

# Executive Summary

This report summarizes findings of Domestic Scan 16-02 on leading landscape design practices for cost-effective roadside water management within transportation agencies and other organizations. The purpose of this scan was to investigate how transportation agencies are applying principles and practices of green infrastructure (GI) for roadside water management to mitigate adverse impacts of flooding, drought, and temperature extremes affecting their infrastructure.

## Scan Purpose and Scope

Although a great deal of information is published by environmental and national highway agencies, there appears to be a limited number of state Department of Transportation (DOT) agencies that are fully implementing these practices and recommendations. The intent of the published information is largely to help agencies deal with regulatory requirements to provide clean water to receivers of their locale. This scan proposed to discover those agencies that were successfully utilizing GI in their practices, what was and was not successful, and how to assist agencies to more fully, cost-effectively, and successfully provide cleaner water while simultaneously providing more environmental, social, and economic benefits.

## General Findings and Observations

After a peer-to-peer exchange and discussions of what were considered significant findings from 12 agencies meeting over four days, participants agreed that eight categories were required for successful GI implementation. Not all these categories or findings are necessarily being exercised in more than one or two jurisdictions. Nevertheless, the team determined that by using all the approaches and solutions combined would provide successful, long-term results, despite varied climates, geographies, and topographies.

## Team Recommendations

These findings and subsequent conclusions and recommendations fall into eight categories:

- Definition of GI
- Maintenance
- Watershed Approach Versus Project Site Approach
- Information Development and Sharing
- Public Outreach
- Asset Management
- Design
- Construction Inspection of Temporary and Permanent Best Management Practices (BMPs)

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The team recognized that these eight categories were those that had a significant impact on the challenges presented by implementing GI practices for roadside water management within transportation agencies. One of the first challenges is that there is no standard definition of GI. All of these challenges would be greatly reduced by recognizing the challenges agencies confront and incorporating the recommendations provided for national, state, and local entities.

The team discovered a curious paradox when looking at the state of GI in state DOTs. Local, state, and federal regulators nationwide promote, encourage, and require low-impact development (LID) stormwater measures.

- Comprehensive design guidance is widely available.
- Applied research programs continue to develop the technique.
- Regional bodies and nongovernmental organizations promote and apply LID and GI.
- Private consultants are well versed in the methods.
- LID and GI are routinely employed by private owners and their consultants.
- FHWA and the American Association of State Highway and Transportation Officials (AASHTO) promote and encourage GI.

Yet GI practice across state DOTs is inconsistent and seems to be employed only when required. GI is not yet a part of the DOT stormwater management toolbox and is not routinely employed as a standard stormwater management method.

The scan team's conclusion was that successful management of stormwater and GI is best accomplished by using a holistic approach. Planning, asset management, maintenance, and a watershed approach are inter-related and impact each other. Long-term success in both regulatory compliance and environmental stewardship is greatly improved when GI is approached as an entire system rather than segmented on a project-by-project basis.

GI's many benefits, such as environmental, economic, social, aesthetic, and habitat improvements, are worth the effort of communities and agencies to look beyond the stormwater functions.