SECTION 221353 - FACILITY SEPTIC TANKS

TIPS:

To view non-printing Editor's Notes that provide guidance for editing, click on MasterWorks/Single-File Formatting/Toggle/Editor's Notes.

To read detailed research, technical information about products and materials, and coordination checklists, click on MasterWorks/Supporting Information.

Content Requests:

Revise this Section by deleting and inserting text to meet Project-specific requirements.

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
   * + 1. RELATED DOCUMENTS

Retain or delete this article in all Sections of Project Manual.

* + - * 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
      1. SUMMARY
         1. Section Includes:

Septic tanks.

Dosing tanks.

Distribution boxes.

Pipe and fittings.

Absorption systems.

* + - 1. ACTION SUBMITTALS
         1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
         2. Manufacturer’s installation instructions shall be provided along with product data.
         3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
         4. Product Data: For each type of product indicated.

Include construction details, material descriptions, dimensions of individual components, and profiles.

Include manhole openings, covers, and pipe connections.

* + - * 1. Shop Drawings: For [**trench absorption systems**] [**bed absorption systems**] [**mound absorption systems**] [**seepage pits**].

Include manhole openings, covers, pipe connections, and accessories.

Include piping with sizes and invert elevations.

Include underground structures.

Include other utilities.

* + - 1. PROJECT CONDITIONS

Retain paragraph below if interruption of existing sanitary sewerage service is required.

* + - * 1. Interruption of Existing Septic Tank System Service: Do not interrupt service to facilities occupied by OwnerDirector’s Representative or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

Notify [**Architect**] [**Construction Manager**] [**OwnerDirector’s Representative**] no fewer than [**two**] <**Insert number**> days in advance of proposed interruption of service.

Do not proceed with interruption of service without [**Architect's**] [**Construction Manager's**] [**OwnerDirector’s Representative's**] written permission.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

* + - 1. CONCRETE SEPTIC TANKS
         1. Description: ASTM C1227 “Standard Specification for Precast Concrete Septic Tanks”, precast, reinforced-concrete tank and covers; [**single chamber**] [**single chamber with internal baffle**] [**two chambers**].

Verify availability of retained option in first paragraph below.

* + - * 1. Design: For [**A-8 (H10-44)**] [**A-12 (HS15-44)**] [**A-16 (HS20-44)**] traffic loading according to ASTM C890 “Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures”.

Verify availability of retained option in first paragraph below.

* + - * 1. Manholes: [**20-inch- (508-mm-)**] [**22-inch- (559-mm-)**] [**24-inch- (610-mm-)**] <**Insert size**> minimum diameter opening with reinforced-concrete risers to grade and access lid with steel lift rings. Include manhole in center of each septic tank compartment top.

Filter access in first paragraph below is an optional component.

* + - * 1. Filter Access: Reinforced-concrete access hole, large enough to remove filter, over filter position.
        2. Inlet and Outlet Access: [**12-inch (305-mm)**] <**Insert size**> minimum diameter, reinforced-concrete access lids with steel lift rings. Include access centered over inlet and outlet.

Resilient connectors in first paragraph below are optional components.

* + - * 1. Resilient Connectors: ASTM C923 (ASTM C923M), of size required for piping, fitted into inlet and outlet openings.

If more than one septic tank is required on Project, delete paragraph and subparagraphs below and schedule septic tanks on Drawings.

* + - * 1. Capacity and Characteristics:

Capacity: <**Insert gal. (L)**>.

Inlet and Outlet Size: <**Insert NPS (DN)**>.

* + - 1. FIBERGLASS SEPTIC TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2255) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Containment Solutions, Inc](http://www.specagent.com/Lookup?uid=123457132490).

[Xerxes by Shawcor Ltd](http://www.specagent.com/Lookup?uid=123457132491).

Approved equivalent.

* + - * 1. Description: UL 1316, single chamber, FRP construction; fabricated for septic tank application with at least one access riser and manhole.

Verify availability of retained option in first paragraph below. Access for PE septic tanks is usually small.

* + - * 1. Manholes: [**22-inch- (559-mm-)**] [**24-inch- (610-mm-)**] <**Insert size**> minimum diameter opening with FRP access risers to grade and cover.

Filter access in first paragraph below is an optional component.

* + - * 1. Filter Access: Include access hole, large enough to remove filter, over filter position.

Resilient connectors in first paragraph below are optional components.

* + - * 1. Resilient Connectors: ASTM C923 (ASTM C923M) or other watertight seal, of size required for piping, fitted into inlet and outlet openings.

If more than one septic tank is required on Project, delete paragraph and subparagraphs below and schedule septic tanks on Drawings.

* + - * 1. Capacity and Characteristics:

Capacity: <**Insert gal. (L)**>.

Inlet and Outlet Size: <**Insert NPS (DN)**>.

* + - 1. POLYETHYLENE SEPTIC TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2256) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Chem-Tainer Industries](http://www.specagent.com/Lookup?uid=123457132480).

[Norwesco, Inc](http://www.specagent.com/Lookup?uid=123457132481).

[Plastic-Mart, Inc](http://www.specagent.com/Lookup?uid=123457132482).

[Premier Plastics Inc](http://www.specagent.com/Lookup?uid=123457132483).

[Premier Tech Environment](http://www.specagent.com/Lookup?uid=123457132484).

Approved equivalent.

Retain one of three options in first paragraph below. Retain one of first two options for single-chamber tanks and third option for two-chamber tanks. Verify that tanks with baffle are available before retaining option in first paragraph below.

* + - * 1. Description: Molded, HDPE or PE construction; fabricated for septic tank application; [**single chamber**] [**single chamber with baffle and at least one access riser and manhole**] [**two chambers each with an access riser and manhole**].

Verify availability of retained option in first paragraph below. Access for PE septic tanks is usually small.

* + - * 1. Manholes: [**18-inch- (457-mm-)**] [**20-inch- (508-mm-)**] [**22-inch- (559-mm-)**] <**Insert size**> minimum diameter opening with HDPE or PE access risers to grade and cover.

Filter access in first paragraph below is an optional component.

* + - * 1. Filter Access: Include access hole, large enough to remove filter, over filter position.

Resilient connectors in first paragraph below are optional components.

* + - * 1. Resilient Connectors: ASTM C923 (ASTM C923M) or other watertight seal, of size required for piping, fitted into inlet and outlet openings.

If more than one septic tank is required on Project, delete paragraph and subparagraphs below and schedule septic tanks on Drawings.

* + - * 1. Capacity and Characteristics:

Capacity: <**Insert gal. (L)**>.

Inlet and Outlet Size: <**Insert NPS (DN)**>.

* + - 1. FILTERS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2258) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Premier Tech Environment](http://www.specagent.com/Lookup?uid=123457132486).

[Tuf-Tite Corporation](http://www.specagent.com/Lookup?uid=123457132487).

[Zabel Industries International, Ltd](http://www.specagent.com/Lookup?uid=123457132488).

Approved equivalent.

Filters in this article are not usually required; retain only if required. Filter units below are for NPS 4 (DN 100) inlet and outlet. They are available with housings in at least 4-, 8-, and 12-inch (102-, 203-, and 305-mm) diameter sizes.

* + - * 1. Description: Removable, septic-tank-outlet filter that restricts discharge solids to 1/8 inch (3.2 mm).
        2. Housing: HDPE or PVC.
        3. Outlet Size: [**NPS 4 (DN 100)**] [**NPS 6 (DN 150)**] <**Insert NPS (DN)**>.
      1. DOSING TANKS

Retain this article only if a dosing tank is required.

* + - * 1. Description: Comply with ASTM C913 for precast, reinforced-concrete tank and cover; designed for structural loading according to ASTM C890.
        2. Design: For [**effluent pump**] [**automatic siphon**] installation and [**A-8 (H10-44)**] [**A-12 (HS15-44)**] [**A-16 (HS20-44)**] traffic loading according to ASTM C890.

Verify availability of retained option in first paragraph below.

* + - * 1. Manholes: [**20-inch- (508-mm-)**] [**22-inch- (559-mm-)**] [**24-inch- (610-mm-)**] <**Insert size**> minimum diameter opening with reinforced-concrete risers to grade and access lid with steel lift rings. Include manhole in center of each septic tank compartment top.

Resilient connectors in first paragraph below are optional components.

* + - * 1. Resilient Connectors: ASTM C923 (ASTM C923M)or other watertight seal, of size required for piping, fitted into inlet and outlet openings.

If more than one dosing tank is required on Project, delete paragraph and subparagraphs below and schedule tanks on Drawings.

* + - * 1. Capacity and Characteristics:

Capacity: <**Insert gal. (L)**>.

Inlet and Outlet Size: <**Insert NPS (DN)**>.

* + - 1. AUTOMATIC SIPHONS

Retain this article only if a dosing tank is required and effluent pumps are not used.

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2259) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[American Manufacturing Company, Inc](http://www.specagent.com/Lookup?uid=123457132492).

[Fluid Dynamic Siphons, Inc](http://www.specagent.com/Lookup?uid=123457132493).

[Zabel Industries International, Ltd](http://www.specagent.com/Lookup?uid=123457132494).

Approved equivalent.

* + - * 1. Description: Manufactured siphon assembly of molded-HDPE trap, pipe, and bell, with PVC vent piping and stainless-steel bolts.

If more than one automatic siphon is required on Project, delete paragraph and subparagraphs below and schedule siphons on Drawings.

* + - * 1. Capacity and Characteristics:

Number Required: [**One**] [**Two**].

Capacity of Each: <**Insert gpm (L/s)**>.

Effluent Outlet Size: <**Insert NPS (DN)**>.

* + - 1. CONCRETE DISTRIBUTION BOXES
         1. Description: Precast concrete, single-chamber box and cover.

Baffle option in first paragraph below is not required for gravity flow.

* + - * 1. Design: Made according to ASTM C913 “Standard Specification for Precast Concrete Water and Wastewater Structures”, and for [**A-8 (H10-44)**] [**A-12 (HS15-44)**] [**A-16 (HS20-44)**] traffic loading according to ASTM C890 “Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures” .[**Include baffle opposite inlet**].
        2. Manholes: [**20-inch- (508-mm-)**] [**22-inch- (559-mm-)**] [**24-inch- (610-mm-)**] <**Insert size**> minimum diameter opening with reinforced-concrete risers to grade and cover with steel lift rings in center of distribution box cover.
        3. Resilient Connectors: ASTM C923 (ASTM C923M), of size required for piping, fitted into inlet and outlet openings. Include watertight plugs in outlets not required.

If more than one distribution box is required on Project, delete paragraph and subparagraphs below and schedule distribution boxes on Drawings.

* + - * 1. Capacity and Characteristics

Inlet Size: <**Insert NPS (DN)**>.

Number of Outlets: [**Two**] [**Three**] [**Four**] <**Insert number**>.

Outlet Size: <**Insert NPS (DN)**>.

* + - 1. PLASTIC DISTRIBUTION BOXES

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2261) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[American Manufacturing Company, Inc](http://www.specagent.com/Lookup?uid=123457132495).

[Premier Plastics Inc](http://www.specagent.com/Lookup?uid=123457132496).

[Tuf-Tite Corporation](http://www.specagent.com/Lookup?uid=123457132497).

[Zabel Industries International, Ltd](http://www.specagent.com/Lookup?uid=123457132498).

Approved equivalent.

* + - * 1. Description: Molded-HDPE or -PE, single-chamber box and cover.

Retain one of first two paragraphs below. Access may be a removable plastic cover and is usually small.

Verify availability of retained option in first paragraph below.

* + - * 1. Manholes: [**18-inch- (457-mm-)**] [**20-inch- (508-mm-)**] [**22-inch- (559-mm-)**] <**Insert size**> minimum diameter opening with HDPE or PE access risers to grade and cover. Access for PE distribution boxes may be a removable plastic cover and is usually small.
        2. Manholes: Manufacturer's standard cover or other access opening of size that permits access to distribution-box inlet and outlets.
        3. Pipe Connections: With seal that prevents leakage. Include watertight plugs in outlets not required.

If more than one distribution box is required on Project, delete paragraph and subparagraphs below and schedule distribution boxes on Drawings.

* + - * 1. Capacity and Characteristics:

Inlet Size: <**Insert NPS (DN)**>.

Number of Outlets: [**Two**] [**Three**] [**Four**] <**Insert number**>.

Outlet Size: <**Insert NPS (DN)**>.

Retain one of first two articles below for leaching piping with a perforated wall and loose joints. This piping is installed downstream from the distribution box and throughout the absorption system (leachfield).

* + - 1. PE DISTRIBUTION PIPE AND FITTINGS
         1. Tube and Fittings: ASTM F405 “Standard Specification for Corrugated Polyethylene (PE) Pipe and Fittings”, perforated corrugated tube with solid-wall fittings.
         2. Couplings: PE band, matching tube and fitting dimensions.
      2. PVC DISTRIBUTION PIPE AND FITTINGS
         1. Pipe and Fittings: ASTM D2729 “Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings”, perforated, for solvent-cemented joints.
         2. Solvent Cement: ASTM D2564 “Standard Specification for Solvent Cements for Poly (Vinyl Chloride) Plastic Piping Systems”. Include primer according to ASTM F656 “Standard Specification for Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) Plastic Pipe and Fittings”.
      3. NONPRESSURE PIPE COUPLINGS
         1. Description: Comply with ASTM C1173 “Standard Specification for Flexible Transition Couplings for Underground Piping Systems”, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, with corrosion-resistant-metal tension band and tightening mechanism on each end.

Sleeve Materials for Plastic Pipes: ASTM F477 “Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe”, elastomeric seal or ASTM D5926 “Standard Specification for Poly (Vinyl Chloride) (PVC) Gaskets for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems”, PVC.

Sleeve Materials for Dissimilar Pipes: ASTM D5926 “Standard Specification for Poly (Vinyl Chloride) (PVC) Gaskets for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems”, PVC or other material compatible with pipe materials being joined.

* + - 1. [**TRENCH**] [**BED**] ABSORPTION-SYSTEM MATERIALS
         1. Filter Material: ASTM D448 “Standard Classification for Sizes of Aggregate for Road and Bridge Construction”, Size No. 24, 3/4 to 2-1/2 inches (19 to 63 mm), washed, crushed stone or gravel; or broken, hard-burned clay brick.
         2. Filter Mat: [**Geotextile woven or spun filter fabric, in one or more layers, for minimum total unit weight of 3 oz./sq. yd. (101 g/sq. m)**] [**Untreated building paper or similar porous material**].
         3. Cover for Distribution Pipe: Geotextile woven filter fabric, in one or more layers, for minimum total unit weight of 3 oz./sq. yd. (101 g/sq. m).
         4. Fill Material: Soil removed from trench.
      2. MOUND ABSORPTION-SYSTEM MATERIALS
         1. Sand-Filter Material: 25 percent or more of very coarse, coarse, or medium sand or combination; maximum of 50 percent fine or very fine sand or combination; and silt and clay combination not to exceed 25 percent. If clay exceeds 60 percent in combination with silt, mixture cannot exceed 15 percent of sand-filter material.
         2. Aggregate-Filter Material: Coarse, 1/2 to 2-1/2 inches (13 to 63 mm).
         3. Cap: Clay, silt, or combination of clay and silt.
         4. Topsoil: Good quality, free of stones, metal, and glass.
         5. Vegetation Cover: Grass compatible with adjacent ground cover. No shrubs or trees.
         6. Filter Mat: [**Geotextile woven or spun filter fabric, in one or more layers, for minimum total unit weight of 3 oz./sq. yd. (101 g/sq. m)**] [**Untreated building paper or similar porous material**].
         7. Cover for Distribution Pipe: Geotextile woven filter fabric, in one or more layers, for minimum total unit weight of 3 oz./sq. yd. (101 g/sq. m).
      3. CHAMBER ABSORPTION-SYSTEM MATERIALS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=2263) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Advanced Drainage Systems, Inc](http://www.specagent.com/Lookup?uid=123457132499).

[CULTEC, Inc](http://www.specagent.com/Lookup?uid=123457132500).

[Hancor Inc](http://www.specagent.com/Lookup?uid=123457132501).

[Infiltrator Systems Inc](http://www.specagent.com/Lookup?uid=123457132502).

Approved equivalent.

* + - * 1. Chamber: Arched, molded-PE structures with solid top, perforated sides, open ends, and open bottom.
        2. End Pieces: Blank without opening for distribution pipe at end of last chamber in row, and with opening for distribution pipe where pipe penetrates chamber.

Retain first paragraph below to run piping through chambers to improve distribution.

* + - * 1. Effluent Distribution Piping: PE or PVC pipe, with holes or slots along pipe, attached to underside of top of chambers.

If more than one leaching chamber is required on Project, delete paragraph and subparagraphs below and schedule chambers on Drawings.

* + - * 1. Capacity and Characteristics:

Total System Storage Capacity: <**Insert gal. (L or cu. m)**>.

Retain subparagraph below only if required.

Effluent Distribution Piping Size: <**Insert NPS (DN)**>.

* + - 1. SEEPAGE-PIT ABSORPTION-SYSTEM MATERIALS
         1. Pit Lining: ASTM C62 “Standard Specification for Building Brick (Solid Masonry Units Made Fromfrom Clay or Shale)”, Type SW, clay bricks; ASTM C55 “Standard Specification for Concrete Building Brick”, concrete bricks; ASTM C90 “Standard Specification for Loadbearing Concrete Masonry Units”, hollow, concrete masonry units; or precast concrete rings with notches or weep holes.
         2. Filter Material: ASTM D448 “Standard Classification for Sizes of Aggregate for Road and Bridge Construction”, Size No. 24, 3/4 to 2-1/2 inches (19 to 63 mm), washed, crushed stone or gravel; or broken, hard-burned clay brick.
         3. Cover: Precast concrete slab; designed for [**A-8 (H10-44)**] [**A-12 (HS15-44)**] [**A-16 (HS20-44)**] traffic loading according to ASTM C890 “Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures “” and made according to ASTM C913 “Standard Specification for Precast Concrete Water and Wastewater Structures”. Include slab dimensions that will extend minimum of 12 inches (305 mm) beyond edge of excavation. Cast cover with opening for manhole in center.
         4. Manholes: [**20-inch- (508-mm-)**] [**22-inch- (559-mm-)**] [**24-inch- (610-mm-)**] <**Insert size**> minimum diameter opening with reinforced-concrete risers to grade and access lid with steel lift rings.

1. EXECUTION
   * + 1. EARTHWORK
          1. Excavating, trenching, and backfilling for piping[**and seepage pits**]. are specified in Section 312000 "Earth Moving."

Stockpile topsoil for reuse in finish grading without intermixing with other excavated material. Stockpile materials away from edge of excavation and do not store within drip line of remaining trees.

Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

* + - * 1. Excavating and Backfilling for Septic[**and Dosing**] Tanks:

Excavate sufficient width and length for tanks to depth determined by tank inlet elevation. Provide level bottom.

Backfill with excavated soil, mounding soil above original grade without compacting.

Retain first paragraph below for trench absorption systems with distribution piping. Coordinate with Drawings.

* + - * 1. Excavating and Backfilling for Trench Absorption Systems:

If dimensions are included on Drawings, delete first subparagraph below.

Excavate for trench absorption systems 30 inches (762 mm) wide and 24 inches (610 mm) deep, minimum.

Backfill with excavated soil, mounding soil above original grade without compacting.

Retain first paragraph below for bed absorption systems with distribution piping. Coordinate with Drawings.

* + - * 1. Excavating and Backfilling for Bed Absorption Systems:

Excavate for bed absorption systems of width indicated and 24 inches (610 mm) deep, minimum.

If dimensions are included on Drawings, delete subparagraph below.

Backfill with excavated soil, mounding soil above original grade without compacting.

Retain first paragraph below for chamber absorption systems. Coordinate with Drawings.

* + - * 1. Excavating and Backfilling for Chamber Absorption Systems:

Revise dimensions in first two subparagraphs for retained manufacturer's chamber size. If dimensions are included on Drawings, delete first two subparagraphs below.

Excavate for trench-type chamber absorption systems [**30 inches (762 mm) wide and 24 inches (610 mm)**] <**Insert dimensions**> deep, minimum.

Excavate for bed-type chamber absorption systems of width indicated and [**24 inches (610 mm)**] <**Insert dimensions**> deep, minimum.

Backfill chamber absorption systems with excavated soil, mounding soil above original grade without compacting.

Retain paragraph below for seepage-pit absorption systems. Coordinate with Drawings. Show top, inlet, and bottom elevations on the Drawings.

* + - * 1. Excavating and Backfilling for Seepage-Pit Absorption Systems:

Excavate sufficient hole diameter for pits to depth determined by tank inlet and bottom elevations. Provide level bottom.

Backfill with excavated soil, mounding soil above original grade without compacting.

* + - 1. SEPTIC TANK INSTALLATION
         1. Install precast concrete septic tanks according to ASTM C891 “Standard Practice for Installation of Underground Precast Concrete Utility Structures”.
         2. Install septic tanks level.

Retain first paragraph below if FRP or PE septic tanks will be installed in a flood plain. Detail pad on Drawings.

* + - * 1. Connect septic tank to concrete ballast pad.
        2. Install filter in septic tank outlet. Secure filter to septic tank wall. Make direct connections to distribution piping.

Retain first paragraph below only if required for freeze protection.

* + - * 1. Install insulation on exterior sides and top of septic tank. Comply with requirements for insulation specified in Section 220716 "Plumbing Equipment Insulation."
        2. Fill septic tank with water.

Retain first article below if dosing tanks are required. See Evaluations for discussion of dosing tanks.

* + - 1. DOSING TANK INSTALLATION
         1. Install dosing tanks according to ASTM C891.
         2. Install dosing tanks level.

Retain one of first two paragraphs below.

* + - * 1. Install automatic siphons embedded in precast-concrete dosing tank. Make direct connections to distribution piping.
        2. Set submersible effluent pumps on dosing tank floor. Make direct connections to distribution piping. Comply with requirements for effluent pumps specified in Section 221329 "Sanitary Sewerage Pumps."
        3. Fill dosing tanks with water.
      1. DISTRIBUTION BOX INSTALLATION

Retain one of two paragraphs below.

* + - * 1. Install precast-concrete distribution boxes according to ASTM C891 “Standard Practice for Installation of Underground Precast Concrete Utility Structures” and at invert elevations indicated. Set level and plumb.
        2. Install PE distribution boxes at invert elevations indicated and according to manufacturer's written instructions. Set level and plumb.
      1. PIPING INSTALLATION
         1. Comply with requirements for sewer pipe installation specified in Section 221313 "Facility Sanitary Sewers."
         2. Install distribution piping according to the following:

Use perforated pipe and fittings for [**trench**] [**bed**] [**mound**] absorption systems with perforations at bottom.

PE Tube and Fittings: ASTM F481 “Standard Practice for Installation of Thermoplastic Pipe and Corrugated Pipe in Septic Tank Leach Fields”.

PVC Sewer Pipe and Fittings: ASTM F481 “Standard Practice for Installation of Thermoplastic Pipe and Corrugated Pipe in Septic Tank Leach Fields”.

* + - 1. PIPE JOINT CONSTRUCTION
         1. Join distribution piping with or according to the following:

Install pipe and fittings for [**trench**] [**bed**] [**mound**] absorption systems with closed joints unless otherwise indicated.

PE Tube and Fittings: With PE band couplings.

PVC Sewer Pipe and Fittings: With solvent-cemented joints according to ASTM F402 “Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings “ and ASTM D2321 “Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications”.

* + - * 1. Join dissimilar pipe materials according to ASTM D5926 “Standard Specification for Poly (Vinyl Chloride) (PVC) Gaskets for Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems”, with couplings and gaskets compatible with pipe materials being joined.
      1. CLEANOUT INSTALLATION
         1. Install cleanouts according to the following:

Revise list below to suit Project.

Inlet and Outlet of Septic Tanks: Cast-iron cleanouts.

Inlet and Outlet of Dosing Tanks: Cast-iron cleanouts.

Inlet and Outlet of Distribution Boxes: [**Cast-iron**] [**PVC**] cleanouts.

At Each Change in Direction of Sewer Piping: [**Cast-iron**] [**PVC**] cleanouts.

At Ends of Each Row[**and at Each Change in Direction**] of Distribution Piping: [**Cast-iron**] [**PVC**] cleanouts.

* + - * 1. Comply with requirements for cleanouts specified in Section 221313 "Facility Sanitary Sewers."

Installation method in first paragraph below is suitable for vehicular-traffic areas.

* + - * 1. Cast-Iron Cleanouts: Install with PVC riser from sewer and distribution piping to cast-iron cleanout housing at grade. Use NPS 4 (DN 100) PVC sewer pipe and fittings with solvent-cemented joints for risers. Attach riser to cleanout housing with rubber gasket or coupling.
        2. PVC Cleanouts: Install with PVC riser from sewer and distribution piping to PVC cleanout at grade. Use NPS 4 (DN 100) PVC sewer pipe and fittings with solvent-cemented joints for risers and cleanout fitting.
        3. Cleanout Support: Set cleanouts in concrete blocks [**18-by-18-by-12-inches (457-by-457-by-305-mm)**] <**Insert dimensions**> deep unless location is in concrete pavement. Formwork, reinforcement, and concrete are specified in Section 033000 "Cast-in-Place Concrete."
        4. Set top of cleanout [**1 inch (25 mm)**] [**2 inches (51 mm)**] above surrounding rough grade, or set flush with grade if installed in pavement.
      1. [**TRENCH**] [**BED**] ABSORPTION-SYSTEM INSTALLATION
         1. Filter Material: Place supporting layer of filter material over the compacted [**trench**] [**bed**] base to a compacted depth not less than 6 inches (152 mm) below bottom of pipe.

Retain first paragraph below if sewer piping should be installed at a certain slope or installed level.

* + - * 1. Install sewer piping [**at minimum slope of 1 percent and maximum slope of 2 percent**] [**at no slope**] <**Insert slope**>.

Piping in first paragraph below is to be installed level.

* + - * 1. Install distribution piping solidly bedded in filter material, with full bearing for each pipe section throughout its length. Maintain pipe alignment with no slope.

Install perforated pipe with perforations down and joints tightly closed. Install couplings as required.

Install elbow fittings with tight joints.

Retain subparagraph below if dimensions are not shown on Drawings; otherwise, delete. Coordinate with Drawings.

Install absorption-system materials as follows from surface of excavation to grade:

Retain one of first two subparagraphs below.

Trench Size: [**12 inches (305 mm)**] [**36 inches (914 mm)**] <**Insert value**> wide by <**Insert value**> long.

Bed Size: <**Insert value**> wide with distribution piping [**36 inches (914 mm) minimum**] <**Insert value**> apart by <**Insert value**> long.

Bottom Filter Material Layer: [**6 inches (152 mm)**] [**8 inches (203 mm)**] <**Insert value**> thick below distribution piping.

Intermediate Filter Material Layer: OD of distribution piping.

Top Filter Material Layer: [**6-inch (152-mm)**] [**8-inch (203-mm)**] <**Insert value**> minimum thickness above distribution piping.

Filter Mat: Above final filter-material layer.

Fill: Above filter mat to final grade.

* + - * 1. Install filter mat over filter material before backfilling.
      1. MOUND ABSORPTION-SYSTEM INSTALLATION

Coordinate first paragraph below with drawing details that indicate depths and widths of material and location of distribution piping or chambers.

* + - * 1. Plow top [**6 inches (152 mm)**] <**Insert dimension**> of surface.

Retain option in first paragraph below for leaching piping; delete for leaching chambers.

* + - * 1. Place layers of sand,[**aggregate,**] cap, and topsoil above plowed area. Provide grass topping to match adjacent vegetation. Provide side slope not steeper than 3:1. Tie slope toe smoothly into existing grade.
        2. Provide solid vent pipe with vent cap extending [**12 inches (305 mm)**] <**Insert dimension**> above top of mounds.

Retain first paragraph below if sewer piping should be installed at a certain slope or installed level.

* + - * 1. Install sewer piping [**flat**] [**at minimum slope of 1 percent and maximum slope of 2 percent**] [**at no slope**] <**Insert slope**>.

Piping in first paragraph below is to be installed level.

* + - * 1. Install distribution piping solidly bedded in filter material, with full bearing for each pipe section throughout its length. Maintain pipe alignment with no slope.

Install perforated pipe with perforations down and joints tightly closed. Install collars and couplings as required.

Install elbow fittings with tight joints.

* + - * 1. Install and grade materials around mound absorption systems to prevent storm runoff from washing away a portion of mound absorption systems and to prevent exposing pipes.

Retain subparagraph below if dimensions are not shown on Drawings; otherwise, delete. Coordinate with Drawings.

Install absorption-system materials as follows from surface of excavation to grade:

Bed Size: <**Insert value**> wide with distribution piping [**36 inches (914 mm) minimum**] <**Insert value**> apart by <**Insert value**> long.

Sand Fill: Not less than [**6-inch (152-mm)**] <**Insert value**> thickness above plowed earth or broken-up sod.

Aggregate Filter Material Layer: OD of distribution piping minimum.

Filter Mat: Above final filter-material layer.

Cap: As required to make rounded mound above filter mat.

Topsoil: [**2-inch (51-mm)**] <**Insert value**> thickness above cap and extended to edges of mound.

Vegetation Cover: Grass[**or match adjacent ground cover**] at surface.

* + - 1. CHAMBER ABSORPTION-SYSTEM INSTALLATION

Retain first paragraph below if sewer piping should be installed at a certain slope or installed level.

* + - * 1. Install sewer piping [**flat**] [**at minimum slope of 1 percent and maximum slope of 2 percent**] [**at no slope**] <**Insert slope**>.

Chambers in paragraph below are to be installed on a level earth surface.

* + - * 1. Install chambers with no slope above plowed area.

Retain subparagraph below if chamber system effluent is pressurized.

Install chamber distribution piping with tight joints throughout chambers.

* + - 1. SEEPAGE-PIT ABSORPTION-SYSTEM INSTALLATION
         1. Excavate hole for [**60-inch (1524-mm)**] <**Insert value**> diameter seepage pit plus minimum of 6 inches (152 mm) around outside of pit and lining.
         2. Do not extend pit depth into ground-water table.
         3. Install constructed-in-place seepage pits according to the following procedure if no requirements of authorities having jurisdiction apply:

Retain one of first two subparagraphs below that coordinates with lining material specified.

Install brick pit-lining material dry and laid flat with staggered joints for seepage.

Install block pit-lining material dry with staggered joints and a minimum of 20 percent of blocks on side for seepage. Install precast concrete rings with notches or weep holes for seepage.

Extend pit-lining material so top of manhole will be approximately [**8 inches (203 mm)**] <**Insert dimension**> below finished grade.

Backfill bottom of inside of pit with filtering material at least [**12 inches (305 mm)**] <**Insert dimension**> above bottom of lining material.

Extend effluent inlet pipe [**12 inches (305 mm)**] <**Insert dimension**> into seepage pit and terminate into side of tee fitting.

Backfill around outside of pit lining with filtering material to top of lining.

Install manhole risers from top of pit to grade. Support cover on undisturbed soil. Do not support cover on pit lining.

* + - 1. IDENTIFICATION
         1. Identification materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green, detectable warning tape directly over piping, at outside edges of underground structures, and at outside edges of absorption systems.
      2. FIELD QUALITY CONTROL

Percolation tests and site survey information are provided by Owner before start of Project design. Delete first paragraph below if not required.

* + - * 1. System Tests: Perform testing of completed septic tank system piping and structures according to authorities having jurisdiction.
        2. Additional Tests: Fill underground structures with water and let stand overnight. If water level recedes, locate and repair leaks and retest. Repeat tests and repairs until no leaks exist.
      1. CLEANING
         1. Clear interior of piping and structures of dirt and other superfluous material as work progresses.
         2. Maintain swab or drag in piping, andpiping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of workday or when work stops.

END OF SECTION 221353