Effect of Low-Impact Sustainable Transportation Design as a Strategy for Alleviating Stormwater Runoff and Reducing GHG Emissions

Transportation networks typically have been designed for maximizing vehicular mobility without accounting for human accessibility or environmental considerations. However, a recent agreement between the Department of Transportation and the Environmental Protection Agency signifies a shift in thinking towards a more integrated transportation design approach. The agreement recognizes that urban sprawl and impervious surfaces such as roadways, parking lots and sidewalks encourage environmental impacts by enhancing runoff and increasing greenhouse gas (GHG) emissions while discouraging sustainable, livable communities. In this proposed effort, we address the integrative goals of the DOT and EPA by examining the potential for low-impact transportation design as an option to reduce sewage system costs and environmental GHG and nitrogen releases. Increased stormwater runoff not only generates unhealthy pollutant loads to urban streams, but also represents and increased energy demand on sewage treatment. Classic solutions to obtain a sustainable wastewater infrastructure are costly and disruptive to the transportation infrastructure. The objective of the proposed research is to assess green design alternatives to reduce transportation impacts on combined sewer loading and GHG emissions. “Green” low-impact transportation design strategies reduce runoff loading prior to generation and can also enhance community desirability, livability, and potentially property values. We propose an integrated approach that spanning multiple academic disciplines linking sustainable “green” transportation design principles with environmental implications with stakeholder input. Research will inform as to which design strategies to reduce CSOs and GHG emissions are most effective while maintaining transportation needs, which are preferred by various stakeholders, and how much stakeholders would be willing to pay for individual options.

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