

## Maintenance

Some of the most persistent questions practitioners or would-be practitioners ask of green infrastructure revolve around maintenance. Cost of maintenance, proper maintenance techniques, and the best maintenance schedules are all relatively unknown for keeping green infrastructure working at peak performance. However, more and more research is being done to answer these questions and to disseminate others' experience to a wider audience. In March 2013, the EPA published a report, "The Importance of Operation and Maintenance for the Long-Term Success of Green Infrastructure," which reviewed the maintenance practices for several green infrastructure projects funded by the ARRA Clean Water State Revolving Fund. This report found several common elements between the projects highlighted as well as extensive literature review. These elements were:

- Accountability mechanisms such as an operations and maintenance (O&M) plan or manual
- Documentation and tracking systems to ensure maintenance schedules are being followed and that green infrastructure is performing as expected
- Training and education for employees and volunteers
- Partnerships to supply necessary resources such as personnel, equipment, and funding
- Compliance assurance mechanisms such as maintenance agreements, especially for green infrastructure projects involving public funds and private contractors and landowners
- Dedicated funding sources

The EPA report also includes an appendix with suggested design and maintenance practices for the Clean Water State Revolving Fund's most commonly-funded green infrastructure practices, with the caveat that all practices should be adjusted for local conditions. In general, green infrastructure requires more intensive maintenance during the one-to-three-year establishment period for any vegetated installations. Designers of green infrastructure should be sure to take maintenance needs into consideration when developing plans for green infrastructure. After the establishment period, the EPA's review suggests that required maintenance can be reduced to only 3-5 times per year, with additional inspections following major rain events or during snowmelt.

Practitioners have found that maintenance can be minimized through simple designs and accurate implementation. Making inspections during precipitation events can give a real-time picture of how effectively the green infrastructure practices are performing. A study in Illinois found that overall, green infrastructure is 25% less costly to maintain than gray infrastructure and is as effective as gray infrastructure in improving stormwater quality, reducing peak flows, and mitigating flooding and sedimentation. Gray infrastructure is the term used for tradition forms of stormwater management such as pipes and storm drains.

### Further reading and resources:

- [http://water.epa.gov/grants\\_funding/cwsrf/upload/Green-Infrastructure-OM-Report.pdf](http://water.epa.gov/grants_funding/cwsrf/upload/Green-Infrastructure-OM-Report.pdf)
- <http://www.epa.state.il.us/green-infrastructure/docs/draft-final-report.pdf>
- <http://www.slideshare.net/savetherain/green-infrastructure-maintenance-workshop>