BMP 5.8.1: Rooftop Disconnection

Minimize stormwater volume by disconnecting roof leaders and directing rooftop runoff to vegetated areas to infiltrate.

Key Design Elements

- Stormwater collection systems.
- Redirect rooftop overland flow to minimize rapid transport to conveyance structures and impervious areas, such as ditches and roadways.
- Direct runoff to vegetated areas designed to receive stormwater.

Potential Applications

Residential: Yes
Commercial: Yes
Ultra Urban: Limited
Industrial: Limited
Retrofit: Limited
Highway/Road: Limited

Stormwater Functions

Volume Reduction: High
Recharge: High
Peak Rate Control: High
Water Quality: Low

Water Quality Functions

TSS: 30%
TP: 0%
NO3: 0%

Description

Traditionally, building codes have encouraged the rapid conveyance of rooftop runoff away from building structures. It is not uncommon for municipal codes to specify minimum slopes which serve to accelerate overland flow onto and across yards and lawns, directed ever more rapidly toward streets and gutters. Concerns pertaining to surface ponding of rooftop stormwater and potential ice formation on sidewalks and driveways are the main drivers of these lot requirements (Center for Watershed Protection, 1998). These requirements, stemming from a convention of rapid transmission of stormwater, serve to discourage on-site treatment of rooftop stormwater. This trend is further exacerbated in northern latitudes where icing concerns are paramount and, consequently, where downspouts may be connected directly to the stormwater collection system.

Disconnecting roof leaders from conventional stormwater conveyance systems allows rooftop runoff to be collected and managed on site. Rooftop runoff can be directed to designed vegetated areas (discussed in Chapter 6) for on-site storage, treatment, and volume control. This BMP offers a distributed, low-cost method for reducing runoff volume and improving stormwater quality through:

- Increasing infiltration and evapotranspiration.
- Increasing filtration.
- Decreasing stormwater runoff volume.
- Increasing stormwater time of concentration.

Variations

In addition to directing rooftop runoff to vegetated areas, runoff may also be discharged to non-vegetated BMPs, such as dry wells, rain barrels, and cisterns for stormwater retention and volume reduction. With proper design, this rooftop water can be used for lawn watering, gardening, toilet flushing and fire protection.

Applications

Routing rooftop runoff to naturally vegetated areas will reduce runoff volume and peak discharge, as well as improve water quality by slowing runoff, allowing for filtration, and providing opportunity for infiltration and evapotranspiration. The use of pervious areas for rooftop discharge has the ability to reduce the quantity of site stormwater runoff and improve the quality of the stormwater that does discharge from the site. Alternatives for disconnecting roof leaders and the use of vegetated areas should consider the following issues (Prince George's County Department of Environmental Protection, 1997; Maryland Department of the Environment, 1997).

- Encourage shallow sheet flow through vegetated areas, using flow spreading and leveling devices if necessary.
- Direct roof leader flow into BMPs designed specifically to receive and convey rooftop runoff.
- Direct flows into stabilized vegetated areas, including on-lot swales and bioretention areas.
- Rooftop runoff may also be directed to on-site depression storage areas.
- Runoff from industrial roofs and similar uses should not be directed to vegetated areas, if there is reason to believe that pollutant loadings will be elevated.
- Limit the contributing rooftop area to a maximum of 500 ft^2 per downspout.
- Flow from roof leaders should not contribute to basement seepage.

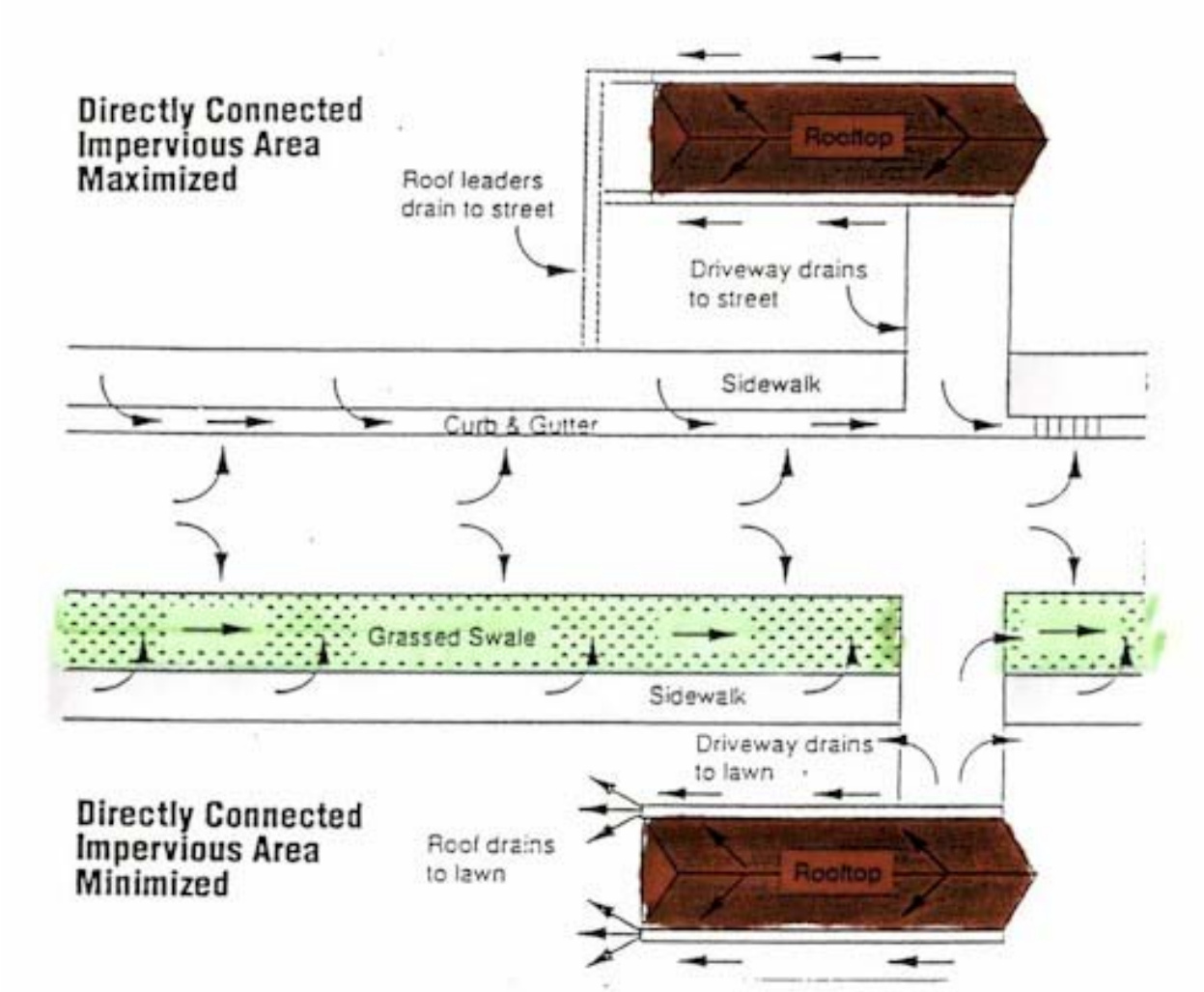


Figure 5.8-1 Examples of Directly Connected Impervious Areas (Roesner, ASCE, 1991)

Careful consideration should be given to the design of vegetated collection areas. Concerns pertaining to basement seepage and water-soaked yards are not unwarranted, with the potential arising for saturated depressed areas and eroded water channels. The proper design and use of bioretention areas, infiltration trenches, and/or dry wells will reduce or eliminate the potential of surface ponding and facilitate functioning during cold weather months.

Maintenance of the planted areas would be required, but would be limited. Routine maintenance would include a biannual health evaluation of the vegetation and subsequent removal of any dead or diseased vegetation plus mulch replenishment, if included in the design. This maintenance can be incorporated into regular maintenance of the site landscaping. If the vegetated area is located in a residential neighborhood, the maintenance responsibility could be delegated to the residents. The use of native plant species in the vegetated area will reduce fertilizer, pesticide, water, and overall maintenance requirements.

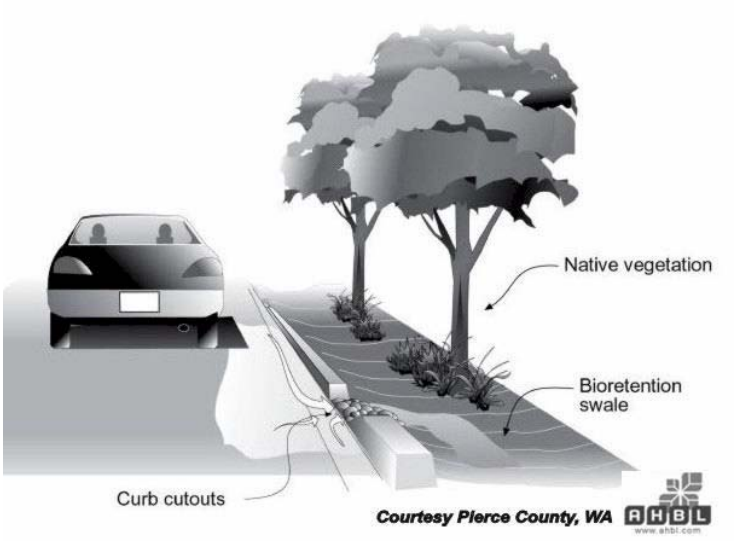
Cost Issues

Construction cost estimates for vegetated areas should be similar or in line with that of conventional landscaping. If bioretention areas are incorporated into the site, their costs are slightly more than costs required for conventional landscaping. Commercial, industrial, and institutional site costs range between $10 and $40 per square foot, based on the design of the bioretention area and the control structures included. These costs, however, can potentially be offset by the reduced costs of conventional stormwater management systems that otherwise would be required, if it were not for the reduction achieved through the application of this BMP.

References

Prince George's County Department of Environmental Protection, 1997
Maryland Department of the Environment, 1997
Center for Watershed Protection, 1998

BMP 5.8.2: Disconnection from Storm Sewers



Minimize stormwater volume by disconnecting impervious roads and driveways and directing runoff to grassed swales and/or bioretention areas to infiltrate.

Key Design Elements

- Disconnect road and driveways from stormwater collection systems.
- Redirect road and driveway runoff into grassed swales or other vegetated systems designed to receive stormwater.
- Eliminate curbs/gutters/conventional collection and conveyance.

Potential Applications

Residential:	Yes
Commercial:	Yes
Ultra Urban:	Limited
Industrial:	Limited
Retrofit:	Limited
Highway/Road:	Limited

Stormwater Functions

Volume Reduction:	High
Recharge:	High
Peak Rate Control:	High
Water Quality:	Low

Water Quality Functions

TSS:	30%
TP:	0%
NO3:	0%