SECTION 221463 - FACILITY STORM-WATER RETENTION TANKS

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

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

Sustainable design standards have provisions for using storm water for sewage conveyance and for non-potable applications such as toilet and urinal flushing, mechanical systems, and custodial uses.

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:

Steel, pressure tanks.

Steel, nonpressure tanks.

Insulated, steel tanks.

Plastic, pressure tanks.

Plastic, nonpressure tanks.

* + - 1. 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.

Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for storm-water retention tanks.

* + - * 1. Shop Drawings:

Include plans, elevations, sections, and [**mounting**] [**attachment**] details.

Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

Detail fabrication and assembly of storm-water retention tanks.

<**Insert list of products**>.

Retain "Delegated-Design Submittal" paragraph below if design services have been delegated to Contractor.

* + - * 1. Delegated-Design Submittal: For storm-water retention tanks.

Retain "Seismic Qualification Certificates" paragraph below if required by seismic criteria applicable to Project. Coordinate with Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment." See ASCE/SEI 7 for certification requirements for equipment and components.

* + - * 1. Seismic Qualification Certificates: For facility storm-water retention tanks, accessories, and components, from manufacturer.

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

Retain "Welding certificates" paragraph below if retaining "Welding Qualifications" paragraph in "Quality Assurance" Article.

* + - * 1. Welding certificates.
      1. QUALITY ASSURANCE

Retain "Welding Qualifications" paragraph below if shop or field welding is required. If retaining, also retain "Welding certificates" paragraph in "Informational Submittals" Article.

* + - * 1. Welding Qualifications: Qualify procedures and personnel according to the following:

AWS D1.1, "Structural Welding Code - Steel."

AWS D1.3, "Structural Welding Code - Sheet Steel."

AWS D1.4, "Structural Welding Code - Reinforcing Steel."

* + - * 1. Pipe and Pressure-Vessel Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

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.

* + - 1. PERFORMANCE REQUIREMENTS

Revise wind load in "Structural Performance" paragraph below to suit local conditions.

* + - * 1. Structural Performance: Facility storm-water retention tank, including structural reinforcement and foundation, shall be capable of withstanding the effects of dead and live gravity loads and winds of [**100 mph**] <**Insert value**>.

Retain "Seismic Performance" paragraph below with "Seismic Qualification Certificates" paragraph in "Informational Submittals" Article for projects requiring seismic design. Delete paragraph if performance requirements are indicated on Drawings. Model building codes and ASCE/SEI 7 establish criteria for buildings subject to earthquake motions. Coordinate requirements with structural engineer.

* + - * 1. Seismic Performance: Facility storm-water retention tank, including structural reinforcement and foundation, shall withstand the effects of earthquake motions determined according to [**ASCE/SEI 7**] <**Insert requirement**>.

Retain subparagraph below to define the term "withstand" as it applies to this Project. Definition varies with type of building and occupancy and is critical to valid certification. Option is used for essential facilities where equipment must operate immediately after an earthquake.

The term "withstand" means "the system will remain in place without separation of any parts when subjected to the seismic forces specified[**and the system will be fully operational after the seismic event**]."

* + - * 1. Thermal Movements: Storm-water retention tank, including structural reinforcement and foundation, shall allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

Differential values in "Temperature Change" subparagraph below (for aluminum in particular) are suitable for most of the U.S.

Temperature Change: [**120 deg F, ambient; 180 deg F, material surfaces**] <**Insert temperature change**>.

* + - 1. STEEL, PRESSURE, STORM-WATER RETENTION TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11346) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[A. O. Smith Corporation](http://www.specagent.com/Lookup?uid=123457041391).

[Lochinvar, LLC](http://www.specagent.com/Lookup?uid=123457041385).

[RBI](http://www.specagent.com/Lookup?uid=123457041389).

[Wessels Company](http://www.specagent.com/Lookup?uid=123457041395).

Approved equivalent.

* + - * 1. Description: Steel, [**horizontal**] [**vertical**], pressure-rated tank with cylindrical sidewalls.

Retain first paragraph below for projects in seismic areas.

* + - * 1. Fabricate supports and attachments to tank with reinforcement strong enough to resist tank movement during seismic event when tank supports are anchored to building structure.
        2. Construction: [**ASME code, steel**] [**Steel**], constructed with welded joints, for [**125-psig**] [**150-psig**] <**Insert value**> working pressure.

Comply with AWWA D100, "Welded Steel Tanks for Water Storage," and with AWWA M42, "Steel Water-Storage Tanks," for welded-steel, surface-water retention tanks.

Indicate manhole location on Drawings.

* + - * 1. Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter; same pressure rating as tank.

Retain second option in "Tappings" paragraph below if ASME label is required.

* + - * 1. Tappings: Factory-fabricated[**stainless**] steel, welded to tank[**before testing and labeling**].

NPS 2 and Smaller: ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, with female thread.

NPS 2-1/2 and Larger: ASME B16.5 “Pipe Flanges & Flanged Fittings”, flanged.

* + - * 1. Specialties and Accessories: Include tappings in tank and the following:

Five subparagraphs below are optional accessories.

Pressure relief valve.

Pressure gage.

Thermometer.

Air-charging connection.

Gage glass, brass fittings, compression stops, and gage-glass guard.

Retain "Horizontal Tank Supports" paragraph below or specify cast-in-place concrete saddles and indicate on Drawings. Retain option if ASME label is required.

* + - * 1. Horizontal Tank Supports: Factory-fabricated steel saddles, welded to tank[**before testing and labeling**].

Retain option in "Vertical Tank Supports" paragraph below if ASME label is required.

* + - * 1. Vertical Tank Supports: Factory-fabricated steel legs or steel skirt, welded to tank[**before testing and labeling**].

Retain one of two subparagraphs below.

Lining Material: [**Cement**] [**Copper**] <**Insert material**>.

Coating: [**Epoxy resin**] [**Galvanized**] [**Glass**] [**Nickel**] <**Insert coating**>.

Retain "Exterior Coating" paragraph below to require tanks to have exterior coating.

* + - * 1. Exterior Coating: [**Galvanized**] [**Manufacturer's standard enamel paint**] [**Primer paint**] <**Insert coating**>.
      1. STEEL, NONPRESSURE, STORM-WATER RETENTION TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11347) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Adamson Global Technology](http://www.specagent.com/Lookup?uid=123457041397).

[Highland Tank & Manufacturing Company, Inc](http://www.specagent.com/Lookup?uid=123457041398).

[RECO USA](http://www.specagent.com/Lookup?uid=123457041399).

Approved equivalent.

* + - * 1. Description: Steel, [**horizontal**] [**vertical**], nonpressure-rated tank with cylindrical sidewalls.

Retain first paragraph below for projects in seismic areas.

* + - * 1. Fabricate supports and attachments to tank with reinforcement strong enough to resist tank movement during seismic event when tank supports are anchored to building structure.
        2. Construction: Steel, constructed with welded joints.

Comply with AWWA D100, "Welded Steel Tanks for Water Storage," and with AWWA M42, "Steel Water-Storage Tanks," for welded-steel, surface-water retention tanks.

Indicate manhole location on Drawings.

* + - * 1. Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter.
        2. Cover for Open Tank: [**Plastic**] [**Steel, with lining same as or similar to tank lining and**] with shape that encloses top of tank.
        3. Tappings: Factory-fabricated[**stainless**] steel, welded to tank.

NPS 2 and Smaller: ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, with female thread.

NPS 2-1/2 and Larger: ASME B16.5 “Pipe Flanges & Flanged Fittings”, flanged.

* + - * 1. Specialties and Accessories: Include tappings in tank and the following:

Four subparagraphs below are optional accessories.

Vacuum relief valve.

Free air vent with insect screen.

Thermometer.

Gage glass, brass fittings, compression stops, and gage-glass guard.

Retain "Horizontal Tank Supports" paragraph below or specify cast-in-place concrete saddles and indicate on Drawings. Retain option if ASME label is required.

* + - * 1. Horizontal Tank Supports: Factory-fabricated steel saddles, welded to tank[**before testing and labeling**].

Retain option in "Vertical Tank Supports" paragraph below if ASME label is required.

* + - * 1. Vertical Tank Supports: Factory-fabricated steel legs or steel skirt, welded to tank[**before testing and labeling**].

Retain one of two subparagraphs below.

Lining Material: [**Cement**] [**Copper**] <**Insert material**>.

Coating: [**Epoxy resin**] [**Galvanized**] [**Glass**] [**Nickel**] <**Insert coating**>.

Retain "Exterior Coating" paragraph below to require tanks to have exterior coating.

* + - * 1. Exterior Coating: [**Galvanized**] [**Manufacturer's standard enamel paint**] [**Primer paint**] <**Insert coating**>.
      1. INSULATED, STEEL, STORM-WATER RETENTION TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11348) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[A. O. Smith Corporation](http://www.specagent.com/Lookup?uid=123457041410).

[Laars Heating Systems Company; a subsidiary of Bradford White Corporation](http://www.specagent.com/Lookup?uid=123457041404).

[Lochinvar, LLC](http://www.specagent.com/Lookup?uid=123457041405).

[Wessels Company](http://www.specagent.com/Lookup?uid=123457041413).

Approved equivalent.

* + - * 1. Description: Steel, vertical, pressure-rated tank with cylindrical sidewalls.

Retain first paragraph below for projects in seismic areas.

* + - * 1. Fabricate supports and attachments to tank with reinforcement strong enough to resist tank movement during seismic event when tank supports are anchored to building structure.
        2. Construction: [**ASME code, steel**] [**Steel**], constructed with welded joints, for [**125-psig**] [**150-psig**] <**Insert value**> working pressure.

Comply with AWWA D100, "Welded Steel Tanks for Water Storage," and with AWWA M42, "Steel Water-Storage Tanks," for welded-steel, surface-water retention tanks.

Indicate manhole location on Drawings.

* + - * 1. Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter; same pressure rating as tank.

Retain second option in "Tappings" paragraph below if ASME label is required.

* + - * 1. Tappings: Factory-fabricated[**stainless**] steel, welded to tank[**before testing and labeling**].

NPS 2 and Smaller: ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, with female thread.

NPS 2-1/2 and Larger: ASME B16.5 “Pipe Flanges & Flanged Fittings”, flanged.

* + - * 1. Specialties and Accessories: Include tappings in tank and the following:

Five subparagraphs below are optional accessories.

Pressure relief valve.

Pressure gage.

Thermometer.

Air-charging connection.

Gage glass, brass fittings, compression stops, and gage-glass guard.

Retain option in "Vertical Tank Supports" paragraph below if ASME label is required.

* + - * 1. Vertical Tank Supports: Factory-fabricated steel legs or steel skirt, welded to tank[**before testing and labeling**].

Retain one of two subparagraphs below.

Lining Material: [**Cement**] [**Copper**] <**Insert material**>.

Coating: [**Epoxy resin**] [**Galvanized**] [**Glass**] [**Nickel**] <**Insert coating**>.

* + - * 1. Insulation: Factory-installed fiberglass or polyurethane foam; surrounding entire tank except connections and other openings; suitable for tank operating temperature; and complying with ASHRAE/IES 90.1 “Energy Standard for Buildings Except Low-Rise Residential Buildings”.
        2. Jacket: Steel, with manufacturer's standard finish unless otherwise indicated.
      1. PLASTIC, PRESSURE, STORM-WATER RETENTION TANKS

* + - * 1. [Manufacturers:](http://www.specagent.com/Lookup?ulid=11349) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Pentair, Inc](http://www.specagent.com/Lookup?uid=123457041414).

[Tankinetics, Inc](http://www.specagent.com/Lookup?uid=123457041415).

Approved equivalent.

* + - * 1. Description: Fiberglass-reinforced plastic (FRP), vertical, pressure-rated tank with cylindrical sidewalls.
        2. Construction: [**ASME code, composite FRP**] [**Composite FRP**], [**contact-molded**] [**or**] [**filament-wound**], thermosetting-resin tank for [**100-psig**] [**125-psig**] [**150-psig**] <**Insert value**> working pressure.

Comply with AWWA D120 “Standard for Thermosetting Fiberglass-Reinforced Plastic Tanks”.

Indicate manhole location on Drawings.

* + - * 1. Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter; same pressure rating as tank.
        2. Tappings: Factory-fabricated, FRP flanged-end nozzle.

NPS 2 and Smaller: Include plastic-to-steel transition fitting from tank nozzle flange to ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, female thread.

NPS 2-1/2 and Larger: ASME B16.5 “Pipe Flanges & Flanged Fittings”, flanged.

* + - * 1. Specialties and Accessories: Include tappings in tank and the following:

Three subparagraphs below are optional accessories.

Pressure relief valve.

Pressure gage.

Thermometer.

* + - * 1. Vertical Tank Supports: Factory-fabricated steel legs or FRP skirt attached by FRP brackets to tank sidewall.
      1. PLASTIC, NONPRESSURE, STORM-WATER RETENTION TANKS

Retain one of first two paragraphs below. Retain first paragraph for tanks fabricated of FRP and second paragraph for tanks fabricated of PE.

* + - * 1. FRP Water Retention Tanks:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=11350) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Amprotec, Inc](http://www.specagent.com/Lookup?uid=123457041416).

[Belding Tank Technologies, Inc](http://www.specagent.com/Lookup?uid=123457041417).

[Palmer Manufacturing and Tank Company](http://www.specagent.com/Lookup?uid=123457041419).

Approved equivalent.

Description: FRP, vertical, nonpressure-rated water tank.

Construction: [**ASTM D3299, filament-wound**] [**or**] [**ASTM D4097, contact-molded**] FRP.

Tappings: Factory-fabricated, FRP flanged-end nozzle.

NPS 2 and Smaller: Include plastic-to-steel transition fitting from tank nozzle flange to ASME B1.20.1 “Pipe Threads, General Purpose, Inch”, female thread.

Exception: Tappings may be threaded FRP coupling integral with nozzle for connections for plastic piping.

NPS 2-1/2 and Larger: Flanged.

Retain "Vertical Tank Support" subparagraph below only if a stand is required.

Vertical Tank Support: Separate factory-fabricated steel stand capable of supporting tank.

Indicate manhole location on Drawings.

Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter.

Cover for Open Tank: Plastic, same as or similar to tank material and with shape that encloses top of tank.

Specialties and Accessories: Include tappings in tank and the following:

Four subparagraphs below are optional accessories.

Vacuum relief valve.

Free air vent with insect screen.

Thermometer.

Gage glass, brass fittings, compression stops, and gage-glass guard.

* + - * 1. PE Water Retention Tanks:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=11351) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Amprotec, Inc](http://www.specagent.com/Lookup?uid=123457041420).

[Chem-Tainer Industries](http://www.specagent.com/Lookup?uid=123457041422).

[Poly Processing Company](http://www.specagent.com/Lookup?uid=123457041423).

[Steel Tank and Fabricating Corporation (STAFCO)](http://www.specagent.com/Lookup?uid=123457041426).

Approved equivalent.

Description: PE, vertical, flat-bottom, nonpressure-rated water tank.

Construction: ASTM D1998 “Standard Specification for Polyethylene Upright Storage Tanks”, molded PE.

Tappings: Factory-fabricated bulkhead fittings attached to tank.

NPS 2 and Smaller: With female thread.

NPS 2-1/2 and Larger: Flanged.

Retain "Vertical Tank Support" subparagraph below only if a stand is required. Tanks are specified as flat-bottom shape and may be installed directly on a base.

Vertical Tank Support: Separate factory-fabricated steel stand capable of supporting entire bottom of tank.

Indicate manhole location on Drawings.

Manhole: Watertight, for tank more than [**36 inches**] <**Insert dimension**> in diameter.

Cover for Open Tank: Plastic, same as or similar to tank material and with shape that encloses top of tank.

Specialties and Accessories: Include tappings in tank and the following:

Four subparagraphs below are optional accessories.

Vacuum relief valve.

Free air vent with insect screen.

Thermometer.

Gage glass, brass fittings, compression stops, and gage-glass guard.

* + - 1. PAINT MATERIALS
         1. Paint: Comply with AWWA D102 “Standard for Coating Steel Water Tanks”.
         2. Primer: Tank fabricator's standard epoxy-polyamide paint.
         3. Tank Shell Exterior Intermediate Paint: Tank fabricator's standard, two-component epoxy paint compatible with prime and finish paint. Intermediate coat shall have a slight color contrast with finish coat.
         4. Tank Shell Exterior Finish Paint: Tank fabricator's standard urethane paint.

Color: [**As selected by Director’s Representative from tank manufacturer's paint chart**] <**Insert color**>.

* + - 1. SHOP PAINTING
         1. Tank Shell Exterior Finish Coat: Factory coating according to AWWA D103 “Standard for Factory-coated Bolted Carbon Steel Tanks for Water Storage”.

1. EXECUTION
   * + 1. INSTALLATION
          1. Install storm-water retention tanks on concrete bases, level and plumb, firmly anchored. Arrange so devices needing servicing are accessible.

Install horizontal tanks on [**concrete piers and factory-fabricated**] [**fabricated steel supports and**] saddles.

* + - * 1. Anchor tank supports and tanks to substrate.

Use steel or FRP straps over or around plastic tanks.

* + - * 1. Install thermometers and pressure gages on water retention tanks and piping if indicated. Thermometers and pressure gages are specified in Section 220519 "Meters and Gages for Plumbing Piping."

Revise first paragraph below to suit Project; coordinate with Drawings.

* + - * 1. Install the following devices on tanks where indicated:

Pressure relief valves.

Temperature and pressure relief valves.

Vacuum relief valves.

Tank vents on nonpressure tanks.

Connections to accessories.

* + - * 1. After installing tanks with factory finish, inspect finishes and repair damages to finishes.
      1. CONNECTIONS
         1. Where installing piping adjacent to storm-water retention tanks, allow space for service and maintenance.
         2. Connect water piping to water retention tanks with unions or flanges and with shutoff valves. Connect tank drains with shutoff valves and discharge over closest floor drains.

Valves NPS 2 and Smaller: Gate valves complying with requirements in Section 220523.15 "Gate Valves for Plumbing Piping," or ball valves complying with Section 220523.12 "Ball Valves for Plumbing Piping."

Valves NPS 2-1/2 and Larger: Gate valves complying with requirements in Section 220523.15 "Gate Valves for Plumbing Piping," or butterfly valves complying with requirements in Section 220523.13 "Butterfly Valves for Plumbing Piping."

Drain Valves: NPS 3/4 Gate valves complying with requirements in Section 220523.15 "Gate Valves for Plumbing Piping," or ball valves complying with Section 220523.12 "Ball Valves for Plumbing Piping." Include outlet with, or nipple in outlet with, ASME B1.20.7, 3/4-11.5NH “Hose Coupling Screw Threads” thread for garden-hose service, threaded cap, and chain.

Water Piping Connections: Make connections to dissimilar metals with dielectric fittings. Dielectric fittings are specified in Section 221116 "Domestic Water Piping."

* + - 1. IDENTIFICATION
         1. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

END OF SECTION 221463