



# A SURVEY OF BARRIERS AND OPPORTUNITIES TO ADOPTING GREEN STORMWATER INFRASTRUCTURE IN MICHIGAN

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*January 2020*

## Executive Summary

This executive summary presents an overview of findings from a Michigan Sea Grant funded survey carried out in 2019 of those working on stormwater management about their experience with traditional and green stormwater infrastructure (GSI), familiarity with successful GSI examples, benefits vs costs, barriers to adoption, and approaches to overcome those barriers. 190 people responded to the survey. 45% were affiliated with government, 34% were experts (consultants and academics), 14% were from the nonprofit sector, and 8% were from the building industry.

Project team notes that in the state of Michigan, decisions to utilize GSI are made at the local level by drain commissioners, public works directors, mayors, and township supervisors while implementation is carried out by the drain commission staff, public works engineers, planning groups, builders, and the consulting community.

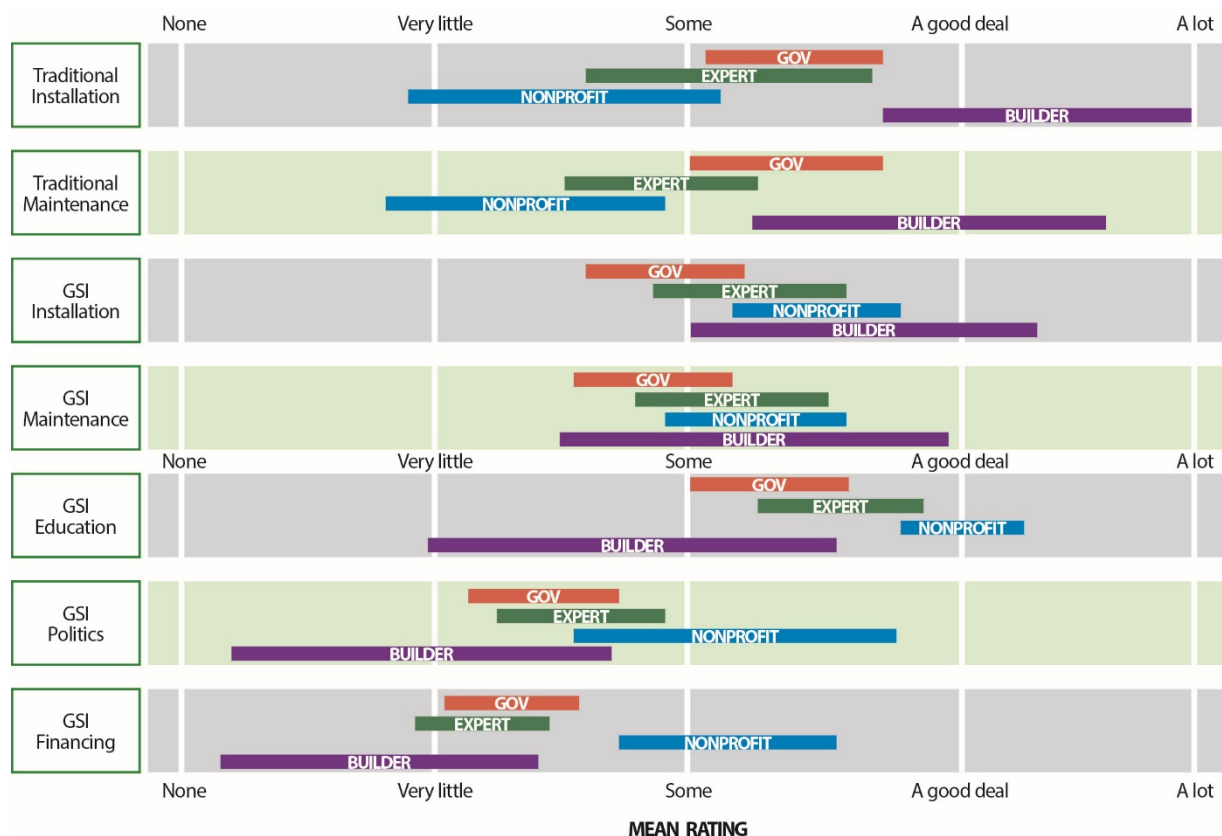
### EXPERIENCE WITH TRADITIONAL AND GREEN STORMWATER INFRASTRUCTURE

Project team asked how much experience respondents had with seven different stormwater management topics—traditional stormwater infrastructure installation, traditional stormwater infrastructure maintenance, green stormwater infrastructure installation, green stormwater infrastructure maintenance, acquiring financing for GSI, garnering political support for GSI, and educating others about GSI. Conclusions include:

1. Builders government affiliates were more experienced with traditional approaches for stormwater management.
2. When comparing the four groups, as might be expected, builders had the most experience installing and maintaining both traditional and GSI but their familiarity with GSI is less than with traditional. The range of familiarity also varied widely among survey respondents.
3. Nonprofits had the most experience educating others about, garnering political support for, and acquiring financing for GSI. Among all topics, nonprofits were most familiar with GSI education.

### OPPORTUNITY

**Because nonprofits focus on promoting GSI, better understanding of traditional stormwater infrastructure can help them better advocate a transition from traditional to GSI.**



## FAMILIARITY WITH GREEN STORMWATER INFRASTRUCTURE

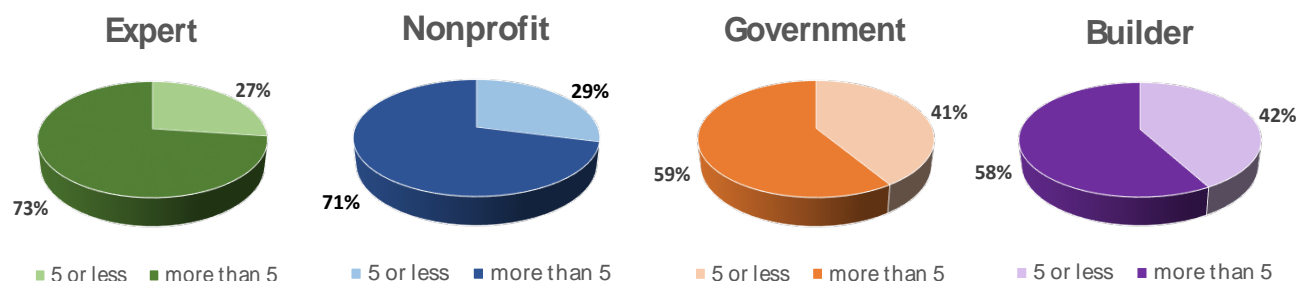
### EXAMPLES

Project team asked how many successful GSI examples respondents knew about. Conclusions include:

1. 65% of all respondents knew of more than five successful examples of GSI in Michigan.
2. Over 70% of expert and nonprofit respondents knew more than five examples, however the fraction for government and builders was lower, at 59% and 58% respectively.

### OPPORTUNITY

Because 30-40% of respondents across all four groups know fewer than 5 successful examples of green infrastructure, there may be an opportunity to provide education about GSI examples, particularly ones that would work for their specific communities.



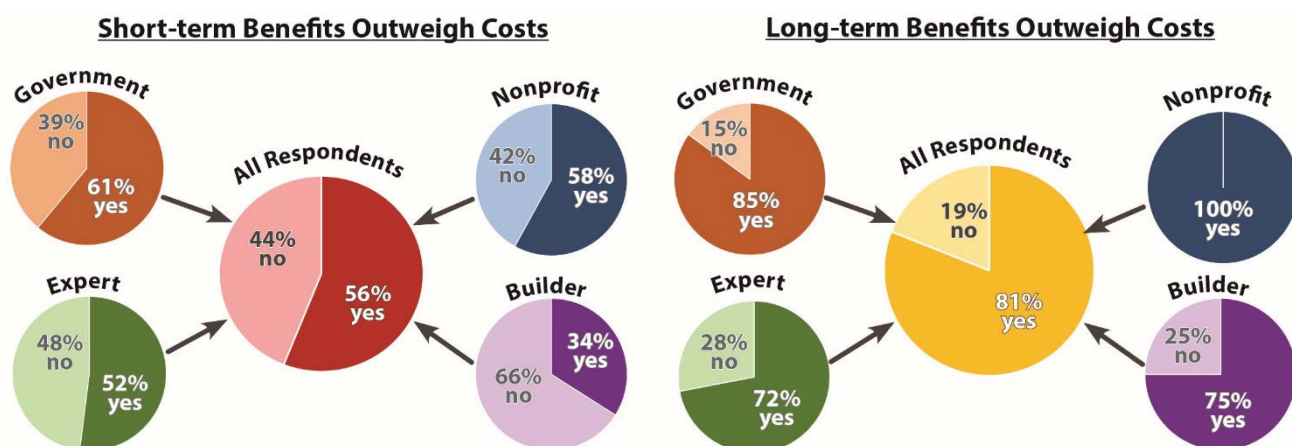
## BENEFITS VS COSTS OF GREEN STORMWATER INFRASTRUCTURE

Project team asked respondents about the benefit-cost ratio of GSI, both in the short-term and the long-term. Conclusions include:

1. A majority of respondents felt that both the long-term benefits (81%) and short-term benefits (56%) of GSI outweighed the costs with long-term benefits.
2. Across all groups, long-term benefit-cost of GSI are perceived to be higher than short-term benefit-cost, although builders are not quite as optimistic as respondents from the other three groups.
3. All but one respondent from the nonprofit sector felt the long-term benefits of GSI far outweighed the costs, whereas the distribution for short-term benefit-cost was mixed.

### OPPORTUNITY

Many of the perceived benefits associated with GSI take longer to be realized, hence the higher long-term benefit-cost ratio. Communicating longer term benefits might reduce implementation barriers.





## BARRIERS TO IMPLEMENTING GREEN STORMWATER INFRASTRUCTURE

Project team proposed 22 barriers to GSI implementation and asked how big of a barrier they were. Factor analysis of 22 barriers to adopting GSI revealed four categories of barriers (six individual barriers remained unfactored):

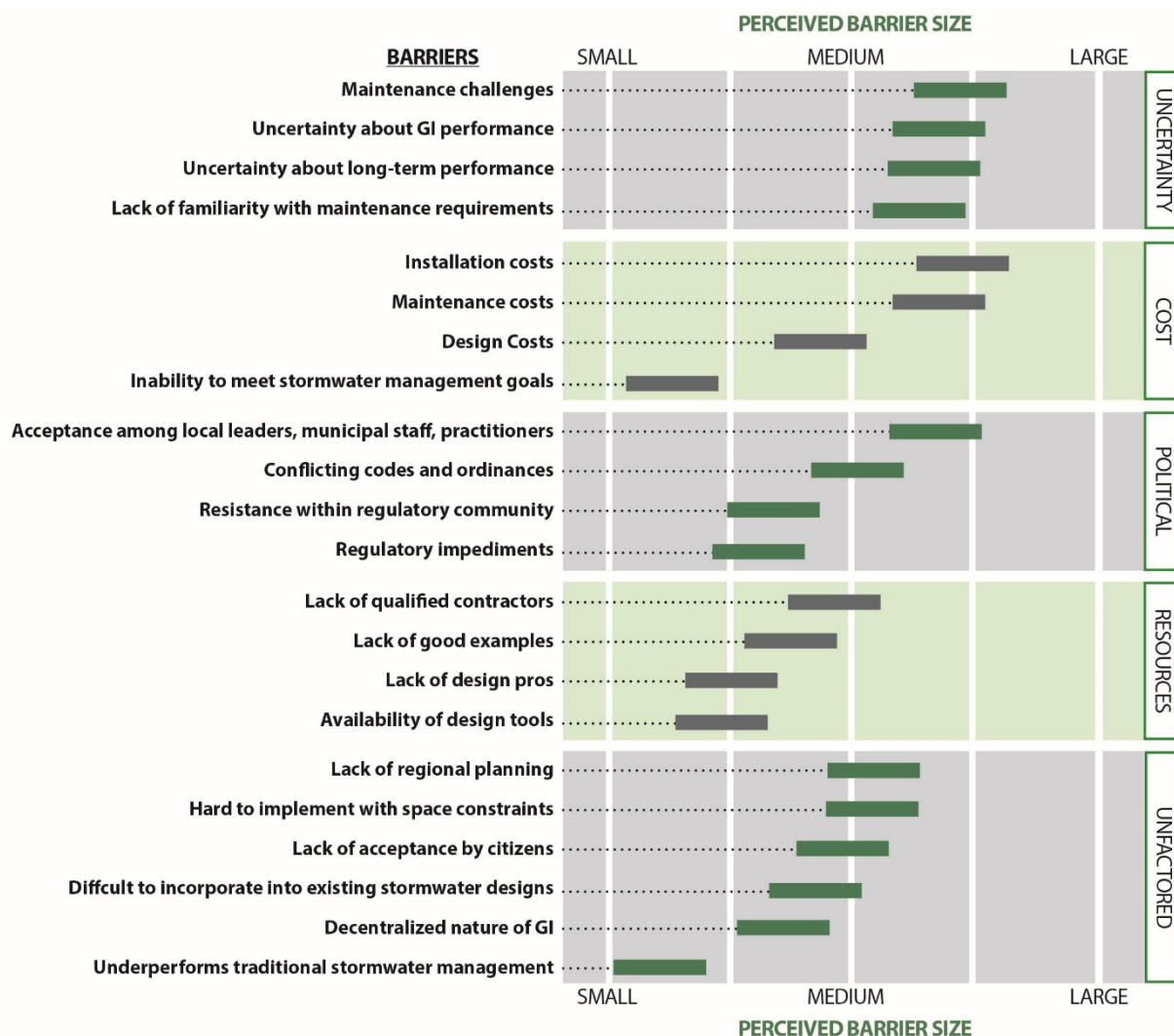
1. **Uncertainty** about GSI performance and maintenance.
2. Barriers about **costs**.
3. **Political** barriers, such as acceptance within the community and regulatory impediments.
4. Barriers about lack of **resources**, such as design professionals and qualified contractors.

The main findings about the barriers were:

1. Of the four categories, uncertainty about maintenance and long-term performance was perceived to be the highest barrier.
2. In the cost category, installation and maintenance costs were a major concern.
3. In the political category, acceptance among local leaders, municipal staff, and practitioners was the biggest barrier which was followed by conflicting codes and ordinances. Resistance from the regulatory community was less of a barrier.

## OPPORTUNITY

Moving away from status quo of traditional infrastructure represents a risk that is amplified by uncertainty about GSI maintenance/performance and concerns about costs. Addressing uncertainty about GSI performance and maintenance could be addressed through GSI success stories across a range of different communities or through additional monitoring. Addressing the cost concerns may be reduced if the costs are clearly documented and described. Short-term financing options may also reduce this barrier.

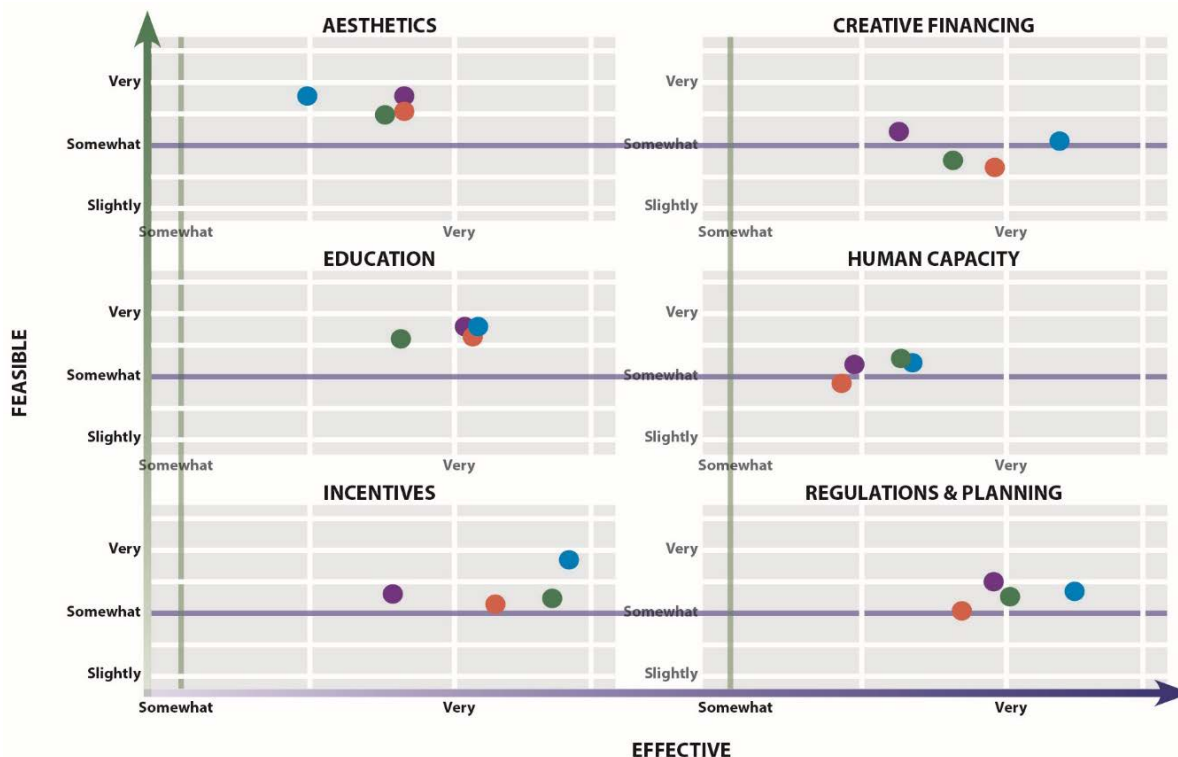


## APPROACHES TO OVERCOME BARRIERS TO ADOPTING GREEN STORMWATER INFRASTRUCTURE

Project team asked about the effectiveness and feasibility of 20 different approaches to reduce the barriers to adopting GSI. The approaches were grouped into six categories: **aesthetics, education, incentives, regulations and planning, human capacity, and creative financing**. The figures presented show a zoomed-in two-dimensional representation of the results, with approaches in the upper right corner being perceived as being more effective and more feasible while the lower left corner being perceived as being less effective and less feasible.



1. Educational approaches are seen as the most feasible and also effective, but not as effective as incentives.
2. Incentives, which include state incentives and water quality incentives, are perceived to be the most effective but only somewhat feasible, suggesting that politics and funding are limiting barriers. Nonprofits are more optimistic about the efficacy of incentives than builders.
3. Improving the aesthetics of GSI is seen as both effective and feasible and may provide a way to overcome resistance in the local community if GSI is built and maintained to be aesthetically pleasing.
4. Regulations and planning approaches, such as enacting local stormwater ordinances and incorporating GSI into development goals are also seen as very effective and feasible.
5. Human capacity, which includes identifying champions and outsourcing maintenance, is somewhat feasible and somewhat effective but might not be as good of a return on investment as other categories.
6. Creative financing, such as creating a customer-funded stormwater utility or private funding of GSI, could be very effective but is not considered very feasible.



KEY: ● BUILDER ● NONPROFIT ● GOVERNMENT ● EXPERT

For purposes of citation of this summary, please use the following:

*“A survey of barriers and opportunities to adopting green stormwater infrastructure in Michigan”, Avik Basu, Sanjiv K. Sinha, and Donald D. Carpenter, Lawrence Technological University Report, 5 pp, January 2020.*

The views and opinions expressed in this summary and corresponding report are those of the authors and do not necessarily reflect the official policies or position of Michigan Sea Grant. This award number NA14OAR4170070, to the Regents of the University of Michigan, supports the work described in the Recipient's proposal entitled Michigan Sea Grant Omnibus FY 2014-2017 dated 10/31/2013.

