECIAL SERVICES DISTRICT
1200 GALLON STANDARD GREASE TRAP

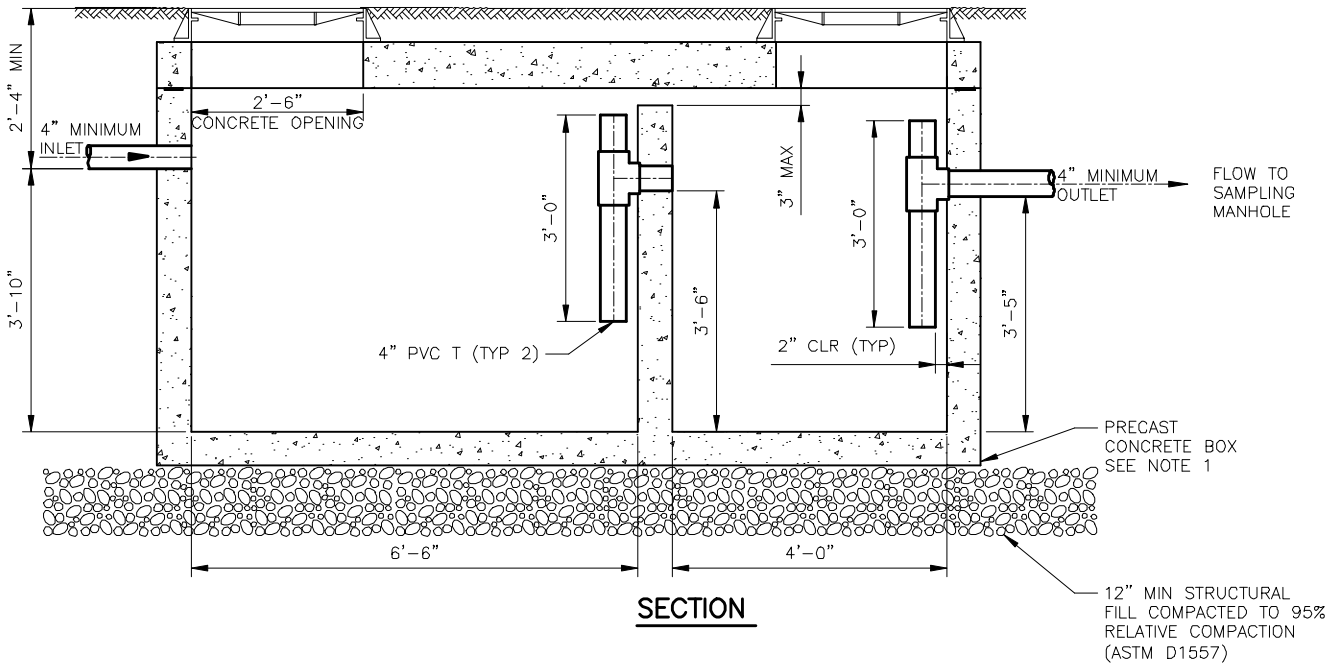
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AUG 07		D-11	



PLAN

NOTES:

1. THE SUPPLIER OF THE PRECAST BOX, SHALL DESIGN AND PROVIDE DRAWINGS AND CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF UTAH AND SUBMITTED TO TSSD FOR REVIEW.
2. SUPPLIER SHALL COORDINATE WITH OWNER THE SIZE AND LOCATION OF ALL PIPE PENETRATIONS PRIOR TO FABRICATION.
3. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
4. SAMPLING MANHOLE (SEE STANDARD DETAILS D-6, D-7, & D-8) SHALL BE INSTALLED DOWNSTREAM OF GREASE TRAP.



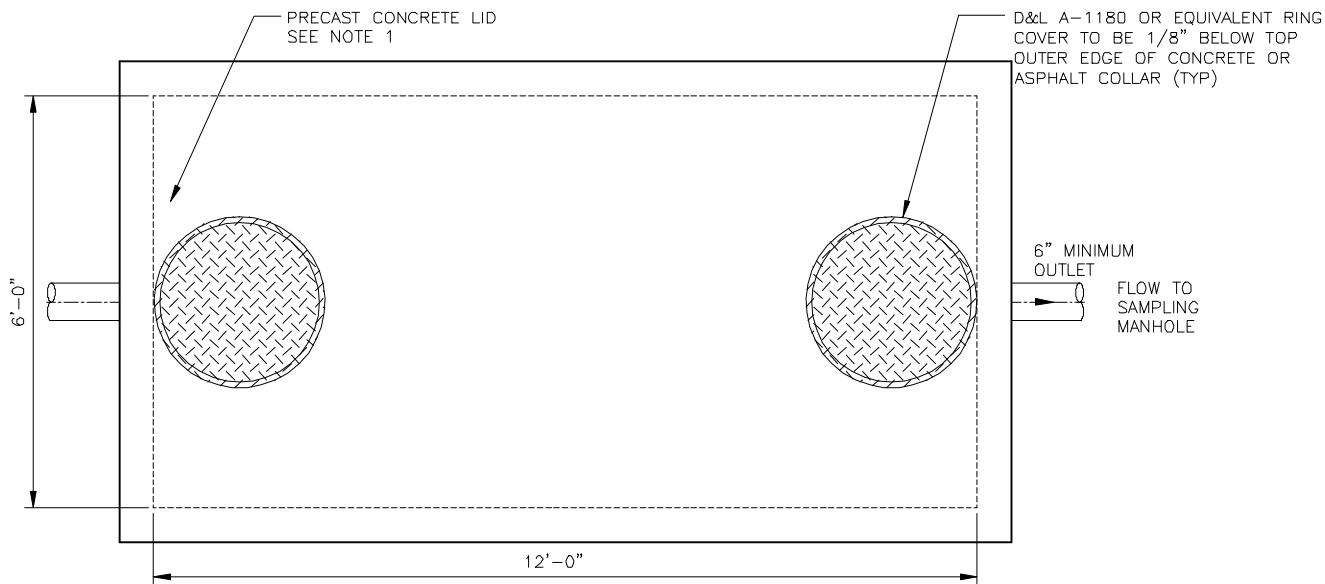
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TIMPANOGOS SPECIAL SERVICES DISTRICT
1500 GALLON STANDARD GREASE TRAP

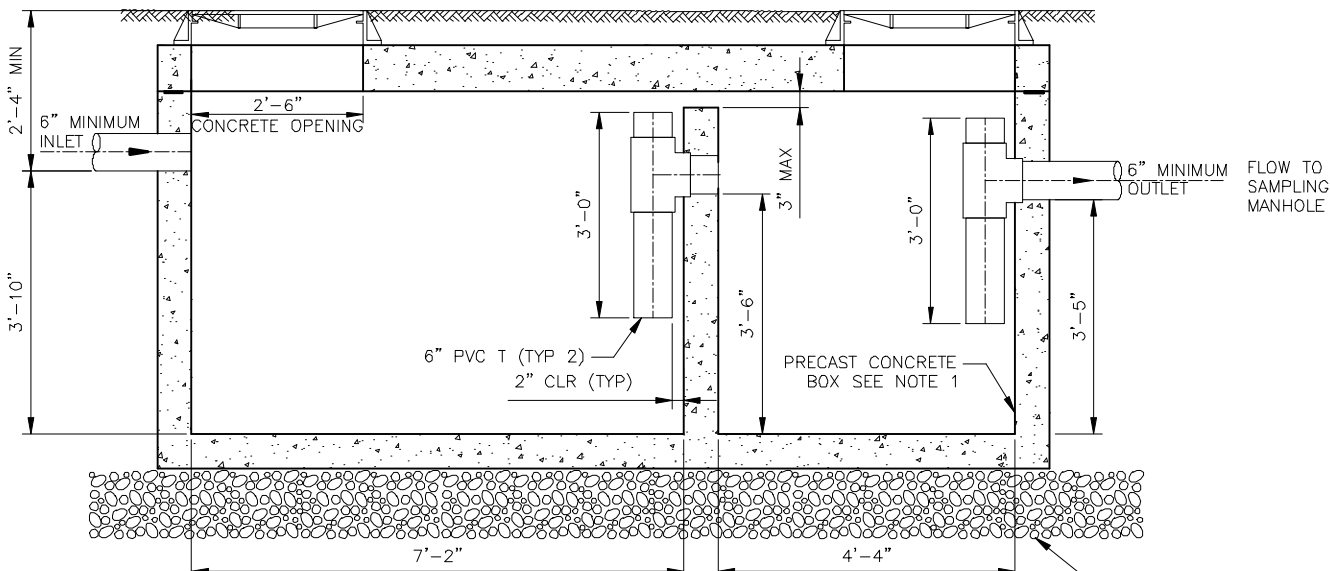
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AUG 07		D-12	



PLAN

NOTES:

1. THE SUPPLIER OF THE PRECAST BOX, SHALL DESIGN AND PROVIDE DRAWINGS AND CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF UTAH AND SUBMITTED TO TSSD FOR REVIEW.
2. SUPPLIER SHALL COORDINATE WITH OWNER THE SIZE AND LOCATION OF ALL PIPE PENETRATIONS PRIOR TO FABRICATION.
3. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
4. SAMPLING MANHOLE (SEE STANDARD DETAILS D-6, D-7, & D-8) SHALL BE INSTALLED DOWNSTREAM OF GREASE TRAP.



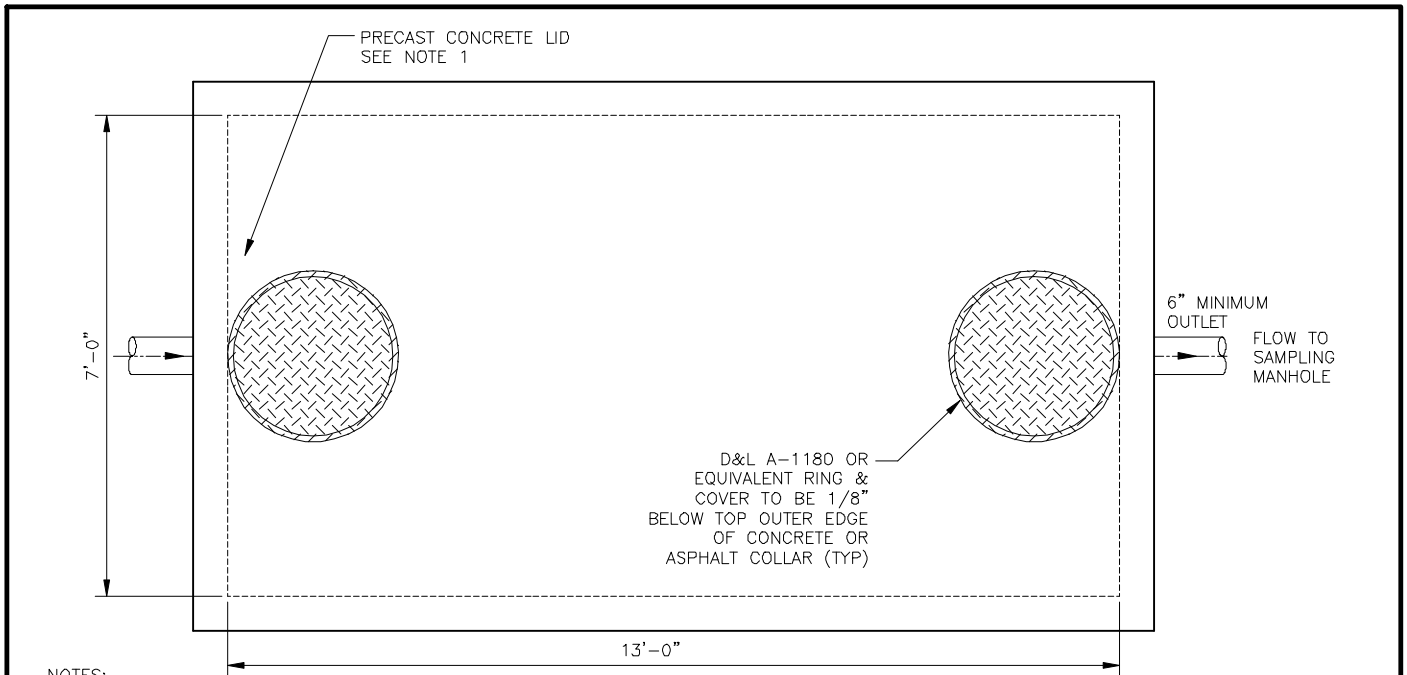
SECTION



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TIMPANOGOS SPECIAL SERVICES DISTRICT
2000 GALLON STANDARD GREASE TRAP

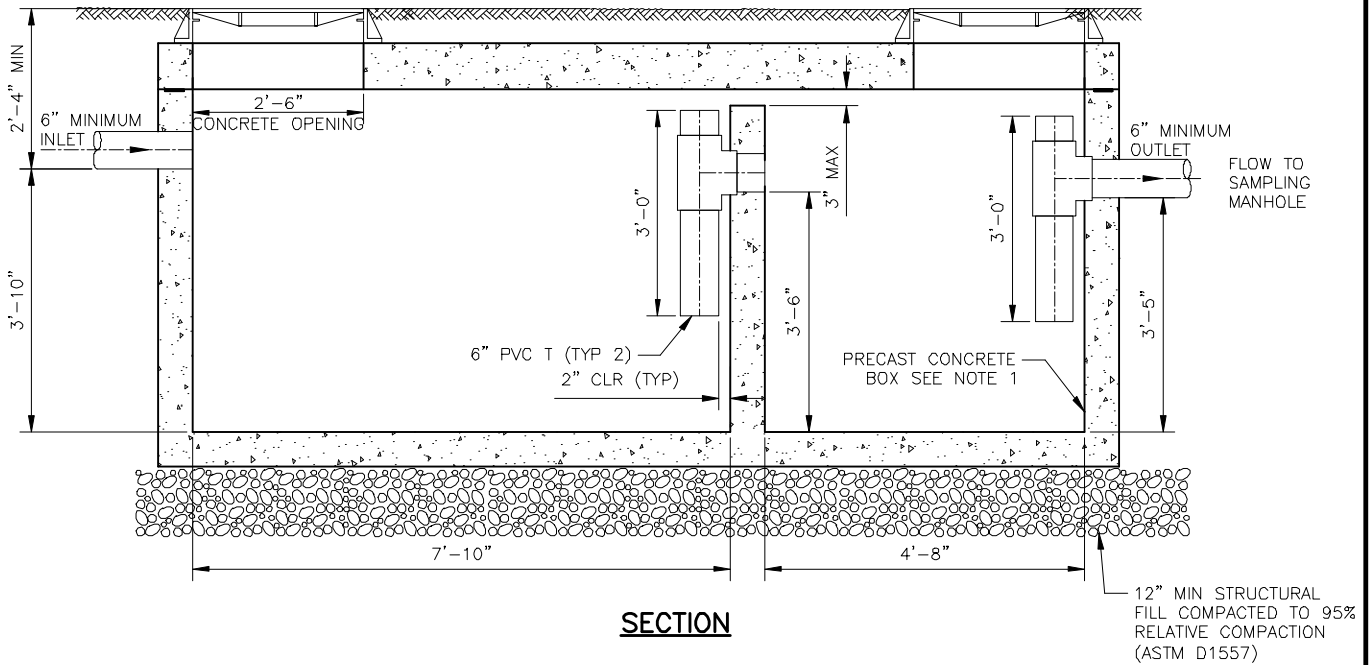
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AUG 07		D-13	



PLAN

NOTES:

1. THE SUPPLIER OF THE PRECAST BOX, SHALL DESIGN AND PROVIDE DRAWINGS AND CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF UTAH AND SUBMITTED TO TSSD FOR REVIEW.
2. SUPPLIER SHALL COORDINATE WITH OWNER THE SIZE AND LOCATION OF ALL PIPE PENETRATIONS PRIOR TO FABRICATION.
3. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
4. SAMPLING MANHOLE (SEE STANDARD DETAILS D-6, D-7, & D-8) SHALL BE INSTALLED DOWNSTREAM OF GREASE TRAP.



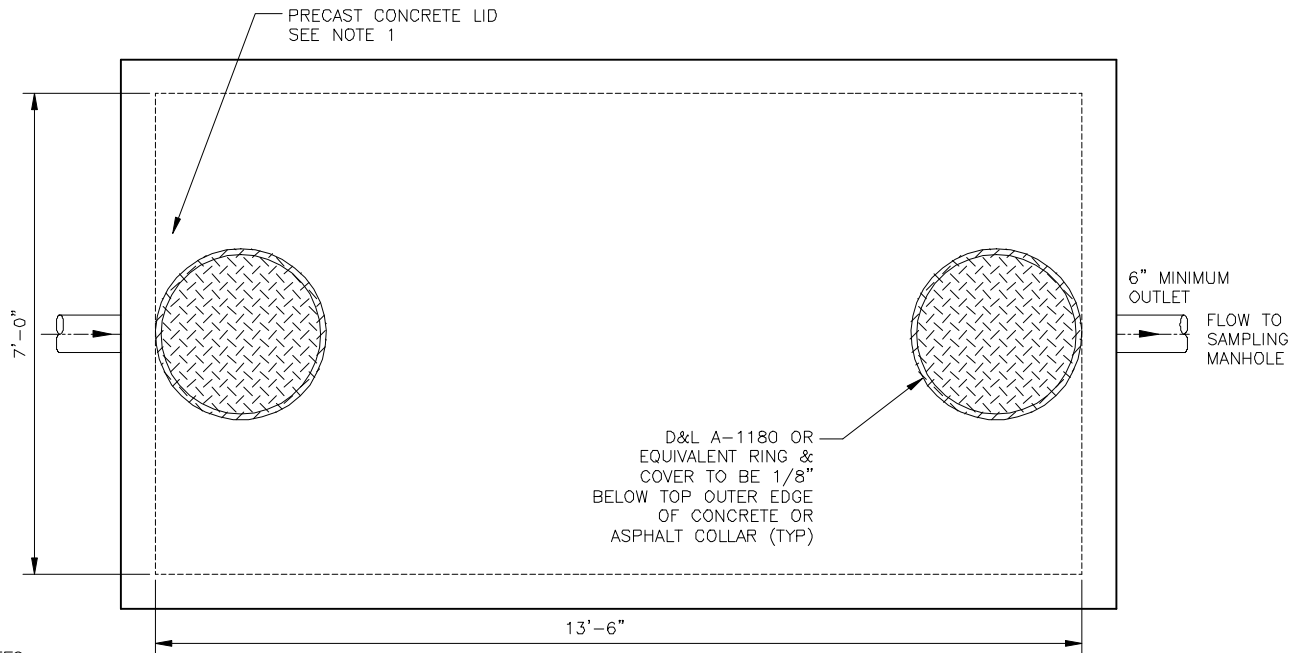
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TIMPANOGOS SPECIAL SERVICES DISTRICT
2500 GALLON STANDARD GREASE TRAP

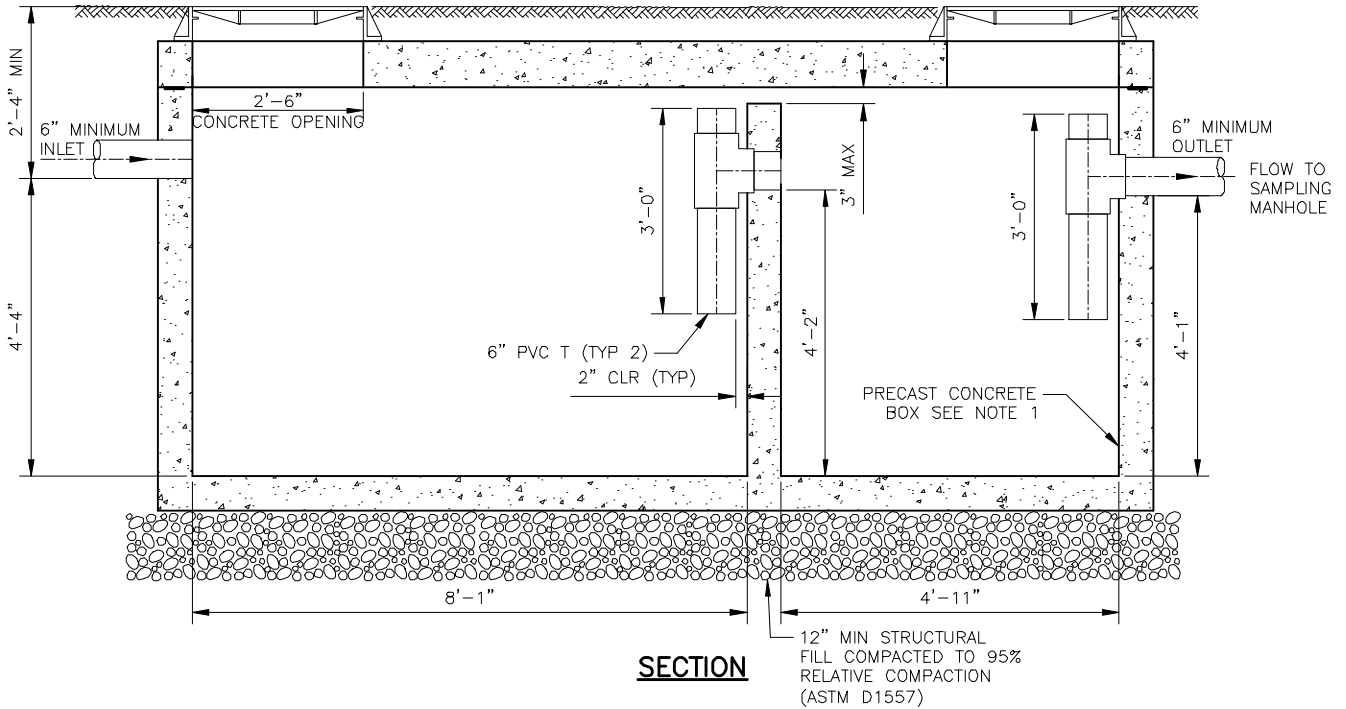
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AUG 07		D-14	



PLAN

NOTES:

1. THE SUPPLIER OF THE PRECAST BOX, SHALL DESIGN AND PROVIDE DRAWINGS AND CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF UTAH AND SUBMITTED TO TSSD FOR REVIEW.
2. SUPPLIER SHALL COORDINATE WITH OWNER THE SIZE AND LOCATION OF ALL PIPE PENETRATIONS PRIOR TO FABRICATION.
3. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
4. SAMPLING MANHOLE (SEE STANDARD DETAILS D-6, D-7, & D-8) SHALL BE INSTALLED DOWNSTREAM OF GREASE TRAP.



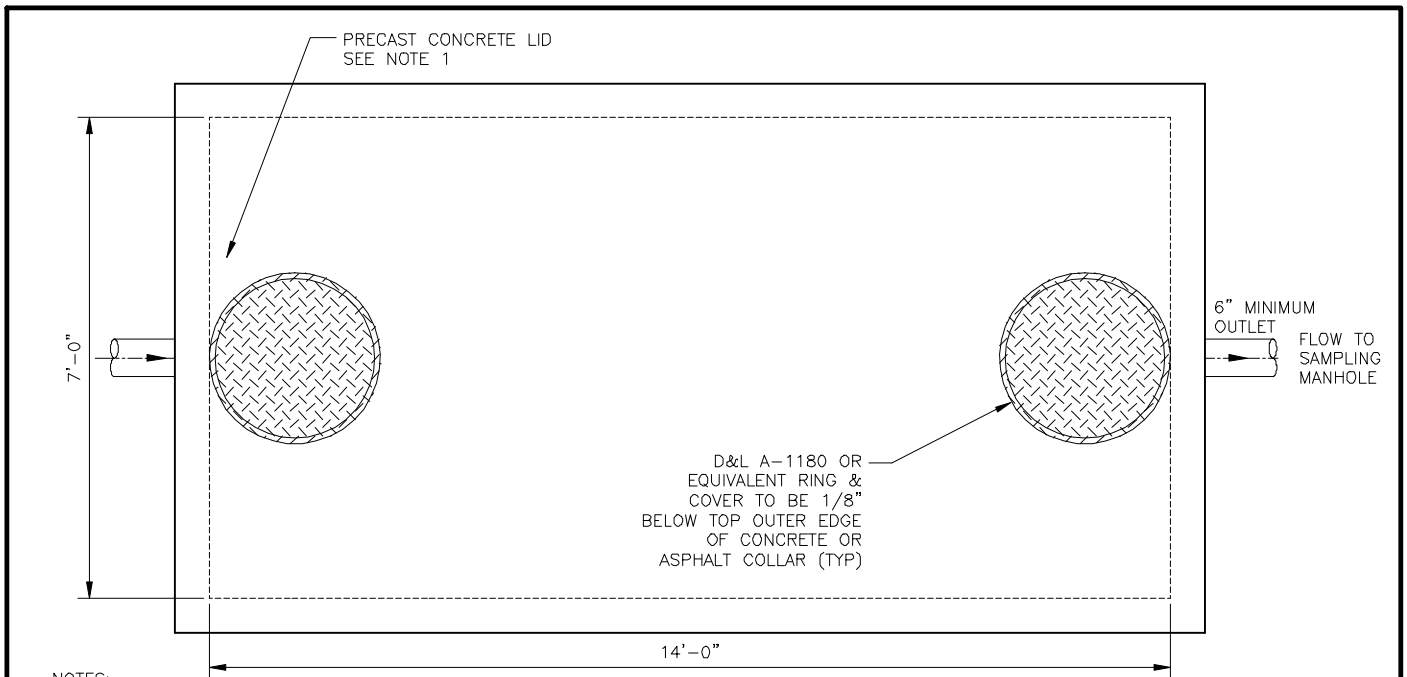
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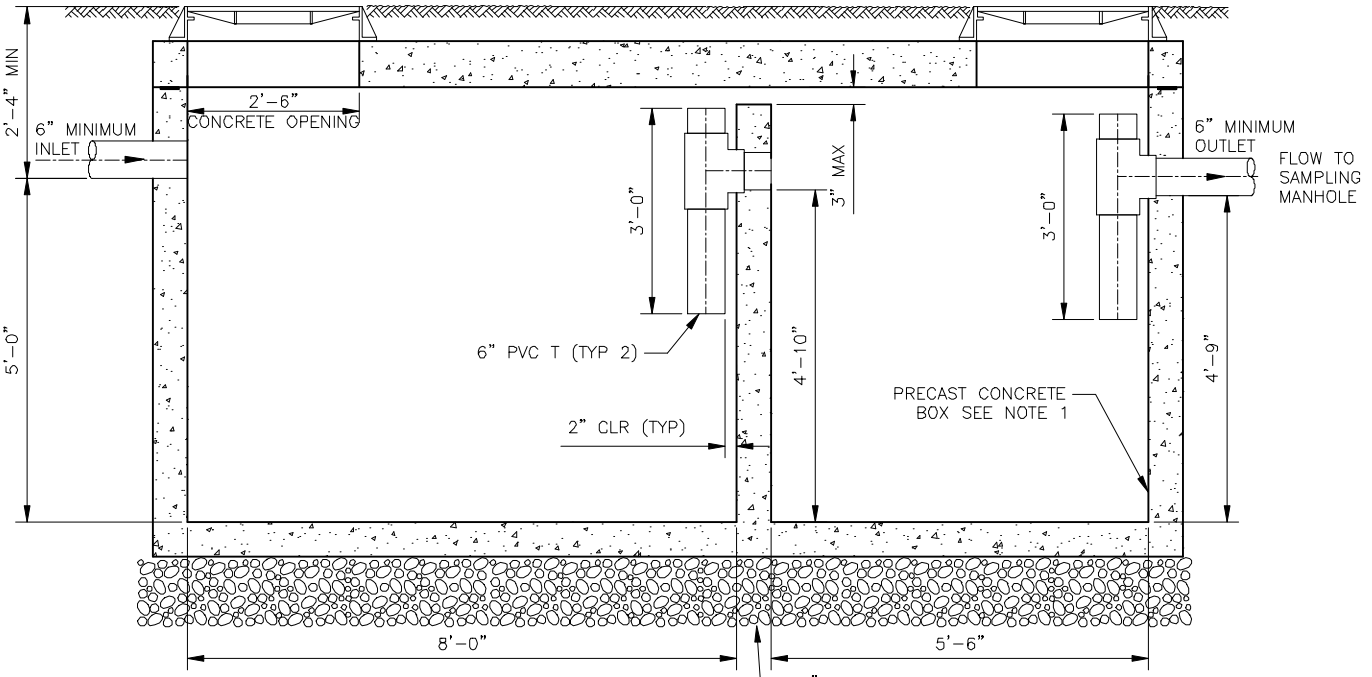
TIMPANOGOS SPECIAL SERVICES DISTRICT
3000 GALLON STANDARD GREASE TRAP

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE:	FILE NAME:	DRAWING NAME:	
AUG 07		D-15	



PLAN

- NOTES:
1. THE SUPPLIER OF THE PRECAST BOX, SHALL DESIGN AND PROVIDE DRAWINGS AND CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF UTAH AND SUBMITTED TO TSSD FOR REVIEW.
 2. SUPPLIER SHALL COORDINATE WITH OWNER THE SIZE AND LOCATION OF ALL PIPE PENETRATIONS PRIOR TO FABRICATION.
 3. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
 4. SAMPLING MANHOLE (SEE STANDARD DETAILS D-6, D-7, & D-8) SHALL BE INSTALLED DOWNSTREAM OF GREASE TRAP.



SECTION

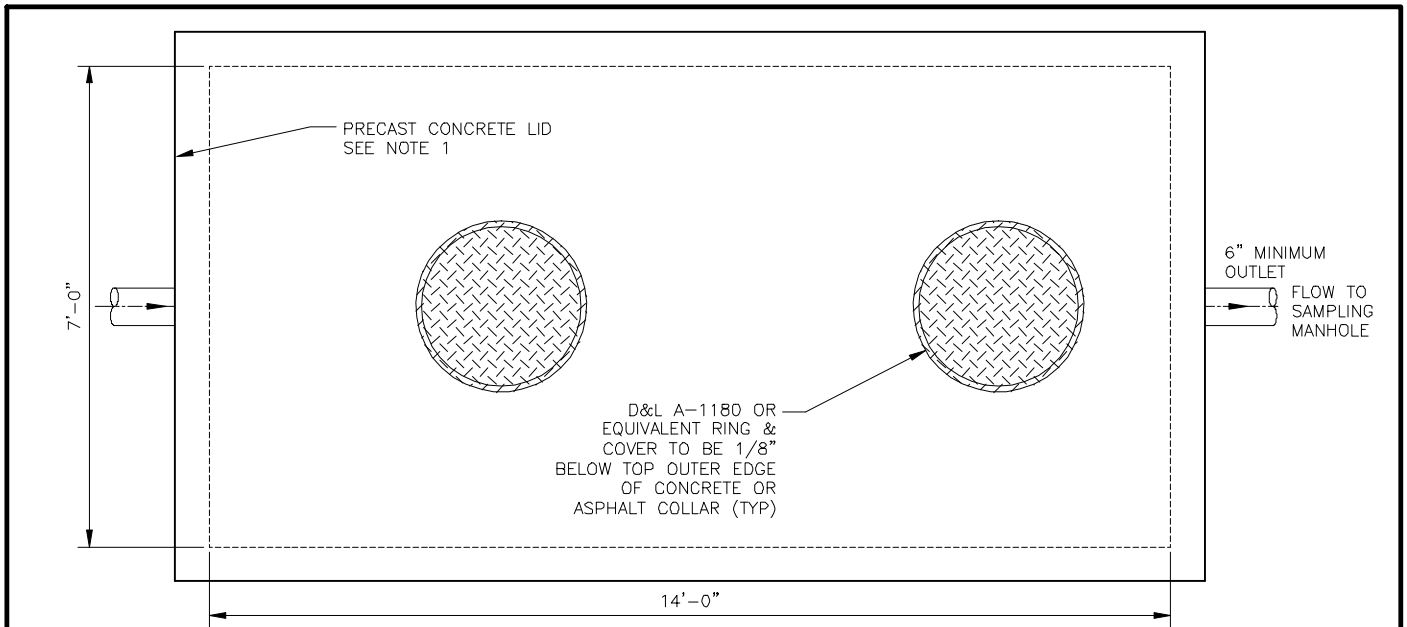
12" MIN STRUCTURAL FILL COMPACTED TO 95% RELATIVE COMPACTION (ASTM D1557)



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TIMPANOGOS SPECIAL SERVICES DISTRICT
3500 GALLON STANDARD GREASE TRAP

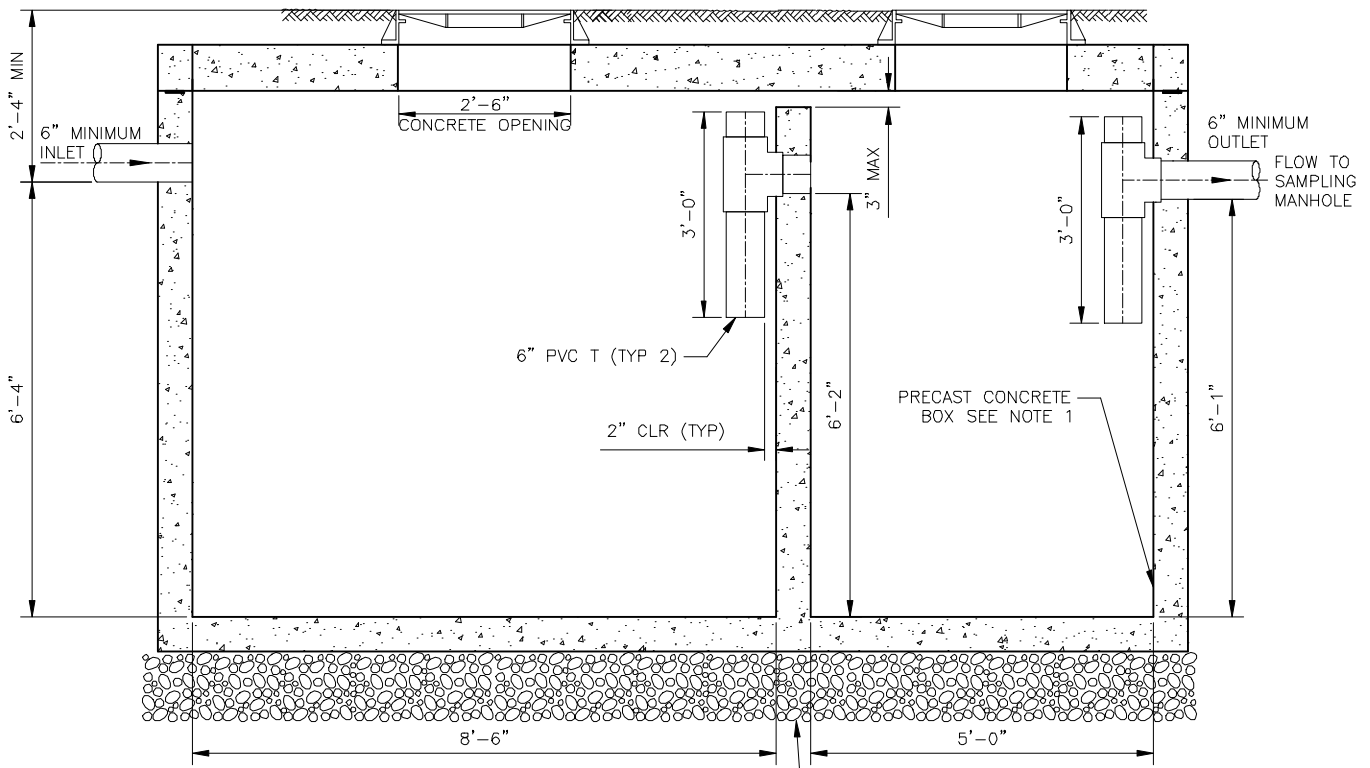
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AUG 07		D-16	



PLAN

NOTES:

1. THE SUPPLIER OF THE PRECAST BOX, SHALL DESIGN AND PROVIDE DRAWINGS AND CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF UTAH AND SUBMITTED TO TSSD FOR REVIEW.
2. SUPPLIER SHALL COORDINATE WITH OWNER THE SIZE AND LOCATION OF ALL PIPE PENETRATIONS PRIOR TO FABRICATION.
3. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
4. SAMPLING MANHOLE (SEE STANDARD DETAILS D-6, D-7, & D-8) SHALL BE INSTALLED DOWNSTREAM OF GREASE TRAP.



SECTION

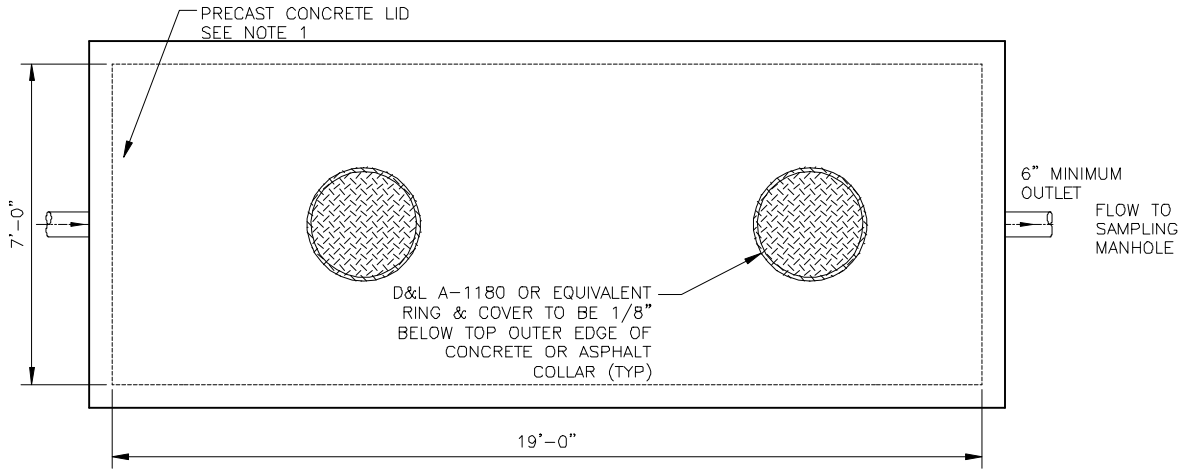
12" MIN STRUCTURAL
FILL COMPACTED TO 95%
RELATIVE COMPACTION
(ASTM D1557)



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NO	DATE	REVISION	BY	CHK	APP

**TIMPANOGOS SPECIAL
SERVICES DISTRICT**
4000 GALLON STANDARD
GREASE TRAP

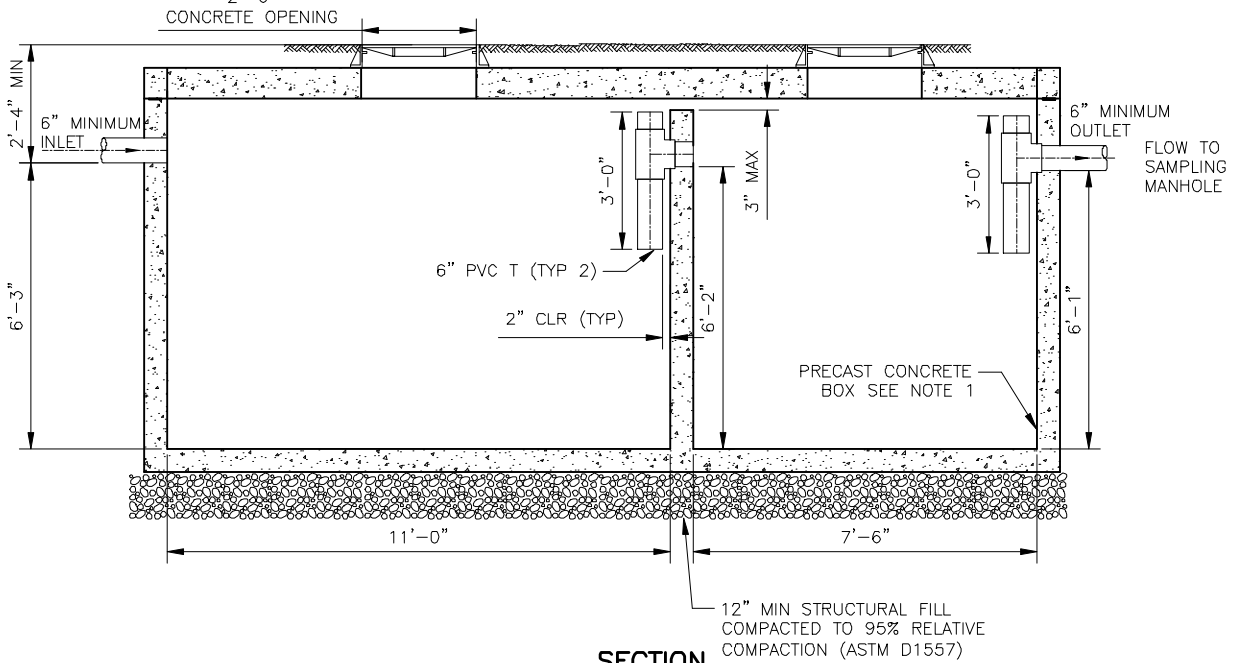
DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE:	FILE NAME:	DRAWING NAME:	
AUG 07		D-17	



PLAN

NOTES:

1. THE SUPPLIER OF THE PRECAST BOX, SHALL DESIGN AND PROVIDE DRAWINGS AND CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF UTAH AND SUBMITTED TO TSSD FOR REVIEW.
2. SUPPLIER SHALL COORDINATE WITH OWNER THE SIZE AND LOCATION OF ALL PIPE PENETRATIONS PRIOR TO FABRICATION.
3. CONTACT DISTRICT INSPECTOR 48 HOURS (2 BUSINESS DAYS) PRIOR TO CONSTRUCTION.
4. SAMPLING MANHOLE (SEE STANDARD DETAILS D-6, D-7, & D-8) SHALL BE INSTALLED DOWNSTREAM OF GREASE TRAP.



SECTION



5						
4						
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NO	DATE	REVISION	BY	CHK	APP	

TIMPANOGOS SPECIAL SERVICES DISTRICT
6000 GALLON STANDARD GREASE TRAP

DRAWN:	DESIGNED:	CHECKED:	APPROVED:
DATE:	FILE NAME:	DRAWING NAME:	
AUG 07		D-18	

APPENDIX

Application to Perform Work Affecting
Timpanogos Special Service District

and

TSSD Service Area and Sewer Outfall Line Map



Timpanogos Special Service District

PLEASANT GROVE ★ AMERICAN FORK ★ LEHI ★ ALPINE ★ HIGHLAND
 CEDAR HILLS ★ EAGLE MOUNTAIN ★ SARATOGA SPRINGS ★ SUN CREST

Telephone 756-5231 Fax 756-1472

Mailing Address: P.O. Box 923 — American Fork, Utah 84003

Job Site Address: Timpanogos Wastewater Treatment Plant — 6400 North 5050 West, Utah County, Utah

APPLICATION TO PERFORM WORK AFFECTING TIMPANOGOS SPECIAL SERVICE DISTRICT

Name of government entity applying:	Date:
Mailing address:	
Telephone number:	

Proposed project location:		
Type of construction (check and provide information below)		
New Manhole	<input type="checkbox"/>	Pipe size and material:
Tie to Existing Manhole	<input type="checkbox"/>	Pipe size and material:
Sewer Meter Vault (if required)	<input type="checkbox"/>	Flume size:
Sampling Manhole	<input type="checkbox"/>	
Grease Trap	<input type="checkbox"/>	
Other:	<input type="checkbox"/>	
Estimated date of construction:		
Proposed discharge flow (residential, commercial or industrial):		
Initial discharge flow (mgd):		Build-out discharge flow (mgd):
Drawings are attached (y/n):		Number of copies:

APPLICATION TO PERFORM WORK AFFECTING TIMPANOGOS SPECIAL SERVICE DISTRICT (continued)

Notes:

1. City shall pay the review and inspection fee of \$150, payable to TSSD, with the application for each project.
2. City shall notify the TSSD Inspector 48 hours (2 business days) prior to beginning construction. No work will be allowed on TSSD holidays or before or after normal working hours.
3. City warrants and guarantees for a period of one (1) year from the date of final acceptance of the sewer work that becomes TSSD property, that the work is free from all defects due to faulty materials or workmanship and that the City will promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the work resulting from such defects. TSSD will give notice of observed defects with reasonable promptness. In the event that the City should fail to make such repairs, adjustments, or other work that may be necessary by such defects, TSSD may do so and charge the City the cost thereby incurred.

City has reviewed and approves of the design and work presented. City warrants and guarantees the work as described in Note 3 above.

District Official

City Official

Title

Title

Name of Developer:	Project Manager:
Mailing Address:	Cell Phone Number:
Phone Number:	
Fax Number:	

Name of Contractor:	Project Manager:
Mailing Address:	Cell Phone Number:
	Site Manager:
Phone Number:	Cell Phone Number:
Fax Number:	



Timpanogos Special Service District

PLEASANT GROVE ★ AMERICAN FORK ★ LEHI ★ ALPINE ★ HIGHLAND
CEDAR HILLS ★ EAGLE MOUNTAIN ★ SARATOGA SPRINGS ★ SUN CREST

Telephone 756-5231 Fax 756-1472

Mailing Address: P.O. Box 923 — American Fork, Utah 84003

Job Site Address: Timpanogos Wastewater Treatment Plant — 6400 North 5050 West, Utah County, Utah

APPLICATION TO ACTIVATE CONNECTION TO TIMPANOGOS SPECIAL SERVICE DISTRICT

Name of government entity applying:	Date:
Mailing address:	
Telephone number:	

Location of connection to be activated:	
Estimated date of connection activation:	
Proposed discharge (residential, commercial or industrial):	
Initial discharge flow (mgd):	Build-out discharge flow (mgd):
Drawings are attached (y/n):	Number of copies:

- Notes: 1. City shall notify the TSSD Inspector 48 hours (2 business days) prior to beginning construction. No work will be allowed on TSSD holidays or before or after normal working hours.
2. City has reviewed and approves of the design and work presented.

District Official

City Official

Title

Title

**APPLICATION TO ACTIVATE CONNECTION TO
TIMPANOGOS SPECIAL SERVICE DISTRICT
(continued)**

Name of Developer:	Project Manager:
Mailing Address:	Cell Phone Number:
Phone Number:	
Fax Number:	

Name of Contractor:	Project Manager:
Mailing Address:	Cell Phone Number:
	Site Manager:
Phone Number:	Cell Phone Number:
Fax Number:	

