# Greauxing Resilience at Home

City of Houston, Texas: **Resilient Houston and Affordable Housing and Nature-Based Efforts** 



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## **ABOUT THIS REPORT**

Louisiana is one of the hardest-hit areas in the United States as extreme weather events and regular flooding become more frequent and intense.<sup>1</sup> These challenges often fall "first and worst" on Black, Indigenous, and People of Color or "BIPOC" and low-income communities.<sup>2</sup> This is especially true in the U.S. Gulf Coast region and the state of Louisiana.

Over time, these challenges are being exacerbated by population increases and transitions as climate and non-climate drivers (e.g., people moving out of urban centers into more rural areas) influence where people choose — or are able — to live.

In southeast Louisiana, resilient, affordable housing initiatives are critical to ensuring equitable adaptation that takes into consideration the myriad overlapping challenges facing all Louisianans, but especially those living in communities that have long borne a disproportionate burden of risk.

Over a two-year period between fall 2020 and spring 2022, **Capital Region Planning Commission** and **Georgetown Climate Center** partnered with dozens of people from government, private, and nonprofit sectors and community stakeholders in Region Seven of the **Louisiana Watershed Initiative**.<sup>3</sup> The result of that partnership effort is **Greauxing Resilience at Home: A Regional Vision**<sup>4</sup> (Regional Vision), a resource to inform Region Seven's ongoing work to increase community resilience by promoting affordable housing and nature-based solutions.

Regional and local governments in Region Seven can use the Regional Vision to identify potential legal, planning, and policy tools and projects to increase the affordability and availability of housing and the use of nature-based solutions. In addition, the Regional Vision offers insights for policymakers across Louisiana, throughout the Gulf Coast region, and nationally.

This report is composed of 24 individual case studies developed by Georgetown Climate Center to support the Regional Vision. These case studies describe best and emerging practices, tools, and examples from Louisiana and other U.S. jurisdictions to make progress on these complex and challenging issues. These case studies are intended to provide transferable lessons and ideas for regional and local governments addressing housing and mitigating flood risk as integrated parts of comprehensive community resilience strategies. Collectively, these case studies present a suite, although not an exhaustive list of tools and approaches that can be used to facilitate any of these efforts.

1 STATE OF LA., LOUISIANA CLIMATE ACTION PLAN: CLIMATE INITIATIVES TASK FORCE RECOMMENDATIONS TO THE GOVERNOR 15–16 (Feb. 2022), available at https://gov.louisiana.gov/assets/docs/CCI-Task-force/CAP/ClimateActionPlanFinal.pdf.

2 See id. at 15–17.

3 The Louisiana Watershed Initiative is an effort to create a paradigm shift in floodplain management towards a strategy that approaches flood risk reduction from a nature-based solutions and land-use-based approach. A part of this approach includes identifying eight separate regional watershed management areas to assist in achieving cross-jurisdictional activities.

Region Seven is one of these eight watershed regions. Region Seven encompasses the upper part of the toe of Louisiana's boot. It spans eastward from the Mississippi River near Baton Rouge across the Northshore (i.e., north of Lakes Pontchartrain and Maurepas) to Mississippi and along the Mississippi River to the Bonnet Carré Spillway. The region includes 13 parishes and 45 incorporated municipalities.

4 To reflect their connection to Louisiana's cultural heritage, the project team and members of Region Seven that participated in this process chose to use the word "Greaux," a French-inspired phonetic spelling of the word "Grow," to brand this product. Where possible, all the case studies share a consistent organizational format to allow easier cross-comparison of tools, processes, and takeaways:

- The **Background** section introduces the regional and local context (e.g., location, demographics) for each case study, including the following facing each jurisdiction: extreme weather risks, housing and environmental challenges, and development pressures.
- The **Housing** section focuses on the legal, planning, and policy tools and projects that have been designed and implemented to support the growth and preservation of housing affordability and availability.
- The **Environment** section highlights how vulnerable habitats like floodplains and other open spaces are being restored, conserved, and protected as a part of comprehensive resilience strategies to provide important ecosystem and community benefits like reducing flood risk and creating community assets, such as parks and trails.
- The **Community Engagement** section summarizes how governments have provided different types of public engagement opportunities and how affected residents have contributed to these planning and decisionmaking processes.
- The **Funding** section identifies how the programs, plans, and projects discussed have been funded by federal, state, and local government and private and nongovernmental sources.
- The **Next Steps** section captures the anticipated future actions that featured case study jurisdictions may take in implementing these tools and strategies.
- The **Considerations and Lessons Learned** section concludes with the primary takeaways from each example that other regional and local policymakers and communities may consider when developing or implementing their own housing and resilience strategies using these legal, planning, and policy tools.

A few additional notes about the case studies:

- The case studies selected prioritize relatable and scalable models from places similar to Louisiana: Wherever possible, Georgetown Climate Center aimed to acknowledge and lift up the work of jurisdictions and nongovernmental actors in Region Seven and neighboring watershed regions to inspire peer-to-peer sharing and actions from as close to home as possible. These resources are drawn from 12 states, with an emphasis on regions and local areas in the Gulf and Mid-Atlantic: Colorado, Florida, Georgia, Illinois, Iowa, Louisiana, New York, North Carolina, Oregon, South Carolina, Texas, and Virginia. Examples and lessons drawn from these regions are easiest to apply to a Louisianan context because they feature similar geography or analogous impacts from flooding and other climate effects.
- There are no perfect, "one-size-fits-all" solutions: While the case studies and resource entries informing the Region Vision are instructive for Region Seven and beyond, none of them are "perfect" examples of how to solve these complex and challenging issues. Georgetown Climate Center found no single case study or resource that provides a point-for-point or model for what Region Seven is trying to accomplish. No other jurisdiction identified is currently trying to integrate housing, flooding, equity, resilience, and population changes together in a single plan, ordinance, or policy. However, some jurisdictions are moving in that direction, or are making progress on discrete elements of what will eventually become a more holistic strategy. Therefore, this report and the Regional Vision draw analogous connections and recommendations that can be combined to facilitate more comprehensive planning and land-use efforts.

The case studies in this report were informed by interviews with practitioners and community leaders in charge of designing and overseeing this work. No statements or opinions, however, should be attributed to any individual or organization included in the *Acknowledgements* section of this report.

It is also important to note that the examples described in each case study are ongoing and the content included in this report is current as of spring 2022. For future updates about these and other case studies and the Regional Vision, please visit **Greauxing Resilience at Home: A Regional Vision** and Georgetown Climate Center's **Adaptation Clearinghouse**.

## City of Houston, Texas Resilient Houston and Affordable Housing and Nature-Based Efforts

## **EXECUTIVE SUMMARY**

Houston has been battered by six federally declared flooding disasters in five years, including the record-setting Hurricane Harvey in 2017. A significant amount of Houston's existing development is located in vulnerable floodplains. These land use patterns, combined with recurrent disasters, have served as the impetus for Houston to undertake several related efforts to increase local resilience.

The city has thus begun to plan to increase its resilience against future storms. In 2018, the city responded by adding structural elevation requirements in the 500-year floodplain and increasing them for the 100-year floodplain. In addition, the city developed the Resilient Houston plan. If implemented, the proposed recommendations in Resilient Houston will promote affordable housing with access to job centers, improve community resilience through green space preservation, and enhance stormwater management through the promotion of green stormwater infrastructure. Other local governments facing similar threats from disaster events and pressures to develop in floodplains could evaluate and consider adopting some of Houston's planning and land-use actions.

## BACKGROUND

At 667 square miles and with nearly 2.3 million residents, Houston in Harris County is the fourth largest city in the country.<sup>1</sup> The number of people in the city has grown exponentially in recent years.<sup>2</sup> This rate of growth outpaces other major cities: Houston's population has increased 1,700 percent in the last hundred years, while Los Angeles's has increased 700 percent and New York's has increased 140 percent in the same period.<sup>3</sup> Harris County is the third largest county in the United States, adding more than 33,000 residents from July 2018 to July 2019.<sup>4</sup>

<sup>&</sup>lt;sup>1</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 9, 12–13 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

 $<sup>^{2}</sup>$  *Id*. at 7.

 $<sup>^{3}</sup>$  *Id.* at 13.

<sup>&</sup>lt;sup>4</sup> Most of the Counties with the Largest Population Gains Since 2010 are in Texas, U.S. CENSUS BUREAU (Mar. 26, 2020), <u>https://www.census.gov/newsroom/press-releases/2020/pop-estimates-county-metro.html</u> (press release).

The city is coastal and sits atop 22 major watersheds that drain into 22 major bayous or waterways.<sup>5</sup>

#### **OVERVIEW OF RESILIENT HOUSTON**

Following Hurricane Harvey, the city created its Resilient Houston plan to guide investments to make Houston more resilient to future storms and disasters. Resilient Houston is an implementation-focused plan with 18 discrete goals, supported by 62 discrete actions, prioritizing engagement, finance, policy, metrics, partnerships, and creating a "smart" city.<sup>6</sup> Some broad goals include removing habitable structures from floodways, completing 100 green stormwater infrastructure (GSI) projects by 2025, and conserving undeveloped regional lands as natural spaces.

The city maintains emergency preparedness as a priority, including delivering preparedness training to 500,000 residents by 2025 and ensuring 100 percent of residents have real-time emergency alerts by 2030.<sup>7</sup> The city is complementing those preparedness efforts by promoting resilience at the community level and the development of affordable housing outside the floodplain.

Ultimately, Houston plans to invest \$50 billion into major resilience projects over the next 20 years, including recovering from Hurricane Harvey, expanding transportation accessibility, and upgrading water and sewer systems.<sup>8</sup> As of May 2021, 56 of the actions identified in Resilient Houston are underway, five are on hold, and one (a city-wide climate impact assessment) is completed.<sup>9</sup>

This case study introduces some of the resilience efforts Houston has proposed and is undertaking. In particular, the case study summarizes initiatives to promote affordable housing, conserve a healthy environment for residents, and efficiently manage stormwater drainage. Related planning initiatives, such as an Incentives for Green Development study, the city's Climate Action Plan, and tree-planting programs, are discussed where relevant.

## HOUSING

Houston has found that while rent burdens in the city are within affordability metrics (the median citizen spends less than 30 percent of his/her income on housing), adding transportation costs to those metrics significantly reduces the actual affordability of living in Houston.<sup>10</sup> This is exacerbated by the tendency of underserved communities to be geographically disconnected from

<sup>&</sup>lt;sup>5</sup> *Id*. at 11.

<sup>&</sup>lt;sup>6</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 39 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

<sup>&</sup>lt;sup>7</sup> *Id*. at 46.

<sup>&</sup>lt;sup>8</sup> Id. at 39.

<sup>&</sup>lt;sup>9</sup> *Id*. at 4.

<sup>&</sup>lt;sup>10</sup> *Id*. at 31.

the city's job centers as a result of sprawl, often requiring vehicle-assisted travel.<sup>11</sup> Car-centric growth patterns have also not historically accounted for the environmental and health effects of the city's growth and development.

Increasing the affordability of housing has several direct and indirect economic benefits for the city at large. Affordable housing in safer areas can promote resilience at the community level by removing dwellings from the floodplain and connecting people to job centers. Houston has also found that affordable housing alleviates homelessness and the social and financial costs associated with it, allowing reinvestment of those savings back into communities.<sup>12</sup>

#### Planning

Houston is divided into 88 "super neighborhoods," which are the city's community planning units.<sup>13</sup> Houston will aim to work with these and smaller neighborhood units to embrace a community-minded approach to resilience. To do that, Goal 4 of Resilient Houston calls for safe, equitable, and resilient neighborhoods that have localized resilience plans tailored to their community.<sup>14</sup> The city will start by selecting pilot neighborhoods for community-focused development modeling, identify community liaisons in those neighborhoods, and expand the Houston Land Bank and Houston Community Land Trust's efforts to develop affordable homes on publicly owned lands.<sup>15</sup>

Under Goal 7 for smart growth, Houston also aims to create a comprehensive housing study and plan with neighborhood-specific recommendations that accommodates projected population growth by promoting the creation of affordable and market-priced housing.<sup>16</sup> This will involve and prioritize the use of different tools, such as GSI, to make affordable housing more resilient.

#### Land Use

Houston is rapidly growing outward. For every single-family home inside Houston, four more are located in the city's extra-territorial jurisdiction, the larger metropolitan area.<sup>17</sup> Houston intends to integrate affordable accessory dwelling units or "ADUs" to address this sprawl and increase

<sup>&</sup>lt;sup>11</sup> *Id*. at 29–31.

<sup>&</sup>lt;sup>12</sup> *Id*. at 64.

<sup>&</sup>lt;sup>13</sup> Super Neighborhoods, CITY OF HOUSTON, TEX., <u>https://www.houstontx.gov/superneighborhoods/</u> (last visited Aug. 19, 2021).

<sup>&</sup>lt;sup>14</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 72 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

<sup>&</sup>lt;sup>15</sup> Id. at 72–76.

<sup>&</sup>lt;sup>16</sup> *Id*. at 88.

<sup>&</sup>lt;sup>17</sup> *Id*. at 92.

density.<sup>18</sup> This will promote the Resilient Houston's Goal 7 to "build up, not out" by incentivizing denser urban infill.<sup>19</sup> In addition, Houston will enhance coordination of Tax Increment Reinvestment Zones with neighborhoods to incentivize community investment from future property tax growth revenues and to align those investments with community needs.<sup>20</sup>

Existing and continued development in the floodplain will exacerbate ongoing flooding threats. To reduce flooding in the weeks following Hurricane Harvey, the city extended its no-net-fill regulation to cover the entire 500-year floodplain.<sup>21</sup> No-net-fill means that when space is filled inside the floodplain for development, an equivalent amount of space must be preserved outside of the floodplain to offset the removal of floodwater storage capacity inside the floodplain. This action will support Resilient Houston Goal 8 for living safely with water and the removal of all habitable structures from the floodplain by 2030.<sup>22</sup>

#### **Voluntary Buyouts and Land Swaps**

One of the resilience approaches embraced by both the Resilient Houston plan and Harris County is to prevent future flood damage in places where structural protections like levees and repairs are not cost-effective or beneficial. The Harris County Flood Control District (HCFCD) is doing this at the county level through a local voluntary buyout program.<sup>23</sup> Under Goal 8, Houston plans to pilot potential relocation efforts on the city level to "make room for water" to live more safely with it.<sup>24</sup> To address the flooding risks faced by underserved and low-income communities, Houston will work with partners to create a community buyout and land swap program for any homes inside

<sup>&</sup>lt;sup>18</sup> Accessory dwelling units, or ADUs, are secondary living units built on existing single-family parcels. There are a variety of ADU types, which include attached units, such as basement and loft units, and detached units, such as a smaller home built on the same property behind the main home.

<sup>&</sup>lt;sup>19</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 92 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

 <sup>20</sup> Tax
 Increment
 Reinvestment
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 TEX.,

 https://www.houstontx.gov/ecodev/tirz.html#:~:text=Tax%20Increment%20Reinvestment%20Zones%20(TIRZs)%
 20are%20special%20zones%20created%20by,development%20in%20a%20timely%20manner
 (last visited Aug. 16, 2021).

<sup>&</sup>lt;sup>21</sup> Edward Clump & Mike Lee, *Houston sees 'defining moment' with new regulations*, POLITICO (Apr. 5, 2018), https://subscriber.politicopro.com/article/eenews/1060078211.

<sup>&</sup>lt;sup>22</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 96 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

<sup>&</sup>lt;sup>23</sup> KATIE SPIDALIERI & ISABELLE SMITH, GEORGETOWN CLIMATE CTR., MANAGING THE RETREAT FROM RISING SEAS: HARRIS COUNTY, TEXAS: FLOOD CONTROL DISTRICT LOCAL BUYOUT PROGRAM (2020), *available at* <u>https://www.georgetownclimate.org/files/MRT/GCC\_20\_Harris-4web.pdf</u>; CITY OF HOUSTON, TEX., RESILIENT HOUSTON 96 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

<sup>&</sup>lt;sup>24</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 97–98 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

the floodway or floodplain that cannot be reasonably repaired or elevated.<sup>25</sup> This pilot would occur, in addition to buyouts led by HCFCD.

To facilitate a land swap, the city could strategically acquire vacant properties outside the floodplain or at higher elevations to enable buyout participants living in a floodway or the floodplain to relocate to safer homes. In turn, flood-prone properties acquired under the program can be returned to open space and used for flood risk reduction and public amenities.

#### ENVIRONMENT

#### **Green Spaces**

Houston's post-Harvey approach to embracing nature involves adopting nature-based approaches for flood control and resiliency purposes.<sup>26</sup> The city's bayous receive significant amounts of pollution, especially during hurricanes and other disaster events. In addition to stormwater runoff, storm surges that result from the wind created by hurricanes carry pollutants and threaten coastal stability by eroding shorelines and disrupting habitats. Goal 9 of Resilient Houston addresses these issues and embraces the role of the area's bayous by incentivizing "water-aware" development, designed to work in tandem with the natural flowing of rivers and bayous, and by employing natural systems to improve and protect surface water quality and coastal protection.<sup>27</sup>

To preserve healthy natural water flows, Houston plans to study, identify, and remove choke points and blockages in bayou systems that cause water backups under Goal 8.<sup>28</sup> These efforts and other conservation measures, such as preserving wetlands, woodlands, and prairies (like the Katy prairie) can promote the natural infiltration and treatment of stormwater to improve water quality. Houston intends to partner with academic and other entities to research and advance nature-based GSI.<sup>29</sup>

#### Trees

Planting and restoring native tree cover is part of Resilient Houston's plan for community resilience and stormwater management. Trees not only reduce heat stress through shade cover and buffer floodwaters, but also improve air quality and enhance open spaces. In 2011, 24 consecutive days of 100+ degree temperatures resulted in \$5.2 billion in agricultural losses from interrupted water services and killed 301 million trees.<sup>30</sup> The city's neighborhoods have lost significant tree

<sup>28</sup> *Id.* at 102.

<sup>&</sup>lt;sup>25</sup> *Id.* at 98.

<sup>&</sup>lt;sup>26</sup> *Id*. at 25.

<sup>&</sup>lt;sup>27</sup> Id. at 104.

<sup>&</sup>lt;sup>29</sup> Id.

<sup>&</sup>lt;sup>30</sup> *Id*. at 27.

cover in recent decades, the ecosystem services value of which has been estimated at \$55 million per year.<sup>31</sup>

As part of the targets included in both Resilient Houston Goal 6 and the city's Climate Action Plan, Houston aims to plant 4.6 million new native trees by 2030.<sup>32</sup> Community partnerships will be used to inform a large-scale planting strategy prioritizing native trees that will replace lost tree canopy starting in the locations with greatest need.<sup>33</sup> This will entail concentrating on areas with minimal green space and areas that lack shade structures.<sup>34</sup> The city will also work to combat challenges to tree planting on streets and sidewalks and encourage private property owners to plant trees.<sup>35</sup> As of 2020, more than 700,000 trees have been planted towards achieving this goal.<sup>36</sup>

In addition to the 4.6 million trees identified in Resilient Houston and the Climate Action Plan, the Houston Parks and Recreation Department (HPARD) is aiming to invest in a legacy tree program to propagate native seedlings and also a nursery to hold 10,000 trees annually.<sup>37</sup> This includes the Linear Forest Program, which seeks to convert mowed esplanades and medians into linear forests by removing that land from the mowing cycle and allowing it to provide shade cover.<sup>38</sup> HPARD also intends to plant more than 200,000 trees as part of its Riparian Restoration Initiative, which restores forested riparian buffers.<sup>39</sup>

#### **Drainage and Green Infrastructure**

Houston has historically addressed upstream flood control by pushing water downstream as quickly as possible. Resilient Houston Goal 11 calls for updating Houston's infrastructure design manual and adopting more comprehensive approaches like encouraging the use of GSI and on-site water capture and retention through best management practices, such as low-impact

<sup>&</sup>lt;sup>31</sup> Urban Ecosystem Analysis for the Houston Gulf Coast Region: Calculating the Value of Nature, AM. FORESTS 12 (2000); CITY OF HOUSTON, TEX., RESILIENT HOUSTON 80 (2020), available at https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf.

<sup>&</sup>lt;sup>32</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 79 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>; CITY OF HOUSTON, TEX., HOUSTON CLIMATE ACTION PLAN 52 (2020), *available at* <u>http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf</u>.

<sup>&</sup>lt;sup>33</sup> *Id*. at 80.

<sup>&</sup>lt;sup>34</sup> *Id*.

<sup>&</sup>lt;sup>35</sup> Id.

<sup>&</sup>lt;sup>36</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON, ONE YEAR REPORT 20 (2021), available at <u>https://www.houstontx.gov/mayor/Resilient-Houston-One-Year-Report.pdf</u>.

<sup>&</sup>lt;sup>37</sup> CITY OF HOUSTON, TEX., HOUSTON CLIMATE ACTION PLAN 25 (2020), *available at* <u>http://greenhoustontx.gov/climateactionplan/CAP-April2020.pdf</u>.

<sup>&</sup>lt;sup>38</sup> Houston Parks & Recreation Dep't, Linear Forest Program, *available at* <u>https://www.houstontx.gov/parks/pdfs/LinearForestProgramFN.pdf</u> (last visited Aug. 16, 2021) (one pager).

<sup>&</sup>lt;sup>39</sup> Houston Parks & Recreation Dep't, Houston Parks Department Kicks Off Riparian Restoration Initiative (Feb. 6, 2020), *available at* <u>https://www.houstontx.gov/parks/pdfs/2020/RiparianRestorationInitiative.pdf</u> (press release).

development.<sup>40</sup> Resilient Houston outlines proposed initiatives like incorporating large-scale GSI and nature-based planning and design to expand the water detention capacity of bayou corridors. Examples of potential GSI and nature-based projects include: detention basins with permanent pools of water and wetland vegetation, natural stable channel design, riparian restoration, wetlands restoration and preservation, and prairie restoration and preservation.

The city also recommends developing a new resilience quotient points system for GSI projects to better ensure that they provide a more standard or consistent level of benefits for people throughout the city.<sup>41</sup> According to the plan:

The locations for GSI must be determined with an equity lens to ensure that all neighborhoods benefit from this infrastructure. Public GSI projects should consider stormwater management needs, but also impacts on neighborhood economic development and quality of life. A team of internal and external stakeholders will be assembled to determine the specific criteria for ranking GSI projects while hydrologic analyses will be used to understand the best locations for stormwater benefits. These evaluation criteria would then be used in the decision-making processes for GSI project selection to develop the resilience quotient for GSI housing and infrastructure projects. A higher score would indicate a higher project viability.<sup>42</sup>

In addition to promoting large projects and design changes, Resilient Houston Goal 1 aims to grow GSI beginning at both the local and individual parcel levels.<sup>43</sup> To aid these efforts, the city studied how to encourage GSI development in the Incentives for Green Development study (IGD study).<sup>44</sup> The IGD study identifies regulatory flexibility, tax abatements, award and peer-recognition programs, and expedited permitting processes as key opportunities to increase the use of GSI.<sup>45</sup> Regulatory flexibility can take the form of a parallel, GSI-focused permitting and regulatory process for development, which can harmonize parking, landscaping, open space, drainage/detention design, and stormwater quality design. As articulated in the IGD study, the city envisions a bifurcated system where developers could build under existing land-use rules or apply for development permits under a GSI-promoting process.<sup>46</sup> The GSI permitting process could incorporate ideas, such as lower minimum parking requirements.

<sup>&</sup>lt;sup>40</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 119 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

<sup>&</sup>lt;sup>41</sup> Id.

<sup>&</sup>lt;sup>42</sup> Id.

<sup>&</sup>lt;sup>43</sup> *Id*. at 50.

<sup>&</sup>lt;sup>44</sup> MICHAEL F. BLOOM, JANET CLEMENTS, & ALISA VALDERRAMA, HOUSTON INCENTIVES FOR GREEN DEVELOPMENT (May 2019), *available at* <u>http://www.houstontx.gov/igd/documents/igd-report-final.pdf</u>.

<sup>&</sup>lt;sup>45</sup> *Id*. at 5.

<sup>&</sup>lt;sup>46</sup> *Id*. at 34–39.

In preparing the IGD study, stakeholders further indicated that more consistent and faster permitting would incentivize wider adoption of GSI.<sup>47</sup> This would also make GSI more economically feasible by reducing permitting costs. The IGD study cites an example from Dallas that Houston could explore.<sup>48</sup>

Borrowing from the Dallas example, the IGD study identifies broad features of a proposed program.<sup>49</sup> Through the program, developers can choose to pay the city a higher permitting application review fee to gain access to an expedited permitting process that would begin with a city project review team meeting consisting of staff from all relevant departments. The review meeting can occur as soon as a development plan is complete. If possible, all minor changes to a plan can be made during that initial review and city staff can sign off prior to the end of the meeting. If revisions cannot be completed on the spot, a follow up meeting can be scheduled. Once necessary changes are made, permits can be issued. It is important to highlight, however, that this approach will likely require training additional or hiring new city staff with specialized training, which would require an initial financial investment.

Between August 2021 and August 2022, the city is in the process of piloting an expedited permitting process for a minimum of ten projects.<sup>50</sup> Specifically, the city is working with "developers to test, evaluate and formalize the process steps necessary for an expedited review of projects that include nature-based solutions."<sup>51</sup>

The IGD study also recommends property tax abatements to incentivize GSI.<sup>52</sup> Property tax abatements reduce an owner's property tax by a certain amount for a specified time to encourage a public benefit.<sup>53</sup> Houston could authorize such a tax abatement through a specific GSI tax abatement or the city's existing blanket abatement authority.<sup>54</sup> The IGD study shows how tax abatements for GSI can be a trigger point across projects of most scales, with larger tax reductions available for GSI projects that provide more benefits.<sup>55</sup> The IGD study also includes recommendations for working with developers who are working on projects that are large enough to cover the costs associated with GSI projects.<sup>56</sup>

<sup>&</sup>lt;sup>47</sup> *Id.* at 34.

<sup>&</sup>lt;sup>48</sup> *Id*. at 35.

<sup>&</sup>lt;sup>49</sup> *Id*. at 35–36.

<sup>&</sup>lt;sup>50</sup> Incentives for Green Development, CITY OF HOUSTON, TEX., <u>http://www.houstontx.gov/igd/</u> (last visited Jan. 12, 2022).

<sup>&</sup>lt;sup>51</sup> Id.

<sup>&</sup>lt;sup>52</sup> MICHAEL F. BLOOM, JANET CLEMENTS, & ALISA VALDERRAMA, HOUSTON INCENTIVES FOR GREEN DEVELOPMENT 26 (May 2019), *available at* <u>http://www.houstontx.gov/igd/documents/igd-report-final.pdf</u>.

<sup>&</sup>lt;sup>53</sup> Id.

<sup>&</sup>lt;sup>54</sup> Id.

<sup>&</sup>lt;sup>55</sup> *Id*. at 27–28.

<sup>&</sup>lt;sup>56</sup> Id.

#### Watershed Management Planning

In addition to the recommendations in the IGD study, Goals 8 and 18 of Resilient Houston seek to foster collaboration with other counties and regional entities, including HCFCD, to promote integrated watershed management.<sup>57</sup> Regional cooperation of this kind is consistent with Houston's efforts under Goal 10 to create a "one water plan" that prioritizes resilient infrastructure and coordinates federal, state, and local efforts to develop a Stormwater Master Plan.<sup>58</sup> This would be in conjunction with incentives for green development to promote tailoring solutions to an area's hydrology and geology.

Multiple goals in Resilient Houston thus seek to move away from managing flood waters at only the city level and toward conserving natural benefits through local and regional collaboration and innovation. These nature-based drainage approaches include promoting denser urban infill to relieve green spaces, leveraging flood mitigation investments with multi-functional design elements, and incentivizing GSI on private property to "mimic the natural flow of water in pre-development conditions."<sup>59</sup>

## **COMMUNITY ENGAGEMENT**

Four of Resilient Houston's 18 goals directly support "safe and equitable neighborhoods," which are disaster-ready and supported by equity-focused, localized plans.<sup>60</sup> Noting that urban sprawl and historical land-use practices have had disproportionate negative effects on some communities, Resilient Houston Goal 6 specifically seeks to address environmental injustices.<sup>61</sup> These goals of promoting equitable community growth, a healthy environment, and nature-based stormwater drainage in Resilient Houston will be supported by robust community engagement and outreach. For example, Goal 7 of Resilient Houston seeks to support affordable housing efforts at the community level through an outreach and education campaign aiming to change negative perceptions around affordable housing.<sup>62</sup> To increase energy efficiency and emergency preparedness of homes, the city will aim to partner with energy utilities to promote home retrofit programs and other weatherization efforts.<sup>63</sup>

To promote its GSI-related goals, Resilient Houston Goal 2 is about developing a GSI workforce through partnerships, educational initiatives, and training programs.<sup>64</sup> As proposed, the workforce

- <sup>61</sup> *Id*. at 86.
- <sup>62</sup> *Id*. at 89.
- <sup>63</sup> Id.

<sup>&</sup>lt;sup>57</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 97, 160 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

<sup>&</sup>lt;sup>58</sup> Id. at 116.

<sup>&</sup>lt;sup>59</sup> *Id*. at 50.

<sup>&</sup>lt;sup>60</sup> *Id*. at 72–87.

<sup>&</sup>lt;sup>64</sup> *Id*. at 55.

would be supported by trained staff at multiple levels in the Public Works and General Services divisions (and by Resilience Officers in every city department), who will begin filling gaps in the workforce's knowledge and skills related to GSI.<sup>65</sup> The city can support the development of this workforce by using its procurement power to ensure resilience project coordinators hire from public program- and partner program-trained workers. Additionally, the city could partner with local universities and other hosts of potential relevant technical programs that would aid workforce education and training.<sup>66</sup>

This stakeholder input and collaboration will not just contribute to the workforce's development, but will also enable the city to better integrate equity into stormwater management. This collaboration will support efforts to localize resilience, including developing community-based plans to complement city and county plans.

### FUNDING

Resilient Houston identifies a variety of federal, state, local, and private funding opportunities that could be used to implement specific projects over time. Finance is a common theme in the plan, as Houston will need to develop new partnerships and tools to fully implement Resilient Houston.<sup>67</sup> For example, the city became the 101st in the Global Resilient Cities Network and crafted the Resilient Houston Plan with private-sector financial support from Shell.<sup>68</sup> This public-private response to Hurricane Harvey was the first time local financial support was used to develop a resilience strategy.<sup>69</sup> The remainder of that funding was dedicated to supporting implementation of the plan's goals. Houston can further encourage the use of GSI and other resilience measures across both public and private programs by leveraging federal grants to advance resilience goals.<sup>70</sup>

To promote affordable housing and healthy communities, Resilient Houston outlines a new, dedicated housing affordability fund<sup>71</sup> that could be modeled after similar programs in Denver<sup>72</sup>

<sup>&</sup>lt;sup>65</sup> Houston has since added two dozen departmental Resilience Officers. *See* CITY OF HOUSTON, RESILIENT HOUSTON, ONE YEAR REPORT 10 (2021), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-One-Year-Report.pdf</u>.

<sup>&</sup>lt;sup>66</sup> See, e.g., Resilience and Climate Progress in Houston, RICE UNIV., <u>https://kinder.rice.edu/resilience-and-climate-progress-houston</u> (last visited Sept. 8, 2021).

<sup>&</sup>lt;sup>67</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 9 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

<sup>68</sup> Id. at 36.

<sup>&</sup>lt;sup>69</sup> *Id.* at 4, 36.

<sup>&</sup>lt;sup>70</sup> *Id*. at 160.

<sup>&</sup>lt;sup>71</sup> *Id*. at 74.

<sup>&</sup>lt;sup>72</sup> The Denver fund was created in the fall of 2016 by a vote of the City Council. The fund is sourced by a one-time fee on new development and property tax revenues, which would raise over \$150 million by 2026 to create and preserve approximately 6,000 affordable housing units for low- to moderate-income families. *Dedicated Affordable Housing Fund*, CITY OF DENVER, COLO. <u>https://www.denvergov.org/content/denvergov/en/housing-</u>

and Detroit.<sup>73</sup> The fund would promote the development of new affordable housing with access to job centers, addressing the cost and transportation barriers identified in the plan.<sup>74</sup> As envisioned, the fund could be managed through a public-private hybrid model and funding would come from public, private, and philanthropic sources.<sup>75</sup>

### **CONSIDERATIONS AND LESSONS LEARNED**

Local policymakers can look to Houston as an example of how to build resilience using planning and GSI incentives to reduce flood risk and provide more open space amenities.

Policymakers can enhance the efficacy of resilience measures by planning on different scales. Resilient Houston is one example of how municipalities can create a guiding framework to identify and prioritize resilience actions across different agencies, departments, and stakeholders. This can produce actions that will maximize community benefits and be more efficient with limited government resources.

In Resilient Houston, Houston recognizes the need to go beyond citywide-scale planning to also engage in community-level planning to meet the individual needs of neighborhoods.

In addition to community-level and -driven planning, policymakers can improve watershed management through regional-scale work. Regional watershed coordination can enhance flood readiness by coordinating efforts across multiple jurisdictions experiencing similar risks and challenges.

Further, as proposed in Resilient Houston, promoting the development and preservation of affordable housing in lower-risk areas can help enable voluntary transitions for residents out of the floodplain. Higher-ground infill development can relieve land-use pressures on the floodplain and directly increase community resilience to disaster events, buffer weather conditions like winds and

<sup>75</sup> *Id.* at 74.

information/partner-resources/build-or-preserve-affordable-housing/denver-dedicated-housing-fund.html (last visited Aug. 22, 2021).

<sup>&</sup>lt;sup>73</sup> Detroit's Strategic Neighborhood Fund is focused on supporting community-driven, neighborhood revitalization investments, such as affordable housing, commercial and mixed-use developments, streetscape improvements, and parks, in historically disinvested neighborhoods like redlined communities. The fund covers ten neighborhoods. Since its inception in 2016, the fund has received \$59 million in city funding and \$56 million in philanthropic grants. The city has been able to leverage this money to raise an additional \$113 million in private investment. *Equitable Rebuilding in Detroit Through the Strategic Neighborhood Fund*, U.S. DEP'T OF HOUS. & URBAN DEV. (July 12, 2021), <u>https://www.huduser.gov/portal/pdredge/pdr-edge-featd-article-071221.html</u>. A 2020 University of Michigan study found that residents of the locations supported with the first-round funding reported experiencing rising property values without fear of displacement. LYDIA WILEDEN & AFTON BRANCHE-WILSON, UNIV. OF MICH., DETROIT'S STRATEGIC NEIGHBORHOOD FUND: A BASELINE REPORT OF RESIDENT PERCEPTIONS (2020), *available at* https://poverty.umich.edu/files/2020/12/PovertySolutions-StrategicNeighborhoodFund-PolicyReport-r6.pdf.

<sup>&</sup>lt;sup>74</sup> CITY OF HOUSTON, TEX., RESILIENT HOUSTON 31 (2020), *available at* <u>https://www.houstontx.gov/mayor/Resilient-Houston-20200402-single-page.pdf</u>.

storm surge, and manage stormwater. These types of risk mitigation land-use strategies can also conserve open spaces to protect natural resources and the environmental landscapes, such as bayous in Houston, that are important to maintaining local culture and character.

Finally, code flexibility and development incentives can be created using existing municipal authorities, such as tax abatement authority, or through new ordinances to encourage investments in resilience. Other local jurisdictions can borrow ideas from Houston's Incentives for Green Development Study and innovations like the city's pilot expedited permitting process for GSI to increase the use of nature-based solutions to mitigate flood and heat risks and promote environmental and community benefits. In addition, policymakers can consider opportunities to leverage mixed funding sources from federal, state, and local government and philanthropic sources to incentivize private investments in affordable housing and the development of GSI.