

# Prefabricated Vertical Drains

**PVD**



Geologic Hazard Application

 Soft/Loose Soil

Diameter/Depth  
4 in width  
Up to 160 ft deep

Compatible Soils  
V. Soft Clays  
Peat  
Fine-grained soils  
Dredge spoil

Key Advantages

- Accelerate settlement
- Minimize future settlement
- Strengthen soil
- Economical
- Fast install process
- Earlier construction start
- Low/no spoil

Key Considerations

- Soft/loose soil needed
- Contamination
- Artesian conditions
- Predrilling

Comparable To  
Vacuum Consolidation

## Overview

**Prefabricated Vertical Drains (PVD)**, also known as Wick Drains, are a cost-effective solution for accelerating the consolidation of fine-grained soil to expedite construction and reduce long-term settlement.

PVD are used to expedite consolidation drainage in clays, silts, tailings, and sludges by relieving pore pressure and reducing the time necessary for groundwater to be evacuated from the layer. Used in combination with pre-loading, PVD evacuates pore water from soft, compressible soil to induce consolidation and settlement. This allows construction to begin in as little as one to three months instead of up to 12 months or longer. The reduction of water content in the saturated soil layers allows the soil to better accommodate superimposed loads and minimizes future settlement.

PVD are used for structures such as buildings and tanks, or with surcharges for earthen structures such as embankments, dams, levees and general fills. Because of the lightweight nature of the drains and the fast rates of installation, PVD are an extremely economical method for improving soft compressible layers.

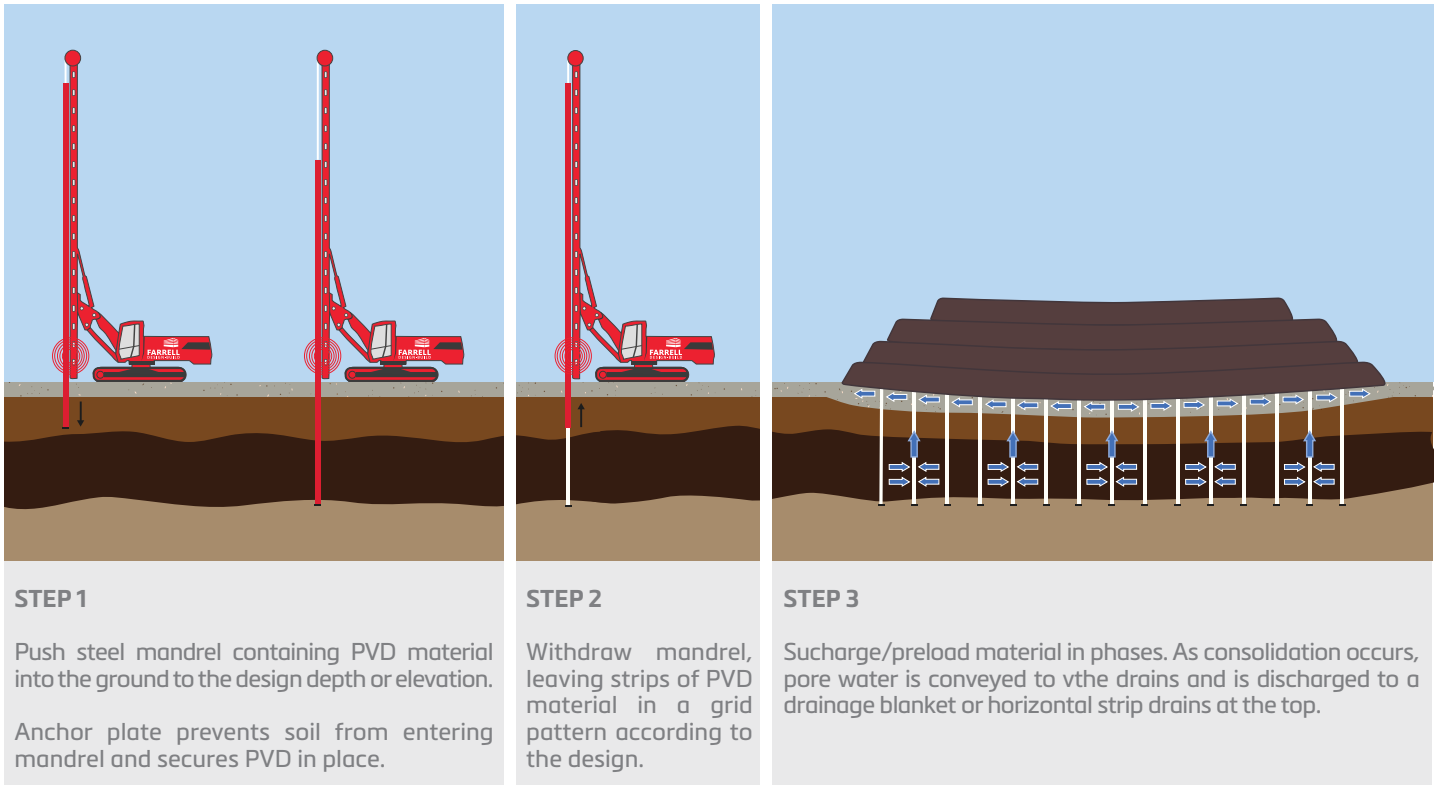
## PVD Applications

Accelerate settlement, ground densification, mitigate liquefaction and downdrag. Ideal applications for PVD:

- 1) Preloads for lightly loaded buildings or tanks.
- 2) Earthen structures such as embankments, MSE walls, dams/ levees.
- 3) Projects with a need for a reduced construction timeframe.
- 4) Surcharge fill for settlement reductions.

## PVD Prefabricated Vertical Drains

### PVD 3-Step Construction Process



### Technical Details

**Prefabricated Vertical Drains (PVD)** are comprised of a channelized plastic core that is encased by a geotextile fabric. The geotextile acts as a filter to minimize migration of fines into the channels as groundwater flows into the drain.

PVD are installed by pushing and retracting a steel mandrel into the ground with the PVD drain material housed inside. An anchor plate affixed to the bottom of the drain holds the drain in place as the mandrel is retracted. The drains are typically installed in a grid pattern, with spacings most commonly in the range of 3 to 8 feet. PVD have been installed to depths of over 150 feet. Where thin, dense layers are present, vibratory assistance can be applied to enable penetration. To penetrate stiff or dense layers of appreciable thickness, it is usually necessary to pre-drill or pre-punch to allow for installation.

A surcharge/preload program is designed to induce settlements in an accelerated timeframe and, therefore, minimize the long-term residual settlements. Placement of surcharge material is done in phases and is monitored throughout the consolidation period. Instruments are installed to validate the design and the safe phasing of construction.

As consolidation occurs, pore water is conveyed to the drains and is discharged to a granular drainage blanket at the top of the drains. In some cases, the water discharges from the drain into coarse-grained layers that intercept the drain.

PVD is an economical consolidation and densification ground improvement system that supports your project to *Go Vertical with Confidence.*