This memorandum presents the findings from interviews with peer cities that have offered incentive programs to encourage implementation of green stormwater infrastructure (GSI) at private development and redevelopment sites. The following sub-sections describe the interview process, the GSI incentive programs that peer cities have implemented, city-specific findings, and a synthesis of the general findings from all interviews.

1.1 Interview Process

Over the course of eight weeks, the research team interviewed municipal staff from a selection of cities that have offered (either in the past or currently) incentives for private property developers to use GSI to manage stormwater at new development or redevelopment sites. The cities were selected on the basis of having or having had incentives for developers to use GSI, being large enough to be relevant to a city of Houston’s size, and based on the authors’ personal contacts within those cities. As shown in Figure 1, the cities represent a diverse range of incentive strategies across the U.S., as well as a range of motivations for promoting the use of GSI, mostly addressing Clean Water Act (CWA) compliance related to mitigating combined sewer system overflows (CSO's), reducing the discharge of pollutants in municipal stormwater runoff under municipal separate storm sewer system (MS4) permits, achieving pollutant load reductions to achieve watershed restoration goals established under total maximum daily loads (TMDLs),¹ or to achieve resiliency objectives.

¹ Implementing load reductions required to achieve established total maximum daily load, which define the amount of a particular pollutant that can be assimilated by a waterbody without violating applicable surface water quality standards.
Through the interviews, the research team gathered information about the factors that led to program success, as well as program challenges, and synthesized this information into a set of principles relevant to the City of Houston regardless of topography or regulatory environment. The research team asked each City interviewee the same set of questions about how local incentive programs were structured, whether they were successful in motivating the use of GSI in development, and reasons for the program’s success or failure.

2.0 Incentive Types and Terminology

For this research, we focused on programs that incentivize the use of GSI practices at new and redevelopment sites, rather than the modification of existing facilities to incorporate GSI. Interviewees identified a variety of incentives, which fall into four main categories as described below. Because cities use differing terminology to refer to similar incentives, rather than use city-specific terms we use more general descriptive terms to explain the incentives and we define these in the text.

2.1 Intensity Incentives

Some of the most common GSI-related incentives for new and redevelopment projects are intensity bonuses. Intensity bonuses provide opportunities for greater intensity of development in exchange for including public benefits, such as GSI, in a development or redevelopment project. Intensity bonuses offer the option to include a greater number of apartments, more condominiums, larger retail space, more finished floor area, or even more building height in exchange for the use of GSI. Three main types of intensity bonuses include density bonuses, floor-area-ratio (FAR) bonuses, and height bonuses:
Relaxed Density Restriction (“Density Bonus”). A GSI density bonus allows a developer to provide more dwelling units on a given size tract than would otherwise be permitted, in communities that regulate development in this manner, in exchange for incorporating GSI. Density bonuses can allow developers to add additional units to a building without adding to its’ size (e.g. creating smaller dwelling units to fit more sellable units into a development). In the case where there are no height restrictions or the height limit has not been met, a density bonus can also result in the opportunity to build additional stories.

Relaxed Floor Area Ratio Restriction (“FAR Bonus”). A FAR bonus allows a developer to provide a larger amount of floor area on a given size tract than would otherwise be permitted, in communities that regulate development in this manner, in exchange for the use of GSI.

Relaxed Height Restrictions (“Height Bonus”). A height bonus allows a developer to build a taller building than would be otherwise allowed in a location were building height is restricted in exchange for the use of GSI.

2.2 Expedited Plan or Permit Review

Expedited reviews provide for a faster overall entitlement process including plan review, platting, permitting, and other required steps, in exchange for the use of GSI. Private development or redevelopment projects almost always rely on financing mechanisms that become more expensive as the duration of the loan is extended. This means that every day of delay in the permitting timeline directly impacts the project bottom line; therefore, obtaining an accelerated overall entitlement process in exchange for the use of GSI could be an effective incentive.

2.3 Alternative Standards

An alternative standard incentive allows a project to proceed under alternative platting rules, alternative permitting rules, or alternative provisions of both, in exchange for the use of GSI. This approach must seek to ensure that the project still achieves overall public health, safety, and welfare objectives, while achieving GSI implementation objectives. Pathways for alternative standards may include reduced parking, landscaping, or other requirements if a developer uses GSI to manage stormwater on-site.

2.4 Fee Reductions

Fee reductions allow the development and redevelopment project to proceed with reduced permitting, platting, and impact fees in exchange for the use of GSI. The effectiveness of this approach depends on the existing fee structure and the amounts collected for various project types.

2.5 Direct Financial Incentives

Cities sometimes provide direct financial incentive, using a variety of methods, to encourage the use of GSI on specific projects. Examples of direct financial incentives encountered during the interview process include:

- **Tax Abatement.** A tax abatement incentive delays, defers, or rebates property tax due on the finished project in exchange for the use of GSI on the project. This directly benefits project sponsors that plan...
to hold the finished project but has no incentive to project sponsors who plan to sell the asset upon project completion.

- **Grant Program.** Grants, rebates, or subsidies can be offered to project sponsors in exchange for the use of GSI.

### 3.0 Findings by City

Table 1 below provides a summary of the key context and elements of the incentive programs in the cities we interviewed.
### Table 1 Peer City Interview Results

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| HOUSTON       | CSO, MS4 | - Tax Abatement: Offered for 1 year on projects that use a green roof at a rate of $5 per square foot, up to $100,000 or the building's tax liability, whichever is less. Program ended because it was under-utilized by property owners who saw it as too administratively burdensome.  
- Grant Program: Provides 100% reimbursement of design and construction costs for GSI that manage 1.0" of rainfall. The city is expanding program with a new category of dedicated funding focused on "greening" parcels over 50,000 square feet. | Coordinating projects with other agencies (e.g., City Law, Fire Department, Department of Buildings) is a major challenge to getting GSI projects on the ground.  
- Lack of political will also a factor limiting success of both incentive programs, with Mayoral attention focused on other topics.  
- Grant Program application process and restrictive covenants are burdensome which limits participation. |
| NEW YORK     | CSO, MS4 | - FAR Bonus: Offers FAR bonus for each square foot of green roof provided on a sliding scale, with the largest bonus for green roofs that meet all design specifications and are visible to the public. FAR bonus can take the form of additional building height and is available in downtown area only.  
- Alternative Standards: Allows developers to implement GSI in area that would otherwise be reserved as a setback from the creek. Available in suburban watershed where large creek buffers are required. | Only one building has taken advantage of Height Bonus by using GSI because other developer decisions (like providing housing for lower income residents) can also provide this bonus. |
| AUSTIN       | MS4    | - Height Bonus: Offers height bonus to planned developments larger than 5 acres, located in certain areas of the City, that use GSI to store at least 25% more stormwater than required by ordinance or that provide water quality treatment for currently untreated off-site areas.  
- Alternative Standards: Offers 15% reduction in parking requirements in exchange for GSI for projects meeting same requirements for the Height Bonus. | No developer has taken advantage of Height Bonus program. Not many developments are larger than 5 acres, and most developers are not aware of the opportunity.  
- New Orleans does not require GSI, but City's encourages GSI by providing an online Stormwater Calculator helps developers demonstrate compliance with local Stormwater Ordinance, and the calculator makes only GSI options available. |
| NEW ORLEANS  | Resiliency | - Green Factor: "Green Factor" program offers flexible landscaping code that encourages the use of GSI. The code includes a scoring framework that allows the developer to achieve a certain "Green Factor" score in various ways. It is generally easier to achieve the required score using GSI. Can result in implicit density bonus because the flexible landscaping code that encourages the use of GSI frequently frees up additional land for development by implementing multi-functional design elements. | Cities considering programs like Green Factor should conduct a sensitivity analysis on some example projects to develop an appropriate scoring approach and refine the various GSI techniques that will be included.  
- Implementation of the Green Factor program required 18 months of meetings with architects, landscape designers, and developers to help build capacity and make sure new policies were understood. |
| SEATTLE      | CSO, TMDL | - Alternative Standards: "Green Factor" program offers flexible landscaping code that encourages the use of GSI. The code includes a scoring framework that allows the developer to achieve a certain “Green Factor” score in various ways. It is generally easier to achieve the required score using GSI. Can result in implicit density bonus because the flexible landscaping code that encourages the use of GSI frequently frees up additional land for development by implementing multi-functional design elements. | Cities considering programs like Green Factor should conduct a sensitivity analysis on some example projects to develop an appropriate scoring approach and refine the various GSI techniques that will be included.  
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| PHILADELPHIA | CSO    | ▪ **Height Bonus:** Relaxed height restriction available in one area of city to developers who manage runoff from the right-of-way.  
▪ **Density Bonus:** Green roof density bonus available in three areas of city for developments that green 60% or more of the roof; provides exceptions to certain residential density rules.  
▪ **Tax Abatement:** Offers one-time tax credit for green roofs; 2007 through 2015, tax credit was 25% of all costs incurred to construct green roof, not to exceed $100,000. For tax years 2016 and after, credit increased to 50% of all costs incurred to construct green roof, not to exceed $100,000. Implemented by Department of Revenue.  
▪ **Expedited Review:** For developments that meet onsite stormwater management regulations using GSI practices (applies to redevelopment projects only).  
▪ **Alternative Standards:** Exemption from flood and channel protection requirements for redevelopment projects that reduce impervious area by 20% compared to the pre-construction impervious area. | ▪ Height bonus must be coordinated with City Planning Commission.  
▪ Tax abatement has not been widely used; provides credit on business taxes, so many institutional properties cannot benefit.  
▪ Density bonus and expedited permitting have both been relatively effective:  
--- Density bonus has been popular and beneficial to the City; 67% of the projects that have applied for the bonus would otherwise have been exempt from onsite stormwater management requirements.  
--- The expedited review incentive has been effective—about 25% of developments take advantage of this incentive. Review by the water department is expedited, however, reviews by other departments are not.  
▪ Meetings with development community were key to effective program design for all incentives programs. |
| PORTLAND     | CSO    | ▪ **Rebate Program:** Eco-roof rebates ($5 per square foot offered from 2008-2012)  
▪ **FAR Bonus:** Offered developers a larger development footprint or additional floor area than otherwise would have been allowed by code if the building proposal included an eco-roof that meets specific requirements. Was only available in Central City Plan District area of city.  
▪ **Alternative Standards:** In some cases, city will allow developers to setback from street if they “green” the setback area. | ▪ Both the Rebate and FAR bonus were considered successful. Both could be used together, which provided further incentive/increased participation. Both programs have sun sunseted. Eco-roofs are now required for developments over 20,000 SF.  
▪ Incentive programs helped pave way to developer acceptance of GSI requirements.  
▪ Before incentives were turned into requirements, Portland Development Commission undertook a study of costs of the new regulatory requirements—found that eco-roof adds 1-2% to building costs. This helped to demonstrate benefit/cost ratio for developers. Also released a manual comparing eco-roof maintenance costs to traditional roof—manual showed that eco-roof have much longer useful life.  
▪ Educating key stakeholders including local politicians was key to getting regulations passed. Information was shared about how GSI improves public health, provides wildlife habitat, reduces localized flood risk, enhances aesthetics, and reduces heat island impacts. This was important for City Council. |
| MILWAUKEE    | CSO, MS4 | ▪ **Grant Program:** Offers about $2.5M each year in a competitive grant program with awards made to only the top-scoring projects. Grants cover 20-50% of GSI construction costs, dollar amount varies based on type of practice. | ▪ The utility created the website: www.freshcoastguardians.com that offers tools for developers to decide how to comply with stormwater management ordinance.  
▪ Grant program helps dispel urban legends about GSI not working and perceived costs. Perceived high cost has been biggest challenge in getting developer community to adopt GSI.  
▪ Grant program is working, program is meeting its goals but they are still working on tracking longer-term performance. |
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| NASHVILLE   | CSO    | ▪ Fee Reductions: Certain stormwater and water / sewer plan review and application fees were waived if GSI is used. Stormwater user fees were reduced by up to 75% if GSI was used to manage stormwater. This program is no longer in place because GSI is now a requirement (as of 2016)  
▪ Alternative Standards: City offered bonus runoff reduction percentage above the actual reduction rate of green roofs (i.e., developer get credit for meeting regulations if they used a green roof, even if not met). In addition, city offered reductions in stormwater detention requirements if developer used GSI. This program is no longer in place because GSI is now a requirement (as of 2016) | ▪ Maintenance of GSI has been an issue, with property developers not maintaining the GSI once they install. City is currently working to improve design specifications so that the GSI is lower-maintenance.  
▪ Incentives were not very successful. Neither the plan review fees nor the ongoing stormwater fees were high enough to make the GSI incentive economically attractive. |
| CHICAGO     | CSO    | ▪ Expedited Review and Fee Reductions: Green Permit Benefit Tier Program offers expedited permitting and development fee waivers. Participants must obtain LEED® or Green Globes® certification and complete a selection of additional projects/requirements (e.g., GSI, affordable housing, bike parking, water management). Participants receive a dedicated Green Permit Project Administrator who helps guide the process and serves as a single point of contact for expediting the permit. In Tier 1, the goal is to provide the final building permit in 30 days or less. Tier 2 is aimed at projects that are looking to achieve higher levels of LEED® or Green Globes status. These projects are required to perform fewer of the city’s additional requirements. In addition to Tier 1 expedited permitting, Tier 2 projects can receive up to $25,000 in waived building permit fees.  
▪ Expedited Review: Green Elements Program aims to provide a one-week turnaround for comments on plans submitted to the Building Department for projects that include green technologies. There is no dedicated project administrator to help guide the process. However, there is also no requirement to obtain LEED® or Green Globe certification. | ▪ At its peak, city processed about 50 Green Benefit Tier permits each year, and 150 Green Element permits.  
▪ City’s Green Permit Benefit Tier program was initially successful but changes to the underlying permitting process, such as the addition of online applications and third party facilitators, made it faster.  
▪ Neither program focuses solely on GSI but applies more broadly to “green strategies or green technologies,” (e.g., green roofs, solar panels, rain water harvesting, and other initiatives).  
▪ Multiple departments are involved in plan review; building department is only responsible for some aspects and can only expedite what they control.  
▪ City investments in online forms/processes and rise of third-party expeditors have reduced need for expedited permitting.  
▪ City is focused on other priorities; new policies, codes, and regulations compete with voluntary program requirements.  
▪ Development standards for intensity, parking, landscaping, and other site design factors are often far upstream of program, making it difficult to incorporate. |

NOTES:  
2. Topography qualitatively characterized based on visual assessment of “Terrain” setting in Google Maps and Google Earth.  
3. Annual Rainfall obtained from U.S. Climate Data.  
4. Hydrologic Soil Group obtained from Environmental Systems Research Institute.  
5. CSO: Obligations under a Combined Sewer Overflow mitigation Consent Order with state or federal regulators.  
6. MS4: Obligations under a Municipal Separate Storm Sewer System permit issued under the Clean Water Act.  
7. TMDL: Obligations imposed in a Clean Water Act wastewater or stormwater permit to achieve load reductions required by an adopted total maximum daily load.
4.0 Synthesis and Lessons Learned

The interview process revealed four main lessons which are described below.

4.1 Engage Local Stakeholders to Understand Local Needs and Build Program Support

Multiple interviewees stressed the importance of engaging local stakeholders to identify incentives that will meet the needs of the local development community. For example, in Philadelphia, developers communicated a high value for additional developable area. As such, the density bonus for green roofs has been effective. In response to developer feedback, Philadelphia also recently enacted a height bonus in one overlay district that allows developers to build additional building height if they provide open space that manages stormwater runoff from offsite (i.e., the public right-of-way).

Conversely, in Austin (TX), staff noted that no developers have implemented green roofs to take advantage of its Downtown Density Bonus Program, in large part because there are multiple other ways to obtain the bonus (e.g., by providing affordable housing, cultural amenities) that are easier for developers to adopt. New Orleans reported that no developers have used GSI to obtain the density bonus because the bonus only applies to planned developments which are 5 acres or more and developments this large are relatively rare. In Chicago, as the permitting process has gotten faster overall, the expedited Green Permit process seems less enticing compared to the additional time it takes to coordinate with the Building Department and follow design changes to meet additional requirements for the Green Permit program.

Stakeholder engagement can help to build support for incentive programs and ensure effective program design. Seattle began meeting with stakeholders (including design and engineering firms, developers, commercial owners, and environmental advocates) as early as 18 months before it introduced the Green Factor Program; Seattle credits private sector involvement as a key to program success. Conversely, New Orleans indicated that a key reason that developers have not participated in their incentive programs is because most are not aware of the opportunity.

Philadelphia continues to work with developers to adaptively manage it’s incentive programs. Philadelphia formed a development services committee in 2012 to gather feedback and to understand what could be improved. Philadelphia also reports that developers played a crucial role in working with city council members to support the utility’s density bonus program.

4.2 Understand the Development Process

It is important to understand the development process so that a new GSI incentive does not add additional steps or red tape to the process, thereby discouraging participation. A representative from the National Association of Home Builders (NAHB) suggests that utilities and municipal departments should map and understand each step in the development process, and the parties involved, to identify where and how an incentive program would best fit. The NAHB representative also noted that development plans are always changing, and developers are less likely to participate in GSI incentive programs if they are overly prescriptive, time-consuming, and/or inflexible.²

² Project team member spoke with an NAHB representative as part of research on incentive programs for the water Research Foundation; publication is forthcoming.
Several utilities have experienced difficulties integrating incentive programs into the development process and timeline. For example, Chicago found that development standards for intensity, parking, landscaping, and other site design factors were often addressed early in the development process, while GSI site design often was not incorporated until later. This made it difficult for the city to incorporate incentives that would allow for alternative standards or offer intensity bonuses. With its grant program, Milwaukee Metropolitan Sewerage District (MMSD) has found that when projects go into final design, they often change and become smaller. This affects the amount of funding needed by the applicant, making it difficult for MMSD to fully allocate funds under its grant program. Similarly, the Northeast Ohio Regional Sewer District has found that the one-time annual application and contracting process (contracting process typically takes six months) for its grant program does not fit in well with the timeline of development projects. The District therefore receives very few applications from new and redevelopment projects, and typically only funds retrofits.

Others have found that it is also important to understand the role of different departments in the permitting and plan review process. For example, cities such as Chicago and Philadelphia that offer expedited permitting note that their stormwater departments are only responsible for one aspect of the review process; if other departments are slow in reviewing plans or issuing permits, then expedited stormwater plan review or permitting process will not provide much of an incentive.

4.3 Understand and Show Value

To help set the stage for success, many utilities have promoted incentive programs by modeling the potential impacts of a successful program in terms that local stakeholders value. For example, if there is strong community support for protecting water quality, as there is in Austin, frame the impacts of the incentive in terms of improved water quality. If there is a core group of advocates who are organized around urban heat island impacts, or localized flooding in a specific set of neighborhoods, modeling and analysis can help these groups understand how proposed incentives policies can make a positive impact on the issues they care most about. Portland also found that most stakeholders do not care about stormwater management per se, and that framing GI as a way to improve public health and ecosystems, and reduce the urban heat island impacts was much more effective in gaining buy-in.

Demonstrating the cost savings and benefits associated with GSI can also help developers understand what else they might receive. According to NAHB, cities who can clearly demonstrate how an incentive will provide value to a developer or building owner are more likely to see uptake. In addition, the project team’s previous research with private-sector representatives has revealed a need for more information on how GSI can add value and/or increase their financial return on investment.

Working closely with local developers can help a city understand the benefits and costs of GSI from the perspective of a developer. For example, Portland analyzed project costs for eco-roofs (the practice they were focused on motivating), finding they added only between 1-2% to a development’s total cost. Portland also put together a two page handout that compared the cost of maintaining an eco-roof with the cost of a traditional roof—the handout showed how the maintenance costs were similar, but the eco-roof had a much longer useful life, which resulted in significant cost savings. Having these local cost figures available can help the City “sell” the incentive programs, both internally and to developers. It can also help to calibrate incentives so that the cost of responding to the incentive does not outweigh the benefit conferred by the incentive.
Finally, several interviewees also noted that one or more highly visible initial projects can help to demonstrate the benefits and effectiveness of GSI to all stakeholders.

4.4 Anticipate Incentive Evolution

The level of community awareness around stormwater issues and GSI is an important factor for utilities and municipalities to consider when figuring out “where to start.” For example, Philadelphia credits early stormwater-related efforts (such as establishing an impervious area-based stormwater fee; GSI-based development requirements; and the rollout of its Green City, Clean Waters plan) as a key factor in its ability to develop a large-scale grant program and incentives for new development and redevelopment projects. Portland serves as another example of a utility that has successfully built public support over time by targeting easy interventions and creating education opportunities.

In many cases, a city began with one specific incentive and only saw uptake once the first incentive was bundled with additional overlapping incentives. For example, in Philadelphia, a developer who uses GSI can not only exempt themselves from certain permit requirements, but they also receive an ongoing financial benefit in the form of reduced stormwater fees, so long as they maintain the GSI on their site (this is somewhat unique to Philadelphia, where stormwater fee reductions provide substantial motivation to implement stormwater management practices). In Portland, developers were able to take advantage of the city’s eco-roof rebate program as well as the eco-roof density bonus. Staff maintains that this greatly increased participation in both programs.

Many cities interviewed also now require GSI for meeting on-site stormwater management requirements, including Nashville, Portland, and San Francisco. These cities report that incentive programs helped to pave the way for developer acceptance of regulations that the cities later introduced. Alternatively, a City may...
want to raise the bar for meeting incentives after several years if the City believes that developers could be doing more.

4.5 Coordinate Internally

Other city processes and programs can affect the success of incentive programs. In New York City, there has been scant uptake of either GSI incentive—the Green Roof Tax Abatement or Green Infrastructure Grant—in large part because of weak coordination across city departments and pushback from some city agencies (including Department of Buildings, Fire Department, and others). To successfully implement incentive programs requires top down direction (e.g., from the Mayor’s office) and strong coordination across all relevant city departments or agencies that must make platting and permitting decisions.

In addition, if GSI is a high priority for a municipality, it is important to ensure it is not eclipsed by other options available to developers seeking development incentives.

4.6 Innovative Practice: Consider the ROW

Getting creative with how the city’s ROW can be developed to meet mutual goals of enhanced stormwater quality and working with the development community to utilize more of a site’s lot area can pay dividends. Seattle’s Green Factor allows bonus points for installing GI in the ROW. This helps the city provide a greater water quality benefit for water flowing across the ROW to the storm sewer, and also allows the developer to count the ROW as part of the required lot area that must be vegetated. In Philadelphia, developers can get a height bonus if they manage runoff from the public ROW.

5.0 Summary

Only a few of the cities interviewed reported great success in using incentives to encourage the use of GSI on private property. The interview results suggest that, while the specific reasons across cities are nuanced, the core issues cities have struggled could be boiled down to, either a failure to draw adequate developer attention to the incentives; or a lack of attention to GSI economics from the perspective of developers (i.e., ensuring that the installation of GSI not too costly relative to the benefit offered by the incentives).

Understandably, cities impose a range of requirements on developers to help ensure that public health, safety, and welfare is maintained and preserved, that life sustaining utilities (power, water, sanitary service, transportation, etc.) can be effectively provided, that hazards from fire or floods are adequately mitigated, and so that cities can grow and evolve in an orderly manner. Private development projects must comply with this very long list of requirements, while delivering a finished project that pleases users, visitors, tenants, occupants, customers, all the while, providing expected financial performance to investors, lenders, and partners. This creates a natural tension between the interests of the city and the private developer.

The key challenge for all of these programs appears to be determining how and to what extent the use of GSI on private property can help achieve both private developer project goals as well as city objectives. For these programs to work, it is important to:
 Identify incentives that will help developers achieve financial objectives and help the city achieve its general welfare objectives;
 Collaborate with the development community to understand factors that will encourage or discourage participation; and,
 Collaborate across all implementing city departments to help set the stage for smooth implementation.