Top Five Barriers to Implementing Green Infrastructure on Residential Sites

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Objectives

The National Association of Home Builders (NAHB) surveyed membership to explore key barriers preventing cost-effective installation of green infrastructure on residential sites. NAHB represents over 140,000 land development and remodeling professionals across the U.S. Our builder-members will construct 4 out of 5 housing units this year. As post-construction stormwater regulations increase in both complexity and variation, developers have reported both administrative and technical problems ensuring cost-effective installation of green stormwater features in the field. We conducted an online member opinion poll in order to better understand these barriers, categorize them in order of importance, and provide case studies and recommendations.

Methodology

NAHB surveyed 92 land development and environmental professionals from 34 states to determine what percentage of members had experience implementing green stormwater practices (e.g., infiltration trenches, drywells, bioswales, raingardens, green roofs, cisterns, dispersion, vegetated wetlands, etc.) on residential sites. Next, NAHB asked developers to identify and rank specific barriers to cost-effective green infrastructure installation, as well as program preferences for ways to encourage increased installation on residential sites. "Typical" barriers presented in the survey were drawn from a series of focus groups with NAHB members that had significant experience installing green infrastructure.

Findings

In preliminary survey results, builder members reported "top five" barriers to implementing green infrastructure on residential sites in the following order:

1. *Regulators lack necessary experience/knowledge in installation of green practices.*
2. *My regulatory approval processes limit flexibility.*
3. *Green infrastructure projects cost more than traditional storm water features (real or perceived costs).*
4. *There is lack of homebuyer demand for green infrastructure.*
5. *There is a lack of standardized protocols and technical specifications for green infrastructure across jurisdictions.*

"*There is lack of adequate data/literature on long term green infrastructure performance*" scored least well in developer's ranking of barriers to cost effective installation. In addition, for those respondents who had previous experience implementing green stormwater features on residential sites, **66%** identified administrative, rather than technical issues as the biggest road block to installing green infrastructure in residential developments. Findings suggest that interventions such as municipal plan reviewer training, flexibility in residential design review protocols, and development process efficiency audits could go along way to getting more features in the ground successfully.

Green infrastructure incentives such as fast track permitting, permit fee discounts, density bonuses (e.g., increased FAR or building height), and fee-in lieu programs scored relatively higher compared to incentives related to green award or recognition programs. In general, incentive preference varied widely. Focus group participants stressed that development incentive preference is closely related to local development patterns (e.g., infill vs. greenfield development), which could explain a wide distribution of responses.

Significance

Views and preferences of private developers are not always taken into account in state and local post-construction program planning efforts. As the focus of municipal programs turns more and more to interventions on private property, it is imperative to better understand emerging implementation barriers.

Appendix – Detailed Response Data

Q1: I am a:

Builder only	**13.04%** 12
Builder-developer	**35.87%** 33
Developer only	**5.43%** 5
Other (please specify)	**45.65%** 42
Total	**N = 92**

42 RESPONSES for OTHER (PLEASE SPECIFY):

HBA = Home Builder Association
EO = Executive Official/Officer (professional building industry association staff)
Verifier = Person certified to verify properties under the National Green Building Standard (NGBS)

Occupation (Other)
Realtor
Restoration Expert
Engineer
attorney
Association Exec.
Remodeling
Third Party Inspector
Independent
Executive Officer, local HBA
Sub Contractor

Executive Officer
supplier
Contractor
Project Manager
Landscape Architect
Environmental Consultant
consultant
Construction Material Provider
GB verifier
Energy Rater
BIA
HBA EO
Civil Engineer
consultant
HBA EO
Consultant
Home owner
State Association Executive
HBA Member
Administrative professional
home automation
ngbs VERIFIER
Consultant/Rater
attorney
rater
President/CEO,Governmental Affairs for our Association
sustainability consultant
association staff
admin
EVP Government Relations for HBA
EO
State Association Executive

Q2: Do you have experience implementing green stormwater practices (e.g., infiltration trenches, drywells, bioswales, raingardens, green roofs, cisterns, dispersion, vegetated wetlands, etc.) on residential sites?

Yes, I install green infrastructure features on the majority of my projects.	**22.50%** 18

– **Yes, I install green infrastructure features occasionally.**	**16.25%** 13
– **Yes, I install green infrastructure features, but only rarely.**	**11.25%** 9
– **No, I have never installed green stormwater infrastructure features on residential sites.**	**22.50%** 18
– **N/A - I'm not a builder/developer.**	**27.50%** 22
Total	**N = 80**

Q3: If you have experience implementing green infrastructure on residential sites, what is your biggest barrier to cost effective installation?

Regulatory or administrative constraints	**38.75%** 31
– **Technical constraints**	**10.00%** 8
– **Other**	**8.75%** 7
– **N/A - I have no experience installing green infrastructure**	**42.50%** 34

Q4: Please assess, based on your experience, the following barriers to implementing cost effective green infrastructure on residential sites.

–	1 - Not important/Not a substantial barrier to installing green features –	2 –	3 –	4 –	5 - Major barrier to installing green infrastructure –	N/A –	Total –	Weighted Average –
– **Regulators lack necessary experience/knowledge of installation of green practices.**	**2.90%** 2	**5.80%** 4	**15.94 %** 11	**27.54 %** 19	**40.58%** 28	**7.25%** 5	69	4.05
– **My regulatory approval processes limits flexibility.**	**2.90%** 2	**10.14 %** 7	**20.29 %** 14	**15.94 %** 11	**39.13%** 27	**11.59%** 8	69	3.89
– **Green infrastructure projects cost more than traditional storm water features (real or perceived costs).**	**5.71%** 4	**10.00 %** 7	**15.71 %** 11	**21.43 %** 15	**40.00%** 28	**7.14%** 5	70	3.86
– **There is lack of home buyer demand for green infrastructure.**	**5.71%** 4	**10.00 %** 7	**28.57 %** 20	**14.29 %** 10	**37.14%** 26	**4.29%** 3	70	3.70
– **There is a lack of standardized protocols and technical specifications for green infrastructure across jurisdictions.**	**8.82%** 6	**4.41%** 3	**27.94 %** 19	**23.53 %** 16	**26.47%** 18	**8.82%** 6	68	3.60
– **Codes and ordinances require redundant systems in addition to LID/green infrastructure practices.**	**10.29%** 7	**5.88%** 4	**23.53 %** 16	**25.00 %** 17	**26.47%** 18	**8.82%** 6	68	3.56
– **My existing code and design standards limit flexibility.**	**7.25%** 5	**15.94 %** 11	**17.39 %** 12	**20.29 %** 14	**28.99%** 20	**10.14%** 7	69	3.53

It is difficult to find subcontractors/engineers/installers experienced and knowledgeable in green infrastructure installation.	**5.71%** 4	**11.43 %** 8	**24.29 %** 17	**28.57 %** 20	**20.00%** 14	**10.00%** 7	70	3.51
Additional time is often required for approval/design of green features.	**11.43%** 8	**10.00 %** 7	**24.29 %** 17	**27.14 %** 19	**21.43%** 15	**5.71%** 4	70	3.39
There is lack of adequate data/literature on long term green infrastructure performance.	**10.00%** 7	**11.43 %** 8	**28.57 %** 20	**21.43 %** 15	**20.00%** 14	**8.57%** 6	70	3.33

Q5: Please assess the following incentives typically used by cities and counties to encourage installation of green infrastructure on residential sites.

–	1 - Not attractive/Not likely to enroll	(no label) –	(no label) –	(no label) –	5 - Very attractive/I would likely enroll	Total –	Weighted Average –
– **Fast track permitting**	**10.61%** 7	**7.58%** 5	**10.61%** 7	**30.30%** 20	**40.91%** 27	66	3.83
– **Permit fee discount**	**10.45%** 7	**2.99%** 2	**17.91%** 12	**31.34%** 21	**37.31%** 25	67	3.82
– **Density bonuses (e.g., increased FAR or building height)**	**16.42%** 11	**7.46%** 5	**17.91%** 12	**17.91%** 12	**40.30%** 27	67	3.58
– **Fee-in lieu or waivers for difficult sites**	**12.31%** 8	**12.31%** 8	**15.38%** 10	**26.15%** 17	**33.85%** 22	65	3.57
– **Rebates or installation financing**	**15.38%** 10	**4.62%** 3	**23.08%** 15	**24.62%** 16	**32.31%** 21	65	3.54
– **Stormwater credit trading**	**10.61%** 7	**13.64%** 9	**25.76%** 17	**18.18%** 12	**31.82%** 21	66	3.47
– **Free technical assistance/training**	**10.61%** 7	**13.64%** 9	**24.24%** 16	**22.73%** 15	**28.79%** 19	66	3.45
– **Green award or recognition program**	**18.75%** 12	**31.25%** 20	**21.88%** 14	**9.38%** 6	**18.75%** 12	64	2.78

Q6: Please share any additional feedback on regulatory/technical barriers to cost effective installation of green infrastructure.

- *Too many agencies look at the same thing and give different reviews delaying the project.*
- *There are no clear codes for dealing with things like greywater.*
- *Subcontactor non-familiarity.*
- *In XXXXX the biggest hurdle is the regs don't address on lot practices well which forces regional approaches.*
- *They are simply not practical in the real world and add significant cost to any project. Most buyers/customers in my market see little to no value in them.*
- *Customer not requesting. The few we have done were driven by the developer in the subdivision Deeds and Restrictions.*
- *Extra cost and small lots with limited area to install such systems.*
- *A lot of the builders tell us they aren't interested due to the homebuyer not wanting to spend their "extra" dollars on green building. They would prefer better cabinets and appliances.*
- *Hardly anybody is pushing hard for this, so regulatory agencies are clueless, good data on what works and what doesn't is hard to find, and knowledgable subcontractors are non-existant in my area.*
- *Paper work and inspections over kill. Should not be fined for lack of, and sand fill is not a pollutant.*
- *I hear builders/developers complaining about the lack of training and inconsistencies of planning boards.*
- *Very few local municipalities offer any incentives for green infrastructure or even have regulations for them. The state is slow at regulations or adopting anything that is related to green infrastructure.*
- *Appearance, cost and long term maintenance obligations are the primary deterrents.*
- *Educating the designers and having continued training is necessary.*
- *In XXXXX the law limits BMPs for storm water within the initial buffer of the critical area.*
- *Conflicting state and local regulations with federal regulations.*
- *My personal opinion to going green is I really believe this should be affordability. I think they should be programs to teach people how to go green and funding should be available or at least tax breaks.*

- *Our market cannot support additional regulations or even voluntary regulations. The cost is prohibitive and the customers do not require/request it.*
- *Not required in my area at this time.*
- *Installation isn't as big of an issue as one might think, but who wants to and will maintain? Homeowners don't want additional maintenance, associations don't want the additional maintenance and the cities don't want additional maintenance typically required with these features.*
- *We are in a price constrained reality. Regardless of the many surveys (most of which I believe are flawed) consumers are NOT willing to pay extra for green features in their home unless the builder can PROVE a monthly offset in utility costs. That is impossible in our market.*
- *Anti-development attitudes by MS4 administrations.*
- *It's seen as something extra. People seem to rather spend extra money on granite countertops or overly ornate MDF trim.*
- *Most municipalities do not recognize sustainable alternatives like rainwater cisterns so redundancy is required*
- *Most regulations in this regard do not focus/allow for what can be done on a practical/effective basis at less cost in favor of more technical/costly things to be done that aren't any more effective.*
- *Technical Education for public & private sector engineers, developers, builders, subcontractors, regulators.*
- *Lack of flexibility by local and state regulators.*