

## Vertical Drain (No.) 630

### DEFINITION

A well, pipe, pit, or bore in porous, underground strata into which drainage water can be discharged without contaminating groundwater resources.

### PURPOSE

Provide an outlet for drainage water from a surface or subsurface drainage system.

### CONDITIONS WHERE PRACTICE APPLIES

This practice is applicable in locations where the underlying strata can receive, transmit or store the design drainage flow, and other drainage outlets are not available and cannot be provided at a reasonable cost. This practice is also applicable where a natural “sinkhole” acts as the vertical drain, and erosion control or treatment of surface runoff is needed.

This practice is applicable only in locations where a determination has been made that it

- Conforms to local, State, Tribal, or Federal laws or regulations
- Will not contaminate groundwater resources
- Will not affect in-stream habitat by reducing surface water flows.

### CRITERIA

The number, size, and location of vertical drains shall be adequate to discharge the design drainage flow into the underlying stratum or strata, and shall be based on a field determination of the depth, permeability, porosity, thickness, and extent of the strata.

The minimum diameter of shallow uncased wells shall be 6 inches and of deep cased wells, 4 inches.

A suitable filter system, desilting basin or other means necessary for removing sediment and other contaminants from the water shall be provided before it enters the vertical drain.

Well casings shall be of adequate strength and longevity to serve planned needs.

Where significant amounts of surface water are planned to be diverted underground, the aggregate effect on stream flows must be determined, and steps taken to mitigate or avoid any potential negative effects on in-stream and riparian habitat.

### CONSIDERATIONS

Consider the potential effects of installation and operation of vertical drains on the cultural, archeological, historic, and economic resources.

Significant additions to subsurface water sources may raise local water tables or cause undesirable surface discharges down-gradient from the vertical drain.

### PLANS AND SPECIFICATIONS

Plans and specifications shall be prepared in accordance with the criteria of this standard and shall describe the requirements for applying the practice to achieve its intended use.

Support data documentation requirements are as follows:

- Inventory and evaluation records
  - Assistance notes or special report
- Survey notes, where applicable
  - Design survey
  - Construction layout survey
  - Construction check survey
- Design records
  - Physical data, functional requirements, and site constraints, where applicable
  - Soils/subsurface investigation report, where applicable
- Design and quantity calculations
- Construction drawings/specifications with:
  - Location map
  - “Designed by” and “Checked by” names or initials
  - Approval signature
  - Job class designation
  - Initials from preconstruction conference
  - As-built notes

- Construction inspection records
  - Assistance notes or separate inspection records
  - Construction approval signature
- Record of any variances approved, where applicable
- Record of approvals of in-field changes affecting function and/or job class, where applicable.

#### **OPERATION AND MAINTENANCE**

An Operation and Maintenance (O&M) plan shall be developed for this practice. The O&M plan shall be consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for the design.