



Republic of the Philippines
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
Bonifacio Drive, Port Area Manila



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DEPARTMENT ORDER)
NO. 138)
Series of 2024)
8/5/2024

**SUBJECT: DPWH Standard Specifications for
Item 656 – Water Supply System and
Item 657 – Wastewater System**

In order to ensure the proper utilization/adoption of Items of Work intended for Tunnel Mechanical Facilities, the attached **DPWH Standard Specifications for Item 656 – Water Supply System and Item 657 – Wastewater System** are hereby prescribed for adoption in Government infrastructure projects.

The Standard Specifications shall form part of the DPWH Standard Specifications for Highways, Bridges and Airports, Volume II and are now included in the Project and Contract Management Application (PCMA).

This Order shall take effect immediately.


MANUEL M. BONOAN
Secretary

Department of Public Works and Highways
Office of the Secretary



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DPWH Standard Specification for Item 656 - Water Supply System

656.1 Description

This work shall consist of fabricating, furnishing, installing, testing and commissioning of water supply system in accordance with this Specification and in conformance to the requirements as shown on the Plans.

656.2 Material Requirements

656.2.1 Pump and Motor

Pumps shall be end suction centrifugal type conforming to the requirements of American Water Works Association (AWWA) E 101, Standard for Vertical Turbine Pumps – Line Shaft and Submersible Type or AWWA E 103, Standard for Horizontal and Vertical Line-Shaft Pumps, whichever is applicable. Booster pumps and jet pumps shall only be required if deemed necessary.

Pumps shall be supplied with a pump nameplate that is easy to read and corrosion resistant containing complete information including the pump manufacturer's name, serial number, pump model number, number of stages, speed, total dynamic head in meter and discharge capacity in gpm (m^3/hr or liters per second), pump horsepower, year manufactured, and the like and shall conform with the Technical Specification given by the designer.

Compound gauge, pressure gauge, common bed, flow measuring device for periodical pump testing, piping for water temperature rise prevention, valve, and accessory pipes shall be installed to the pump and motors.

Automatic pressurizer shall maintain pressure as indicated in the plans at no flow condition. Pumps shall automatically operate alternately to maintain pressure. Wetted parts of the pump shall be made of stainless steel.

656.2.2 Tanks

The tank shall be provided with manhole, cover, drain pipes, distribution pipe outlet, overflow pipes and air vent, and float switch or electrode to automatically stop and start the operation of the pump.

656.2.2.1 Steel Tanks

Steel tanks shall be American Iron and Steel Institute (AISI) steel Grade 304 conforming to AWWA D 100, Standard for Welded Carbon Steel Tanks for Water Storage or AWWA D 103, Standard for Factory-Coated Bolted Steel Tanks for Water Storage. The steel tanks shall be groove-designed with built-in drain valve and air vent.

656.2.2.2 Concrete Tanks

Materials for the construction of concrete tanks shall be in accordance with the requirements

of Item 405, Structural Concrete and Item 404, Reinforcing Steel. Water tanks shall be waterproofed as indicated in the Plans.

656.2.3 Pipeline System

All pipes and fittings shall be pressure-rated and all exposed pipes and fittings shall be fire-rated.

656.2.3.1 Plastic Pipes

Plastic pipes shall conform to the applicable requirements of Table 656.1.

Table 656.1 Requirements for Plastic Pipes

Material	Standard Specification
Polyvinyl Chloride (PVC)	ASTM D2241, Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
	ASTM D1785, Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 1201
Chlorinated Polyvinyl Chloride (CPVC)	ASTM F442, Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)
Polyethylene	ASTM F714, Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
	ASTM D2239, Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter
	ASTM D3035, Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
Polypropylene (PP)	ASTM F2389, Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems

656.2.3.2 Metal Pipes

Metal pipes shall conform to the applicable requirements of Item 707, Metal Pipe.

656.2.4 Electrical Equipment and Appurtenances

All electrical equipment and appurtenances to be used for the system shall be in conformity with the Philippine Electrical Code (PEC), Part 1, and bearing the Philippine Standard (PS) mark for locally manufactured and Import Commodity Clearance (ICC) certification marks duly issued by Bureau of Philippine Standards (BPS) for imported materials.

Power supply shall be provided by the Contractor at the pull box installed inside the machine room and shall furnish and install the main circuit breaker and starter with suitable ratings and capacities, conduits, wirings, fittings, devices, and all other equipment and electrical connections needed to complete the electrical installation of the system.

656.3 Construction Requirements

656.3.1 Submittals

The Contractor shall submit shop drawings and manufacturer's data which includes but not limited to brochures, maintenance manual, and manufacturer's certificate for the approval of the Engineer prior to fabrication, furnishing, installation, and commissioning of the water supply system.

656.3.2 Installation

The installation of all water system equipment shall be in accordance with the requirements of AWWA Standards, American Society of Mechanical Engineers (ASME) Standards, Philippine Society of Mechanical Engineering (PSME) Code, and the Philippine Electrical Code (PEC), Part 1.

Each pump and motor shall be installed in accordance with the written instruction of the manufacturer and under the direct supervision of the manufacturer's representative and the Engineer. Pump assemblies shall be adjusted such that driving units are properly aligned, plumbed, and leveled with driven units and interconnecting shafts and couplings. Misalignment shall not be compensated by use of flexible couplings. After the pump and driver have been set in position, aligned, and shimmed to proper elevation, the space between bottom of baseplate and concrete foundation shall be grouted with poured, non-shrink grout of proper category. All wedges shall be removed after grout is set and voids shall be packed with grout. Connect suction and discharge piping without imposing strain to pump flanges.

Foundations shall be constructed in conformity with the Plans and drawings. Anchor bolts and expansion bolts shall be set accurately. Anchor bolts shall be sized and furnished by the pump manufacturer.

All welds in the steel tank and structural attachments shall be made in a manner to ensure complete fusion with the base metal, within the limits specified for each joint, and in strict accordance with the welding procedure specifications. For bolted steel tanks, all bolts shall be located and installed in accordance with the instructions provided by the manufacturer. Gasketing and sealants or both shall be supplied by the manufacturer and installed between all joints in compliance with the instructions.

Concrete tanks shall conform to the applicable requirements of Item 404, Reinforcing Steel and Item 405, Structural Concrete.

Pipes shall be installed in accordance with the approved pipeline layout.

The Contractor shall install the panels at the location indicated on the Plans. Electrical components shall be installed in the enclosures in proper position and shall be completely factory-wired and ready for operation.

Electrical conduits and fittings shall be installed in their correct positions and locations as shown on the Plans. Conduit and fittings to be embedded in concrete shall be held securely in position prior to concreting. All threaded conduit connections shall be watertight after assembly.

All conduit bends shall be of standard radii bent without heating and shall be free from any deformations which reduce the cross-sectional area. Burrs and edges at the end of each piece of conduit shall be removed with a taper reamer. Bushings shall be installed on the ends of conduits at boxes of cabinets to protect conductors from abrasion, and locknuts and bond nuts shall be installed to provide tight grounded connections between conduits and boxes.

656.3.3 Test and Guarantee

656.3.3.1 Leak Test

Leak test shall be conducted for the tanks prior to acceptance.

656.3.3.2 Testing and Commissioning

After installation, testing and commissioning shall be conducted by the Contractor at his own expense, with the presence of the Engineer, to make the system operational and accepted in compliance with the requirements of the National Fire Protection Association (NFPA), latest edition of the Philippine Electrical Code, National Safety Code and any other applicable ordinances and equivalent specifications.

All materials, labor, and equipment required for the conduct of tests shall be supplied by the Contractor.

The Contractor shall replace all defective equipment and repair all defects with no additional cost.

656.4 Method of Measurement

The work under this Item shall be measured by lump sum of installed and accepted water supply system as indicated on the Plans.

656.5 Basis of Payment

The accepted quantity, measured as prescribed in Section 656.4, Method of Measurement, shall be paid for at the Contract Unit Price which price and payment shall be full compensation for furnishing all materials, including all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this Item.

Payment shall be made under:

Pay Item Number	Description	Unit of Measurement
656 (1)	Water Supply System	Lump Sum

DPWH Standard Specification for Item 657 – Wastewater System

657.1 Description

This work shall consist of furnishing, installing, and testing of a wastewater system in accordance with this Specification and in conformity to the requirements as shown on the Plans.

The system shall collect and dispose the wastewater to allowable effluent standards based on the latest Department of Environment and Natural Resources (DENR) Guidelines prior to discharge to a body of water.

657.2 Material Requirements

657.2.1 Concrete Wastewater Tanks

The tank shall be provided with manhole, cover, drain pipes, overflow pipes, and air vent. Materials for the construction of concrete tanks shall be in accordance with the requirements of Item 404, Reinforcing Steel and Item 405, Structural Concrete. Wastewater tanks shall be waterproofed as indicated in the Plans.

657.2.2 Drainage Pipes

Pipes shall conform to the applicable requirements of Item 706 – Concrete, Clay, Plastic and Fiber Pipe.

657.2.3 Bedding Material

Bedding material shall conform to the applicable requirements of Item 500, Pipe Culverts and Storm Drains.

657.3 Construction Requirements

657.3.1 Submittals

The Contractor shall submit shop drawings for the approval of the Engineer prior to furnishing and installation of the wastewater supply system.

657.3.2 Excavation

Excavation shall conform to the applicable requirements of Item 103, Structure Excavation.

657.3.3 Bedding

Bedding shall conform to the applicable requirements of Item 500, Pipe Culverts, Storm Drains and Lined Canal.

657.3.4 Concrete Wastewater Tank

Concrete wastewater tank shall be constructed in accordance with the applicable requirements of Item 404, Reinforcing Steel and Item 405, Structural Concrete.

657.3.5 Pipes Installation

Pipes shall be installed in accordance with the approved pipeline layout.

657.3.6 Acceptance

Leak test shall be conducted for the tanks prior to acceptance.

657.4 Method of Measurement

The work under this Item shall be measured by lump sum of installed and accepted wastewater system as indicated on the Plans.

657.5 Basis of Payment

The accepted quantity, measured as prescribed in Section 657.4, Method of Measurement, shall be paid for at the Contract Unit Price which price and payment shall be full compensation for furnishing all materials, including all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this Item.

Payment shall be made under:

Pay Item Number	Description	Unit of Measurement
657 (1)	Wastewater System	Lump Sum