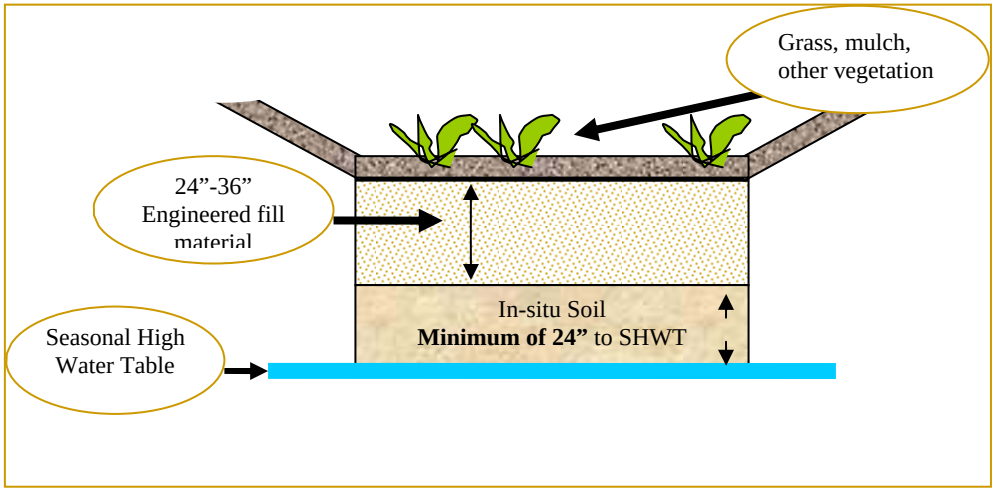
REQUIREMENTS AND GUIDANCE FOR DESIGN, CONSTRUCTION AND MAINTENANCE OF BIORETENTION AREAS FOR COMPLIANCE WITH SB 845

In a large proportion of the state, some type of stormwater controls are now in place. When bioretention cells are used in those areas to meet a state or local stormwater mandate, **Chapter 12 of the Division of Water Quality's Stormwater BMP manual** (LINK THIS) will determine how those systems are to be designed, installed and maintained. However, state legislation (SB 845, Session Law 2008-198) adopted in July of 2008, requires that projects in areas of the state not under an existing mandate to control stormwater (as of April 1, 2009) must limit the impervious pavement on larger parking areas or install, as an alternative, a bioretention stormwater treatment system. For these bioretention systems, the technical requirements and specifications are almost all identical to those specified in Chapter 12 with a few exceptions as shown below.

Conditions that may differ from Chapter 12 of the Stormwater Manual

1. The bioretention cell design for SB 845 compliance does not require that the runoff from the entire impervious surface be treated. In SB 845, only 20% of the "Vehicular Surface Area" must be treated. However, the law specifies that the bioretention cell should be designed to treat the runoff of the first two inches of rain rather than the traditional design storm of one inch for much of the state.
2. Sizing of the cell should be adequate to account for any additional runoff (other than the 20% parking area required) that might flow into the cell, including any off-site drainage.
3. As with the standard bioretention cell specifications, volume in excess of the design volume shall bypass the bioretention cell. However, in bioretention cells installed for compliance with SB 845, a minimum-length vegetated filter strip is not required for bypass or overflows, although filter strips or other devices to assure non-erosive flow conditions are required.

Standard design conditions that apply to all bioretention cell installations

1. Side slopes stabilized with vegetation shall be no steeper than 3:1.
2. Bioretention facilities shall not be used where the seasonally high water table less than 2 feet below bottom of BMP.
3. Media permeability of 0.52-6"per hour is required, 1-2 in per hour is preferred.
4. The design shall be located a minimum of 30 feet from surface waters.
5. The design shall be located a minimum of 100 feet from water supply wells.
6. Media should be specified as listed in Chapter 12 of the DWQ Stormwater BMP Manual.

7. The phosphorus index (P-index) for the soil must be low, between 10 and 30. This is enough phosphorus to support plant growth without exporting phosphorus from the cell.
8. An underdrain shall be typically installed if in-situ soil drainage is less than 2 in/hr or if there is in-situ loamy soil (~12% or more of fines). This is usually the case for soil tighter than sandy loam or if there has been significant soil compaction from construction.
9. Clean-out pipes must be provided if underdrains are required.
10. Inflow must be sheet flow or utilize energy dissipating devices that reduce the velocity to one foot per second for standard bioretention cells or two feet per second for grassed bioretention cells.
11. Ponding depth shall be 12 inches or less. Nine inches is preferred.
12. Media depth shall be specified for the vegetation used. For grassed cells, use 2 feet minimum. For shrubs or trees use 3 feet minimum.
13. Flow into all bioretention cells must have some type of pretreatment as specified in Chapter 12 of the DWQ Stormwater BMP Manual.
14. To assure that the bioretention device is not later converted to another use, it should be located in a recorded drainage easement with a recorded access easement to a public right of way (ROW).
15. Unless specifically designed to address high velocity inflows, bioretention facilities shall not be used where slopes are greater than 20%.
16. Design and installation of bioretention systems must be performed by appropriate professionals who meet any North Carolina occupational licensing requirements for the type of system proposed. At the present time, NC State University Department of Biological and Agricultural Engineering offer workshops on design, installation and maintenance of bioretention systems.