

Section 10

Maintaining Green Streets

Maintaining Green Streets



Like all infrastructure, green street practices require a detailed maintenance regime. Integrating the who, what, when, and how of maintenance into design concepts will ensure that the final project reflects local capacity and resources. Matching practice selection with site-specific resource conditions will improve the likelihood of appropriate regular maintenance and project success. A detailed maintenance plan describes these elements and should accompany any Green Streets design. Maintenance plans typically include:

- **WHO:** Identification of the responsible parties to manage maintenance tasks.
- **WHAT:** A protocol of tasks (such as weeding and sediment removal) and any determination of functionality (such as an infiltration test)
- **WHEN:** Timing of regular maintenance.
- **HOW:** Design details with photographs to identify plant species and necessary tools to perform maintenance tasks.
- **WHY:** Without a maintenance plan, a green street will appear neglected. Overgrown plant may become an eyesore and deter from the objective of a green street.

Long-term funding should be considered if equipment purchase is necessary or the municipality elects to hire skilled workers to fulfill the maintenance requirements. For projects in a state highway right-of-way, a signed maintenance agreement between the host municipality and VTrans is required to ensure continued compliance with stormwater laws. Maintenance agreements are also required when the site is permitted by the state.

10.1 PLANNING: BEFORE AND DURING CONSTRUCTION

Before any construction occurs, proper measures for protecting existing vegetation should be established. Details specific to tree root zone protection should be noted in any project that includes disturbance of developed land. To meet state regulations, erosion and sediment controls (ESC) are expected to be installed before the start of any construction project. It is essential that municipalities and state agencies regularly inspect ESC throughout the construction process to prevent undue harm of waterways during the construction of a project. The timing of

Maintaining Green Streets

when a stormwater facility comes ‘on line’ is also vital during the completion of a project. Some facilities, like rain gardens, are required to remain ‘off line’ until all construction is complete and, in many cases, until vegetation is established. Careful oversight of these steps will enable the life of a project to start on positive footing.

10.2 WHO

The decentralization of green stormwater infrastructure was partially motivated by the feasibility of maintenance on a smaller scale. Rather than requiring heavy equipment for the maintenance of centralized systems, such as detention ponds, green streets options can be maintained with shovels, rakes and pruners.

Early in a Green Streets design process, planners and designers should seek to be in close contact with municipal staff to best understand the human resources available for long-term maintenance. If the new infrastructure will require duties that depart from current practices, staff training needs should be identified and planned for prior to project completion.

Green Streets maintenance is commonly completed by one of three options: solely by a municipality as part of their public infrastructure upkeep tasks, through a private–public partnership where an organization works with the municipality to take over the work or pays for an outside group to do it, or through a publicly-funded contract to a professional maintenance crew. The City of Portland, Oregon has developed a stewardship program for volunteers to help maintain Green Streets. While they have staff that oversee maintenance of the infrastructure, they provide a clear list of tasks that stewards can undertake and when. The City also provides details on the schedule and content of tasks that will be undertaken by staff or a contractor. Green Streets maintenance success is also influenced by educating surrounding residents and businesses so that they are connected to and aware of the living system in their neighborhood. For example, maintenance staff can leave door hangers for Green Street neighbors with a description of the work performed and contact information for reporting maintenance needs between regular visits.

10.3 WHAT

Maintenance interventions differ by practice type. Note that most practices fall into more than one category, and as a result will need attention that addresses multiple functions. A maintenance plan specific to the infrastructure on your site will ensure

clarity for those administering the inspection and upkeep tasks. Green Street’s practice maintenance can be categorized based on several factors:

Presence and type of vegetation

Practices that utilize vegetation will necessitate regular care of the vegetation. Tasks range from regular mowing in grass swales, weed removal in bioretention cells, and pruning of trees. In all cases, vegetation requires special care, including watering, during establishment.

Pretreatment

Pretreatment allows settling of particles out of stormwater before it is routed to a vegetated practice. Catch basin sumps and forebay cells are common pretreatment mechanisms. Because they function as settling basins, practices that utilize pretreatment should have sediment regularly removed. Depending on the practice and design, this is commonly achieved either by hand with a flat shovel or with a vacuum truck.

Mechanism of treatment

Both infiltration and filtration practices require consistent ability for water to move through the media (known as hydraulic conductivity). In these practices, removal of sediment build-up that can clog the media is necessary, usually every year. This can vary depending on the characteristics of the watershed. In bioretention cells, this type of maintenance includes scraping of the top layer of soil and mulch and replacement with fresh material.

Presence of hard infrastructure

Practices with hard infrastructure (such as underdrains or concrete inlet structures) require assessment of the integrity of the built elements. Underdrains may become clogged and require backflushing through maintenance ports at the surface of the practice. This may require pressurized hose equipment. Practices such as planter boxes or green gutters that rely on intact hard surfaces should be inspected for cracking or damage that may inhibit function.

10.4 WHEN

Maintenance should begin immediately following installation. For vegetated

Maintaining Green Streets



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systems, this is especially true as newly-planted vegetation requires irrigation and protection from weeds while root systems establish. This initial maintenance could be included in the contractor's warranty period. In these cases, it is advisable to have a retainer in place to ensure that maintenance is performed by the contractor as specified in the contract.

Infiltration and filtration practices can become clogged with sediment, rendering them useless, if not protected during construction. Requiring a post-construction infiltration test by the contractor to verify the practice integrity can incentivize extra care of the site by project managers.

10.5 HOW

Some inspection and maintenance activities are routine, like weeding and mowing. Others require special knowledge and tools, like infiltration testing or catch basin vacuuming. How an activity is completed can be flexible based on local needs. For instance, if a town does not own or regularly contract the use of a vactor truck, a shallow forebay structure can be specified to allow sediment removal with a flat shovel instead. Similarly, if a town or property owner lacks the capacity or will to maintain complex flowering perennial plantings, a simple plant palette of clumping grasses or shrubs can reduce maintenance burden without impacting practice functioning. The "how" of maintenance should carefully consider the capacity of the ultimate caretaker so design can reflect an agreed upon method for care.

10.6 WHY

Without designing with maintenance in mind, green streets and especially, green infrastructure will not perform as expected over the long-term. There are several maintenance factors to consider before project implementation, especially in our unique Vermont-climate which consists of several freeze-thaw cycles.

10.7 MAINTENANCE ACTIVITIES SPECIFIC TO VERMONT

Vermont's weather means including winterization as part of a maintenance plan. Draining, cleaning, and sealing any subsurface systems above the frost line, removing standing water with an approved vacuum cleaning device, and waste disposal are a few things to consider. Some traffic bump-out stormwater systems may require installation of vertical posts to delineate the border for snow plowing. Avoid the storage of snow piles containing sand on or near any green infrastructure practice. Communication with plowing contractors and clear delineation of practice area will be necessary to ensure compliance.

Maintaining Green Streets

10.8 MAINTENANCE ACTIVITY SCHEDULE

	Green Street Care and Maintenance Activity	2-3 Year Establishment Period		Long-Term Stewardship Phase
		Frequency	Time of Year	
VEGETATION	Water vegetation	Weekly during first 2-3 months after installation and when rainfall is less than one inch per week; 25 gallons bi-monthly via slow release device	May – September	After first three years: weekly during droughts (more than two weeks without rain).
	Spot weeding	Inspection in the spring and the fall at minimum and maintain as needed	April-October	
	Remove and replace mulch layer (and upper layer of soil if clogged)	Annually or as needed	May-June	Annually or as needed
	Prune trees and shrubs as needed to keep inlets and outlets clear		February-April	As needed
	Add planting to maintain desired vegetation density, if applicable		September/October	As needed
	Street sweep for leaves	As needed	September/October	
HARDSCAPE & TRASH	Clear stormwater curb openings of leaves, trash, debris.	Following storm events; quarterly inspections	May- November	Quarterly Inspections at minimum to maintain function
	Remove trash	Quarterly inspection at minimum and maintain as needed	May-October	Quarterly Inspections at minimum to maintain function
	Remove sediment in pretreatment cells and inflow points	Quarterly inspection at minimum and maintain as needed	May-October	Quarterly inspection at minimum and maintain as needed
	Clear top of overflow drain	Quarterly inspection at minimum and maintain as needed	May-October	Quarterly inspection at minimum and maintain as needed
	Structural repairs	Quarterly inspection at minimum and maintain as needed	May-September	Quarterly inspection at minimum and maintain as needed
	Vacuum clean out of inlet/storm lines	Annually or as needed		Annually or as needed
	Winter protection of systems	Quarterly inspection at minimum and maintain as needed	Install Fall/ Remove Spring	Annually



SOPHIE SAVOYE

MIDDLESEX, VERMONT: An interactive and educational vegetative swale.