

# TEXAS STORMWATER SCORECARD

## PRIVATE DEVELOPMENT POLICIES:

- 1) Water quality requirement** — A portion of stormwater must be treated for water quality and released later.
- 2) Flood detention requirement** — A portion of stormwater must be detained for flood control and released later.
- 3) Stormwater retention requirement** — A portion of stormwater must be captured and retained on-site.
- 4) GSI/LID credit allowance** — GSI/LID features can qualify for water quality and/or flood detention requirements.
- 5) Code review** — Municipal codes have been revised to support stormwater regulations and remove obstacles to use of GSI/LID features.

## PRIVATE DEVELOPMENT INCENTIVES:

- 6) Regulatory incentives** — Zoning upgrades, expedited permitting, or other incentives are provided to private property owners who install GSI/LID features.
- 7) Financial incentives** — Rebates, tax credits, or other forms of funding are provided to private property owners who install GSI/LID features.
- 8) Stormwater fee discount** — Amount of fee is reduced for property owners who install GSI/LID features.

## PUBLIC INITIATIVES:

- 9) Capital project construction** — GSI/LID features are included in the construction of public buildings and facilities.
- 10) Capital project design** — Use of GSI/LID is included in the design standards for public buildings and facilities.
- 11) Street construction** — GSI/LID features are included in the construction of streets and transportation elements.
- 12) Street design** — Use of GSI/LID is included in the design standards for streets and transportation elements.
- 13) Pilot projects** — Use of GSI/LID is supported in limited-scale projects involving multiple sites or property owners.
- 14) Stormwater fee** — Drainage utility fee is assessed on property owners to fund municipal stormwater projects.
- 15) Education** — Public awareness is developed through GSI/LID installation signage, written materials including manuals and guides, and other educational efforts.

# **Yes on HB 1536: Green Stormwater Infrastructure Report**

## **Summary:**

HB 1536 is a study bill that directs TCEQ to oversee the preparation of a biennial report on the use of Green Stormwater Infrastructure (also known as Low-Impact Development) across Texas. GSI features include rain harvesting, green roofs, rain gardens, and permeable pavement.

The report will be prepared by a stakeholder group with members representing cities, counties, real estate developers, civil engineers, landscape architects, water conservation groups, environmental groups, and vendors and providers of GSI systems.

The bill states that the report shall include an inventory of existing GSI installations in the state; an estimate of how much stormwater is managed by these features; and recommendations for encouraging the use of GSI.

## **Analysis**

When land is covered with buildings and roads, the amount of ground that can absorb rain is reduced. The resulting increase in runoff can exacerbate flooding. It can also harm the water quality in rivers and lakes, since runoff picks up surface pollutants as it flows over roofs, roads, and yards. GSI features can compensate for the increased runoff that comes from increased development because these features retain rain where it falls. Rain gardens let this water slowly soak into the ground, while green roofs let it gradually evaporate into the air. Rain harvesting systems can collect water in wet months, and store it for use in dry months.

Examples of GSI features can be found across Texas, including the George W. Bush Library in Dallas, the UT/Dell Medical School in Austin, and the Federal Reserve Bank in Houston.

## **Supporters**

Association of Water Board Directors, American Society of Landscape Architects–Texas Chapter, Caddo Lake Institute, Dow Chemical, Environment Texas, Hill Country Alliance, Houston Land & Water Sustainability Forum, Greater Edwards Aquifer Alliance, Greater Houston Builders Association, Galveston Bay Foundation, National Wildlife Federation, The Nature Conservancy, Public Citizen, San Antonio River Authority, Save Our Springs Alliance, Sierra Club–Lone Star Chapter, Texas Conservation Alliance, Texas League of Conservation Voters, Water Environment Association of Texas, Wimberley Valley Watershed Association, City of Austin, City of Houston, and City of San Antonio.

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## Austin to promote green stormwater infrastructure

If you've shopped at Austin plant nurseries, you've probably seen this sign: "The best time to plant a tree was 20 years ago. The second-best time is today."

Austinites now can plant more trees, shrubs, flowers and grasses – and not just for looks, but to perform an important function, too. At its June 15 meeting, the Austin City Council passed a resolution calling for an increase in the use of green stormwater infrastructure (GSI) to help reduce pollution, flooding and erosion caused by runoff.

Green stormwater infrastructure sounds new and complicated, though it's actually simple and well-established. It describes building and landscape features that use natural processes to retain and reuse rainwater. Rain gardens, bioswales and green roofs rely on native plants and soil mixes to filter runoff and let it soak into the soil or evaporate into the air. Other common GSI features include rain-harvesting systems and permeable pavement.

Previous generations of Texans – especially farmers – would recognize these features, though they called them by different names – stock tanks, terraces, cisterns and hayfields – and used them for a different purpose, like soil and water conservation. Cities now use GSI features for stormwater management because they can sharply cut runoff.

Most of us only think about runoff when it floods. However, a more common problem is water pollution that's caused by dirty runoff – even after small storms. When rainwater flows over buildings, roads and yards, it picks up roofing chemicals, automotive oil, garbage and animal waste. It then carries these pollutants into our creeks, rivers and lakes.

Studies show that GSI features can absorb or evaporate 50-90 percent of the rain that falls on a site. Cutting runoff doesn't just help reduce runoff pollution; it can also reduce the severity of flooding and erosion. In addition, GSI features can store rainwater for reuse and beautify the urban environment. GSI construction costs can be much lower than comparable costs for detention ponds and storm drains.

Our Watershed Protection Department has constructed several GSI instal-

lations in city buildings and facilities. The city's Environmental Criteria Manual has been revised to allow private developers to use GSI features more often. Austin Water Utility has been exploring greater use of stormwater as part of its long-term planning process. The Watershed Protection Department and Austin Water Utility jointly run the city's WaterWise program, which offers rebates to homeowners and businesses for installing GSI features.

But despite this support, Austin's use of green stormwater infrastructure is low. We believe the city can do better. That's why the City Council unanimously passed the recent GSI resolution sponsored by Council Member Ann Kitchen and co-sponsored by Mayor Steve Adler and Council Members Leslie Pool and Alison Alter.

The resolution directs the city manager to catalog the city's existing GSI initiatives and evaluate new GSI provisions proposed in CodeNext. It also calls for adding a section to the Land Development Code that will summarize and locate all the code's environmental provisions.

Most importantly, the resolution follows up on a recommendation made five years ago in Imagine Austin – a 30-year vision for the city – by calling for the development of an Integrated Green Infrastructure Plan. This plan will address not just stormwater management features but also parks, waterways, open space, trails, green streets, tree canopies and agriculture. The goal will be to integrate and leverage the value of these green assets.

As Austinites install more rain gardens, green roofs, permeable pavement and rain-harvesting systems, we'll help clean up our creeks, rivers and lakes. But we'll also save taxpayers' dollars, since reducing the runoff burden on the city's existing stormwater infrastructure will extend its utility life. We can carry on the Texas tradition of cisterns and stock tanks – but to keep our city's urban environment green, healthy and sustainable.

Adler is mayor of Austin. Council Members Kitchen, Pool and Alter represent Districts 5, 7 and 10, respectively. Zabcik is a clean water advocate at Environment Texas.

Lady Bird Lake



## Runoff on our streets, pollution in our waters

### A threat to our waterways

Natural water features like Galveston Bay, Lady Bird Lake and Woodlawn Lake are the pride of Texas. But they're being polluted by something that a lot of us don't think about: rain runoff.

Because we've paved over so much of our cities, a lot of rain can't soak into the soil anymore. Instead, it flows over roofs and roads, where it picks up oils, chemicals, litter and animal waste, and then it runs off into our great waters with these pollutants.

### Managing our rainwater

There's a way to cut runoff pollution, and that's by preventing runoff in the first place.

We can collect rain with barrels and cisterns, we can replace traditional roofs with green ones, and we can turn lawns into rain gardens. By cutting runoff, these Green Infrastructure methods can reduce the severity of water pollution, flooding and erosion in Texas.

#### Learn more online

Learn more about how Texas cities can reduce runoff with Rainwater Management at:



[www.EnvironmentTexasCenter.org](http://www.EnvironmentTexasCenter.org)

### Preventing runoff pollution

Green Infrastructure has been found to be very effective. Studies show that it can capture over half of the rain that falls on a site. In addition, features such as rain gardens and green roofs help beautify urban settings, and rain harvesting systems can store water for later use in landscape irrigation.

By demonstrating to officials that the public wants Green Infrastructure—and by working with green builders and suppliers, environmental engineers and landscape architects—we can get the right policies in place.

### What can you do?

Communities can use green methods in new public buildings and roads. They can also make it easier for businesses and residents to install green features by removing permitting barriers and providing financial incentives.

You don't need to wait for your city to act. You can install rain gardens, green roofs, rain harvesting cisterns and permeable pavements at your own home or business now.

Texas won't stop growing. But with Green Infrastructure, we can make sure that our new growth is as green as possible.



Photos: (front) Kushal Bose/Shutterstock; (above) Lady Bird Johnson Wildflower Center, The University of Texas at Austin | Printed on recycled paper.



The 2015 Memorial Day Flood in Austin.

# Catching the Rain

## How Green Infrastructure Can Reduce Flooding and Improve Water Quality in Texas

*Flooding and stormwater pollution have been persistent threats in Austin and throughout Texas in recent years. Green stormwater infrastructure – installations that mimic the natural environment and absorb rainfall – has the potential to help reduce flooding, improve water quality and add beauty to local neighborhoods.*

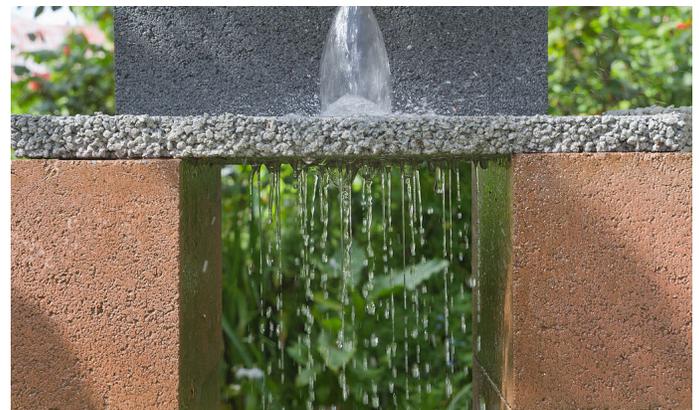
### The Benefits of Green Stormwater Infrastructure

Green stormwater infrastructure (GSI) refers to the man-made systems that absorb and filter rain and runoff in ways that incorporate or replicate nature. Common examples include rain gardens, permeable pavement and rainwater harvesting.

Because these systems absorb rain where it falls, they can limit flooding. Studies have found that most GSI systems can absorb between 50 and 90 percent of rainfall and have the potential to fully prevent flooding from less severe storms.

GSI can improve the local community beyond contributing to stormwater management. Other benefits of these systems include:

- **Improving water quality.** Stormwater systems can trap between 45 and 99 percent of solid pollutants.
- **Beautifying the landscape.** Many green stormwater management installations can be incorporated into new or existing public parks, further benefiting the community.
- **Removing greenhouse gases from the atmosphere.** Trees and green roofs can capture hundreds of pounds of carbon dioxide over their lifetimes.



Permeable pavement allows water to soak through, absorbing more than 80 percent of rainfall.



Beyond absorbing and filtering stormwater, rain gardens add natural beauty to developed areas.

## Austin Is at Risk for Flooding

Heavy rains have increased 67 percent in the city of Austin since 1950. Texas has lost more lives to floods than any other state over the last 20 years, and Austin has been hit particularly hard. Onion Creek has flooded twice since 2013, and the area is vulnerable enough to future flooding that the city has started buying out at-risk homes.



Stormwater mixed with automotive fluids at a service station during the 2015 Memorial Day flood in Austin.

## Stormwater Pollutes Our Waterways

Stormwater carries pollutants from roads, construction sites and parking lots into the water supply. In 2008, more than 430 miles of rivers and streams across the state were found to be impacted by stormwater runoff. On its city government website, Austin warns local residents to “refrain from swimming after flooding or heavy rains” because stormwater has been known to transport manure and hazardous waste to local streams. Green stormwater infrastructure, which both filters and absorbs stormwater, can help address these concerns.

### Citations:

<sup>1</sup> William J. Taylor; Taylor Aquatic Science and Policy, White Paper for Stormwater Management Program Effectiveness Literature Review: Low Impact Development Techniques, April 2013.

<sup>2</sup> Ibid.

<sup>3</sup> Center for Neighborhood Technology, The Value of Green Infrastructure: A Guide to Recognizing Its Economic, Environmental and Social Benefits, 2010.

<sup>4</sup> Climate Central, Across U.S., Heaviest Downpours on the Rise, 27 May 2015, available at [www.climatecentral.org/news/across-us-heaviest-downpours-on-the-rise-18989](http://www.climatecentral.org/news/across-us-heaviest-downpours-on-the-rise-18989).

<sup>5</sup> National Weather Service, Flood Fatalities by State and Location (dataset), 1995-2015, available at [www.nws.noaa.gov/om/hazstats](http://www.nws.noaa.gov/om/hazstats).

<sup>6</sup> Texas Commission on Environmental Quality, Texas Nonpoint Source Management Program, May 2012, 2.

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## GSI Is Growing in the Austin Area

Local examples of green stormwater infrastructure policies and installations showcase opportunities for further expansion of GSI.

- The city of Austin offers rebates of up to \$500 for installing stormwater management systems – including permeable pavement, rain gardens and bioswales – in homes or schools.
- The Dell Medical School at the University of Texas at Austin installed a green roof in July 2016, with native plants that don't require irrigation.

## Austin Should Expand Green Stormwater Infrastructure

Austin has an opening to improve stormwater management through CodeNEXT, a new city initiative that will lead to a massive overhaul of the city's development code. The city should use the CodeNEXT process as a jumping-off point for improved public policy to expand use of green stormwater infrastructure. Specific steps that Austin can take include:

- Requiring all new developments to incorporate green infrastructure elements such as permeable paving, rain gardens and green roofs.
- Identifying obstacles to the expansion of green infrastructure by reviewing, revising and updating its building codes and zoning ordinances.
- Adopting a citywide GSI plan that would measure the amount of stormwater handled by existing green infrastructure, set a target for increasing this amount, and implement policies to achieve this target.

*For more information and the full report,  
please visit [www.EnvironmentTexasCenter.org](http://www.EnvironmentTexasCenter.org)*



**FRONTIER GROUP**

## **Green Stormwater Infrastructure (GSI) Resolution**

Draft proposal submitted by Environment Texas for consideration by the Austin City Council

February 21, 2017

A RESOLUTION establishing that Green Stormwater Infrastructure is an essential component of the City's policies for water resource management, environmental protection, and land development; and adopting a goal for increasing its use in Austin by 2018.

WHEREAS, there has been a steady increase in the amount of land in Austin covered by impervious surfaces, and a steady decrease in the amount of ground capable of absorbing rain; and

WHEREAS, the result has been a sharp rise in the amount of runoff that flows off-site from developed properties and into stormwater drains, and then into creeks, rivers, and lakes; and

WHEREAS, this increase in runoff has contributed to increases in flooding severity, erosion problems, and water pollution; and

WHEREAS, Green Stormwater Infrastructure can capture rain on-site where it falls, thus sharply decreasing the amount of runoff that flows off-site; and

WHEREAS, Green Stormwater Infrastructure (GSI), also known as Low-Impact Development (LID), refers to a set of design features in buildings and landscapes that can retain and re-use rainwater; and

WHEREAS, GSI design features such as rain gardens and bioswales (shallow basins and channels planted with vegetation), green roofs, and permeable pavements can allow rainwater to slowly soak into the soil or evaporate into the air; and

WHEREAS, GSI design features such as rain harvesting cisterns and barrels can store rainwater for later use in landscape irrigation; and

WHEREAS, GSI design features have been shown to absorb up to 50–90 percent of rainfall on-site, and to trap up to 45–99 percent of solid particles contained in stormwater; and

WHEREAS, GSI can provide additional benefits, such as increased tree canopy, better pedestrian safety, improvements to streetscapes or bikeways that provide appreciable economic and aesthetic value, and climate mitigation and adaptation value; and

WHEREAS, Green Stormwater Infrastructure has been endorsed by the Imagine Austin Comprehensive Plan (2012), the Water Resource Planning Task Force (2014), the Flood Mitigation Task Force (2016), and the Green Infrastructure Working Group (2016); and

WHEREAS, the CodeNEXT revision of the Land Development Code and Zoning Map will increase the maximum percentage allowed for impervious cover on many properties, leading to a further decrease in stormwater infiltration across Austin; and

WHEREAS, properties with impervious cover of 80 percent or higher will be required to offset their runoff by participating in the Functional Green program;

THEREFORE, BE IT RESOLVED THAT THE COUNCIL DIRECTS THE CITY TO:

Develop and deliver a “Ten-Year Master Plan for Green Stormwater Infrastructure” by June 30, 2018;

Coordinate the work of all departments with responsibility for GSI, including Watershed Protection, Water, Parks and Recreation, Public Works, Transportation, and Development Services;

Conduct an inventory of the total amount of stormwater currently handled by existing public and private GSI installations in Austin, including rain gardens, bioswales, green roofs, permeable pavements, and rain harvesting cisterns and barrels;

Set an ambitious but realistic target for increasing this amount;

Encourage the use of GSI design features in the construction of new developments and redevelopments, and in the retrofitting of existing developments;

Prioritize the use of GSI design features in watersheds with known flood hazard zones;

Apply the Functional Green program to properties on which the current impervious coverage maximums will be raised to levels below the proposed 80 percent threshold;

Explore opportunities for lowering the amount of impervious cover on previously developed properties whenever feasible;

Incentivize the installation of GSI by expanding the City's existing WaterWise program for homeowners and business;

Increase the use of GSI design features in the City's public works projects whenever feasible;

Integrate all aspects of water management in the City's departments, including drinking water, wastewater, stormwater, and natural water sources;

Provide for the funding of GSI plans through adequate budget appropriations, bond issues, and new financing and partnership opportunities.

## RESOLUTION NO.

**WHEREAS**, there has been a steady increase in the amount of land area in Austin covered by impervious surfaces, and a steady decrease in the amount of pervious land area capable of absorbing rainfall; and

**WHEREAS**, the result has been an increasing rise in the amount of runoff that flows off-site from developed properties and into older, undersized stormwater drain systems, creeks, rivers, and lakes; contributing to increases in flooding severity, damage to private property, loss of life, and water pollution; and

**WHEREAS**, retrofits to stormwater infrastructure are necessary to reduce runoff and pollution, but capital investment is daunting, presenting a significant economic burden but also an opportunity to re-evaluate the most efficient way to invest in stormwater infrastructure and environmental protection and restoration programs; and

**WHEREAS**, the Flood Mitigation Task Force Final Report of May 2016 included Green Stormwater Infrastructure (GSI) recommendations and asserted “when implemented on a widespread basis throughout a neighborhood, they can provide essential benefits”; and

**WHEREAS**, GSI is a stormwater management practice referring to a set of design features in buildings and landscapes that can retain and beneficially re-use rainwater on-site and increase infiltration of rainwater to improve stream baseflows thereby decreasing the amount of runoff that flows off-site; and

**WHEREAS**, using GSI for urban stormwater retrofits can reduce stormwater pollution while also reducing the burden and demand on existing infrastructure by capturing rainfall on-site; and

**WHEREAS**, GSI has the potential to be less costly than or cost competitive with traditional water quality and conservation infrastructure and provides additional environmental and economic benefits; and

**WHEREAS**, GSI, broadly utilized, offers the potential for significant cumulative benefits across watersheds that would help reduce the burden and extend the utility life of our existing stormwater infrastructure, improve water quality and provide other environmental benefits, as well as extend our potable water supply that is subject to growing population and drought; and

**WHEREAS**, GSI can provide additional benefits, such as improving streetscapes and bikeways with increased tree canopy and lower ambient air temperatures and appreciable economic and aesthetic value as well as human and ecological health benefits; and

**WHEREAS**, GSI has been endorsed by the Imagine Austin Comprehensive Plan (2012), the Water Resource Planning Task Force (2014), the Flood Mitigation Task Force (2016), the Green Infrastructure Working Group (2016), and the Environmental Commission (2017); and

**WHEREAS**, parcel and district-scale rainwater and stormwater capture are being considered as water demand reduction and supply augmentation options in the Austin Water Forward Plan, the city's 100-year water supply planning effort being overseen by the Austin Integrated Water Resource Planning Community Task Force ; and

**WHEREAS**, the CodeNEXT draft of the land development code recommends more beneficial use of stormwater on-site via GSI to enhance creek

baseflow, support on-site vegetation, reduce potable water consumption, and for the implementation of a “Functional Green” program; and

**WHEREAS**, the City of Austin was an early adopter and has long been a national leader in the implementation of GSI projects, regulations and practices; and

**WHEREAS**, Imagine Austin Comprehensive Plan identifies Green Infrastructure as one of the eight priority programs (Priority Program 4), directing the use of: “... green infrastructure to protect environmentally sensitive areas and integrate nature into the city” and further frequently cites green infrastructure should be expanded and integrated into our urban environment; and

**WHEREAS**, Imagine Austin Comprehensive Plan, Priority Program 4, pages 195 and 196, further states “An integrated green infrastructure system can also reduce energy consumption and greenhouse gas emissions by providing alternatives to automobiles, reducing water use, and shading buildings; and

**WHEREAS**, the Imagine Austin Green Infrastructure Priority Program Implementation Team provides a forum for inter-departmental collaboration on policies and programs relating to open space acquisition, regulatory policies, and programs relating to the management of City of Austin lands; **NOW, THEREFORE,**

**BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF AUSTIN:**

The City Manager is directed to:

- Develop a list of green stormwater infrastructure practices that can be utilized to achieve on-site beneficial use of stormwater;

- Evaluate and test the proposed “Functional Green” tools in Exhibit A using different types of example projects to determine the most appropriate threshold(s) for the application of the tool;
- Evaluate and test the “On-Site Beneficial Reuse” tools in Exhibit A using different types of example projects to determine the most appropriate thresholds for application of the tool with a focus on 3-9 unit developments;
- Clarify the coordination of “Functional Green” and “On-Site Beneficial Reuse” tools in Exhibit A on projects as they are reviewed by Watershed Protection and Development Services Departments and develop language to summarize the environmental elements integrated throughout the code, and citation of their locations in the code, to inform and achieve the natural and sustainable vision of Imagine Austin;
- Include the Environmental Commission as a review Board and Commission to provide recommendations to Council as it relates to aspects of the code with environmental impact; and
- Implement the Environmental Commission recommendations for an inventory of all efforts at implementing GSI and establishment of a program that encourages increased use of GSI as well as to include continued collaboration with Austin Water’s Water Wise program and Watershed Protection Department’s storm water management, particularly in small-scale beneficial re-use programs.

**BE IT FURTHER RESOLVED:**

The City Manager is directed to assess the City's progress toward achieving the vision, goals, policies, and actions relating to green infrastructure, as defined in the Imagine Austin Comprehensive Plan and to identify and evaluate opportunities and strategies to further integrate and leverage the City's green infrastructure related programs and projects. The product of this assessment should be a work plan for an Integrated Green Infrastructure Plan as set forth in the Priority Program 4 "Short Term" Work Program in the Imagine Austin Comprehensive Plan. The work plan for development of an Integrated Green Infrastructure Plan shall:

- Be developed with consideration of the sub-tasks specified in the Priority Program 4 "Short Term" Work Program and other existing City plans relating to green infrastructure such as the Austin Parks Department Long-Range Master Plan, the Urban Forest Plan, the Community Climate Plan, the Urban Trails Master plan, Community Wildfire Protection Plan, and the Watershed Protection Master Plan;
- Include tasks assessing critical gaps relating to green infrastructure policies and priorities, identifying and evaluating opportunities and strategies to further integrate the City's green infrastructure related policies and programs, and recommending solutions to address identified gaps. These tasks may relate to open space and parkland acquisition; integration of CodeNEXT recommendations pertaining to on-site stormwater management and beneficial re-use with the Water Forward Integrated Water Resources Plan; and improved management of public lands; and

- Include recommendations regarding the required resources, the process, and the timeline for the development of the Integrated Green Infrastructure Plan under the direction of the Imagine Austin Green Infrastructure Priority Program Implementation Team.

**BE IT FURTHER RESOLVED:**

The City Manager is directed to bring forth a catalog of existing Green Stormwater Infrastructure initiatives and an integrated plan that further leverages cross departmental programs by December 2017.

**BE IT FURTHER RESOLVED:**

The City Manager is directed to bring the work plan for the development of an Integrated Green Infrastructure Plan to relevant Boards and Commissions for review and to City Council for approval by March 31, 2018.

**ADOPTED:** \_\_\_\_\_, 2017

**ATTEST:** \_\_\_\_\_

Jannette S. Goodall  
City Clerk