

## Customer Requirements Custom Vault Installations

C-UG-1150

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### Scope

This standard details Tacoma Power's requirements for custom underground vaults that are constructed and installed by the Customer, but will be owned and maintained by Tacoma Power. All detail design work and system layout drawings are the responsibility of the Customer.

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### Inspection

- After having completed the necessary prior arrangements with Tacoma Power's Engineering Section, the Customer shall contact Tacoma Power's Construction Inspector at least **24 hours** in advance of beginning construction. Construction work performed without prior notice to the Inspector will be subject to rejection.
  - Materials or workmanship failing to meet this Standard's requirements, or any such special requirements, will be rejected. If required by the Inspector, the Customer must remove the rejected material and furnish and install, at Customer's expense, approved material and/or workmanship.
  - No work shall be backfilled, embedded in concrete, covered or concealed until it has been inspected and approved by the Inspector.
  - Materials delivered to the job site shall be subject to inspection by the Inspector. Damaged or imperfect materials shall not be used in the work.
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### Vault Requirements

**Strength** Vaults shall be designed to sustain all expected loads that may be imposed upon the structure including dead load, live load, equipment load, impact, load due to water table, frost, and any other load expected to be imposed upon the structure, to occur adjacent to the structure, or both. This shall include loads imposed by construction at the site. The structure shall sustain the combination of vertical and lateral loading that produces the maximum shear and bending moments in the structure.

**Pulling eyes** There shall be a pulling eye installed opposite each duct line entering a manhole or vault and in direct line with the cable pull. Pulling eyes shall be installed with a **safety factor of 2** based on the expected applied load.

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## **Vault Requirements** (continued)

**Manhole access openings**      The minimum size of a manhole shall be designated by the Engineer.

1. Round access openings in a manhole containing supply cable shall not be less than 36 inches in diameter. A 36" x 36" spring loaded diamond plate cover may be used in place of the steel round cover in light-vehicular traffic areas, and approved by the Tacoma Power Engineer.
2. Openings shall be free of protrusions that will injure personnel or prevent a quick exit.

**Manhole Covers**

1. Manhole covers shall be weighted or designed so they cannot be easily removed without tools.
2. Covers shall be designed to not fall into manholes or protrude into manholes sufficiently far to contact cable or equipment.
3. Cover strength and their supporting structure shall be sufficient to sustain all applied loads.
4. Covers shall have a utility identifying of "*TACOMA POWER*" in 2" minimum height block letters.

**Access**      Vault or manhole openings shall be located so that safe access can be provided. When in the highway, they should be located outside of the paved roadway when practical. They should be located outside the area of street intersections and crosswalks whenever practical to reduce the traffic hazards to the people working at these locations.

Manholes should be located so they are not directly over cables or equipment. Where these openings interfere with curbs, etc., they can be located over the cable if one of the following is provided:

- A conspicuous warning sign
- A protective barrier over the cable
- A fixed ladder

**Access doors**      Where accessible to the public, access doors to utility tunnels and vaults shall be locked unless qualified persons are in attendance. Such doors are provided to prevent entry by unqualified persons.

EXCEPTION: This rule does not apply where the only means of locking is by padlock and the latching system is so arranged that the padlock can be closed on the latching system to prevent locking from the outside.

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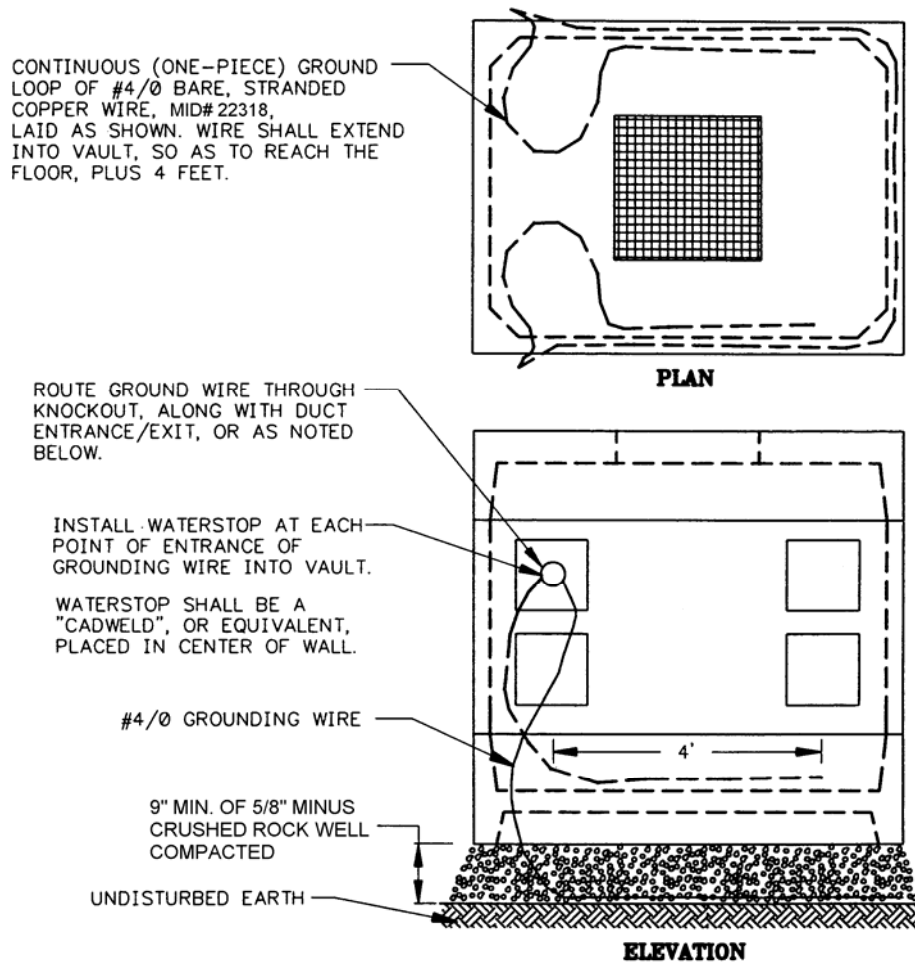
### **Vault Requirements** (continued)

- Ladders** Fixed ladders shall be corrosion resistant.
- Drainage** Where drainage is into sewers, suitable traps or other means should be provided to prevent entrance of sewer gases into manholes, vaults, or tunnels.
- Ventilation** Adequate ventilation to open air shall be provided for manholes, vaults, and tunnels having an opening into enclosed areas used by the public. In some cases, a forced air system may be required.
- Conduit Entrance** Conduit entering a vault will be required to enter at a 90° angle to the wall. In no case will a conduit be allowed to enter a structure at other than perpendicular from horizontal or vertical. Standard end bells shall be installed and grouted at each conduit entrance into the structure. Where standard knockout slabs are not available, the Customer will be required to core-drill into the structure.
- Typical Installations** Installation consists of the following:
1. Each vault shall be set on a minimum of 9 inches <sup>5</sup>/<sub>8</sub>" crushed rock.
  2. A sump of 18 inches in diameter by 24 inches deep inside dimensions shall be furnished by the Customer. The Customer shall also be responsible for ensuring water-tightness of all structures.
  3. The exterior surface of the vault shall be given two coats of dehydatine #4 per Federal Specification SS-A-701, manufactured by A.C. Horne, Inc. Coating shall be applied in accordance with manufacturer's recommendations and shall be cured before backfilling.
  4. The Customer shall afford Tacoma Power the option of performing water tests. The cost to remove any water from the structures, if defective, shall be borne by the Customer.
  5. The Customer also shall make all necessary repairs of defective structures to make them water-tight at their expense.
  6. After a 30-day concrete curing time, the Customer shall paint the interior surfaces of the structures, excluding the floor, with one coat of Parker's Epo Tilt (#9145) or approved equal, and one coat of Kelly-Moore (#1680) Dura-Poxy+ acrylic enamel, or approved equal. All paint shall be applied in accordance with manufacturer's recommendations.

**Vault Requirements** (continued)

- Grounding**
- Vaults that are an integral part of the customer's building, or buried under hard surface such as asphalt or concrete, shall have a bare 4/0 Cu wire that extends from the vault ground grid into the trench line a distance of 40 feet.
  - Four 1½" plastic sleeves, one at each corner, shall be installed through the floor of vault (except buried type) for the purpose of ground rod insertion. They shall be located a minimum of 6 inches out from each wall and shall protrude through all slabs or footings by 1 inch.
  - Grounding shall be as noted below.

**Figure A**      **Grounding Requirements**





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### **Ownership**

All conduit, vaults, and equipment in the right of way will revert to Tacoma Power's ownership after all construction on the site has been completed. Customer-provided utility system vault rooms on private property will be owned by the Customer but provided for the exclusive use of Tacoma Power.

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### **Sources**

N.E.S.C. section 323, "Manholes, Handholes, and Vaults"

Tacoma Power standards:

- A-UG-011/S630.2201
- B-UG-426/S630.2201
- B-UG-427/S630.2202
- B-UG-409/D5.4002