

Subsurface Conveyance System

USDA, Natural Resources Conservation Service

Scope

This standard applies to the design and installation of perforated pipe conduits placed beneath the surface of the ground, to provide for the collection and conveyance of snowmelt and storm runoff from roofs.

As a local amendment to NRCS Conservation Practice Standard 606, Subsurface Drain, this practice covers the selection and installation of shallow (less than 2 foot depth) subsurface drainage pipe, with the purpose of collecting and conveying of roof runoff only. **This practice is not to be used for the collection of subsurface or laterally moving groundwater, or to protect or drain subsurface water away from buildings, foundations or other structures.**

Background

The use of infiltration systems has been an accepted **Best Management Practice (BMP)** in the Lake Tahoe Basin for many years. The purpose of an infiltration system is to collect and infiltrate runoff from impervious surfaces, thereby reducing the potential for surface erosion and the migration of undesirable chemical constituents from the site.

Infiltration system designs are based on soil and slope site conditions, and should be able to store the expected runoff from a '1 inch 1 hour' design storm event. There are local site conditions such as low soil permeability, steep slopes, and /or proximity to sensitive structures where the standard design may need to be augmented by the addition of a subsurface drain, to more efficiently convey water to a receiving structure such as a drywell. For additional information on infiltration systems and drywells refer to NRCS Conservation Practice Standard 570-Runoff Management.

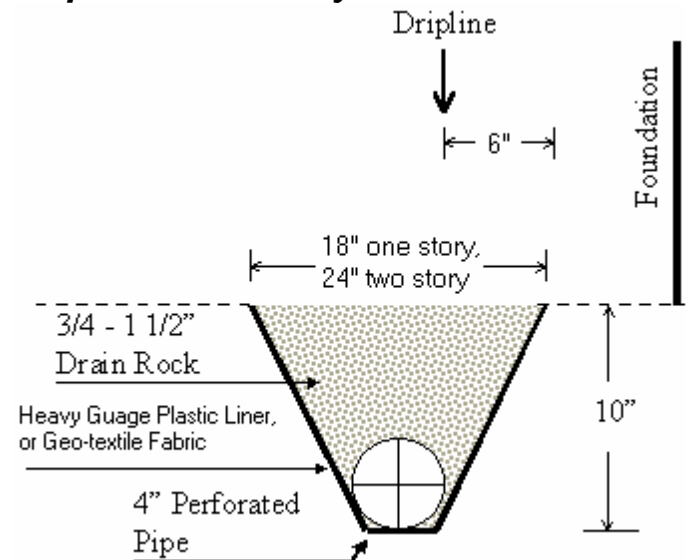
Design Details

Subsurface drains should be used for applications in the Lake Tahoe Basin (covering less than 3000 square feet of contributing roof surface area) a subsurface drain can be installed using standard 4-inch diameter

perforated PVC pipe or corrugated polyethylene tubing. Trenches

should be excavated to create a minimum 1% slope in the direction of flow. In addition, an 8 mil plastic liner should be placed to capture roof runoff and direct it into the drain pipe. Geo-textile may replace plastic liner for applications where water will not flow or percolate towards a foundation or other sensitive structure. Refer to Figure 1 for a typical installation design.

Figure 1. Typical Installation, 4" Drip-line Conveyance.

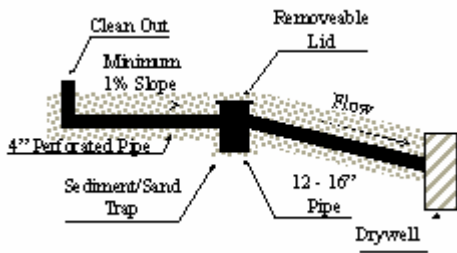


Cleanouts and/or sediment traps should be installed at the upper and lower end of each pipe section, and at all bends and abrupt changes in slope. Cleanouts can be constructed by the inclusion of an elbow or a 'T' extending above the surface and capped with a threaded cover. Inline sediment traps can be included into the system by placement of a pre-cut culvert section placed vertically into the trench. Refer to Figure 2 for installation details.

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Figure 2. Clean Out & Sediment Trap



Subsurface drainage systems deliver flow to a drywell, where runoff is allowed to infiltrate into the surrounding soil. Drywells require the design expertise of a qualified professional to insure adequate capacity and performance.

Materials

All materials shall comply with the following applicable reference standards:

Pipe:

ASTM D2729 – Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM F405 – Corrugated Polyethylene Tubing and Fittings

Gravel:

Gravel for drip-line drains shall be clean, free of fines and poorly graded 3/4 to 1-1/2 inch diameter.

Installation Guidelines

Trench should be excavated to the dimensions indicated in Figure 1. The trench bottom shall be smooth and free of clods, loose or exposed rock. Care should be taken when placing the pipe into the trench bottom to avoid direct contact with protruding or sharp rocks. The trench for the standard 4" subsurface drain is to be lined with a heavy gauge plastic liner prior to placement of pipe. Filter fabric may replace heavy gauge plastic liner where sensitive structures will not be damaged by water percolation. Non-perforated pipe/tubing may be used when the line passes through areas where root growth may create an obstruction, or when crossing hard rocky areas.

Maintenance

Buildup of leaves, conifer needles and sediment should be periodically removed from the surface of the trench to insure adequate capacity to allow storm-water into the trench. Additionally, the use of a hose to wash out any sediment buildup in the pipe should be conducted through the cleanout access pipes. Further maintenance should be performed on all sediment traps and the infiltration well(s), to remove the buildup of sediments from the bottom of the structure.

All installers and homeowners should note that the design of this shallow drainage system does not include the ability to support extreme surface loading due to vehicular traffic. Damage to the pipe and reduced long-term function may result from driving vehicles over the top of the trenches.

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