

State of Vermont

Agency of Transportation

**Vermont Agency of Transportation (VTrans)
Green Stormwater Infrastructure (GSI) Implementation Work Plan**

Effective July 1, 2013

by


VTrans Secretary Brian Searles**I - INTRODUCTION**

Governor Shumlin, in March of 2012, signed an Executive Order which established an Interagency Green Stormwater Infrastructure (GSI) Council. The Council includes the Secretaries (or delegates) of the Agency of Natural Resources, Agency of Transportation, Agency of Commerce and Community Development, and the Commissioner of the Department of Buildings and General Services or their designees. The main responsibilities of the council include, but are not limited to:

- A. Identify opportunities for integrating GSI systems and practices into existing state programs.
- B. Develop technical guidance for implementation of GSI systems and practices.
- C. Establish a plan and timeframe for implementing GSI systems and practices associated with state properties and state constructed sites.
- D. Identify state liaisons to support GSI implementation within their agencies.
- E. Identify and undertake GSI research and monitoring studies.
- F. Identify on-going and sustainable funding sources to support regional planning, coordination, and implementation efforts.

In conjunction with the above, members of the Council are also responsible for the development of *Green Stormwater Infrastructure (GSI) Implementation Work Plans*. The purpose of the work plans is to highlight current initiatives, identify barriers and challenges to the implementation of GSI practices, and set a direction for the promotion and adoption of GSI in the years ahead. Note that these plans are a first step towards greater integration of GSI concepts into State processes and programs. A great deal of education, outreach, and discussion is needed before more specific and tactical work plans can be developed.

A. Stormwater Runoff & Traditional Treatment Methods

Stormwater runoff, caused by precipitation running off impervious surfaces, is a leading cause of surface water pollution in Vermont. Impervious surfaces generate hundreds of thousands of gallons of untreated runoff per year resulting in various negative effects to streambank stability, aquatic habitat, and infrastructure. Managing the quality and quantity of this runoff in a sustainable way is of utmost importance for the health of our communities and the protection of our natural resources.

The traditional approach to managing stormwater runoff is with "gray infrastructure," a network of pipes, storm drains, and concrete tanks where collected runoff is then discharged to receiving waters. Time has shown that this approach is very effective at conveying water but does little to mitigate volume and pollutant loads. In fact, this traditional method can cause, and has caused, additional issues downstream from end-of-pipe (outlet) structures.

B. Green Stormwater Infrastructure and its Benefits

An alternative approach is to use GSI, which relies on natural and semi-natural systems to infiltrate, treat, and store water in dispersed locations throughout the landscape. This decentralized approach deals with stormwater as close to the source as possible. Groundwater recharge, flow control, and filtration are all inherent features of GSI as it strives to manage stormwater and pollutants by restoring and maintaining the natural hydrology in a watershed and emphasizes infiltration. This approach reduces runoff and pollutant loading.

As a result, GSI has many benefits including reduced and delayed stormwater runoff volumes, enhanced groundwater recharge, stormwater pollutant reductions, flood mitigation, reduced sewer overflows, improved air quality, additional wildlife habitat and recreational space, improved human health, increased land values, and long term cost savings from reduced stormwater infrastructure operation and maintenance costs.

C. Green Stormwater Infrastructure and VTrans

VTrans has chosen to embrace the use of GSI as an effective means of mitigating and managing stormwater. VTrans is proud of its efforts put forth to date incorporating GSI into Agency projects and processes and recognizes that there are many challenges and opportunities ahead. The development of this GSI Work Plan has brought many of those challenges to light and sets a course for looking at a variety of ways to address them over the course of the coming years.

The outcome of this effort will have impacts on how VTrans goes about its business in project planning, scoping, design, construction, and operation & maintenance. The development of a VTrans GSI Implementation Work Plan has also allow VTrans to document work efforts, research, policies, practices, and strategies already in place that meet the intent of the GSI Executive Order.

Integrating GSI into Agency projects, transportation infrastructure and associated facilities statewide that VTrans owns and controls will be a multi-year effort. As a matter of perspective, VTrans owns or controls 2,702 miles of roadway; 62 District Maintenance Facilities; 9 State Airports; 24 Active Park & Rides (plus 4 inactive); 3 Gravel Pits; 14 Rail Yards (leased to 3rd party); and 2 Public Transit Facilities (leased to 3rd party).

II - VTRANS LONG-TERM VISION FOR GSI

VTrans has successfully integrated GSI systems and practices into some of its existing programs (refer to "Past and Current VTrans GSI Initiatives" section). The long-term vision for VTrans is to develop a program that uses an adaptive management approach towards the integration and implementation of GSI systems and practices into its existing programs to the maximum extent practicable, given financial and resource constraints, barriers and challenges to GSI implementation, and to the extent that it does not interfere with VTrans' Mission.

VTrans' Mission statement is...

"To provide for the safe movement of people and goods in a reliable, cost effective and environmentally responsible manner."

VTrans will need to address how and to what extent GSI will be implemented across Agency functions. Although GSI is an important practice to have in the tool box, developing strategic policy recommendations and specific actions addressing the issues, barriers, questions, and opportunities put forth in this GSI Work Plan needs to be a balanced and fitting approach for the transportation sector. This effort will focus on identifying initiatives that promote transportation co-benefit opportunities such as flood resilience, regulatory relief, mitigation, and cost savings, and recognize strategies worthy of research and more analyses. Timing for considering integrating and implementing GSI systems and practices into VTrans operating systems, across all state property and into all projects, will vary depending upon the specific initiative. Progress will be reported annually.

III - PAST AND CURRENT VTRANS GSI INITIATIVES

There are three (3) major Divisions within VTrans that are involved and influence how projects are planned, designed, constructed, and maintained. It is within these Divisions of the Agency that GSI is being practiced to varying degrees. Current Initiatives discussed in this GSI Work Plan are supported by federal or state funds tied to projects or operation and maintenance budgets. The level of funding from year to year is not reliable and thus neither will be the level of GSI implementation from one budget year to the next.

Past and current GSI initiatives by Program are listed below which will be updated annually to reflect current state of GSI practice at VTrans.

A. Policy, Planning and Intermodal Division (PPAID)

The Policy and Planning Section of PPAID is responsible for developing Agency policy, preparing the State Long Range Transportation Business Plan and the State Transportation Improvement Program; strategic, modal and corridor management plans; and for regional planning relationships and activities. PPAID also includes Aviation, Public Transit and Rail Sections.

1. Aviation (9 State Airports), Public Transit (2 facilities) and Rail (14 facilities)

Compliance under the NPDES Multi-Sector General Permit (MSGP) for Industrial Stormwater with site specific Stormwater Pollution Prevention Plan (SWPPP) for each state airport, rail and public transit facility considers the need for stormwater treatment practices including GSI. Some of these facilities are also subject to State Stormwater Discharge Permits which may have constructed GSI under that permit program.

2. Rest Areas (15 sites) leased to third party (BGS)

Rest Areas and Welcome Centers will be addressed by Buildings and General Services (BGS).

3. Highway Stormwater Treatment Practice Research

Linear Highway Stormwater Treatment Best Management Practice Research has been recently completed in 2012 looking at which types of GSI are better suited for the linear nature of the Transportation system. This information will be used to launch the development of a VTrans Highway Stormwater Design Manual and/or to augment/enhance the update of the Agency of Natural Resources Stormwater Design Manual.

B. Program Development Division (PDD)

This Division includes project design sections under Highway Safety & Design (Pavement Management, Roadway, and Structures), a Local Transportation Facilities Section, a Right-of Way Section (including

Highway Access Management), an Environmental/Hydraulics Section, a Construction Section, and a Materials & Research Section.

1. Project Scoping, Design Development and Construction

- a) Designers and plan reviewers are actively looking for opportunities to move towards GSI (i.e. pavement management projects and guardrail replacement projects....we are looking at removing timber curbing under guardrails to allow sheet flow over vegetated roadway side slopes and are actively looking for opportunities to eliminate closed drainage systems and promote surface sheet flow into vegetated areas along our projects).
- b) Other examples of GSI constructed on VTrans projects include:
 - 1) Using grass swales and disconnection along roads; disconnection of roof tops at airports; and infiltration swales within Interstate medians.
 - 2) Using rain gardens & rain barrels at Williston I-89 Welcome Centers.
 - 3) Park & Rides incorporating GSI (i.e. bioretention/infiltration at Ferrisburgh Park & Ride, gravel wetland at St. Albans Park & Ride, Waterbury Park & Ride infiltration trench, and porous pavement at Randolph Park & Ride).
 - 4) VTrans Construction Environmental Engineers monitor water quality permit compliance during construction activity and ensure appropriate erosion control practices are followed and vegetation is restored in a timely manner.

2. Right-of-Way & Highway Utilities & Permits

- a) Highway access management; "drain-on" control; and illegal connection/illicit discharge detection, elimination, and prohibition.
- b) Standard permit conditions for controlling type and volume of water entering right-of-way.
- c) Require outside right-of-way (ROW) treatment by an applicant seeking to discharge stormwater into our ROW such that there will be no increase over pre-construction flows to ROW.
- d) We are looking at holding onto our surplus land holdings where those parcels provide natural treatment of stormwater from transportation infrastructure.

3. Program Development Environmental & Hydraulics Review

- a) Scoping & Resource Identification – working with project designers to preserve natural systems (wetlands and river/lake buffers which provide stormwater treatment).
- b) Hydraulics Manual promotes adequate culvert and bridge sizing and stream equilibrium.
- c) VTrans Better Back Roads Program funds municipal water quality enhancements.
- d) VTrans Culvert and Ditching Procedure in place to offer guidance to contractors and District Maintenance Crews on proper temporary and permanent stormwater treatment controls.

4. Materials & Research

- a) Ongoing internal research, literature reviews, and stormwater treatment practice testing.
- b) Ongoing cooperative research with UVM Transportation Research Center on stormwater treatment practices (i.e. Porous Pavement Park and Ride in Randolph).

C. Operations Division (OPS)

The Agency of Transportation (VTrans) has a significant public investment in its transportation infrastructure. And it's the Operations Division (OPS) that must maintain that infrastructure for the benefit of the traveling public. The OPS Environmental Program is charged with administering compliance for the Agency under NPDES Clean Water Act and State Stormwater Permits in addition to promoting environmental stewardship in all our activities.

1. District Maintenance Facilities (62 sites) and Gravel Pits (3 sites)
 Site specific Stormwater Pollution Prevention Plans (SWPPPs) have been developed for 5 Maintenance Facilities and 3 Gravel Pit sites with plans to develop SWPPPs for the remaining 57 District Maintenance Facilities over a period of time. These SWPPPs look for and incorporate stormwater treatment practices and source control at these sites, some already including GSI. Some of these facilities are also subject to State Stormwater Discharge Permits which may have constructed GSI under this permit program.

2. District Highway Operation and Maintenance Best Management Practices
 Maintenance Activities have and will continue to be assessed to look for opportunities to incorporate GSI to the maximum extent practicable into daily operation and maintenance activities. Most of the maintenance activities that are compatible with GSI practices and philosophy are covered under Best Management Practice Guidance Documents, some of which are already in place and include:
 - a) Vegetation Management
 (Mowing, Tree, Brush, Invasive Species Management and Riparian Protection)
 - b) Bridge Washing & Vehicle Washing
 - c) Snow and Ice Control

3. Town Grant Programs
 Codes and Standards have been developed under Act 110 that promotes municipal road maintenance standards benefitting water quality, some of which are GSI.

- D. Inter-Agency Communication, Policy, and Other Programmatic Strategies involving GSI
 There are various other initiatives underway that embrace GSI and have been used meet the intent of the GSI Executive Order. These include:
 1. Inter-Agency Communication Protocol, Post Construction Stormwater Protocol, and Local Transportation Facilities Stormwater Protocol allow for meaningful opportunities to influence project design with a specific emphasis on stormwater treatment.
 2. Environmental Ethic Policy.
 3. Partnerships focused on water quality enhancements.
 4. VTrans representation on GSI Council and GSI Roundtable.

IV - BARRIERS AND CHALLENGES TO WIDESPREAD UTILIZATION OF GSI

Barriers and challenges are an expected part of any new initiative and change is particularly difficult in a large State Agency such as VTrans. We have identified some of the barriers and challenges under a number of categories listed below. The Agency hopes to gain better insight into how and if barriers can be overcome and challenges turned into opportunities. A better understanding of how GSI is relevant to VTrans from a functional perspective including planning, design, and maintenance could help move GSI further along in the Agency.

- A. Physical Barriers
 1. Site infeasibility and right-of-way space limitations.
 2. Soil suitability for infiltration.
 3. Proximity to high ground water, steep slopes, floodplains, wetlands and waterways; contaminated soils; underground utilities; Meteorological conditions.

B. Technical Barriers

1. Design and safety standards for highways (FHWA) and for Airports (FAA).
2. Inconsistent messages on the greater meaning of GSI and limited technical guidance.
3. Unknown life cycle costs and lack of understanding about what GSI will cost to design, construct, operate, maintain and replace in comparison to conventional stormwater treatment approaches.
4. Unknown risks and lack of long-term performance data.
5. Local, State, and Federal code and regulation limitations.

C. Institutional Barriers

1. Risk and liability issues.
2. Stormwater has been and sometimes still is an afterthought in project design.
3. Lack of ability of VTrans to timely alter its procedures, standards, and specifications.
4. Lack of education and training at all levels.
5. Competing Agency missions – environmental priorities challenge other Agency priorities (i.e. safety).
6. Competing interests for funding – environmental mitigation competing with other Agency priorities.
7. Leased land (Rail and Public Transit) and municipally managed projects.
8. VTrans Policy regarding Road to Affordability Priorities.

D. Financial and Resource Barriers

1. Competing interests for limited funding and mounting demands calling for more resources.
2. Perceived and real costs and lack of investment in research.
3. Lack of financial support to operate and maintain stormwater infrastructure.

V - SHORT-TERM OPPORTUNITIES AND STRATEGIES

VTrans' short-term strategy is to continue and enhance what it has done to date to incorporate GSI practices and systems into Agency Programs. We have identified a VTrans GSI Liaison to coordinate and track all internal GSI efforts and to sit on the joint State Agency GSI Council as the Agency's sole representative. This Liaison will develop an internal GSI Team representing each relevant program in VTrans that, over the coming years, will:

- A. Develop strategic policy recommendations and specific actions addressing the issues, barriers, questions, and opportunities put forth in this GSI Work Plan.
- B. Implement GSI Work Plan and prepare annual reports addressing accomplishments and challenges in that year and opportunities and strategies moving forward in the coming year.
- C. Work with ANR to identify training opportunities for VTrans staff.
- D. Support research and monitoring of new and innovative technologies.
- E. Support GSI initiatives at the local level (town road crews).
- F. Support development of technical guidance and standards.
- G. Review Better Back Roads Program for applicability of GSI components.

It is important to remember that the purpose of the GSI Work Plan is to highlight current initiatives, identify barriers, challenges, and opportunities to the implementation of GSI, and set a direction for the promotion and adoption of GSI in the years ahead. Note that this plan is the first step towards greater integration of GSI concepts into State Transportation processes, programs, and projects.

Primary Contact and VTrans GSI Team "Liaison"

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