

WATER AGENCIES' DESIGN GUIDE

Design Guidelines for Water and Sewer Facilities

SECTION 8.2 VAULTS

8.2.1 PURPOSE

The purpose of this section is to provide guidelines for the selection and placement of vaults and/or manholes on water/sewer pipeline projects.

8.2.2 STANDARD TERMS AND DEFINITIONS

Wherever technical terms occur in these guidelines or in related documents, the terms and meaning shall be interpreted as described in Standard Terms and Definitions.

8.2.3 GENERAL

It is the responsibility of the user of these documents to make references to and/or utilize industry standards not otherwise directly referenced within this document. The Engineer of Work may not deviate from the criteria presented in this section without prior written approval of the Agency's Engineer.

8.2.4 GUIDELINES

This section covers general design parameters for vault installation. In general, vaults or manholes are installed on distribution and transmission pipelines to provide access to appurtenances or pipelines for repairs, modifications, or maintenance work.

- Vaults shall be installed for valves twenty-four inches (24") or larger or otherwise directed by the Agency Engineer. The vault lid shall have a hole cored above the actuator nut to allow for an extension and portable motor operator to be used.
- Vault design plans and specifications shall reference WAS Standard Drawings and Standard Specifications where applicable.
- Vaults shall be sized appropriately to accommodate appurtenances and provide enough room for workability within the vault. Typically, horizontal clearance of twenty-four inches (24") is required between vault piping/valves and vault walls. Verify flange patterns and bolt/nuts to ensure bolts can be installed/removed in the space provided. Consideration shall be given for provisions for the removal of piping or valves from the vault.
- Vault plans shall be prepared in digital format, in accordance with Section 1.2 or Section 1.3.
- Vault buoyancy shall be evaluated for each vault considering groundwater conditions and conditions during construction. In high ground water situations, the vault may not rely on restraint from protruding pipes or other appurtenances to mitigate buoyancy.
- All joints and pipe penetrations shall be designed to be water tight.
- Vaults shall be installed on crushed rock base and backfill materials shall be in accordance with Water Agencies' Standards Section 02223.
- The vault must be designed for excavation, foundation stabilization, placement of base material, backfill, and compaction per Water Agencies' Standards. The excavation shall be large enough to accommodate the vault structure and permit grouting of openings and backfilling operations.

- The design of the vault shall take into account the geotechnical evaluation of the vault location.

8.2.5 VAULT PLACEMENT

- To the extent possible, vaults shall be placed within public right-of-way, Agency property, or easements. If the vault can not be installed within public right-of-way, Agency properties, or existing easements, provide adequate easements per Section 1.5.
- Vaults shall be placed with sufficient clearance from outside of traveled way for accessibility and maintenance.

8.2.6 VAULT TYPES

- A. Precast Concrete Vaults:
 - Precast concrete vaults may be used for pressure-reducing stations, turnout structures, valves, meters, pipeline access, or other appurtenances as Directed by the Agency Engineer.
 - Precast concrete vaults shall be in accordance with Water Agencies' Standards Section 03462.
- B. Cast-In-Place Concrete Vaults:
 - Cast-In-Place vaults may be used for pressure-reducing stations, turnout structures, valves, meters, pipeline access, or other appurtenances as directed by the Agency Engineer.
 - Cast-In-Place vaults shall be designed to accept engineering standards and Water Agencies' Standards with twenty-eight (28) day concrete compression strength of not less than 4,000 psi.
 - Cast-In-Place concrete vaults shall be in accordance with Water Agencies' Standards Section 03000.
 - Be designed for H-20 continuous traffic loading.
- C. Fiberglass Reinforced Plastic (FRP) Vaults:
 - FRP vaults may be used for potable water meters and recycled water meters 4-inches and larger or other applications as directed by the Agency Engineer.
 - FRP vaults shall be in accordance with Water Agencies' Standards Section 06620.
 - Be designed for H-20 continuous traffic loading.
- D. Precast Concrete Manholes:
 - Precast Concrete Manholes may be used to access water mains, sewer mains, and appurtenances.
 - Manhole shafts shall be fabricated only from precast sections, grade rings, and concentric shaft without cone sections for water transmission main applications unless otherwise directed by the Agency Engineer.
 - Precast Concrete Manholes shall be in accordance with Water Agencies' Standards Section 03461.

8.2.7 VAULT HATCH/DOORS/COVER

- Vault covers (access hatches) must be hinged and spring-assisted to accommodate "one person operation" must have hold open stay bars and safety railings when doors are in the open position, provide a locking ability, and designed to withstand H-20 traffic loadings unless otherwise directed by the Agency Engineer. Any cover panel must not be longer than eight feet in any direction.

- The design engineer shall identify if hatch covers require H-10 parkway loading, H-20 intermittent traffic rating or H-20 continuous traffic rating, and incorporate into the design.
- Vault hatch, doors, covers, or frames shall be in accordance with Water Agencies Standards.

8.2.8 VAULT ACCESSORIES

- Vault accessories shall be in accordance with Water Agencies Standards Section 11020.
- Electrical Components:
 - Electrical components shall be in accordance with Water Agencies' Standards Section 11020.
 - The design shall incorporate explosion-proof components as determined by the Engineer.

8.2.9 REFERENCES:

- A. Should the reader have any suggestions or questions concerning the material in this section, contact one of the member agencies listed.
- B. The publications listed below form a part of this section to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said publications unless otherwise called for. The following list of publications, as directly referenced within the body of this document, has been provided for the user's convenience. It is the responsibility of the user of these documents to make reference to and/or utilize industry standards not otherwise directly referenced within this document.
 - 1. Water Agencies' Standards (WAS):
 - a. Design Guidelines:
 - 1. Section 1.2, AutoCAD Guidelines
 - 2. Section 1.3, MicroStation Guidelines
 - 3. Section 1.5, Easements and Encroachments
 - b. Standard Specifications:
 - 1. Section 02223, Trenching, Excavation, Backfill & Compaction
 - 2. Section 03000, Cast-In-Place Concrete
 - 3. Section 03461, Precast Concrete Manholes
 - 4. Section 03462, Precast Concrete Vaults
 - 5. Section 06620, Fiberglass Reinforced Plastic (FRP) Vaults
 - 6. Section 11020, Concrete Vault Accessories

END OF SECTION