

# Case study: Green Infrastructure in the Upper Valley

## Vermont Municipal Green Infrastructure Toolkit

Green Infrastructure (GI) means different things to different people depending on the context in which it is used. In Vermont we define it as “a wide range of multi-functional, natural and semi-natural landscape elements located within, around, and between developed areas at all spatial scales.” This includes everything from forests and meadows to wetlands, floodplains, and riparian areas. For municipalities Green Infrastructure can be promoted in two ways: by using Low Impact Development (LID) concepts at both the macro-level of town planning and site design and by promoting the use of Green Stormwater Infrastructure (GSI) practices and techniques. LID seeks to maintain a site’s pre-development ecological and hydrological function through the protection, enhancement, or mimicry of natural processes.” GSI consists of systems and practices that restore and maintain natural hydrologic processes in order to reduce the volume and water quality impacts of the built environment while providing multiple societal benefits.”

As part of a project with the Vermont Agency of Natural Resources and with other Regional Planning Commissions in Vermont, the Two Rivers-Ottawaquechee Regional Commission first sought to assess regulatory gaps and barriers to the adoption of green infrastructure programs and practices in several of our towns. In looking at our initial study towns of Bradford, Braintree, Chelsea and Hartford, we identified the following issues:

- Lack of thorough understanding of the concept of Green Infrastructure, and Green Infrastructure was often not specifically supported in municipal documents, and;
- The belief that it is only used and/or suitable in urban settings, even if the municipality has an area of relatively dense development.

After reviewing the town plans and zoning regulations for our initial study towns, we realized that, while towns may have a general understanding of the uses and benefits of Green Infrastructure, a deeper understanding is lacking. However, this was not an unanticipated finding and we recognized that providing a deeper understanding of Green Infrastructure is one of the overall goals of our work.

All of our study towns had in their town plans background discussions of the physical and ecological characteristics, and all had the general goal of protecting or improving important environmental conditions within their town.

Of our four study towns, Bradford was the only one to include a specific, albeit basic, reference to Green Infrastructure in the town plan. Inventories and technical information existed for each of our initial study towns, though we suspect the connections between using this information and Green Infrastructure are not explicitly known and understood. That being said, all four of our study towns had the foundations for adding more specific language into their town plans.

For the most part, our study towns had clauses that would support Green Infrastructure concepts within their bylaws and regulations. However, for any given town, the coverage of Green Infrastructure concepts throughout the bylaw was piecemeal. Language that would support more nuanced Green Infrastructure concepts, such as street features receiving runoff or vegetated open channels, was absent. We were surprised to find that Braintree, which is the most rural of our study towns, had an impressive amount of Green Infrastructure-related language in their Unified Bylaw.

Although many of our towns have village centers with relatively dense development, the remainder of the land area is rural. At a very basic level, Green Infrastructure is used to manage stormwater runoff and its impacts. This is a problem that rural communities are thought to be immune to, as they are not as densely developed as urban or suburban areas.

However, rural communities are not immune from the impacts of stormwater. Rather, the impacts may simply be different from those in an urban area. For example, dirt and gravel roads are considered “impermeable” in the same way rooftops, concrete, and asphalt are considered “impermeable,” but the impacts to the area surrounding those impermeable surfaces may be somewhat different. Further, stormwater impacts in a village center of a rural community (the “urban” part of the community) may be quite similar to those experienced in an urban area, but they may not be viewed that way. Like all village centers, the village centers in the Two Rivers region have many impermeable surfaces: rooftops; paved roads; sidewalks; driveways; among others. No matter the scenario, stormwater runoff impacts all areas in some way. Green Infrastructure concepts exist to manage that runoff as an alternative to traditional stormwater management techniques and can be utilized in both rural and urban communities.

## Challenges / Issues

We have identified two immediate challenges to implementing Green Infrastructure in the Two Rivers region: lack of understanding of how it can be used in the rural setting and funding. Before Green Infrastructure concepts can be integrated into town regulatory documents, local officials need to understand how these concepts can be used and tailored to a rural community. In some ways, Green Infrastructure invokes an “urban versus rural” attitude, and that attitude needs to be broken down before it can be embraced by a rural community. The first step in that process is building a foundation is to provide education and examples tailored to a rural community.

The second challenge we anticipate is funding. Direct funding for Green Infrastructure related-work has been in small quantities or nonexistent. The potential exists with the new Vermont Clean Water Act to provide funding for stormwater/Green Infrastructure work at the regional planning commission level.

## Next Steps

We foresee future work to promote Green Infrastructure in the Two Rivers-Ottawaquechee region. As part of

a pilot project, we will be developing a stormwater management plan for Ayers Brook in Randolph, Vermont. This will be an opportunity to investigate the ways Green Infrastructure may be able to be used in the Ayers Brook watershed, and also begin to understand how the information contained in a stormwater management plan can be used to further the implementation of Green Infrastructure in a largely rural watershed. Our work on the stormwater management plan will inform a stormwater education program that we are planning to develop and present in the next year. The goal of the education program will be to start to build a deeper understanding of stormwater impacts in rural areas, and we anticipate part of the program will include a discussion of Green Infrastructure.

Another next step for the Two Rivers region is to begin incorporating more language supportive of Green Infrastructure during the town plan process. This will serve the purpose of educating planning commission members, while also providing information and the town’s perspective on Green Infrastructure within the town plan. This is an important step as the town plan is the main policy document for a town, and is important document in the absence of zoning regulations. Once the town plan update is complete, the typical next step in the process is to update the town’s regulations to be consistent with the town plan. We also plan to work with interested planning commissions to include language supportive of Green Infrastructure in their town’s regulations.

Recognizing the majority of our communities, even with the presence of a village center, are quite rural, we also intend to continue to support educational opportunities for our region’s road foreman. Many miles of our region’s roads are dirt/gravel, and, as mentioned above, these surfaces are impermeable and in the presence of stormwater runoff, create impacts on the surrounding area and downstream. The Vermont Department of Environmental Conservation’s Rivers & Roads training is one example of a program that teaches road foreman best management practices for building and maintaining roads.

For more information on building Green Infrastructure in the Two Rivers-Ottawaquechee region, please contact: Two Rivers-Ottawaquechee Regional Commission, 128 King Farm Road, Woodstock, VT 05091. (802) 457-3188.

or, visit <http://vpic.info/GreenInfrastructureToolkit.html>