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RISING TIDE: Stormwater Management, Historic Preservation, and Sustainable Redevelopment in Houston's Fifth Ward

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RISING TIDE: Stormwater Management, Historic Preservation, and Sustainable Redevelopment in Houston's Fifth Ward

by

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Abstract

RISING TIDE: Stormwater Management, Historic Preservation, and Sustainable Redevelopment in Houston's Fifth Ward

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Houston's Fifth Ward neighborhood is one of the last remaining areas of the inner city to have not yet seen large-scale redevelopment. Situated just northeast of downtown, the neighborhood's population is predominantly low- to mid-income African Americans; demographics are similar today as they were during the neighborhood's prime, from the 1920s-60s, when the Fifth Ward was a cultural hub of Houston famous for its musical culture of zydeco and blues. The ward's rich history also has dark spots, however, specifically its longstanding reputation as a center of poverty and violent crime, and its physical vulnerability to damaging floods. Much of the neighborhood's built history is unpreserved and unprotected, at risk of being wiped off the map by both development interests and extreme weather events. By modernizing the city's approach to stormwater management and infrastructure and strengthening its historic preservation and emergency management practices, Houston could help preserve one of its oldest

communities, while also decreasing flood volumes, improving air and water quality, saving money, and establishing a pattern of smart growth citywide. In addition, neighborhood level efforts to promote placemaking via preservation and sustainability efforts can help the Fifth Ward leverage the redevelopment process to change its reputation, ensuring a future for the community that respects its past.

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Introduction

According to the National Oceanic and Atmospheric Administration (NOAA), the thirty-year averages for annual flood losses in the United States are 95 deaths, and $8.22 million in damages. During the same thirty-year period, Texas had the highest concentration of flood deaths of any state. Flash floods are an especially common, and dangerous, occurrence throughout Texas, particularly in the central Hill Country region, but more predictable flooding, such as the kind that accompanies hurricanes and tropical storms, is also a major problem for cities on and near the Gulf Coast.

On September 13, 2008, Hurricane Ike made landfall on the Texas Gulf Coast as a Category 2 storm, measuring 450 miles wide with wind speeds of 110 mph. Ike killed 103 people and caused more than $24.9 million in damages. At the time, Ike was the latest in a string of hurricanes in the Houston-Galveston region, including Allison in 2001 and Rita in 2005, that not only caused extensive property damage, coastline erosion, and loss of life, but also revealed pervasive knowledge gaps in coastal communities' hazard mitigation and recovery strategies.

One area in which these communities were, and still are, overwhelmingly unprepared for a major natural disaster is the protection and preservation of historic-age buildings. The negative effects of failing to incorporate historic preservation practices into hazard mitigation planning were made abundantly clear in New Orleans in 2005 in the aftermath of Hurricane Katrina. In addition

to the numerous historic homes and properties destroyed by flood damage, even more fell victim to failures in the recovery process. Improper condition evaluations and fast-tracked demolitions dramatically increased the number of historic properties lost in the wake of the storm.

Seeing the damage caused in Houston by Hurricane Ike in 2008 and knowing that there is the potential for a much stronger storm, the question then becomes how to mitigate the effects of large storms in the gulf, particularly in terms of their effects on the region's historic, and historic-age, resources. In Houston, the threat of structural damage from stormwater flooding is magnified by an extensive network of bayous, nonabsorbent clay soils, poor land use and watershed planning, and thousands of square miles of impervious cover. These conditions all contribute to the city's longstanding fight against dangerous and damaging bouts of urban flooding.

In addition to the past and present conditions contributing to Houston's problems with stormwater management, specifically the city's longstanding natural vulnerabilities to flooding as well as its existing infrastructure and land use patterns, recent trends in development and redevelopment also stand to negatively affect Houston's stormwater management moving forward. One Houston neighborhood that is at the convergence of these past, present, and future problems with flooding and redevelopment is the Greater Fifth Ward, a predominantly African-American low-income neighborhood just northeast of downtown, which dates back to Civil War Reconstruction.

The Fifth Ward neighborhood is one of the last remaining areas of the inner city to have not yet seen large-scale redevelopment and gentrification. With

Houston's population growing rapidly, and demographic trends revealing a shift toward living inside the I-610 loop that separates the city's urban core from its sprawling suburbs, the Fifth Ward is at risk of losing its cultural identity in more ways than one. Early 1900s shotgun houses and craftsman bungalows can still be found scattered throughout the ward, as can historic churches, commercial storefronts, blues bars, and zydeco clubs, but many structures indicative of the neighborhood's cultural past have been lost or damaged over the decades due to urban renewal, the construction of Houston's extensive highway system, storm damage, economic decline and general neglect. An active redevelopment authority, the Fifth Ward Community Redevelopment Corporation, worked hard to erase the violent stigma of the Fifth Ward as the run-down, crime-ridden "Bloody Nickel" of the 1970s, 80s, and 90s, but massive storm damage from Hurricane Ike in 2008 slowed the group's progress. Five years later, the damage to Fifth Ward homes, business, and infrastructure is still being repaired, but efforts by the Redevelopment Corporation paired with federal disaster recovery funds and investment from the city have brought the neighborhood back into the spotlight as an area prime for growth. However, this impending influx of new development, and its corresponding impervious cover, could potentially worsen the ward's longstanding fight against hurricane-related flooding, in addition to jeopardizing what remains of the Fifth Ward's rich architectural and cultural heritage.

With this report, I set out to determine how a socially and physically vulnerable historic neighborhood slated for massive redevelopment could manage to preserve its history and cultural identity in the face of increased extreme

weather events and the pressures of gentrification. The report will begin with a brief history of Houston and its development, an account of the city's overall vulnerabilities in terms of flood hazards, and an explanation of the Fifth Ward's role in Houston's past, present, and future. Second will be an outline of the city's relevant policies, specifically in regards to historic preservation, stormwater management, land use, and economic development. Third will be an analysis of current literature pertaining to the confluence of preservation planning and stormwater management in Houston. The paper will conclude with a Houston-specific prescription for mitigating the immediate and long-term effects of the inevitable increase in stormwater in the Greater Fifth Ward, providing citywide policy recommendations, ideas for neighborhood level efforts, and suggestions for individual property owners on how to adapt the neighborhood to a changing environmental and economic climate.

Research for this report was conducted from December 2013 through May 2014. Archival research was conducted at the Dolph Briscoe Center for American History at the University of Texas at Austin, the Houston Public Library's African American Library at the Gregory School, and the Houston Public Library's Houston Metropolitan Research Center. A windshield survey was conducted and photographs taken in the Fifth Ward in January 2014; a walking visual survey was conducted and photographs taken in the Fifth Ward, the Cottage Grove neighborhood, and the area surrounding Rice University in February 2014. All additional information and materials included or referenced in the report were obtained from publicly available primary and secondary sources.

HOUSTON: A HISTORY OF FLOODING

Since the city's founding in 1836, Houston has struggled against its natural environment. Prior to rise of the railroad, major cities were defined by their waterways as the main sources of transportation, commerce, and trade. According to Barrie Scardino's essay "H_2Ouston" (2000), the town's founders, brothers Augustus Chapman Allen and John Kirby Allen, advertised Houston as just a short sail away from Galveston Bay down the Buffalo Bayou. In reality, Buffalo Bayou was not a navigable channel and Houston would not have been its head of navigation if it were. In spite of this, the city still managed to gain population, and newly minted Houstonians quickly realized their new home was perched not on the banks of a prolific waterway as advertised, but was instead more or less a swamp (Scardino, 2003, p. 25).

Much of the Houston area is at sea level, or just barely above; downtown Houston is 50 feet above sea level. (FIGURE 1) The terrain is generally flat, and natural drainage is poor. Stormwater runoff slowly drains into the Gulf of Mexico via a network of bayous.

FIGURE 1: Topographic map of Greater Houston. (Data source: USGS)

Adding to the poor drainage conditions is the clay "gumbo" soil native to the Texas coastal plains, which absorbs very little runoff (Lerup, 2011, pp. 134-5). These ecological factors stacked the odds against Houston's continued growth, but after a hurricane in 1900 caused the near total destruction of Galveston, at that point Texas's largest and most prosperous city, Houston took over as the state's primary commercial port. The Buffalo Bayou was dredged and widened, and the Houston Ship Channel was born (Scardino, 2003, pp. 26-27).

Although the channel turned Houston into a major economic hub, it did little to control frequent floods. Major storm events throughout the first half of the twentieth century prompted Houston planners to look for innovative, technological solutions to the city's age-old issues with flooding. A storm in 1929 caused all of Houston's bayous to overflow and the San Jacinto River to rise 30 feet, resulting in $1.5 million in damage. In 1935, seven people died after 100 residential and 25 downtown blocks were flooded. In an effort to control the effects of these devastating storms, in 1937 the Texas Legislature created the Harris County Flood Control District. At a cost of over $35 million, the Addicks and Barker Dams were built to retain and divert floodwaters, and two canals were dug from White Oak Bayou to the San Jacinto River and from Buffalo Bayou to Galveston Bay (Scardino, 2003, p. 31). In spite of these state-of-the-art methods of flood control, Houston continued to suffer, and floods seemed to worsen.

With the city's history in mind, perhaps the best explanation for Houston's struggles with stormwater is the obvious one: the city was built on a swamp. The natural landscape is prone to flooding, and no amount of scientific or technological advancement can change the facts of topography, soil, and climate.

However, in hindsight, it's clear that Houston's patterns of development and land use greatly exacerbated the area's problems with flooding. In fact, it is likely that the flood control measures themselves that Houston planners, the Army Corps of Engineers, and the Harris County Flood District implemented in the early 20th century, such as rechanneling waterways and paving canals and bayous, have amplified the negative effects of urban flooding over time. Scardino notes that, when it comes to dealing with floodwaters, there are only three options: "move it, park it, or get out of its way" (Scardino, 2003, p. 31). He argues that moving excessive water via channelization has proven ineffective in Houston, and although "parking" the water with dams and retention areas can be effective, these practices will only succeed if we also get out of the way; as an example, he cites federal buy-out programs for homes in the floodplain. For a city like Houston, however, with a growing population of residents eager to live in denser, more centrally located urban neighborhoods, the idea of "getting out of the way" of flooding will likely be hard to accept as available and affordable inner-loop real estate grows more scarce.

Houston is well known for its contentious relationship with planning, and a lack of foresight is easy to identify in the city's development patterns. Even without counting its seemingly endless acres of suburban sprawl, Houston proper is nearly 600 square miles, according to the 2010 Census. The vast majority of this area is impervious cover, as illustrated in Figure 2. Although Scardino argues that the Houston area's natural clay gumbo soil is nearly as bad at absorbing runoff as concrete, there is no question that Houston's sprawl contributes to its

stormwater problems, not to mention the extreme levels of pollution from runoff that drains into the bayous, reservoirs, and Galveston Bay.

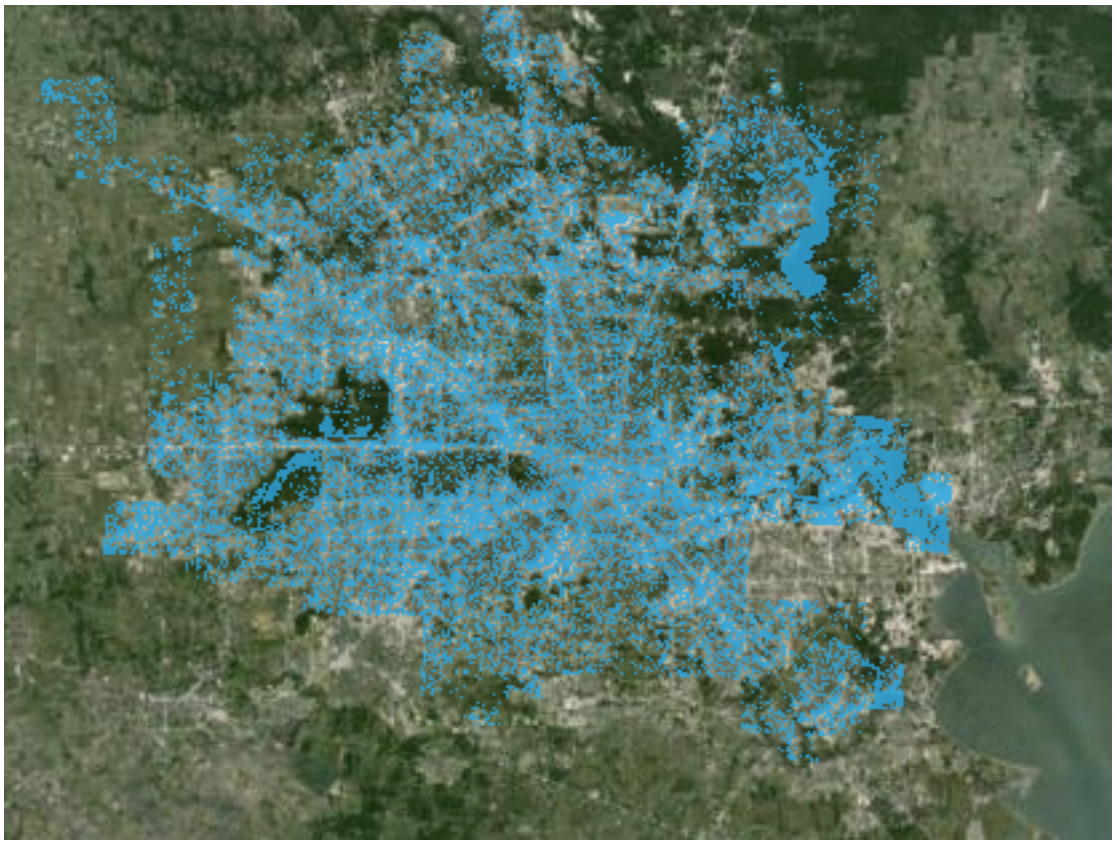

FIGURE 2: Houston's impervious cover, in blue. (City of Houston Public Works & Engineering Department, 2014)

THE FIFTH WARD AND FRENCHTOWN

One Houston neighborhood that has long felt the effects of poor drainage and flooding is the Greater Fifth Ward, on the city's northeast side. Its boundaries

are imprecise, but for the purpose of this report, the area in question is bounded by Buffalo Bayou on the south, Cavalcade Street to the north, Jensen Drive to the west, and Lockwood Drive to the east (Figure 3). Liberty Road is often cited as a dividing line between the Fifth Ward proper and the Greater Fifth Ward, but the in the blocks just north of Liberty and south of Collingsworth, between Jensen and Russell Street, sits the small Fifth Ward neighborhood called Frenchtown: an area with one of the richest histories in the city, and also one of the highest probabilities for irreparable structural damage from flooding in the event of another Hurricane Ike-sized storm. Both Frenchtown's contributions to Houston's cultural history, as well as its vulnerability to storm damage, have been acknowledged by the City of Houston, but little has been done to protect or preserve Frenchtown's architectural and cultural resources in the event of a natural disaster (FIGURE 4).

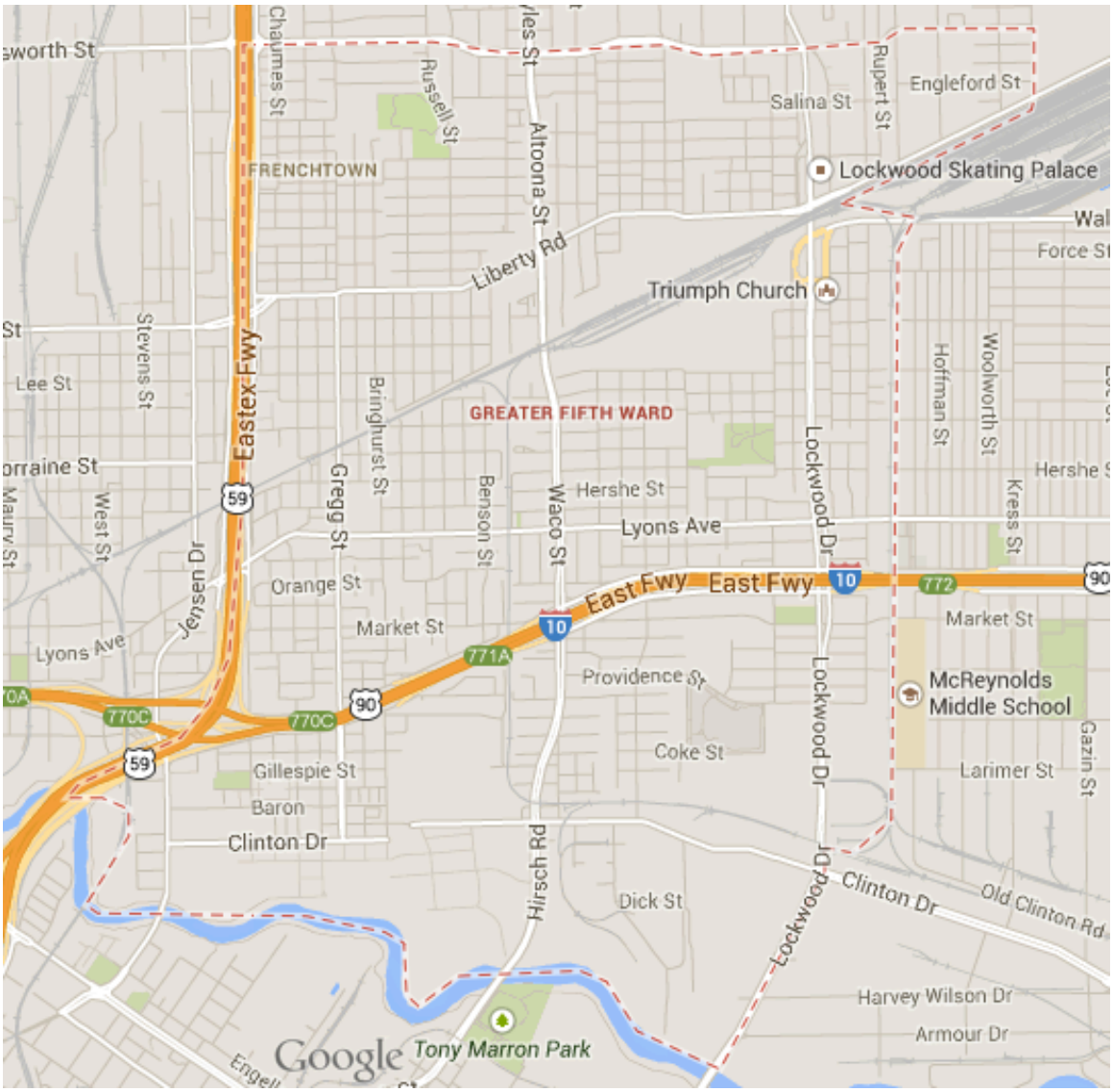

FIGURE 3: The Greater Fifth Ward (Google Maps, 2014)

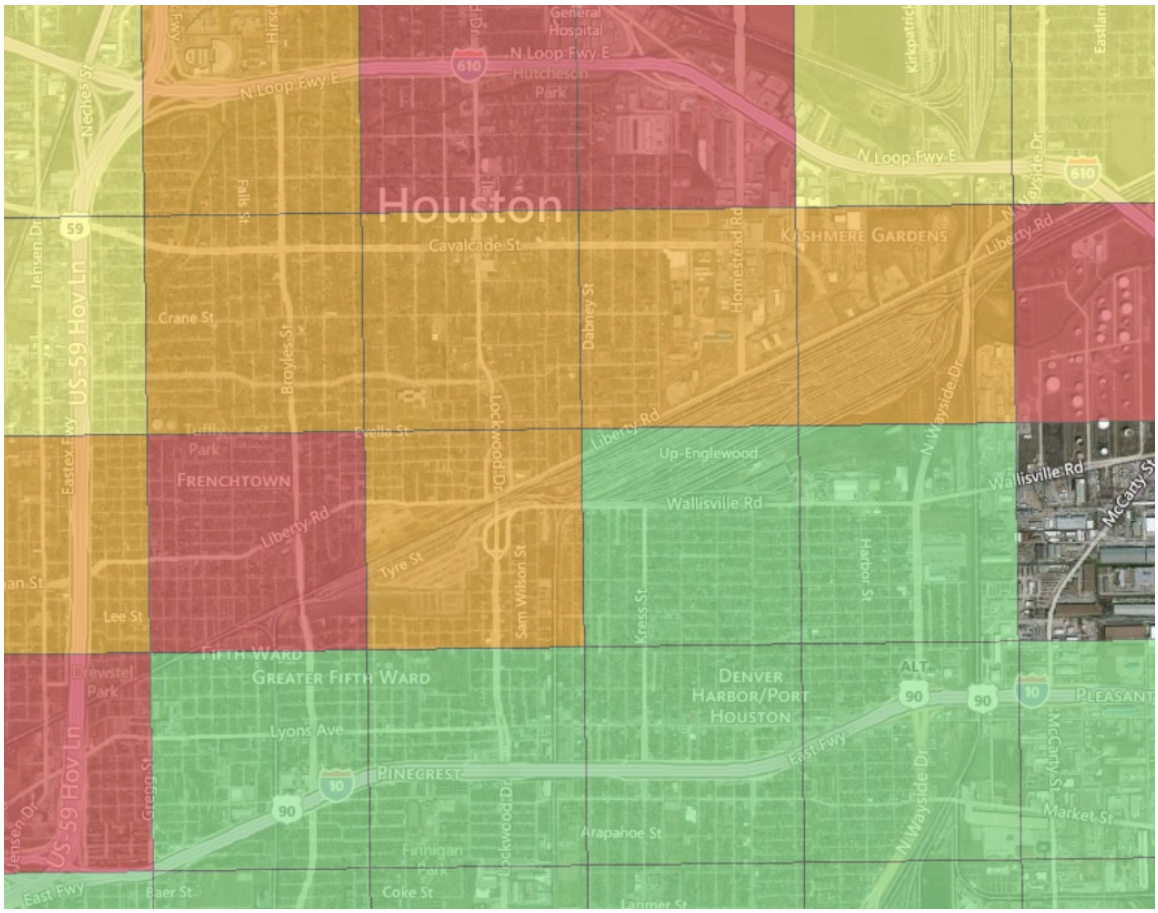

FIGURE 4: Houston Storm Risk Map of the Greater Fifth Ward, from the Houston Storm Risk Calculator. Flood risk modeled using a Hurricane Ike strength storm. Green indicates no risk of structural flooding. Yellow indicates low risk; flood damage is slight, less than .5 ft in a one story house and less than 1.3 ft in a two story house corresponding to less than 10% of the average home's replacement value. Orange indicates medium risk; flood damage is moderate, .5 to 4 ft. in a one story house or 1.3 to 8 ft. in a two story house, corresponding to 10% to 50% of the average home's replacement value. Red indicates high risk; flood damage is substantial, over 4 ft. in a one story house or more than 8 ft. in a two story house, corresponding to over 50% of the average home's replacement value. (City of Houston, 2014)

Potentially just as threatening to Frenchtown and its surrounding community, however, is its high likelihood for future redevelopment and gentrification. Not only could redevelopment jeopardize the fabric of the neighborhood by potentially altering historic land use patterns, as well as housing typology, availability, and affordability, it would also likely capitalize on the area's large swaths of vacant lots and undeveloped land. For an area that already struggles with drainage issues, an increase in impervious cover and decrease in open space will only worsen the neighborhood's already high potential for flooding.

Part of what makes the Fifth Ward such a prime target for redevelopment, besides its central location within three miles of the city's downtown, is the social vulnerability of its residents. According to the City of Houston Super Neighborhood Demographic and Income Profile for the Greater Fifth Ward, 40.8% of area residents make less than $15,000 (FIGURE 5). The area's population density has decreased over the past several decades, and the residents that remain are primarily renters, not homeowners (FIGURES 6-9). The neighborhood is also experiencing a shift in racial demographics; historically an African American community founded by freed slaves, the area is becoming more and more diverse (TABLE 1).

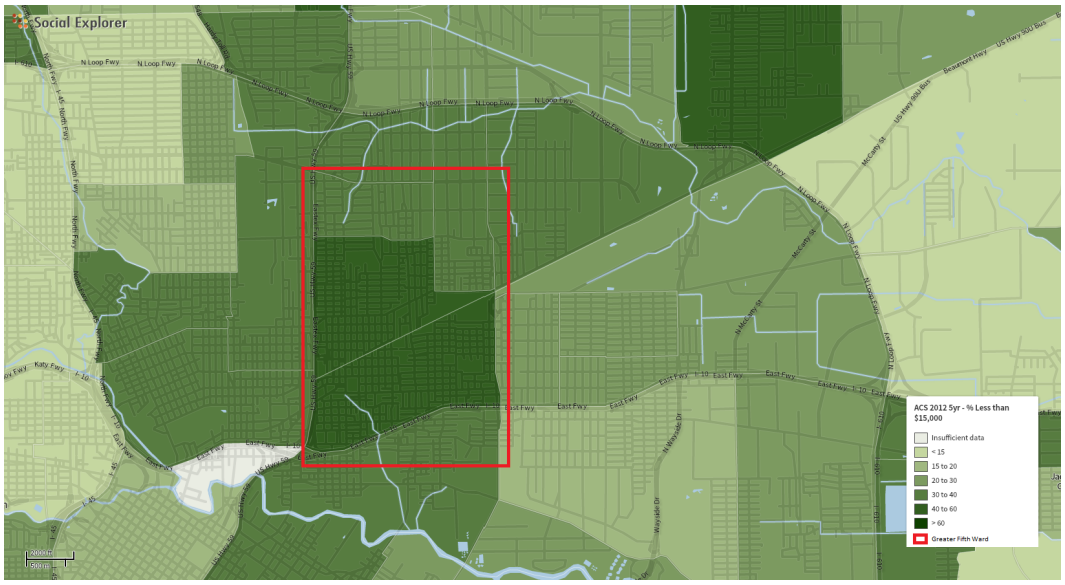

FIGURE 5: Households making less than $15,000, 2012, by census tract. U.S. Census data accessed by Social Explorer (2014).

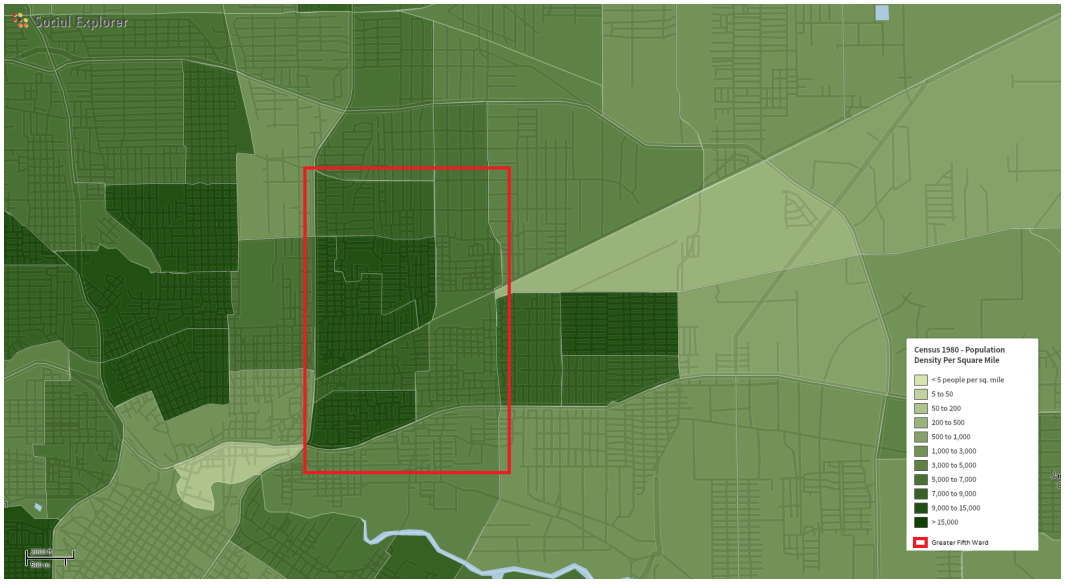

FIGURE 6: Population density, 1980, by census tract. U.S. Census data accessed by Social Explorer (2014).

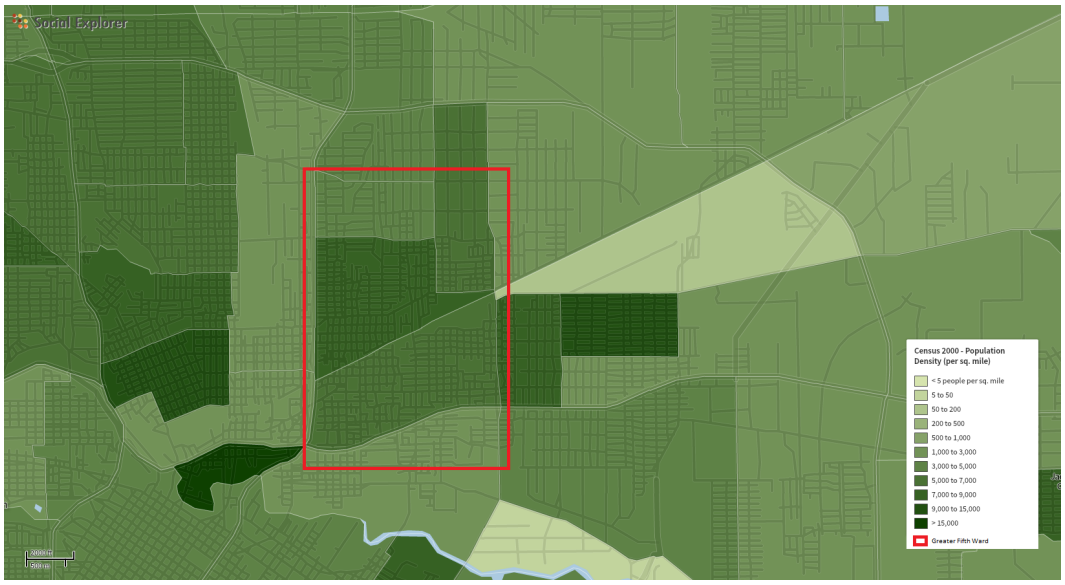

FIGURE 7: Population density, 2000, by census tract. U.S. Census data accessed by Social Explorer (2014).

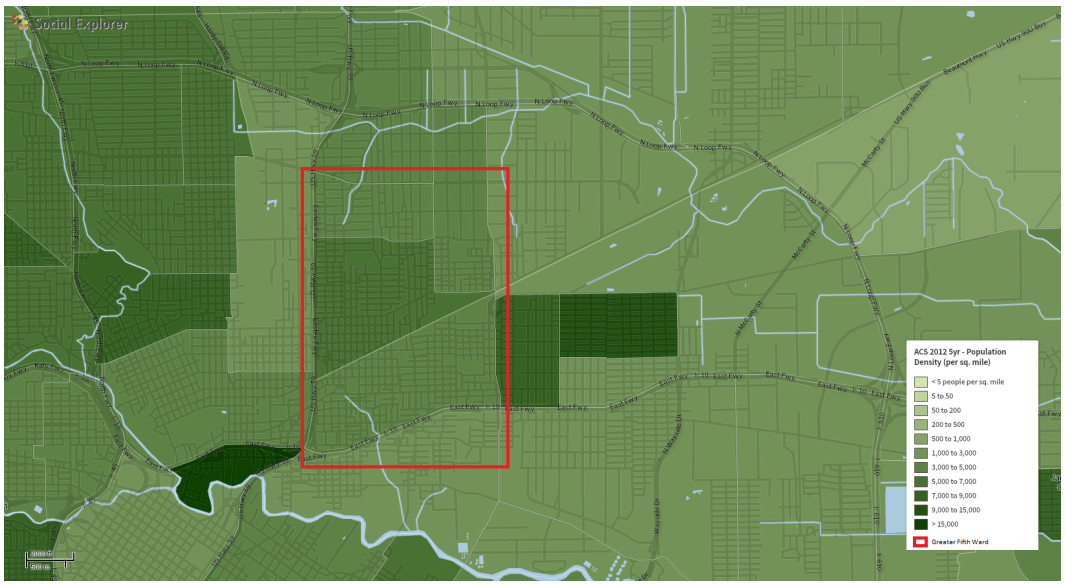

FIGURE 8: Population density, 2012, by census tract. U.S. Census data accessed by Social Explorer (2014).

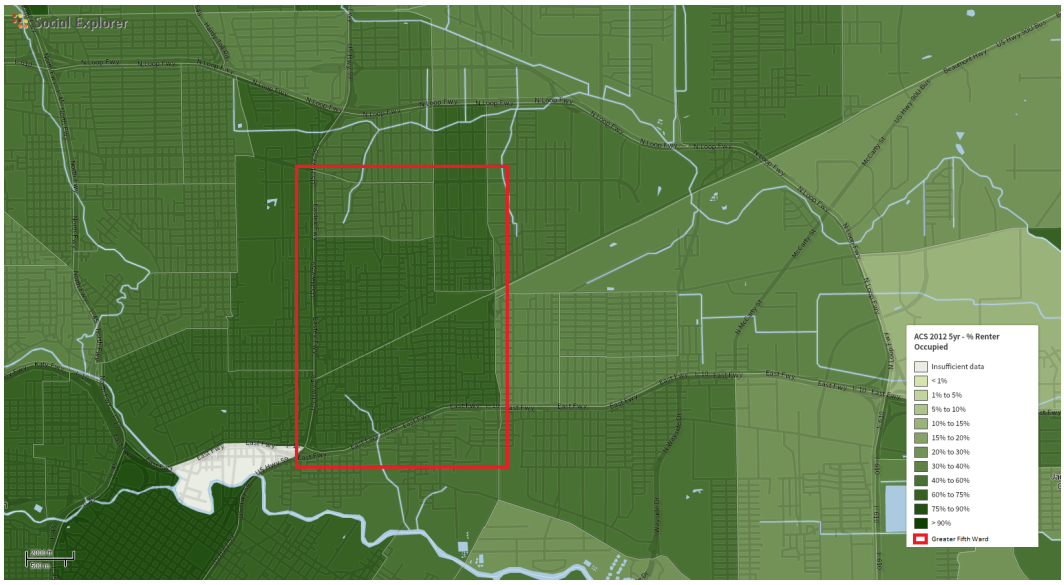

FIGURE 9: Percentage of renter occupied housing, 2012, by census tract. U.S. Census data accessed by Social Explorer (2014).

	2000		2009		2014	
Race and Ethnicity	Number	Percent	Number	Percent	Number	Percent
White (Non-Hispanic)	332	1.9%	213	0.9%	174	0.9%
Black (Non-Hispanic)	13,486	61.2%	13,141	56.0%	13,011	53.7%
Am. Indian (Non-Hispanic)	21	0.1%	21	0.1%	21	0.1%
Asian (Non-Hispanic)	58	0.3%	66	0.3%	70	0.3%
Pacific Isldr (Non-Hispanic)	1	0.0%	1	0.0%	1	0.0%
Other Race (Non-Hispanic)	10	0.1%	9	0.0%	9	0.0%
2+ Races (Non-Hispanic)	81	0.4%	77	0.3%	78	0.3%
Hispanic Origin	8,223	37.0%	9,954.00	42.4%	11,057.00	45.3%

TABLE 1: Shifting racial demographics in the Fifth Ward, from 2000 to 2014. (City of Houston, Planning and Development Department, Public Policy Division, 2010)

At its prime, from the 1920s to the 1960s, the Fifth Ward was an African American cultural hub of Houston. Lyons Avenue, the community's main commercial strip, was home to retail shops, theaters, blues bars, and nightclubs. In an article from the *Houston Press* from February 17, 2009, Josh Nova Lomax describes the area around Lyons and Jensen, also known as "Pearl Harbor, the Times Square of the Bloody Fifth," as being "Harlem in Heavenly Houston: Club Matinee - "the Cotton Club of the South" - was right around the corner, and right down the street from that was Duke-Peacock Records, before Motown the most important black-owned record company in America" (Lomax, 2009). Even though an influential music scene was gaining ground, the area was still well known for its problems with violent crime, thus the nicknames "Pearl Harbor" and "the Bloody Fifth." The neighborhood's shortfalls, however—its crime and poverty, as well as the lack of infrastructure and city services that stemmed from Civil Rights wars and segregation—served as the crux of the Fifth Ward's cultural significance, inspiring artists, musicians, poets, and politicians to speak up for a neighborhood that was largely ignored. Juke Joy Bonner, a Houston blues musician who lived in the Fifth Ward from 1932 to 1978, wrote a song called "Stay off Lyons Avenue" that detailed the stories behind the corner's violent nickname of Pearl Harbor:

You know what?When you go down to Houston
You'll learn you some bad news,
You better stay off—Lyons Avenue.

'Cause you go there, you go there green
Somewhere on Jensen, the last time you be seen.

You know how it is.
Boy, you know how it is.

You know what?
If you ever walk around on Houston's streets
You like to be real wise
And stay off of Lyons Avenue street
And don't go down on Jensen nowhere
Because you're living on luck and a prayer.

You know things happen to us sometimes,
To the best of us and to the worst of us and all this kinda stuff
But you're asking for it,
Anytime you hit on Blood Alley, Lyons Avenue
Just off Jensen, it ain't hard to find
All you have to do is go around there and you'll find cats almost dying,
It ain't hard to find

Although Bonner's song may be the most indicative of life in the Fifth Ward, he is far from the only artist to have roots in the neighborhood; one of Houston's most well-known R&B groups, Archie Bell & the Drells, came out of the Fifth Ward, as did blues guitarist Lightnin' Hopkins. A mural called "Fruits of the Fifth Ward" was put up in 2006 on Lyons Avenue to commemorate 21 of the most notable residents of the neighborhood, including Hopkins; Barbara Jordan, the first black female elected to the U.S. House of Representatives; and Jordan's successor, Congressman Mickey Leland.

In addition to the neighborhood's contributions to blues, jazz, and R&B, the ward's small Creole neighborhood of Frenchtown has its own remarkable history of musicianship and creativity. According to Richard West in a February 1979 article for *Texas Monthly*, "As Fifth Ward is a city within the city of Houston, so is Frenchtown a unique city within Fifth Ward: different language, different skin color, different food and music, different mores." Frenchtown was established in the 1920s by a group of 500 Creoles who were displaced from Louisiana by flooding. They settled in a four square block pocket of the Fifth Ward, and quickly created an insular community based around Creole cultural staples such as the Creole French language, Catholicism, and Cajun music. They also brought with them New Orleans' characteristic "shotgun house": narrow, woodframed homes built close to the street, designed for small lots in warm climates prone to flooding. The one-room wide layout of typical shotgun houses allowed for air to circulate before air conditioning, and the homes were often raised two to three feet above the ground on brick piers, with a raised front porch (Frenchtown and the Silver Slipper, 2008) (FIGURE 10-11).

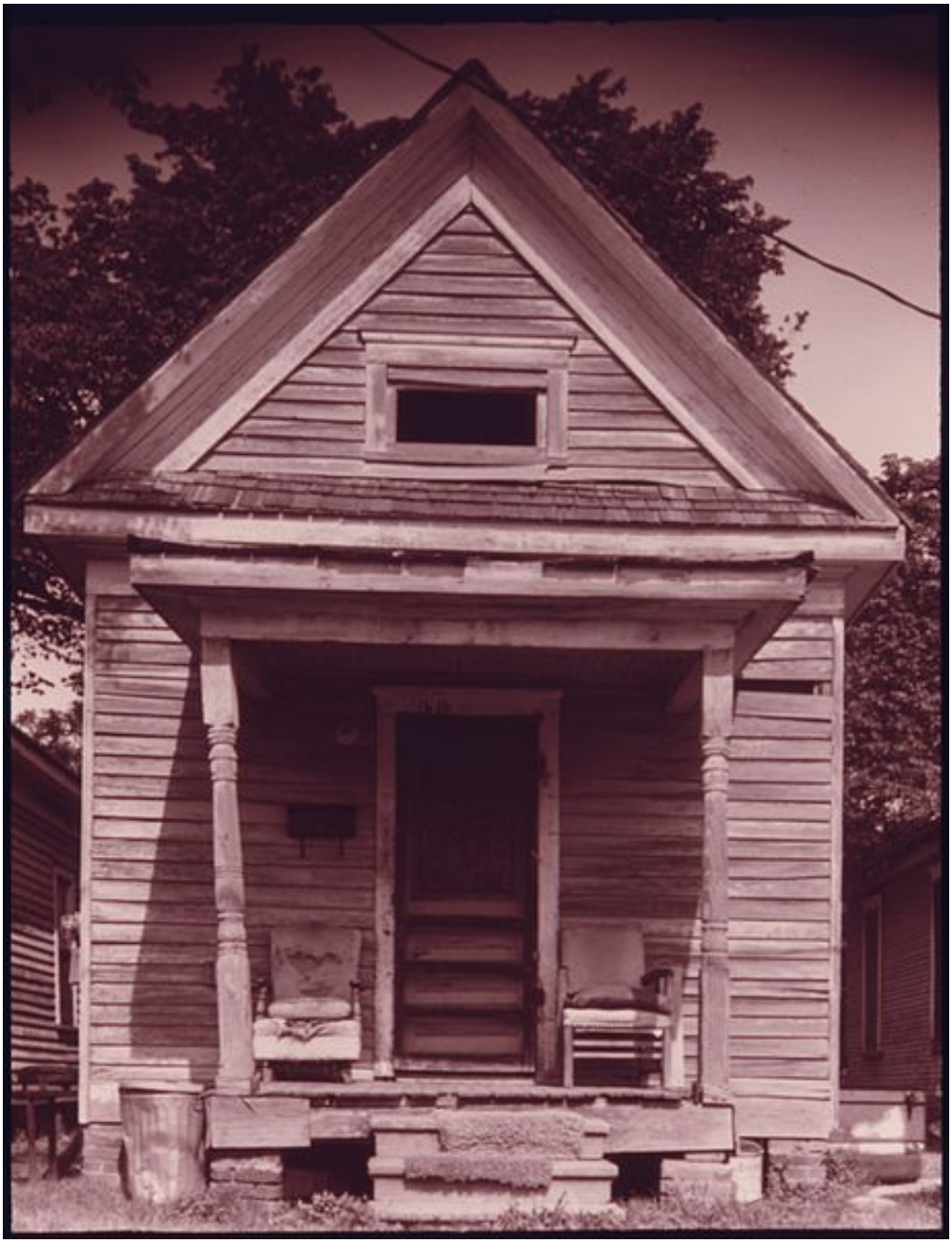

FIGURE 10: A Fifth Ward shotgun house, 1942. (Lyon, 1942)

FIGURE 11: A Fifth Ward shotgun house, 2013. (Fifth Ward Houston, 2013)

By far Frenchtown's biggest contribution to the culture of the Fifth Ward, Houston, and the Southeastern United States in general, however, was the invention of zydeco music. Although it was popularized in New Orleans and southeast Louisiana, zydeco was born in Frenchtown as a hybrid between the traditional Cajun music played by Creoles at small house parties called "La Las," and the Fifth Ward's ubiquitous brand of Houston blues (Frenchtown and the Silver Slipper, 2008). In noting Frenchtown's musical significance, West quotes Houston-based music historian Mack McCormick:

> I can think of only two other neighborhoods in the United States that developed a unique music form. In New Orleans with jazz, and neighborhoods in New York with salsa. From Frenchtown came zydeco music, the marriage of Texas blues and Louisiana creole. (West, 1979)

By the 1970s, integration led to "black flight" across the Fifth Ward, and those with the social or financial mobility to leave the dense, urban neighborhood did so. What was left behind West called a "ghetto":

> It is a cryptic, closed society existing in the middle of Houston. There are more barbershops, pawnshops, churches, loose dogs, abandoned buildings, bars, broken windows. There are fewer sidewalks, streetlights, fire hydrants, culverts, curbs, parks, jewelers, museums, libraries, garbage trucks. But whether more or less, in the Fifth Ward it is all out in the open, on the street. (West, 1979)

During this period, the Fifth Ward and its individual neighborhoods were known by any number of menacing monikers, perhaps the most prevalent and long lasting being variations on "the Bloody Nickel." High rates of poverty, crime, and violence plagued the community, and to a somewhat lesser extent, still do today.

In 1989, the Fifth Ward Community Redevelopment Corporation was founded to address the numerous social, economic, and political problems facing the neighborhood. The corporation's efforts have included new construction as well as preservation of existing structures, including single family homes from the early 20th century, as well as commercial and retail buildings (Texas Low Income Housing Information Service , 2000). The CRC has played an integral role in bringing new development to the neighborhood, but the organization saw their efforts stall in 2008 after Hurricane Ike left the Fifth Ward badly damaged by rain and wind. According to an article from February 14, 2010 by Florian Martin for Houston Public Media, residents in the Fifth Ward are still trying—over five

years later—to return their neighborhood to its pre-Ike state. Neal Rackliff, the director of Houston's housing department, told Martin that the city is still working to redevelop multi- and single-family homes in the area, and that Houston has $150 million dedicated to home repair and reconstruction (Martin, 2014). In 2013, the city demolished the Houston Housing Authority's Kelly Village Apartments in the Fifth Ward, which were reportedly abandoned and in disrepair after Ike. Built in 1939, Kelly Village was the oldest public housing complex in Houston (Russel, 2013).

Current Preservation, Stormwater, and Economic Development Policies in Houston

HISTORIC PRESERVATION

Because of the Fifth Ward's proximity to downtown Houston, and the increasing desirability of housing in the city's urban core, the once ignored neighborhood is now prime for redevelopment. If the city were to promote sustainable development practices for future growth, it is possible that the community could retain major elements of its historic and cultural identity, while also mitigating the potential for increased flooding and drainage issues owed to a rise in impervious cover and overdevelopment of the watershed.

As it stands, there are several state and local landmarked buildings and areas in the Greater Fifth Ward; however, none of these landmarks are explicitly protected. According to the City of Houston Historic Preservation Ordinance, a landmark is defined as "any individual building, structure, object or site designated by the city council for its historical, cultural, architectural or archaeological significance in the city, state, nation or region," whereas a protected landmark is defined as "a landmark whose owner has elected to permanently protect the landmark by foregoing the 90-day waiver certificate." The 90-day waiver certificate applies to landmarks not in historic districts, such as the landmarks in the Fifth Ward. If the owner of the landmark applies for a Certificate of Appropriateness and it is denied, they can still move forward with their project after a period of 90 days, as long as they are in compliance with deed

restrictions and local building codes. Therefore, unprotected landmarks are subject to very little regulation from the city.

The historic preservation code in Houston is weak in its regulatory protections, and options for obtaining protections are limited. However, obtaining a historic designation is not particularly difficult, as long as 67% of property owners in the district are in favor of the designation. Frenchtown as a district, and its individual buildings, may not necessarily have retain the level of integrity necessary to be listed as a NRHP district, but the City of Houston only requires that potential historic districts only be more than 50 years old, and meet just one of the following eight qualifications:

> (1) Whether the building, structure, object, site or area possesses character, interest or value as a visible reminder of the development, heritage, and cultural and ethnic diversity of the city, state, or nation;
> (2) Whether the building, structure, object, site or area is the location of a significant local, state or national event;
> (3) Whether the building, structure, object, site or area is identified with a person who, or group or event that, contributed significantly to the cultural or historical development of the city, state, or nation;
> (4) Whether the building or structure or the buildings or structures within the area exemplify a particular architectural style or building type important to the city;
> (5) Whether the building or structure or the buildings or structures within the area are the best remaining examples of an architectural style or building type in a neighborhood;
> (6) Whether the building, structure, object or site or the buildings, structures, objects or sites within the area are identified as the work of a person or group whose work has influenced the heritage of the city, state or nation;
> (7) Whether specific evidence exists that unique archaeological resources are present; and

> (8) Whether the building, structure, object or site has value as a significant element of community sentiment or public pride. (Houston City Council, 2010)

Regardless of a building's official landmark status or designation, the buildings of the Fifth Ward are valuable cultural artifacts, to which flooding is always a threat. Fifth Ward neighborhoods north of Liberty Road are located in a FEMA designated Special Flood Hazard Area, or 100-year floodplain. There are limits placed on construction and alterations that can be made to structures located in the floodplain, however, the city's official flood guidelines do reference historic buildings. The guidelines define a historic structure as:

> Any structure that is:
> (1) Listed individually in the National Register of Historic Places or preliminarily determined by the Secretary of the Interior as meeting the requirements for individual listing on the National Register;
> (2) Certified or preliminarily determined by the Secretary of the Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined by the Secretary to qualify as a registered historic district; or
> (3) Individually listed on the Texas Inventory of Historic Places. (11)

The guidelines allow owners of historic structures, or potentially historic structures, in a special flood hazard area to apply for variances for reconstruction, rehabilitation, or restoration work otherwise prohibited (36). See Appendix A for general standards for construction in special flood hazard areas.

As detailed in this report's first section, the history associated with the Greater Fifth Ward is extensive, and certainly worthy of recognition and preservation. However, without a community advocate to gather support from residents and property owners and take these preservation matters to the city, the

likelihood of securing regulatory protection for structures in the Fifth Ward is low.

STORMWATER MANAGEMENT

Because the city has a long history of flooding, the stormwater management plan for Houston is comprehensive and broad. The city focuses primarily on three areas: floodplain management, impervious cover regulations and drainage fees, and capital improvements of current drainage infrastructure.

Floodplain Management

Controlling development in the floodplain is the most obvious answer to flooding problems, and new construction in Special Flood Hazard Areas is limited under the city's flood guidelines, found in Chapter 19 of the Houston City Code (See Appendix A). However, for structures that are already in the floodplain, the city outlines several potential approaches. For the northern Fifth Ward neighborhood of Kashmere Gardens, for example, the Harris County Flood Control District has been buying out homes located in the floodplain and floodway of Hunting Bayou. According to the City of Houston Public Works and Engineering Department, in accordance with the Federal Emergency Management Agency's (FEMA) regulations, a floodway is defined as "The primary conveyance area for storm runoff along a bayou, river, or other watercourse," whereas a floodplain is "the land area adjacent to the watercourse that stores and/or conveys water during the 100-year event (a rainstorm that has a 1% chance of occurring in a given year) that cannot be conveyed within the banks of the watercourse" (City of Houston Public Works and Engineering Department, 2008).

According to a May 2010 article from the *Houston Chronicle*, a $175 million project to widen and deepen Hunting Bayou and create a 75-acre stormwater detention basin includes plans to buy out and remove 5,000 homes located in Kashmere Garden's 100-year floodplain and floodway (Moran, 2010). According to the article, 100-year flood events occurred in the neighborhood during Tropical Storm Allison and Hurricane Ike, as well as in 1979, 1980, 1983, 1989, 1993, 1994, 1997, 1998, 2006, and 2007.

The Chapter 19 flood management guidelines refer to the possibility of elevating structures as a method of floodproofing, which could be a sensible response for parts of the Fifth Ward located in the floodplain and floodway. Owners of structures located in the floodplain or floodway can apply for an Elevation Certificate from FEMA and the National Flood Insurance Program (NFIP). Structures with Elevation Certificates, an official assertion from a structural engineer or land surveyor stating that the structure's first floor elevation is located above the area's Base Flood Elevation (BFE), may be eligible for exemptions from NFIP requirements, as well as local building ordinances associated with floodplain development as designated by Chapter 19 of the Houston City Code. According to Chapter 19, redevelopment of a property in the floodplain cannot exceed 50% of the property's value, and can only occur above the BFE. No additional impervious cover can be constructed on a parcel within a floodplain.

Elevating may be a particularly apt solution for the Fifth Ward's remaining shotgun style bungalows, as the style's popularity in flood-prone areas is due in part to the fact that shotgun houses are customarily raised two to three

feet off the ground on brick piers (Preservation Resource Center of New Orleans, 2014). Although further elevation may correspond with some of the historic housing typology of the Fifth Ward, it may prove problematic in terms of the neighborhood's cultural preservation, as street life is a vital part of the neighborhood dynamic.

Impervious Cover Regulations

As a method of decreasing the amount of impervious cover that accompanies standard development, the City of Houston recently implemented restrictions and fees related to the percentage of a parcel that can be impervious. Through a citywide pay-as-you-go initiative effected in July 2011 called ReBuild Houston, residents and developers are responsible for drainage utility charges and impact fees as determined by their property's percentage of impervious cover. For single-family residential lots less than or equal to 15,000 square feet, no more than 75% of the parcel can be impervious without requiring additional stormwater detention measures (City of Houston Department of Public Works & Engineering, 2011). For the percentage of the parcel that is impervious, drainage utility rates are calculated by the drainage system that serves the parcel: curb and gutter or roadside ditch. Nonresidential parcels pay a flat rate based on the percentage of impervious cover, no matter the drainage system type (City of Houston, 2014).

Larger scale projects have similar stormwater detention requirements. As of April 2014, developers are required to pay a one-time impact fee per service unit, one service unit equaling 1,000 square feet of impervious cover from new development. The impact fee also applies to redevelopment of existing properties;

service units are determined based on the square footage of additional impervious cover being constructed on the parcel. Impact fee rates vary by watershed; for example, development in the Buffalo Bayou watershed incurs a $16.38 fee per service unit, whereas development in the Hunting Bayou costs $10.24 per service unit (City of Houston, 2014).

Stormwater Infrastructure

ReBuild Houston encompasses the city's current capital improvement plan for stormwater and drainage; it currently affords no upgrades to infrastructure in the Fifth Ward. However, this does not necessarily mean that there are no opportunities for improvement in the near future. According to the City of Houston's Department of Public Works and Engineering Infrastructure Design Manual, areas with deficient drainage systems are eligible for public/private funding if developers agree to upgrade existing infrastructure:

The City will consider joint project funding with a private entity for construction of drainage systems that improve existing drainage infrastructure. The City's first priority will be to fund those projects included in the Capital Improvement Plan (CIP). Where feasible, City funding will be leveraged with other funding sources including private entities, civic organizations, and other public agencies (Harris County, HCFCD, Corps of Engineers, Housing and Community Development, and other funding sources). For drainage systems that have been identified as deficient and are not scheduled to receive funding in the current CIP, the City will consider authorizing improvements performed by the

private entity that comply with the City's objectives. (Krueger & Smitha, 2012, p. 96)

The Department of Public Works and Engineering considers streets to be a part of the city's drainage system. Streets are meant to detain and divert excess stormwater in the event that the primary drainage systems—storm sewers, curbs, gutters, and roadside ditches—are overwhelmed, in order to deter structural flooding: "Street ponding of short duration is anticipated and designed to contribute to the overall drainage capability of the system" (Krueger & Smitha, 2012, p. 95). However, street ponding on a road without curbs and gutters can become a problem when roadside ditches are full of stormwater or flow-blocking debris, thereby creating a situation in which the water on the street is not contained or diverted as effectively. According to the City of Houston Storm Water Management Program, "In virtually all curb and gutter streets, the streets are intended to flood for a given rainfall intensity and duration in order to provide protection to the adjacent properties" (City of Houston Stormwater Management Program, 2014); the same is not said of streets drained by roadside ditch. Ditch drainage can be an effective part of a stormwater management plan if the ditches are regularly monitored and properly maintained, which is not the case for drainage ditches in the Fifth Ward (FIGURE 12).

FIGURE 12: A roadside drainage ditch in the Fifth Ward filled with flow blocking debris.

Besides its main thoroughfares, streets in the Fifth Ward are narrow, with no curbs or gutters, and are drained by roadside ditches. As a part of ReBuild Houston, the City Council voted in August 2013 to allot $2.4 million to surveying the city's drainage ditches. According to an August 28, 2013 article in the *Houston Chronicle*, the city knows the location of drainage ditches, which account for over a third of the city's drainage system, but does not have "comprehensive information on the capacity of ditches, their elevation relative to roadways and where water [feeds] into underground drainage systems" (Fraser, 2013).

The City of Houston acknowledges the deficiencies of its stormwater management plan, but proponents of ReBuild Houston claim that the city is

working as quickly and efficiently as possible to bring the overall drainage system up to par (Fraser, 2013). Of the dozens of drainage improvements completed and scheduled, however, only one project utilized Low Impact Development (LID) techniques, or the practice of using natural systems to retain and remove pollutants from stormwater runoff, for managing excess stormwater.

Cottage Grove, the pilot neighborhood for Houston's LID study, is located seven miles due west of the Fifth Ward, in northwest Houston near Memorial Park. The neighborhood has a similar historic layout and land use pattern as the Fifth Ward: small single family homes on narrow streets without curbs or gutters, no sidewalks, shallow setbacks, and roadside drainage ditches. Also potentially similar to the Fifth Ward is the manner in which Cottage Grove has been developed over the past decade. According to a document from the City of Houston's Public Works and Engineering Department called "White Oak Bayou BMP Demonstration Project – Cottage Grove Subdivision Quality Assurance Project Plan" (2012), Cottage Grove is redeveloping from the original single family residential area (density of 2-6 dwelling units per acre) to high density townhomes (density of approximately 24 dwelling units per acre). The impervious cover ranges from approximately 50 percent per lot (original single family lots) to ninety percent per lot (new high density development). (12)

The increase in density and impervious cover thereby increases the amount of stormwater runoff, and the level of bacteria, pathogens, and pollutants that are carried through the Buffalo and White Oak Bayous—which were identified in the 2008 Texas Index of Water Quality Impairments by the Texas

Commission on Environmental Quality (TCEQ) as being impaired for bacteria—into Galveston Bay (City of Houston - Green Houston, 2014).

Green Infrastructure and Low Impact Development: Cottage Grove

Low impact development, also called LID or green infrastructure, is the practice of harnessing or replicating the earth's natural methods of containing, filtering, and draining stormwater via vegetation and soils, which has been shown to improve air and water quality, decrease stormwater flood volumes, and create natural habitats for wildlife, according to the Environmental Protection Agency (EPA, 2014). In conjunction with the TCEQ and the Severe Storm Prediction, Education and Evacuation from Disasters (SSPEED) Center at Rice University, the city chose to implement LID techniques in Cottage Grove for managing stormwater runoff. The drainage system for a two-block section of Darling Street between T.C. Jester Boulevard and Reinerman Street was reconstructed to filter stormwater runoff through vegetative swales, porous pavement, and filter tree boxes (City of Houston - Green Houston, 2014) (City of Houston Public Works and Engineering Department, 2012) (FIGURE 13).

FIGURE 13: Redevelopment in the Cottage Grove neighborhood (Google Maps, 2014).

The stated goals of the pilot project are threefold: "[to] evaluate the effectiveness of LID [Best Management Practices (BMPs)] to reduce pollutant loadings and runoff volume…the cost of installation of LID BMP's (sic) in neighborhoods under redevelopment to townhomes…[and] the ongoing cost of maintenance of LID technologies" (City of Houston Public Works and Engineering Department, 2012, p. 13). Because the Cottage Grove project was funded by the Environmental Protection Agency (EPA) through the TCEQ under the Clean Water Act, the primary focus is on using LID to decrease stormwater pollutant loads, however, controlling runoff volume is also cited in the project's goals.

Although LID is not specifically mandated by the city, it is regulated in the sense that there are guidelines in the city's Infrastructure Design Manual for implementing LID measures as part of stormwater quality management plans for

private developers. Chapter 13, Stormwater Quality Design Requirements, details ways in which LID techniques can be used on construction, development, or redevelopment projects to comply with local, state, and federal requirements regarding stormwater quality. In addition to complying with Harris County's "Storm Water Management Handbook for Construction Activities," "Storm Water Quality Guidance Manual," and the "Minimum Design Criteria for Certain Storm Water Runoff Treatment Options," new development or significant redevelopment on tracts larger than five acres are required by the city to identify pollutants expected from the site, and design a Storm Water Pollution Prevention Plan for the site that treats, at a minimum, the first half inch of runoff (Krueger & Smitha, 2012, pp. 201-202). The Design Manual presents seven approved LID techniques for treating runoff: bioretention, infiltration trenches, porous pavement, vegetative swales, green roofs, hard roofs, and rain barrels. In addition to using these BMPs for treating water quality, the manual also acknowledges hard roofs, green roofs, and porous pavement in Chapter 9 as being neutral areas in determinations of impervious cover percentages (Krueger & Smitha, 2012, p. 117). Further discussion and explanation of the potential impacts of LID practices will occur in the proceeding chapter.

ECONOMIC DEVELOPMENT

As evidenced via the city's approach to private/public funding mechanisms for dealing with drainage and stormwater quality issues, if there is one aspect of planning in Houston that the city holds in high regard, it is planning for economic development. Throughout its history, the city has most often looked

to private developers and other commercial interests in planning for the city's future. Therefore, programs for encouraging economic development in Houston are a high priority.

Tax Increment Reinvestment Zones

One program the city operates to encourage economic development is the designation of Tax Increment Reinvestment Zones (TIRZs). TIRZs begin as blighted communities: they are identified based on their potential to "substantially arrest or impair the sound growth of the municipality or county creating the zone, retard the provision of housing accommodations, or constitute an economic or social liability and be a menace to the public health, safety, morals, or welfare in its present condition and use" (City of Houston, 2014). There are 22 of these zones in Houston, and they are funded primarily by the property taxes due to the city within the zone's geographical boundaries. The property taxes paid by residents are "frozen" for the predetermined life of the TIRZ, 30 years in the case of the Fifth Ward, going not to the city but instead to the TIRZ. The tax income is then used for public improvements, as determined by the zone's city council-appointed board of directors. Additionally, the TIRZ can issue tax-exempt bonds, backed by the zone's anticipated property tax income (City of Houston Finance Department, 2005).

The Fifth Ward was designated by the City of Houston in 1999 as TIRZ 18 (FIGURE 14), with the purpose of "establish[ing] a framework and creat[ing] conditions for redevelopment to occur that will stabilize a declining tax base, establish the basis for a consistency of land uses and strengthen the character or

residential and commercial properties" (Fifth Ward Community Redevelopment Corporation, 2011). More specifically, the city outlined the TIRZ's goals in the 2005 city budget as centering principally on infrastructure improvements, including upgrades to streets, sidewalks, sewers, and streetlights. The anticipated budget in 2005 of $6.9 million included these improvements, as well as "parks and streetscape improvements, brownfields remediation, historic preservation and property acquisition," with a projected overall investment over the course of 30 years of $36.6 million (City of Houston Finance Department, 2005). The Fifth Ward Redevelopment Authority serves as the zone's governing board.

According to the Fifth Ward Redevelopment Authority's 2014 operating budget and 2014-2018 capital improvement budget approved by city council on November 6th, 2013, $1.75 million of the TIRZ's total 30-year operating budget will be devoted to land assembly and historic preservation, $2.55 million to roadway and sidewalk improvements, $30,000 to public utility improvements, $500,000 to environmental remediation, $400,000 to demolition, and $350,000 to streetscaping, landscaping, and lighting. Additionally, $5 million will go toward improving Lyons Avenue.

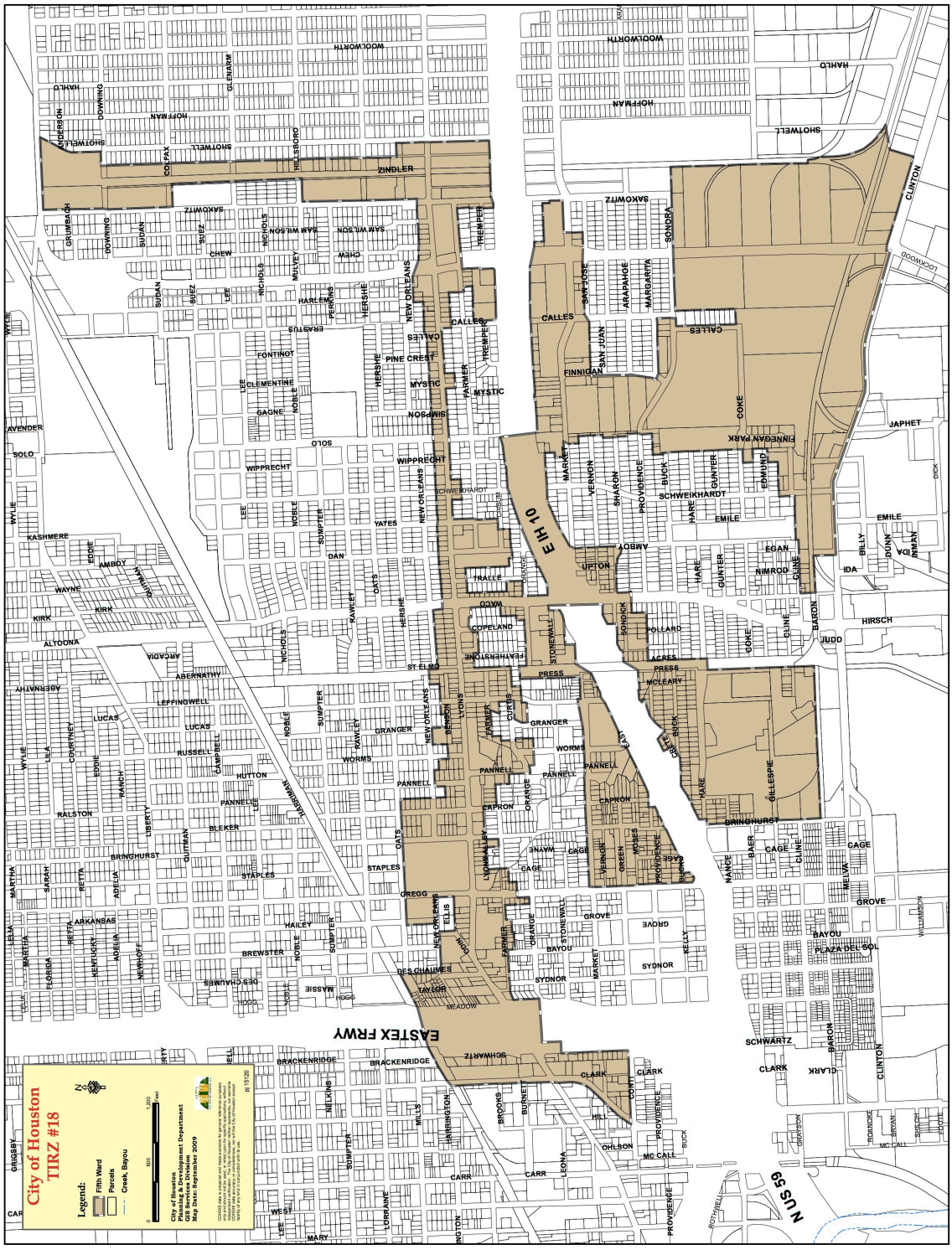

FIGURE 14: TIRZ 18 (City of Houston Finance Department, 2005)

The capital improvements budget spanning 2014 to 2018 includes $190,000 for land acquisition for the purpose of developing affordable housing, $105,000 for further development and maintenance of the public park and community space Fifth Ward Jam, and $71,500 for improvements to the Lyons Avenue streetscape (Houston City Council, 2013). In addition to these projects, past TIRZ projects in the Fifth Ward include installing public art, community gateway monuments, demolishing blighted buildings, and most recently, renovating the historic DeLuxe Theater on Lyons Avenue, which was previously closed for 40 years. The $5.5 million project was paid for primarily by a Community Development Block Grant (CDBG) administered by the city's Housing and Community Development Department, with $250,000 coming from the TIRZ budget (Houston City Council, 2013) (Aldridge, 2014).

The Fifth Ward Redevelopment Corporation, along with the TIRZ, have released two community studies, The Fifth Ward Housing Study (2011) and The Fifth Ward Pedestrian and Bicyclist Special District Study (2011), in conjunction with the Houston-Galveston Area Council.

Potential Problems and Solutions

The crux of a successful economic redevelopment program in the Fifth Ward will be effective placemaking: removing the stigma of isolation and neglect that currently surrounds the neighborhood in order to make it a desirable location for current and future businesses and residents. However, simply increasing demand for development and redevelopment is not a straightforward solution to the neighborhood's longstanding problems. Without protective regulations to both classify historic significance and protect in the event of a natural disaster, the remaining structural markers of the Fifth Ward's long cultural history could be easily lost. In addition, a sharp deviation from the area's historic land use patterns based heavily on single-family housing could negatively impact the Buffalo, White Oak, and Hunting Bayou watersheds, all of which already suffer from serious flooding problems due to overdevelopment. Protecting the historic built environment of the Fifth Ward from extreme flood events while also positioning the neighborhood as a viable location, economically and ecologically, for future residential and commercial development hinges upon a successful informational campaign defining the combined roles of low impact development practices and historic preservation on flood mitigation and sustainable placemaking.

GREEN INFRASTRUCTURE AND LOW IMPACT (RE)DEVELOPMENT

As mentioned in the preceding chapter, LID practices are not foreign to Houston; at the same time, they are not entirely pervasive either. The Infrastructure Design Manual recognizes seven approved LID techniques for treating runoff: bioretention, infiltration trenches, porous pavement, vegetative

swales, green roofs, hard roofs, and rain barrels. The specific guidelines for each practice are mainly site and situation specific, but the definitions of each practice as determined by the City of Houston are important to note as they relate to state, local, and federal regulations regarding stormwater treatment and pollutants, as well as local regulations regarding the calculation of allowable impervious cover in the cases of porous pavement, green roofs, and hard roofs.

The first practice, bioretention, can be used to mimic hydrologic conditions predevelopment by "using the chemical, biological and physical properties of plants, microbes and soils for removal of pollutants from storm water runoff." The Design Manual limits the depth of ponding to a maximum of six inches, and requires that the bioretention area be designed to empty within 48 hours of rainfall via "infiltration, evapotranspiration, and/or the design of a subsurface drainage system." Runoff from commercial, industrial, or parking areas requires pretreatment in the form of a vegetated buffer or swale (Krueger & Smitha, 2012, p. 202).

The second approved method is infiltration trenches, which are used for water quality and quantity control. Infiltration trenches are designed to detain water over a period of time, allowing it to naturally drain into the soil. Trenches must be designed to drain within 48 hours; therefore infiltration trenches cannot be placed in soil areas with infiltration rates slower than rate of 0.5 inches per hour without a supplemental subsurface drainage system. Runoff from commercial, industrial, or parking areas requires pretreatment in the form of a vegetated buffer or swale (Krueger & Smitha, 2012, p. 203).

The third LID practice is the use of porous pavement, which is a water quality and quantity control measure approved for both stormwater quality and flood mitigation. Porous pavement can be any permeable surface that allows water to infiltrate through to a graded stone bed filter as opposed to flowing off. Similar to infiltration trenches, porous pavement cannot be placed in soil areas with infiltration rates slower than rate of 0.5 inches per hour without a supplemental subsurface drainage system. Porous pavement can only be used for lightly trafficked areas such as trails, sidewalks, or parking pads (Krueger & Smitha, 2012, pp. 204-206).

The fourth LID practice, vegetated swales, are natural, planted conveyances capable of filtering stormwater runoff up to four inches, although they are capable of detaining runoff from much larger storm events. Vegetated swales can be dry, including a supplemental drainage system, or wet, having no underdrain. They must be designed to empty within 48 hours (Krueger & Smitha, 2012, pp. 206-207).

The fifth LID method is a green roof, which, like porous pavement, can be applicable both to stormwater quality and flood management. A green roof is planted with drought tolerant vegetation suited to the local climate, collecting and filtering rainwater through the natural processes of plants and soil (Krueger & Smitha, 2012, pp. 208-210).

The sixth best management practice is a hard roof, which, like porous pavement and green roofs, can be applicable both to stormwater quality and flood management. A hard roof is a horizontal roof designed to detain rainwater and drain it slowly towards the ground (Krueger & Smitha, 2012, pp. 210-211).

The seventh and final LID practice approved for stormwater control is a rain barrel or cistern. Containers are placed at a house's downspout to collect runoff from the roof, and can range from 55 gallons to hundreds of gallons. Collected water can be used to water plants and lawns (Krueger & Smitha, 2012, pp. 211-212).

At a February 2013 conference called "Low Impact Development in Houston," Philip B. Bedient, Director of Rice University's SSPEED Center, outlined the need for increased LID practices in Houston. On average, in an environment like Houston that is over seventy five percent impervious cover, deep soil infiltration accounts for five percent of all stormwater, shallow infiltration ten percent, evapotranspiration thirty percent, and runoff fifty five percent. In a natural ground cover scenario, deep soil infiltration accounts for twenty five percent of all stormwater, shallow infiltration twenty five percent, evapotranspiration forty percent, and runoff ten percent (Bedient, 2013). The city's omnipresent impervious cover, however, is only one aspect of the built environment's contribution to Houston's flooding problems. According to George Oliver Rogers and Buren B. DeFee II's article, "Long-term impact of development on a watershed: early indicators of future problems" (2005), a fifty percent increase in development and construction in Houston's White Oak Bayou from 1948 to 2000 resulted in a doubled potential for flooding (Rogers & DeFee, 2005, p. 229).

Houston's Department of Public Works and Engineering supports the incorporation of LID principles into stormwater management plans for the private development of tracts larger than five acres, but it does little to specifically

encourage these practices or entice developers to use LID techniques as opposed to standard stormwater quality management methods. In his article "Promoting Low Impact Development in Puget Sound through Regulatory Assistance and other Measures" (2008), Bruce Wulkan details how the Puget Sound Action Team in Washington encouraged local governments, professionals, universities, and nonprofit organizations to come together in removing regulatory and informational barriers to LID in the region. Although Houston has no ordinances preventing LID, it also has no ordinances promoting or mandating it. In terms of technical assistance, the SSPEED Center at Rice University has brought the need for LID into focus in the Houston area. Washington's culture of planning likely contributed to the Puget Sound Action Team's success in codifying LID principles in the region; Houston's notorious aversion to planning and Texas's steadfast protection of property rights are perhaps the only things in the way of a similar outcome. Whether these hurdles in the way of LID's advancement into local code regulating private development, or at least its promotion to best practice for future drainage improvements completed by the city, could ever be cleared is yet to be seen.

Houston clearly has an expressed need for a new approach to flood management, and LID's success in other environments encourages a move toward larger scale LID practice in the Fifth Ward and other urban neighborhoods facing development across the city. Although Houston sanctions certain LID techniques for private development, the Cottage Grove subdivision is the first instance of LID being implemented by the city itself as a response to urbanization and increased runoff and drainage demand. Houston is looking toward the Cottage

Grove model to prove LID's worth over time, but evidence suggests that LID not only works to improve stormwater quality and drainage, but that it also costs less to install and maintain than traditional methods, provides unique educational opportunities, and adds to a neighborhood's streetscape, landscape, and overall sense of place (Bedient, 2013). Another potential benefit of using LID in the Fifth Ward is the way in which swales and other BMPs could be integrated almost seamlessly into the historic landscape of the neighborhood, utilizing the already existing street and ditch structure. Not only would these green infrastructure practices help to better manage stormwater and add to aesthetic appeal, they could also serve as a way to preserve and protect the existing neighborhood pattern.

A prime example of a successful low impact redevelopment project in Houston is the Bagby Street Reconstruction in Midtown, or TIRZ 2. The Midtown Redevelopment Authority leveraged its TIRZ status to turn Bagby Street, a heavily damaged major neighborhood thoroughfare, into a "Complete Street," balancing pedestrian and vehicular traffic. To address problems with stormwater management, the Midtown Redevelopment Authority opted to combine the street's landscape and drainage needs by constructing a series of rain gardens, complete with wide sidewalks, built in seating, and LED street. Greenroads, a sustainability rating system for roadway projects similar to LEED, awarded the Bagby Street Reconstruction a Silver rating, making it the first Greenroads certified street in Texas (Greenroads, 2013).

HISTORIC PRESERVATION AND EMERGENCY MANAGEMENT

There is only so much that can be achieved in terms of pre-disaster mitigation as it relates to the preservation of historic structures. While incorporating LID practices into the Fifth Ward's redevelopment efforts could potentially help to curb structural flooding of historic and non-historic buildings alike, these measures alone are not enough in terms of developing a comprehensive preservation plan that recognizes the threat of natural disasters. In terms of emergency management and disaster recovery planning, there are further measures that can be taken by the city, neighborhood organizations, and individual homeowners to protect the neighborhood's historic buildings in the event of a catastrophic flood event.

At the individual property level, regular maintenance is the most important aspect of preserving historic structures. Quickly repairing structural deficiencies and damage from previous storms or regular wear and tear can greatly improve a building's resiliency in the face of an extreme weather event. For example, structural flooding may be unavoidable if stormwater rises above a building's first floor, but if the threatened building also has a poorly maintained roof, it is likely to incur further unnecessary damage to its interior and/or higher floors.

Unfortunately, regular maintenance of historic-age properties can be cost prohibitive in low-income communities like the Fifth Ward. The Fifth Ward Community Redevelopment Corporation does have programs for home repairs and rebuilding, and there are other nonprofit homebuilding organizations like Habitat for Humanity active in the community. A more centralized volunteer program, however, could provide a stronger network of low cost solutions for

preserving historic-age homes and buildings. For example, the City of San Antonio's Office of Historic Preservation operates a program called S.T.A.R. (Students Together Achieving Revitalization), in which local architecture students and contractors offer assistance with exterior structural maintenance and repairs to low- and middle- income historic property owners (City of San Antonio Office of Historic Preservation, 2014).

As noted in the previous chapter, the Harris County Flood Control District is in the process of buying out structures in the Hunting Bayou floodway. Although permanently removing the structures most likely to flood, and most likely to contribute to increased flooding, is the simplest scenario, in the case of historic structures and districts it can be much more complicated. Elevating historic buildings in floodplains is relatively common practice, often funded via FEMA disaster mitigation and recovery grants, such as Public Assistance Grants, Hazard Mitigation Grants, Pre-Disaster Mitigation Grants, and Disaster Survivor Assistance. FEMA grants meant for historic preservation purposes are usually provided to governments, public organizations, or nonprofits, although in some cases they are given directly to individual historic property owners. For example, Public Assistance and Hazard Mitigation Grants are available to state, local, and tribal governments, as well as public entities and some nonprofits. Pre-Disaster Mitigation Grants are available to state and tribal governments only. Disaster Survivor Assistance is available to individual historic homeowners (Advisory Council on Historic Properties, 2005). FEMA coordinates with State Historic Preservation Offices (SHPO) as well as local historic commissions and private consultants to determine historic eligibility.

The first step of any flood mitigation and response plan for the Fifth Ward's historic-age properties is to survey and inventory the neighborhood's existing structures, noting all buildings constructed prior to 1965, and any buildings of particular historical, cultural, or architectural significance, a successful claim for architectural significance insofar as the ward's residential structures go is unlikely. A report from the American Institute of Architects called "The Fabulous Fifth: A Revitalization Strategy for Houston's Fifth Ward" notes that "The available housing types in the Fifth Ward, some of which are variants on the indigenous residential architecture of New Orleans, are to be respected even in their often distressed state. While not architecturally significant, they serve to set a unique tone and texture to the area" (American Institute of Architects, 2012). Community members or organizations could lead this inventory process in the Fifth Ward, but in order to achieve the strongest possible effect, the process should, in some way, tied back to the city's historic preservation office.

Registering the City of Houston with the National Parks Service (NPS) as a Certified Local Government (CLG) would be directly beneficial to this historic resource inventory process, not just in the Fifth Ward, but throughout the city's numerous other historic-age neighborhoods as well. The CLG designation provides cities with fifty percent grant funding matches for preservation projects, as well as technical preservation planning assistance from the NPS. In order to qualify for the designation, a city must agree to achieve the following five goals: establishing a qualified historic preservation commission, developing a local ordinance to enforce state or local legislation designating and protecting historic

landmarks, surveying and maintaining an inventory of the city's historic resources, facilitating public participation in the preservation process, and following any other guidelines directly specified by the State of Texas's CLG Procedures for Certification (National Parks Service, 2014).

Although pursuing CLG certification for the City of Houston would be beneficial for the Fifth Ward's preservation efforts, there are still actions that can be taken within the city's current historic preservation planning framework. In this case, the next step would be the process of gaining protected landmark status for any eligible buildings under state and local regulation. However, even if structures or districts in the Fifth Ward were identified by the city or state as protected landmarks, there is no plan in place in Houston to protect such resources in the event of an emergency. The entirety of the city's historic structures, not just those in the Fifth Ward, is at constant risk of destruction from hurricanes, tropical storms, and other extreme weather events that bring excess wind and rain. As Houston's emergency management plan does not explicitly outline a protocol for the protection of historic structures in the event of a natural disaster, such structures are left vulnerable not only to the disaster itself, but also to the recovery process.

There is a great deal of literature examining the field of disaster preparedness and recovery, but very little of it acknowledges historic preservation. In turn, there are a number of resources available that focus on preparing historic-age properties for, and repairing them after, natural disasters, but the majority of these works are written primarily for individual property

owners. There is a gap in the literature when it comes to studying the practical and theoretical overlaps between disaster planning and historic preservation.

One possible explanation for this lack of study is the belief that, in an emergency situation, monitoring, documenting, and protecting historic structures and landscapes is of less importance than other issues commonly faced by communities before, during, and immediately following a natural disaster. There is truth to this—nothing is more important in an emergency than preventing loss of life, for example. However, the majority of hazard mitigation goals and historic preservation goals do not have to be mutually exclusive. In developing plans and protocols for disaster situations, there is often room to include historic preservation concerns, particularly in the cases of disaster-prone historic communities.

For a city like Houston where natural disasters, i.e. flooding from hurricanes and tropical storms, are predictable and known, the process of accounting for preservation in emergency management plans is simpler, politically, culturally, and psychologically. Houston, however, does not implicitly address historic properties in its emergency management plan, which is an issue that Annie Christoff raises in her article "House of the Setting Sun: New Orleans, Katrina, and the Role of Historic Preservation Laws in Emergency Circumstances" (2007). In it, she compares and contrasts the experience of post-Katrina New Orleans in regard to historic preservation laws and protocols to that of Santa Cruz, California after the October 1989 Loma Prieta Earthquake and Charleston, South Carolina after Hurricane Hugo the month before.

Immediately following Hurricane Katrina, New Orleans mayor Ray Nagin suspended the oversight powers of the city's Historic District/Landmarks Commission (HDLC) under the pretense of the commission's usual protocols regarding demolitions of historic properties being prohibitive to the city's recovery. Many of the city's damaged historic properties were demolished without going through the standard approval process. Similarly, after the 1989 earthquake in Santa Cruz, the city manager decided to demolish several historic buildings in the Pacific Garden Mall, a National Register historic district, with little oversight and no predetermined procedure. These decisions to demolish directly contributed to the Pacific Garden Mall being removed from the National Register of Historic Places in 1992.

In contrast, after Hurricane Hugo, Charleston mayor Joseph Riley maintained pre-hurricane levels of historic preservation protocol. Out of town contactors looking to capitalize on the recovery process were strictly permitted and regulated, and the repair and demolition permitting process remained unchanged. This adherence to Charleston's business as usual historic preservation methods resulted in a near full recovery from the storm, even though the process was admittedly long and arduous.

None of these three cities had specific emergency procedures in place to deal with the treatment of damaged historic properties, and each city reacted in different ways. Christoff argues that many of the struggles faced by each of these cities could have been reduced had a formalized procedure been in place.

Developing a protocol for dealing with historic preservation issues after a disaster is an obvious, though often overlooked, solution to the question of how to

manage preservation in times of crisis. However, it is only one part of a multipart process. Christoff also notes that there is a not a one size fits all approach to the role of preservation in disaster planning and recovery. Determining the best course of action is just as important as having a course of action prepared at all.

The largest barrier between historic preservation and hazard mitigation is undoubtedly communication: preservationists and emergency managers need to coordinate before, during, and after a disaster in order to ensure that cultural resources are taken into account. In terms of facilitating this coordination between preservationists and emergency managers, part of the preservationist's job must be to effectively communicate the value of cultural resources to the people and organizations with the power to protect them from the effects of a disaster.

Although the cultural argument is the easiest to make in favor of a combined historic preservation emergency management plan, there is also an environmental argument to be made, and perhaps more importantly, an economic argument as well. In a city like Houston so dominated by commercial interests, economic arguments are usually the most persuasive, but in a discussion of sustainability, it can be easy enough to find common ground between the environmental and the economic. For example, according to Preservation Green Lab's report "The Greenest Building: Quantifying the Environmental Value of Building Reuse" (2011), after studying the effects of reusing and retrofitting existing buildings on climate change factors, "building reuse almost always offers environmental savings over demolition and new construction" (Preservation Green Lab, 2011, p. 6).

In addition to sustainability arguments on an individual building level, it is also worthwhile to note that the historic land use patterns of a centrally located urban community like the Fifth Ward, with its small residential blocks and main commercial strip, is already more sustainable environmentally and economically than newer, more sprawling developments. For example, several of the EPA's Smart Growth principles for sustainable comminutes are inherent to the Fifth Ward and similar historic-age neighborhoods, such as compact building design and walkability (Environmental Protection Agency, 2014). The National Trust for Historic Preservation's Main Street Program promotes sustainable land use planning via preservation of historic commercial strips like Lyons Avenue.

Conclusion

Houston's Fifth Ward exists at a crossroads—it will not be long before outside development encroaches upon the neighborhood, taking advantage of its prime location and bargain-basement land values. Whether or not redevelopment of the Fifth Ward will occur in an economically, environmentally, and culturally sustainable way depends on whether or not the community's residents and civic organizations, in partnership with the City of Houston, can leverage the Fifth Ward's unique characteristics to create a strong sense of place. The stigma of the "Bloody Nickel" has long kept businesses and residents from investing in the Fifth Ward, and without the driving engine of private development, the city has all but ignored the area's substandard infrastructure and services for decades. By promoting and protecting the neighborhood's past as a cultural hub of Houston, the Fifth Ward community can help to secure its future, ensuring that the important built features contributing to the community's character remain intact.

Redevelopment pressures are not the only thing threatening the history and culture of the Fifth Ward. Like many older neighborhoods in Houston, the Fifth Ward faces a significant threat in the form of flooding; the neighborhood's stormwater management system is antiquated and poorly maintained, and each hurricane season brings the risk of devastating damage. Five years after Hurricane Ike, the area is still working to erase the effects of the storm, and capital improvements to the Fifth Ward's substandard streets, sewers, and drainage ditches have been limited.

In order to protect the Fifth Ward's historic built environment while also preparing the neighborhood for a future of residential and commercial growth, neighborhood stakeholders should campaign for the Fifth Ward's drainage issues to be addressed via LID principles that will not only help prevent structural flooding, but will also help brand the neighborhood as a place that values past, present, and future.

Appendix A – Chapter 19 Flood Guidelines

All new construction and improvement of any existing structure in special flood hazard areas shall be performed so as to keep the structure reasonably safe from flooding and in accordance with the following standards:

(1) All improvements shall be designed or so modified so as to be adequately anchored to prevent flotation, collapse, or lateral movement of the structure in the presence of floodwaters;
(2) All improvements shall be constructed by methods and practices so as to minimize flood damage;
(3) All improvements shall be constructed with materials and equipment resistant to flood damage;
(4) All electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding;
(5) All water supply systems shall be designed to prevent or eliminate infiltration of floodwaters into the system;
(6) All sanitary sewer systems shall be designed to prevent or eliminate infiltration of floodwaters into the structure's systems and discharge of sewage into floodwaters;
(7) All on-site disposal systems, including but not limited to sewage treatment plants and septic tank systems located on the site of the structure, shall be located so as to prevent impairment of the function of those systems in the presence of floodwaters and to prevent contamination of floodwaters from those systems during flooding; and
(8) Fully enclosed areas below the lowest floor that are used solely for parking, building access or storage in an area other than a basement and that are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered architect or professional engineer licensed in the State of Texas or meet or exceed the following minimum criterion: have a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding, with the top of all such openings no higher than one foot above grade or BFE, whichever is lower. Openings may be equipped with screens, louvers, valves, or other coverings or devices, provided that they permit the

automatic entry and exit of floodwaters. (City of Houston Public Works and Engineering Department, 2008)

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