N-1. Disconnection of Rooftop Runoff

Rooftop disconnection involves directing flow from downspouts onto vegetated areas where it can soak into or filter over the ground. This disconnects the rooftop from the storm drain system and reduces both runoff volume and pollutants delivered to receiving waters. To function well, rooftop disconnection is dependent on several site conditions (e.g., flow path length, soils, slopes).

Applications:

There are many opportunities for disconnecting rooftops in both new and redevelopment designs. Runoff may be directed to undisturbed natural areas (e.g., vegetated buffers) or landscaped areas (e.g., lawns, grass channels). Rooftop disconnection is possible in commercial, industrial, and residential settings given the constraints listed below.

Performance:

The P_E values shown in Table 5.6 may be applied to the ESD sizing criteria when the contributing rooftop area is adequately disconnected. Re_v requirements (see Chapter 2) are also addressed when the P_E from Table 5.6 meets or exceeds the soil specific recharge factor listed in Section 2.2.

Constraints:

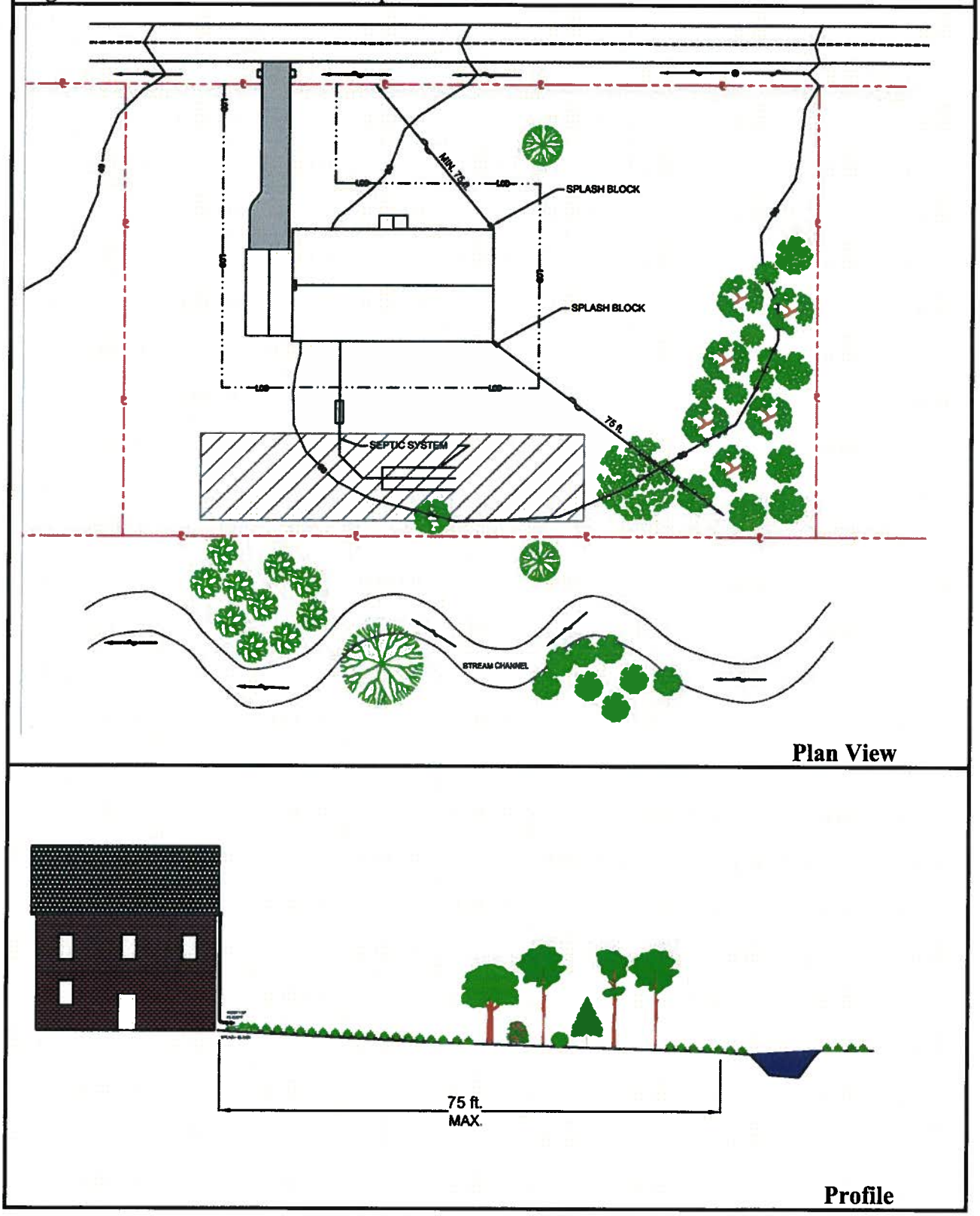
The following constraints are critical when considering the use of rooftop disconnection to capture and treat stormwater runoff:

- **Space:** A permeable, vegetated treatment area equal to the flow path length must be available down gradient from the downspout to effectively disconnect rooftop runoff. Additional treatment using micro-scale practices may be used to fully meet P_E requirements.

- **Topography:** Runoff must be conveyed as sheetflow from the downspout and across open areas to maintain proper disconnection. Level spreaders may be needed at the downspout to dissipate flow. Additionally, disconnected downspouts should be located on gradual slopes ($\leq 5\%$) and directed away from buildings to both maintain sheetflow and prevent water damage to basements and foundations. If slopes are too steep ($> 5\%$), a series of terraces or berms may be required to maintain sheetflow. These terraces may be readily constructed of landscaping stones, timber, or earthen berms.

- **Soils:** Downspout disconnections work best in undisturbed, sandy soils that allow runoff to infiltrate. Clayey soils or soils that have been compacted by construction equipment greatly reduce the effectiveness of this practice and soil amendments may be needed.

Figure 5.4 Disconnection of Rooftop Runoff



- **Drainage Area:** The rooftop area to each downspout should be small enough to prevent concentration of flow within the permeable treatment area. Disconnections may not be feasible for large rooftops or those with a limited number of downspouts.

- **Reconnections:** Disconnections are ineffective if runoff flows onto impervious areas located directly below the downspout. This practice may not be feasible if there are large areas of imperviousness close to downspouts.

Design Guidance:

The following conditions should be considered when designing rooftop disconnections:

- **Conveyance:** *Runoff from disconnected downspouts shall drain in a safe and non-erosive manner through vegetated areas to the property line or downstream BMP.*

- **Treatment:** Disconnections shall meet the following conditions:

  - *A pervious area at least 15 feet long (12 feet for Eastern Shore projects) shall be available down gradient of disconnected downspouts.* The length of the disconnection flow path may be increased up to 75 feet to address larger values of P_E as shown in Table 5.6.
  - *Disconnections shall be located on an average slope of 5% or less.* Terraces, berms, or similar grade controls may be used where average slopes exceed 5%.
  - *The drainage area to each disconnected downspout shall be 500 ft^2 or less.*
  - *Disconnected downspouts shall be at least 10 ft. from the nearest impervious surface of similar or lower elevation to prevent reconnection.*

Table 5.6. ESD Sizing Factors for Rooftop Disconnection

	Disconnection Flow Path Length (ft.)				
Western Shore	15	30	45	60	75
Eastern Shore	12	24	36	48	60
P_E (in.) =	**0.2**	**0.4**	**0.6**	**0.8**	**1.0**

- **Landscaping**: *Areas receiving disconnected rooftop runoff shall be identified and notations related to grading and construction operations included on the landscaping plans.*

  Disconnections should be directed over HSG A, B, or C (e.g., sands, sandy loams, loams). HSG D or soils that are compacted by construction equipment may need to be tilled and/or amended to increase permeability. Groundcover should be provided after any soil amendments are used. Turf grass is the most common groundcover in residential applications. However, trees and shrubs as well as other herbaceous plants will enhance infiltration and evapotranspiration of runoff.

Construction Criteria:

The following items should be addressed during the construction of projects with planned rooftop disconnections:

- **Erosion and Sediment Control**: *Erosion and sediment control practices (e.g., sediment traps) shall not be located in vegetated areas receiving disconnected runoff.*

- **Site Disturbance:** Construction vehicles and equipment should avoid areas receiving disconnected runoff to minimize disturbance and compaction. *Should areas receiving disconnected runoff become compacted, scarifying the surface or rototilling the soil to a depth of four to six inches shall be performed to ensure permeability.* Additionally, amendments may be needed for tight, clayey soils.

Inspection:

A final inspection shall be conducted before use and occupancy approval to ensure that sizing for treatment areas have been met and permanent stabilization has been established.

Maintenance Criteria:

Maintenance of areas receiving disconnected runoff is generally no different than that required for other lawn or landscaped areas. The areas receiving runoff should be protected from future compaction (e.g., by planting trees or shrubs along the perimeter). In commercial areas, foot traffic should be discouraged as well.