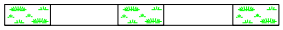
Non-Structural Low Impact Development Controls

Vegetated Conveyance Systems

Plan Symbol



Description

Vegetated conveyances are designed and installed as an alternative to curb and gutter and hard piping storm water conveyance systems. Open vegetated conveyances improve water quality by providing partial pollutant removal as water is filtered by the vegetation and by the opportunity to infiltrate into the soil. Open vegetated conveyances also are designed to reduce flow velocities when compared to hard piping systems.

When and Where to Use It

Open vegetated conveyance systems are incorporated into moderate to low density development sites where land is available and where the land surface is gently sloping (less than 5 percent). The soil must be able to withstand the design tractive forces and flow velocities of the open conveyance, or an applicable

Design Criteria

Design Turf Reinforcement Mats or Erosion Control Blankets to protect the open conveyance. Install a dense cover of strong rooted vegetation in the conveyance systems. For maximum water quality benefits, design vegetated open conveyances with a flat longitudinal slope to promote low velocity flow.

Installation

Construct vegetated conveyances with trapezoidal or parabolic cross section with relatively flat side slopes (flatter than 3H:1V).

Install a flat bottom between 2 and 8 feet wide.

During construction, it is important to stabilize the channel before the turf has been established, either with a temporary grass cover or with the use of natural or synthetic erosion control products.

Inspection and Maintenance

- The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If properly designed and regularly maintained, vegetated swales can last indefinitely.
- The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover.
- Maintenance includes periodic mowing (with grass never cut shorter than the design flow depth), weed control, watering during drought conditions, re-seeding of bare areas, and clearing of debris and blockages.
- Remove accumulated sediment manually to avoid the transport of resuspended sediments in periods of low flow and to prevent a damming effect from sand bars. Minimize the application of fertilizers and pesticides.
- Repair damaged areas within a channel.
- Inspect for a healthy thick grass cover. Re-seed as necessary.

Water Quality BMPs

Water Quality control BMPs can be classified into two major classifications:

- Non-structural Controls
- Structural Controls.

The following post construction water quality BMPs are discussed in this BMP Manual:

Non-Structural Low Impact Development Controls

Vegetated Conveyance Systems
Stream Buffers
Disconnected Rooftop Drainage to Pervious Areas
Cluster Development
Natural Infiltration

Structural Controls

Wet Detention Ponds
Dry Detention Ponds
Underground Detention Systems
Storm Water Wetlands
Bioretention Areas
Infiltration Trench
Enhanced Grassed Swales
Pre-Fabricated Control Devices
Vegetated Filter Strips (VFS)
Grass Paving and Porous Paving Surfaces

Innovative Technologies

To encourage the development and testing of innovative alternative water quality BMPs, alternative management practices that are not included in the Handbook, Standard Specifications and Standard Drawings may be accepted upon review and approval.

Water Quality Volume

The water quality volume is the storage needed within a water quality control BMP to control the "first flush" of runoff during a storm event. The water quality volume can be calculated as:

$$WQV = \frac{FFV * DA}{12}$$

Where:
FFV = First flush runoff depth inches (½, 1.0, or 1-½ dependent upon site conditions)
WQV = Water quality volume (acre-feet)
DA = Design drainage area to water quality BMP (acres)

Variances

SCDHEC may grant variances from the State Storm water Management Regulations for post-construction water quality if the applicant provides sufficient data and acceptable justification. The applicant must provide a written request for a variance in the Permit application package specifically stating the variances sought and all data that supports the variance. SCDHEC has the authority to reject a written request for a variance if the justification is deemed unacceptable or is associated with a project located in sensitive areas of South Carolina where variances have been deemed to be unacceptable.

A project may be eligible for a waiver from water quality control requirements if the applicant can justly verify that:

- The proposed land development activity will return the disturbed areas to the pre-development land use and runoff conditions.
- The proposed land development will create land use conditions that have the potential to discharge less pollutants than the pre-development land use conditions.
- The pre-development land use conditions are unchanged at the end of the project.
- An alternative water quality plan is designed that provides a reasonable alternative to water quality storage and release time requirements and that still fulfills the intent of the regulations. Specific development sites may not have enough land area to incorporate traditional water quality structures that provide the required storage volume. Alternative technologies and development techniques may be acceptable provided that sufficient documentation exists as to the effectiveness and reliability of the proposed structures or techniques.
- Exceptional circumstances exist such that strict adherence to the regulations could result in unnecessary hardship and not fulfill the intent of the regulations.

This variance does not exclude water quality, erosion prevention, sediment control from being implemented during the active construction phases of a particular project.