

## **Part 2 Task Force on City Revitalization in 2045**

### **Introduction**

My name is Ethan, planning specialists in history and climate change, working for the Planning and Development Department in the city of Houston as a planning consultant for Task Force On City Revitalization in 2045. In the last decade, Houston has experienced a very high number of extreme weather events and is clearly showing signs of increased frequency and frequent record breaking. After 2020 alone, Houston has experienced high temperatures, cold snaps, extreme rainfall and flooding. Not to mention the world-famous Hurricane Harvey in 2017. These extreme weather events continue to pose a threat to the people of Houston and are a constant drain on the city's emergency resources. What the task force I lead needs to accomplish is to solve the root causes of the climate threats Houston currently faces and build a greener, more efficient, and more equitable Houston by 2045.

In this memo, I will address the overview of the city through the following areas:

### **Historical background & spatial layout**

#### **Climate Challenges:**

- **High temperatures**
- **Cold waves**
- **Hurricanes and flooding**

#### **Case studies of urban transformation in response to climate change:**

- **New York City**
- **Case reflection**

### **Vision of Houston 2045**

## Historical background & spatial layout

Houston, like many cities in the United States, has a history of segregation. During the early and mid-20th century, segregation was codified into law<sup>1</sup> and practice, affecting where African Americans and other racial groups could live, work, and go to school.

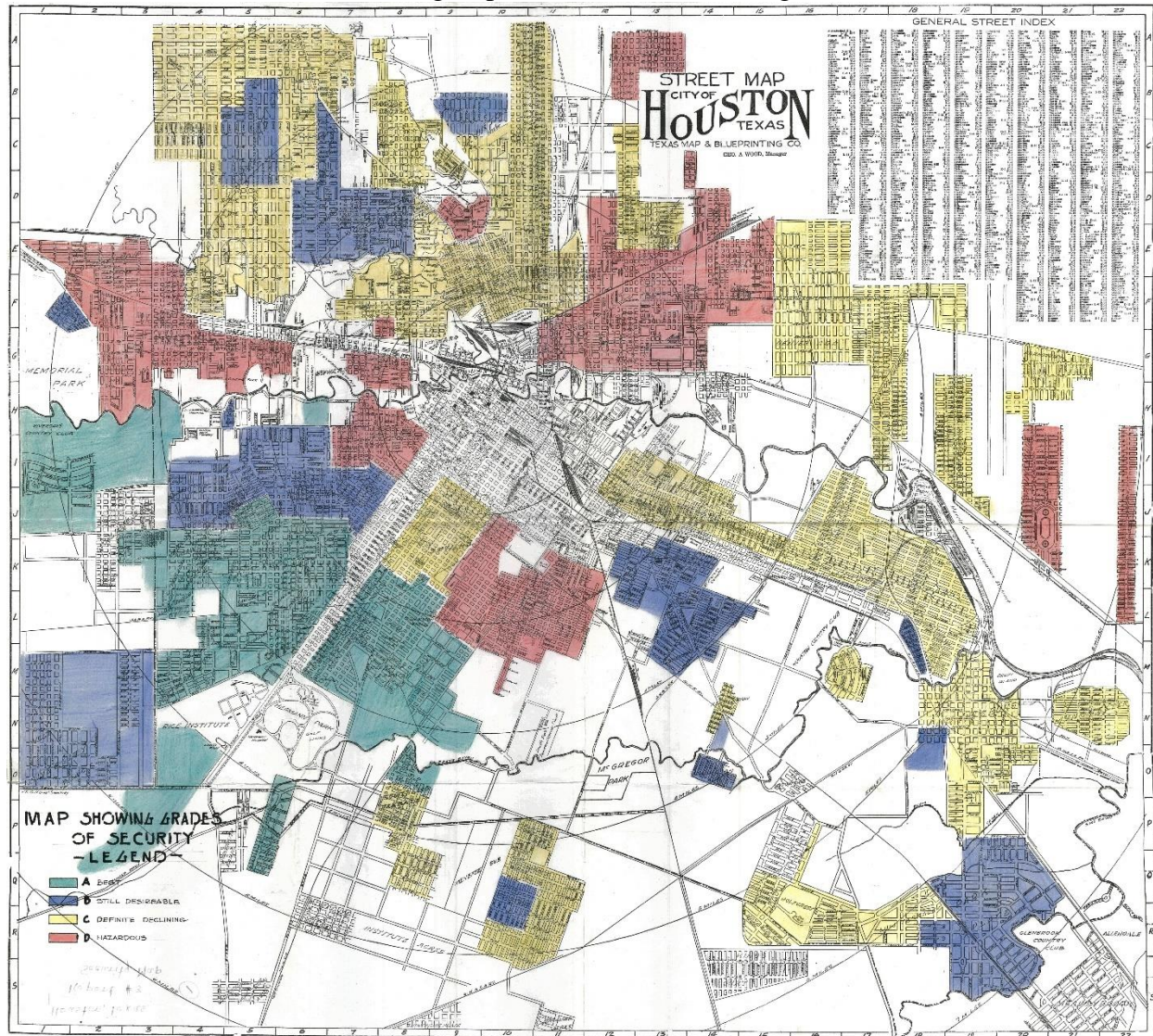


Figure 1 City of Houston, created by Home Owners' Loan Corporation (HOLC)

<sup>1</sup> See United States Federal Home Loan Bank Board, Annual Report of the Federal Home Loan Bank Board, December 31, 1933, <https://fraser.stlouisfed.org/title/annual-report-federal-home-loan-bank-board-70/first-annual-report-federal-home-loan-bank-board-23532>. HOLC was created to provide relief to home owners during the Great Depression by refinancing home mortgages. HOLC created "Residential Security" maps for major American cities, which were used to evaluate mortgage lending risk. These maps often led to "redlining," a practice where neighborhoods deemed high-risk or "Hazardous" were denied access to capital investment, adversely affecting housing and economic opportunities for residents.

This map was created by the Home Owners' Loan Corporation (HOLC) in the 1930s under the Home Owners' Loan Act to assess credit worthiness in order to determine mortgage security risk<sup>2</sup>. HOLC provided loans to African Americans, but in ways that reinforced racial segregation. HOLC's approach to refinancing black-owned properties helped preserve racial segregation by stabilizing financial markets and bailing out creditors, rather than focusing on individual homeowners<sup>3</sup>, with many of the areas marked as "Hazardous" by HOLC becoming low-to-moderate income and minority neighborhoods over time.

After we know for a fact that on the redlining map Zone A is only on the east side of the city, I visualized<sup>4</sup> the current percentage of non-whites in these neighborhoods. It is clear to see that the previously fragmented zoning districts have come clustered together, and it is clear to be able to see that the percentage of non-whites is much greater in the central and western parts of downtown Houston than in the eastern part of the city, with a clarity that can even be drawn with a single line.

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<sup>2</sup> See United States Federal Home Loan Bank Board.

<sup>3</sup> See Todd M. Michney and LaDale Winling, "New Perspectives on New Deal Housing Policy: Explicating and Mapping HOLC Loans to African Americans," *Journal of Urban History* 46, no. 1 (January 1, 2020): 150–80, <https://doi.org/10.1177/0096144218819429>. HOLC's local operations and lending record to black applicants were influenced by racial considerations, which aligned with the mainstream real estate industry's ideologies at the time. The action was consistent with New Deal priorities of aiding major industries and maintaining a façade of fairness, despite detailed attention to the racial character of neighborhoods.

<sup>4</sup> See "Census Bureau Data," accessed May 4, 2024, <https://data.census.gov/>.



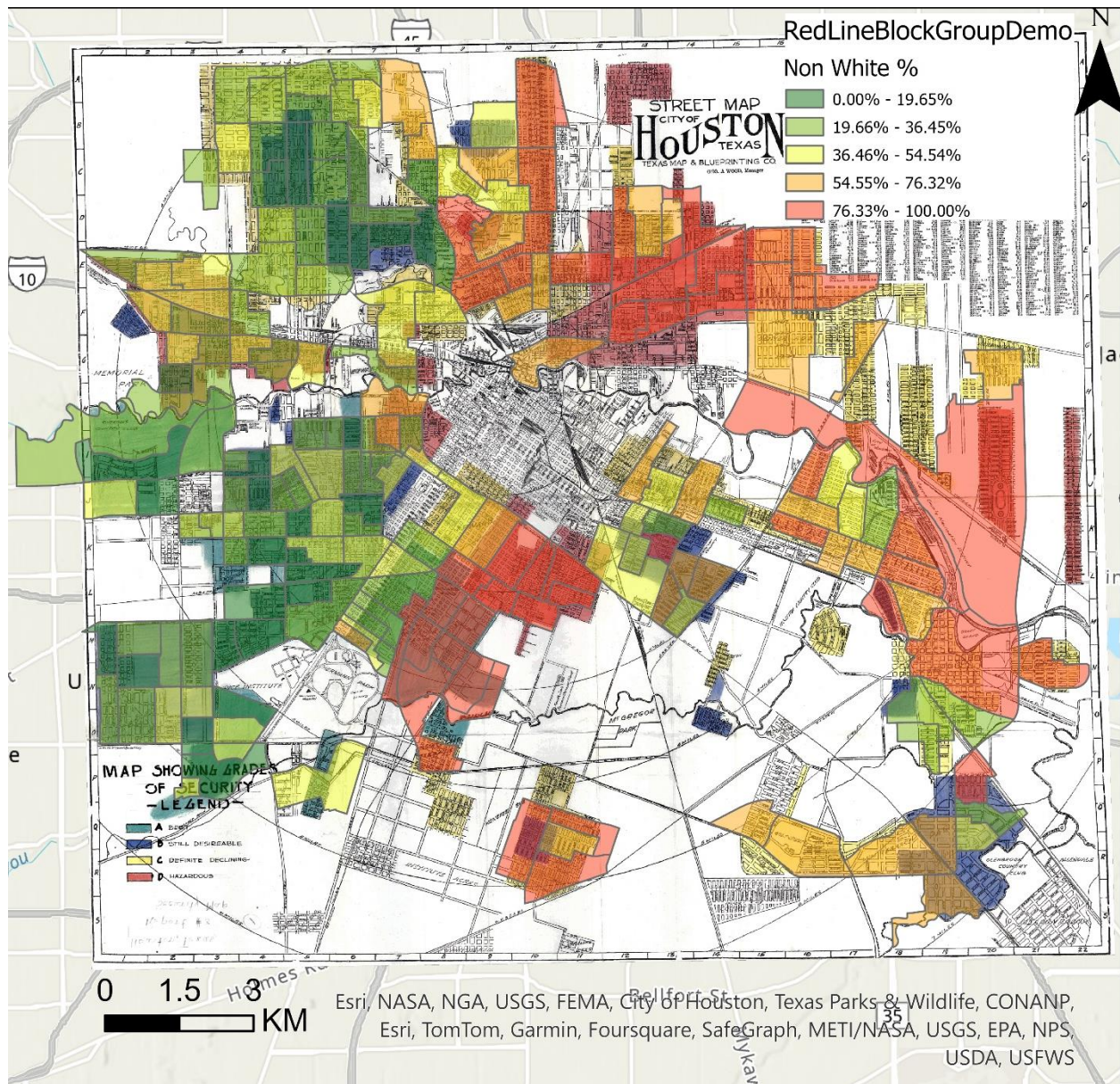


Figure 2 Current Segregation Situation Overlaying Redlining Map, created by ArcGIS Pro, using ACS 18-22 data

Similarly, when we look at education levels<sup>5</sup> and incomes<sup>6</sup> in these regions, a similar segregation occurs. This shows that even decades after discriminatory laws were repealed, Houston today still has structural segregation and inequality. This segregation and inequality is not limited to demographics, but is rooted in planning, profoundly affecting the environment<sup>7</sup> in which residents live, the level of development and accessibility of their neighborhoods, which leads to significant differences in access to resources<sup>8</sup>, health<sup>9</sup> and lifespan.

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<sup>5</sup> See “Census Bureau Data.”

<sup>6</sup> See Tracy Jan, “Analysis | Redlining Was Banned 50 Years Ago. It’s Still Hurting Minorities Today.,” *Washington Post*, November 24, 2021, <https://www.washingtonpost.com/news/wonk/wp/2018/03/28/redlining-was-banned-50-years-ago-its-still-hurting-minorities-today/>. White families today have nearly 10 times the net worth of black families and more than eight times that of Hispanic families, according to the Federal Reserve.

<sup>7</sup> See Brad Plumer, Nadja Popovich, and Brian Palmer, “How Decades of Racist Housing Policy Left Neighborhoods Sweltering,” *The New York Times*, August 24, 2020, sec. Climate, <https://www.nytimes.com/interactive/2020/08/24/climate/racism-redlining-cities-global-warming.html>. Neighborhoods that were once redlined see more extreme heat in the summer than those that weren’t.

<sup>8</sup> See M et al., “In U.S. Cities, The Health Effects Of Past Housing Discrimination Are Plain To See,” *NPR*, November 19, 2020, sec. Public Health, <https://www.npr.org/sections/health-shots/2020/11/19/911909187/in-u-s-cities-the-health-effects-of-past-housing-discrimination-are-plain-to-see>. The resources in the redlining area diminish over time after the redlining has been implemented.

<sup>9</sup> See “Racist ‘Redlining’ Practices Has Led to Oppressively Hot Neighborhoods,” September 3, 2020, <https://web.archive.org/web/20200903005409/https://www.nationalgeographic.com/science/2020/09/racist-housing-policies-created-some-oppressively-hot-neighborhoods/>. The covenant-free, redlined areas of the map corresponded disturbingly well with the areas they knew had high asthma rates and low birth weights—conditions associated with exposure to air pollution and other environmental hazards.



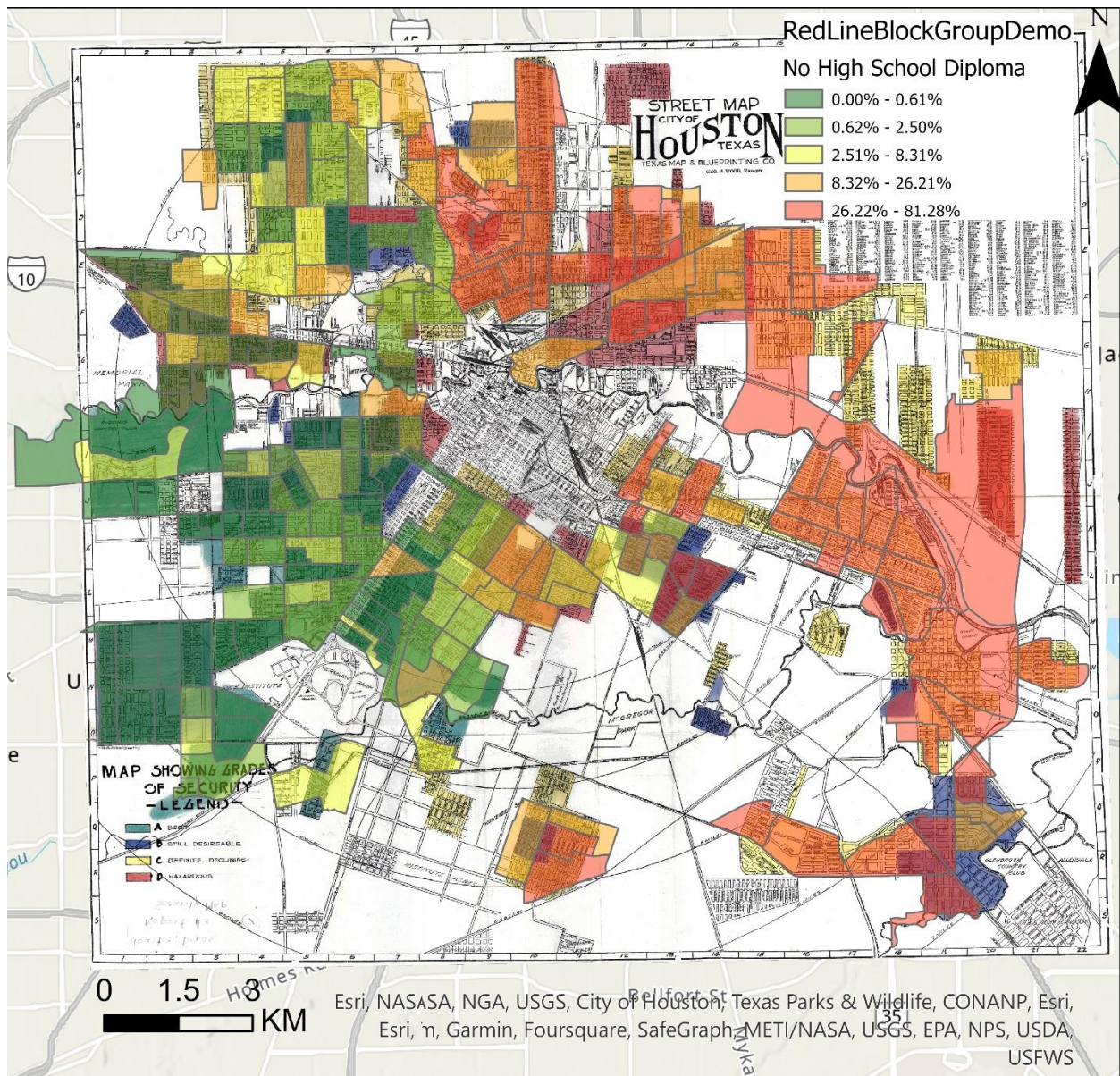


Figure 3 Percentage of People without HS Diploma Overlaying Redlining Map, created by ArcGIS Pro, using ACS 18-22 data



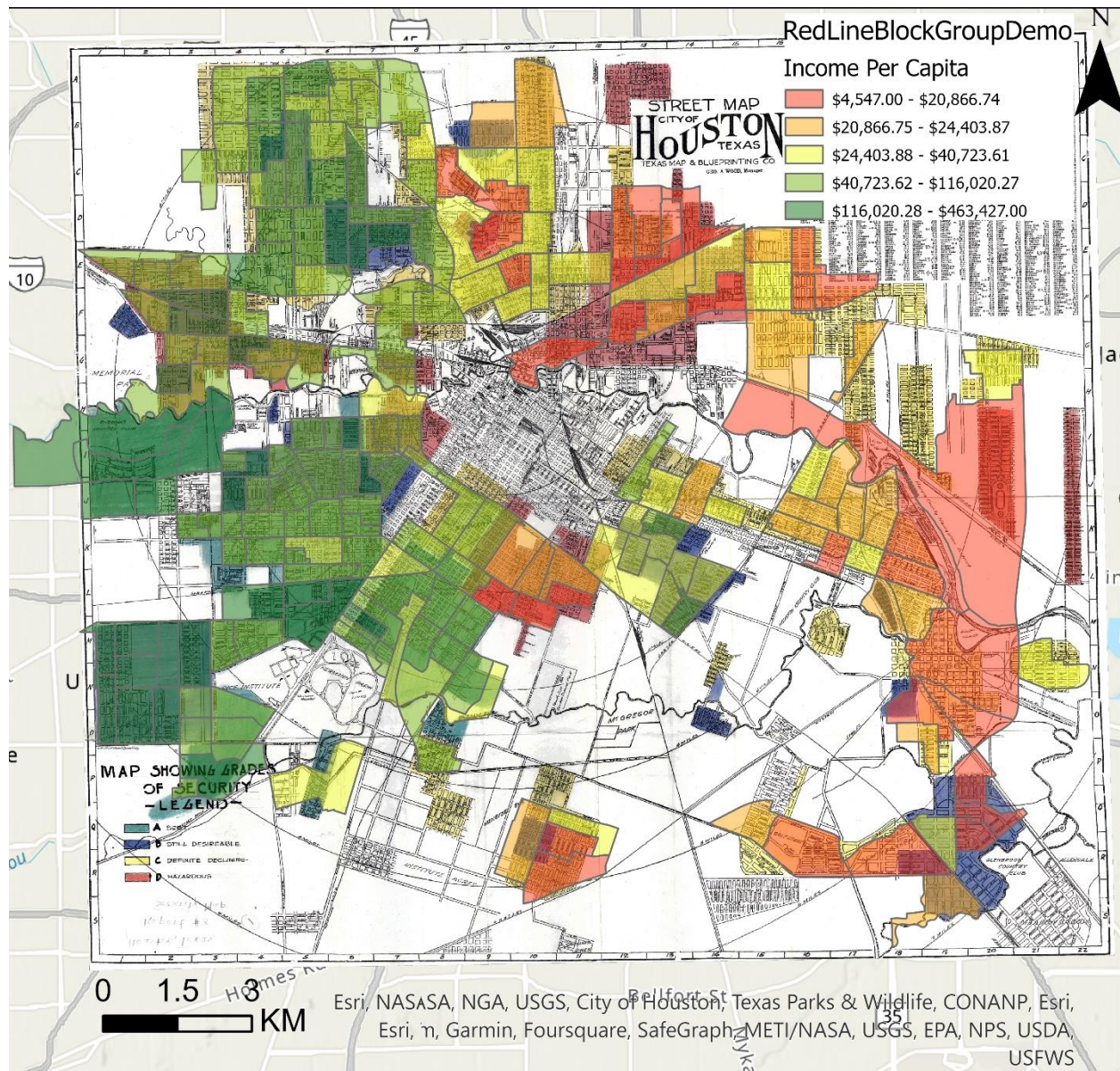


Figure 4 Income per Capita Overlaying Redlining Map, created by ArcGIS Pro, using ACS 18-22 data

The series of charts above demonstrate the robustness of segregation and inequality in the current downtown Houston area through multiple indicators. Using the indicator of per capita income provides a good picture of the spatial distribution of segregation and inequality throughout the City of Houston, that is, the western part of downtown Houston and the northeast and southeast corners of Houston are the most affluent areas of the City of Houston. The



independent cities and independent villages within Houston are the most affluent areas of the entire metropolitan area, surrounded by other low- and moderate-income neighborhoods<sup>10</sup>.

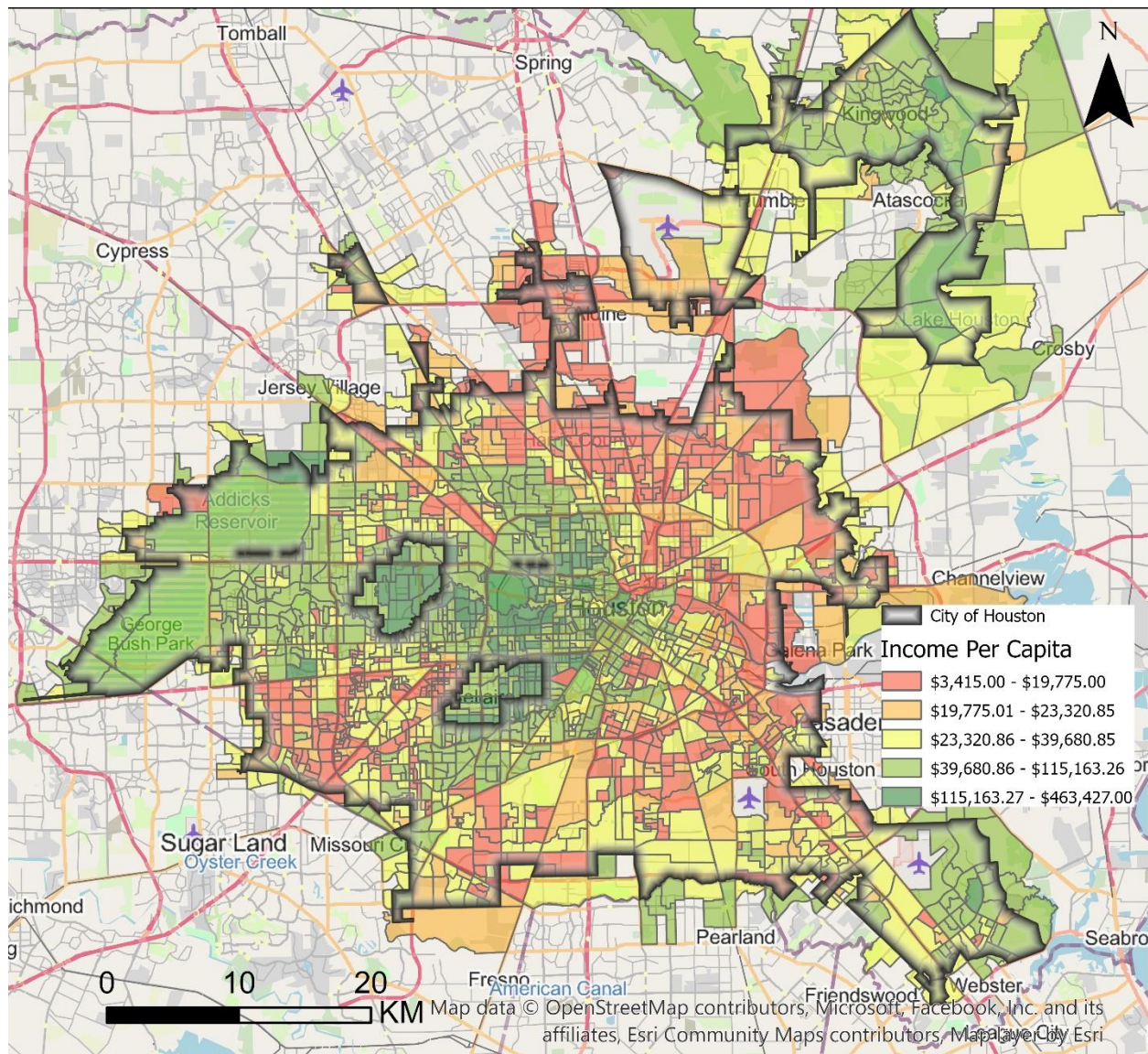


Figure 5 Income Distribution in City of Houston, created by ArcGIS Pro, using ACS 18-22 data

## Climate Challenges

The previous section demonstrated the demographic inequalities in the spatial patterns of the city of Houston, and this section will tell the story of the natural hazards that the city of Houston faces and the dangerous areas that are at risk from these hazards.

<sup>10</sup>See “Census Bureau Data.”



## High temperatures

Houston's summers are becoming increasingly hotter and more extreme, a trend that is evident in the rising temperatures and the frequency of heat waves. The city is facing a future where extreme heat becomes a norm rather than an exception<sup>11</sup>. The data indicates that heat waves are not only becoming more frequent but also more intense, with temperatures soaring to record highs. For instance, Houston tied its all-time high temperature record at 109 degrees Fahrenheit in August 2023, as reported by Houston Public Media<sup>12</sup>. This level of heat, which was once considered rare, is now occurring with alarming regularity, underscoring the escalating severity of summer heat.

The long-term data further supports this trend of intensifying heat. Analysis shows that over the past several decades, Houston's average summertime temperatures have climbed significantly. A study highlighted by Houston Public Media reveals that from 1970 to 2022, the city's average summer temperature has increased by 4.2 degrees. This steady rise in temperatures contributes to longer and more punishing heat waves, which pose serious health risks,

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<sup>11</sup> See “Weathering Tomorrow: Houston’s Dangerous Heat Waves and Their Deadly Impact,” ABC13 Houston, August 16, 2023, <https://abc13.com/weathering-tomorrow-houston-heat-waves-extreme-impacts-weather/13653697/>. Data examined by ABC News found heat waves in Harris County, where the heat index reaches over 100 degrees, will increase from an average of 16 days now to 31 days by 2050. That's over a 90% increase.

<sup>12</sup> See Adam Zuvanich, “Houston Ties Record for Hottest Temperature Ever Recorded in City at 109 Degrees,” Houston Public Media, August 25, 2023, <https://www.houstonpublicmedia.org/articles/news/weather/2023/08/25/460628/houston-ties-record-for-hottest-temperature-ever-recorded-in-city-at-109-degrees/>. A temperature of 109 degrees was recorded at Bush Intercontinental Airport at 2:54 p.m. Thursday, according to the National Weather Service's Houston/Galveston office. That tied the mark established on Sept. 4, 2000, and matched on Aug. 27, 2011.

particularly to vulnerable populations. The increasing heat is not just a matter of discomfort but a critical public health issue that demands attention and action<sup>13</sup>.

The implications of these extreme heat conditions are far-reaching, affecting various aspects of life in Houston. The unequal exposure to heat waves, exacerbated by factors such as redlining and socioeconomic disparities, leads to inequitable health outcomes among the city's residents. As the summers grow hotter, these disparities become more pronounced, with communities lacking adequate green spaces and cooling infrastructure suffering the most. The data and trends paint a clear picture: Houston's summers are not only getting hotter but also amplifying existing inequities, making the discussion on heat exposure and urban planning ever more urgent and necessary.

Historically, the best rated areas on the redlining map were west of Downtown Houston. To this day, west of downtown Houston and westward remains a high-income area, with a marked disparity from the areas that surround downtown Houston. This illustrates the inescapable responsibility that redlining policies and Houston's inequality today still have. Once deemed 'best' by redlining maps, these western neighborhoods continue to enjoy affluence and an abundance of resources to mitigate the heat. Meanwhile, the historically marginalized areas

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<sup>13</sup> See Adam Zuvanich, "Houston Summers Are Getting Hotter and More Extreme, Data Shows," Houston Public Media, June 13, 2023, <https://www.houstonpublicmedia.org/articles/climate-change/2023/06/13/454344/houston-summer-temperatures-hotter-more-extreme-data-shows/>. Houston's average temperatures for June, July and August increased by 4.2 degrees Fahrenheit from 1970-2022, with the city experiencing 53 additional days per year when the temperature is above its summertime normal. Houston ranked third nationally in the latter category. Climate Central says the near-nationwide warming trend since 1970 is an indicator of human-caused climate change and presents significant health hazards, particularly to children, the elderly and people living with illnesses. Exposure to extreme heat can result in illness and death, while summer heat can worsen air quality and exacerbate respiratory conditions such as asthma.



near downtown suffer from the urban heat island effect, where heat-absorbing concrete and asphalt exacerbate the temperatures, posing significant health risks to the residents there<sup>14</sup>.

The areas that were once redlined and are now predominantly inhabited by minority populations are the same areas that experience the most intense heat. This is no coincidence, as these communities have been systematically deprived of the resources needed to mitigate heat. The absence of adequate infrastructure and cooling systems means that residents are at a higher risk of heat-related health issues, which can be particularly severe for the elderly, children, and those with chronic health conditions<sup>15</sup>- nonhomeowners, African-American and Hispanic/Latinos, those with incomes less than \$30,000 per year, those unemployed, and those in poor health as the groups most at risk, which underscore the need for targeted interventions in these communities to reduce the risk of heat-related illnesses and deaths<sup>16</sup>.

Heat exposure can have long-term health effects on these vulnerable populations. the cumulative effect of repeated exposure to high temperatures can lead to a range of chronic health conditions. This further highlights the importance of addressing the root causes of inequality

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<sup>14</sup> See Rachel Ramirez, “Another Legacy of Redlining: Unequal Exposure to Heat Waves,” *Grist*, January 15, 2020, <https://grist.org/justice/another-legacy-of-redlining-unequal-exposure-to-heat-waves/>. Many vulnerable communities lack green spaces, which cool surface temperatures and provide significant health benefits to residents. Instead, city officials tend to invest in safe green parks built in wealthier neighborhoods.

<sup>15</sup> See Jeremy S. Hoffman, Vivek Shandas, and Nicholas Pendleton, “The Effects of Historical Housing Policies on Resident Exposure to Intra-Urban Heat: A Study of 108 US Urban Areas,” *Climate* 8, no. 1 (January 2020): 12, <https://doi.org/10.3390/cli8010012>. Those experiencing the greatest exposure to present and potentially future extreme heat are living in neighborhoods with the least social and ecosystem services historically.

<sup>16</sup> See Mary H. Hayden et al., “Adaptive Capacity to Extreme Heat: Results from a Household Survey in Houston, Texas,” *Weather, Climate, and Society* 9, no. 4 (October 1, 2017): 787–99, <https://doi.org/10.1175/WCAS-D-16-0125.1>. Nonhomeowners, African-American and Hispanic/Latinos, those with incomes less than \$30,000/yr, those unemployed, and those in poor health to be most vulnerable to heat stress. The findings indicate that these populations have little or no knowledge of the symptoms of heat stress nor do they know where the closest cooling center is. Often, financial barriers restricted the use of an air conditioner at home where the greatest number of participants reported symptoms of heat stress.

and investing in sustainable urban planning solutions that prioritize the health and well-being of all Houstonians in our Houston 2045 project.

## **Cold waves**

In the face of Houston's typically sweltering climate, the city has also experienced its share of chilling extremes. The cold waves that have swept through Houston stand in stark contrast to the city's usual warmth, leaving a lasting impact on the community and infrastructure. These events are not only meteorological anomalies but also serve as a stark reminder of the city's vulnerability to extreme weather patterns.

During the February 2021 cold snap, the city was gripped by an Arctic blast that plunged temperatures to historic lows, with the National Weather Service recording a forecast low of 13 degrees<sup>17</sup>, tying for Houston's 5th coldest morning since records after 1889<sup>18</sup>. This cold snap was part of a larger weather disaster that affected the entire state of Texas, bringing with it not only frigid temperatures but also widespread power outages and water supply issues.

The cold wave's impact on infrastructure was catastrophic. Power outages were widespread as the demand for heating surged and supply faltered. The Texas power grid, unprepared for such an event, experienced failures that left millions without electricity. The cost of this disaster was immense, with the National Oceanic and Atmospheric Administration (NOAA) estimating the damage at \$1 billion<sup>19</sup>. The human toll was equally tragic. The lack of

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<sup>17</sup>See Neal Meyer, "The February 2021 Houston (and Texas) Cold Snap Event," blogHOUSTON, March 5, 2021, <https://www.bloghouston.com/2021/03/the-february-2021-houston-and-texas-cold-snap-event/>. Monday night, the thermometers went down to the 12-14 degree range.

<sup>18</sup> See Matt Lanza, "Looking Back at Some Previous Historic Houston Cold Snaps," *Space City Weather* (blog), February 13, 2021, <https://spacecityweather.com/looking-back-at-some-previous-historic-houston-cold-snaps/>. 1930, 1940, 1983, 1989

<sup>19</sup> See "The Great Texas Freeze: February 11-20, 2021," National Centers for Environmental Information (NCEI), February 23, 2023, <https://www.ncei.noaa.gov/news/great-texas-freeze-february-2021>. the Great Texas Freeze caused a billion dollars' worth of damages, state-wide



power led to at least 210 confirmed deaths in Texas, with some estimates suggesting the number could be significantly higher<sup>20</sup>. This is now the costliest U.S. winter storm event on record, more than doubling the inflation-adjusted cost of the 'Storm of the Century' that occurred in March 1993<sup>21</sup>.

Looking back at previous historic cold snaps, such as the one in January 2018, Houston faced temperatures as low as 19 degrees Fahrenheit. While not as severe as the 2021 event, it still marked a significant departure from the city's typical weather, with nights at or below freezing occurring over a span of 20 days<sup>22</sup>. In December 2022, Houston braced for another powerful cold front. The National Weather Service warned of severe weather, including isolated scattered showers and thunderstorms, as the front moved into the area<sup>23</sup>. Such events highlight the city's ongoing struggle with weather extremes, from scorching heat to unexpected cold, each bringing its own set of challenges, which also need to be addressed as a priority in Houston 2045.

## **Hurricane and flooding**

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blackouts, hundreds of fatalities, and enacted a massive emotional and financial toll on Texas residents.

<sup>20</sup> See ANDREW WEBER KUT, "Texas Winter Storm Death Toll Goes Up To 210, Including 43 Deaths In Harris County," Houston Public Media, July 14, 2021, <https://www.houstonpublicmedia.org/articles/news/energy-environment/2021/07/14/403191/texas-winter-storm-death-toll-goes-up-to-210-including-43-deaths-in-harris-county/>. The Texas Department of State Health Services on Wednesday updated its official tally of deaths linked to the historic freeze in February and now says 210 people across the state died because of the winter storm. The update represents an increase of 59 deaths from the agency's previous count.

<sup>21</sup> See Adam B. Smith, "U.S. Billion-Dollar Weather and Climate Disasters, 1980 - Present (NCEI Accession 0209268)" ([object Object], 2020), <https://doi.org/10.25921/STKW-7W73>. \$26.8 billion

<sup>22</sup> See Lanza, "Looking Back at Some Previous Historic Houston Cold Snaps."

<sup>23</sup> See Matt Harab, "Houston Weather: Cold Arrives in Region on Tuesday, with Possibility of Severe Weather," Houston Public Media, December 12, 2022, <https://www.houstonpublicmedia.org/articles/news/weather/2022/12/12/439279/cold-front-arriving-in-houston-area-late-tuesday-possible-severe-weather/>. "Strong winds and isolated hail is the main risk," says Janice Maldonado, meteorologist, National Weather Service. "Brief downpours will be possible so we cannot rule out some minor street flooding."

According to The Federal Emergency Management Agency (FEMA), Harris County, where Houston is located, has seen 134 floods from 1996 to 2019, with 40 since 2015 alone<sup>24</sup>.

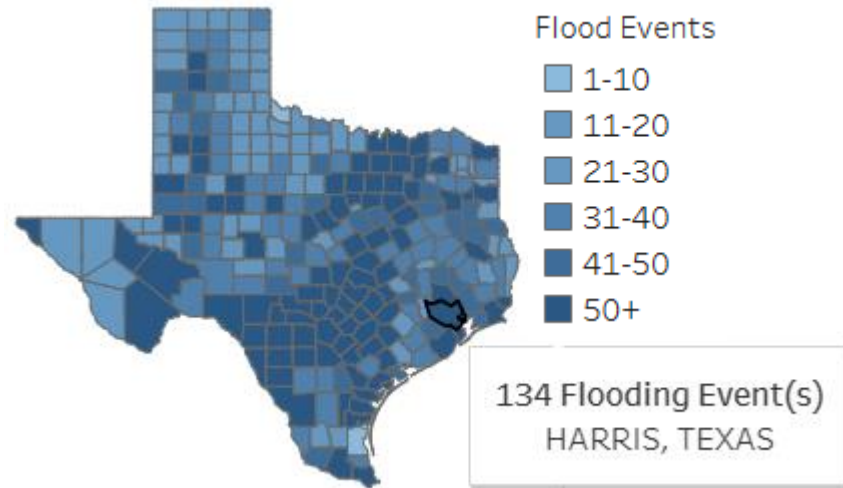


Figure 6 Historical Flood Risk and Costs, Created by FEMA

In the wake of Hurricane Harvey, the Planning and Development Department opened Neighborhood Resilience Plans. The content of the plan is very good. The Department began work to guide communities continuing to recover from recent climate related disasters such as Hurricane Harvey in 2017 and other flooding events through a public engagement resilience planning process<sup>25</sup>. But because fighting environmental disasters is a large-scale affair, it is difficult for a community to stand out from the rest of the community through a renovation program to protect it from the threat of subsequent disasters.

There are a few things worth mentioning in Baseline Analysis:

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<sup>24</sup> See “Historical Flood Risk and Costs | FEMA.Gov,” March 21, 2024, <https://www.fema.gov/data-visualization/historical-flood-risk-and-costs>. Historical flood impact

<sup>25</sup> See “Planning and Development Department,” accessed May 4, 2024, <https://houstontx.gov/planning/nrp/index.html>. Neighborhood Resilience Plans are a crucial step forward realizing the vision established in Mayor Sylvester Turner’s citywide resilience plan, Resilient Houston. In early 2022, the Planning and Development Department began work to guide three communities continuing to recover from recent climate related disasters such as Hurricane Harvey in 2017 and other flooding events through a public engagement resilience planning process. In early 2023, Mayor Turner authorized Neighborhood Resilience Plan development in three additional neighborhoods.



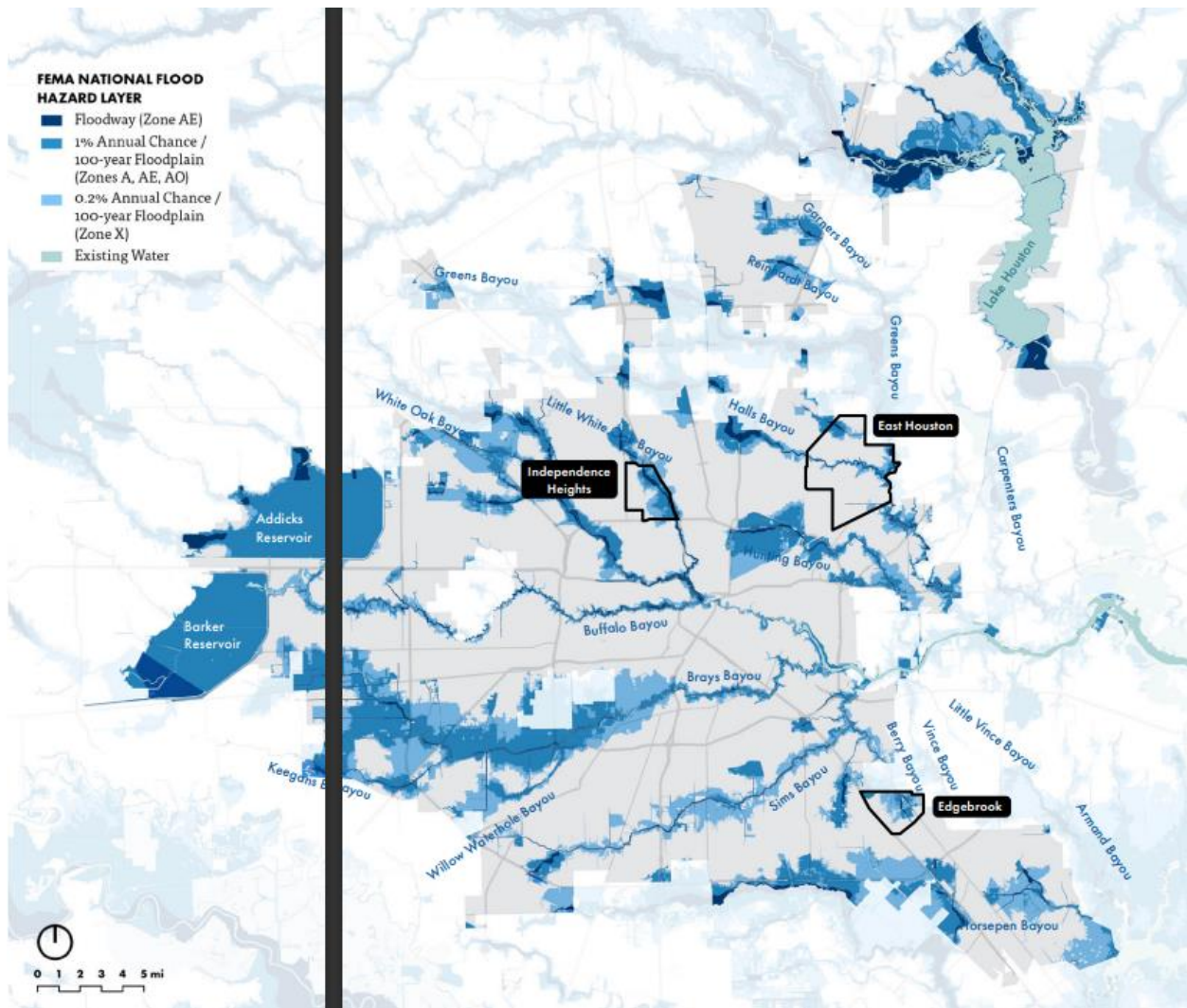


Figure 7 FEMA National Flood Hazard Layer

If this figure<sup>26</sup> is compared to figure 5, it again proves that the area west of downtown Houston is least at risk of flooding. As shown in figure 5, low-income communities are basically facing the threat of large-scale erosion by floods.

The figure<sup>27</sup> below visualizes the extent of flooding caused by Hurricane Harvey in the city of Houston in 2017. You can see the east side of Houston, especially the i-610 east side, is heavily damaged. Since the Planning and Development Department only highlighted the city of

<sup>26</sup>See “Baseline-Analysis.Pdf,” accessed May 3, 2024, <https://houstontx.gov/planning/nrp/Baseline-Analysis.pdf>.

<sup>27</sup>See “Baseline-Analysis.Pdf.”

Houston and lost some of the surrounding spatial details, I will visualize the inequity in and around Houston and the 100-year Flood zone presented by FEMA, as well as the elevation and hurricane evaluation zone.

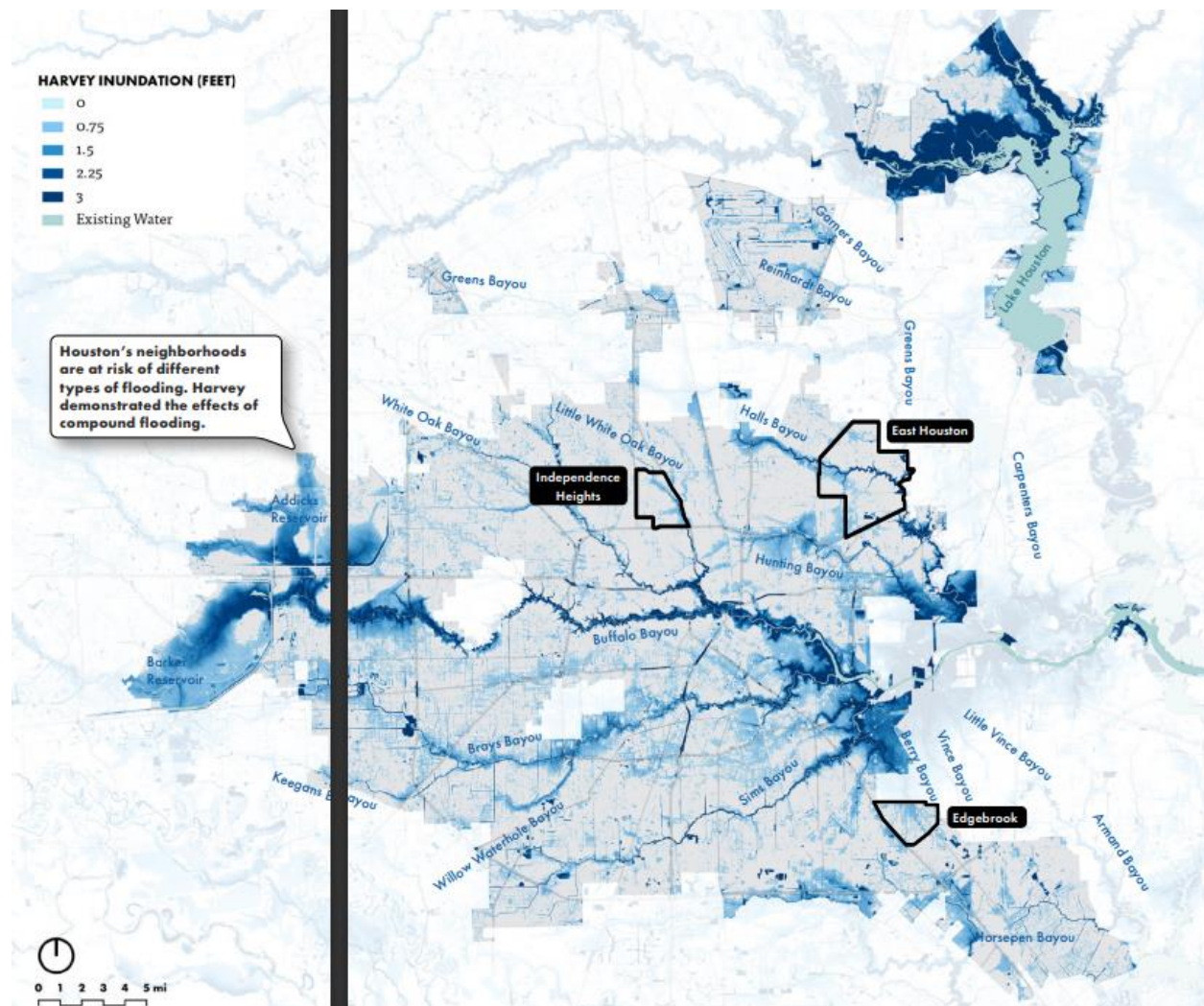


Figure 8 Harvey Inundation Simulation by Planning and Development Department

From Figures 9<sup>28</sup> and 10<sup>29</sup> it can be visualized that the vulnerable neighborhoods in front of the floods and hurricanes are in the southwestern and southeastern part of the city of Houston. Protecting people's property from flood damage will be the most important part of Houston 2045.

<sup>28</sup> See "FEMA Flood Map Service Center | Search All Products," accessed May 4, 2024, <https://msc.fema.gov/portal/advanceSearch#searchresultsanchor>; "Census Bureau Data."

<sup>29</sup> See "USGS.Gov | Science for a Changing World," accessed May 4, 2024, <https://www.usgs.gov/>; "FEMA Flood Map Service Center | Search All Products."



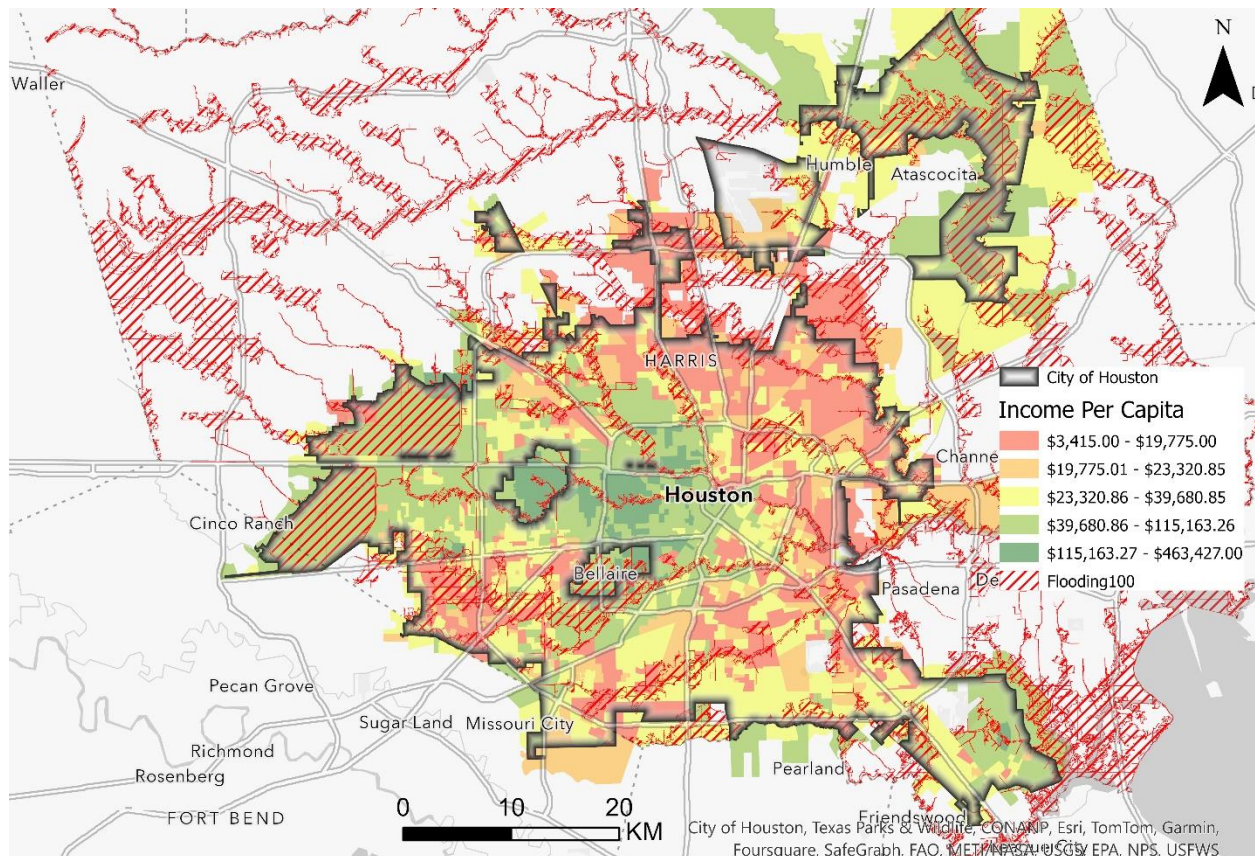


Figure 9 Houston's Income Inequity and 100-year Floodplain, created by ArcGIS Pro, using ACS 18-22 and FEMA

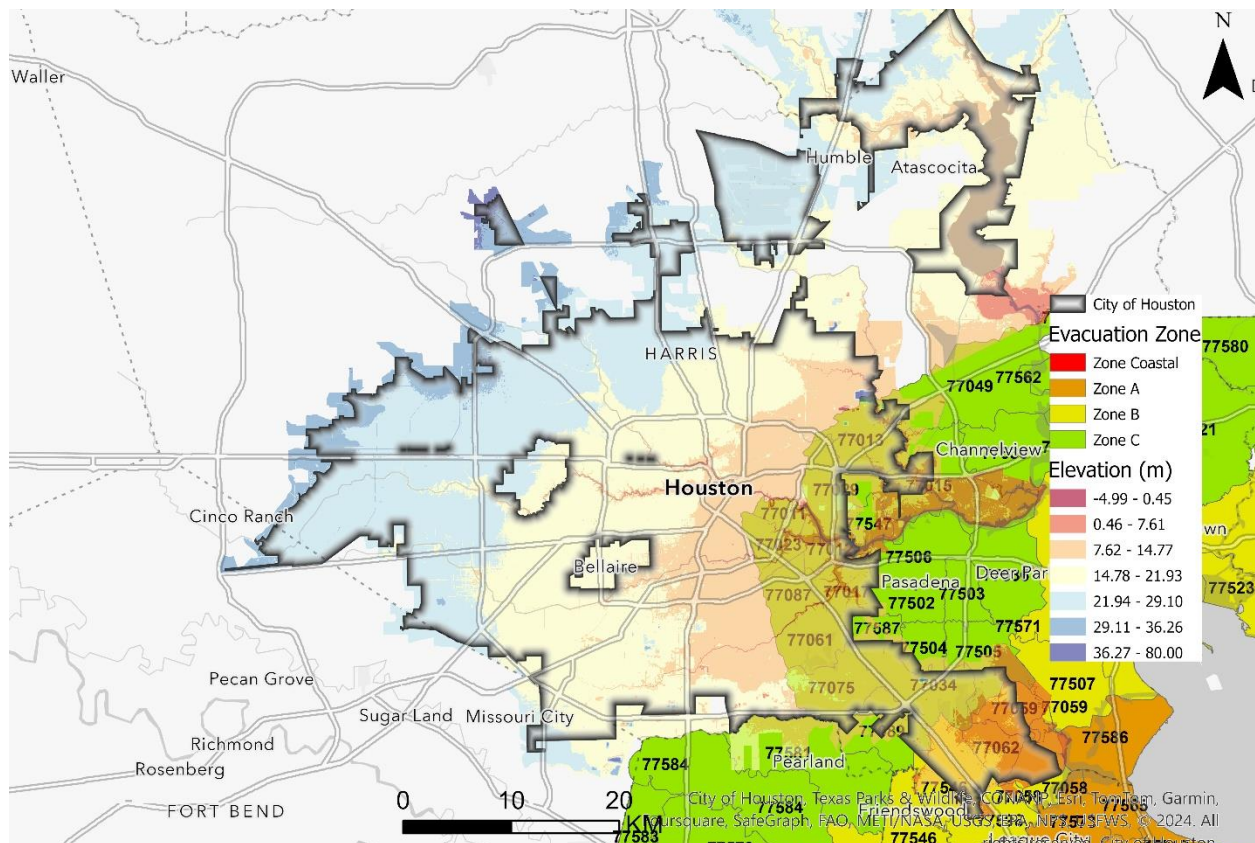


Figure 10 Houston's Elevation and Hurricane Evacuation Zone, created by ArcGIS Pro, using USGS and FEMA



## **Case studies of urban transformation in response to climate change: New York City**

Big U: The Big U project in New York City is a comprehensive flood protection system designed to safeguard Lower Manhattan from the impacts of flooding and climate change. It extends over a 10-mile perimeter from West 57th Street down to The Battery and up to East 42nd Street<sup>30</sup>. The project is divided into sections, each serving as a separate flood-protection zone. For example, the East River Park section includes a Bridging Berm that provides protection against storm surges and rising sea levels, while also offering waterfront access and creating a resilient urban habitat. Another section, spanning Two Bridges and Chinatown, features deployable walls that can be flipped down during floods, with panels decorated by local artists. The section from Brooklyn Bridge to The Battery includes the Battery Berm, which creates an elevated path through unique landscapes and repurposes the existing Coast Guard building<sup>31</sup>.

The implementation of the Big U has been a collaborative effort with New York City, receiving \$335 million for its execution. A decade after its inception, the project has led to the planning and design of various sections, with funded plans covering areas from East 25th Street on the East Side to Chambers Street on the West Side. These sections are known by names such as East Side Coastal Resiliency, Brooklyn Bridge Montgomery Coastal Resilience, and Lower Manhattan Coastal Resilience<sup>32</sup>.

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<sup>30</sup> See “PROJECT PAGES: THE BIG U – Rebuild by Design,” accessed May 4, 2024, <https://rebuildbydesign.org/work/funded-projects/the-big-u/>. In collaboration with New York City, The BIG U proposal was developed to protect Lower Manhattan from floodwater, storms, and other impacts of a changing climate. The BIG U calls for a protective system around the low-lying topography of Manhattan beginning at West 57th Street, going down to The Battery, and then back up to East 42nd Street.

<sup>31</sup> See “PROJECT PAGES.”

<sup>32</sup> See “THE BIG U 10-YEAR UPDATE – Rebuild by Design,” accessed May 4, 2024, <https://rebuildbydesign.org/news-and-events/updates/the-big-u-10-year-update/>.

Sea Wall: In addition to the Big U, New York City has considered the construction of a sea wall to protect against storm surges. This proposed barrier would span 6 miles from the Rockaways in Queens to New Jersey and include retractable gates. However, the estimated cost of \$119 billion has raised concerns about the project's feasibility<sup>33</sup>.

The initiatives of the Big U and the sea wall are part of New York City's efforts to adapt to climate change and protect against future extreme weather events. These projects reflect the city's commitment to resilience and sustainability in the face of environmental challenges.

### **Case Reflection**

Houston's current flooding woes are similar to those of New York, but unlike New York, Houston is a much larger city than Manhattan and its downtown area is not at serious risk of flooding. So, for Houston, the plan is flexible and adaptable.

The case study suggests that creating a green buffer similar to the Big U would be more appropriate for the current economic and physical status of Houston today, i.e., buffering through green space in areas at risk of flooding. For areas where the practice does not hedge the risk, such as the low-lying areas in the southeast. Considering the cost of flood insurance<sup>34</sup>, as well as the cost for residents to rebuild and the cost of potential loans<sup>35</sup>, new housing could be considered to be built in safe areas near the City of Houston.

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<sup>33</sup> See “\$119 Billion Sea Wall Being Considered To Protect New York, New Jersey From Storm Surges - CBS New York,” January 21, 2020, <https://www.cbsnews.com/newyork/news/new-york-119-billion-sea-wall-proposal/>. Former President Donald Trump has already mocked the plan, calling it costly, foolish and environmentally unfriendly.

<sup>34</sup> See “Flood Insurance Rules and Legislation | FEMA.Gov,” May 27, 2021, <https://www.fema.gov/flood-insurance/rules-legislation>.

<sup>35</sup> See “Flood Insurance | FEMA.Gov,” September 27, 2023, <https://www.fema.gov/flood-insurance>. Homes and businesses in high-risk flood areas with mortgages from government-backed lenders are required to have flood insurance.

## **Vision of Houston 2045**

Houston 2045 is a comprehensive plan aimed at creating a city that is more sustainable, equitable, and resilient. It acknowledges the pressing need to address the growing hazards posed by climate change to Houston, such as heat waves that are getting worse, extremely cold spells, hurricanes, and flooding. It also recognizes, though, the more fundamental structural problems that have resulted from the city's history of inequality and segregation, which have had an outsized influence on underprivileged populations.

It is impossible to combat climate change without addressing the historical legacy of discriminatory practices such as redlining. The neighborhoods that were originally labeled "hazardous" due to discriminatory housing practices are now those that bear the brunt of environmental issues, such as flood hazards and urban heat islands. Creating a genuinely resilient Houston requires ending this cycle of injustice.

The relevance of sustainable urban development and green infrastructure should be seriously considered in the plan. Houston can lessen the effects of excessive heat, flooding, and storm surges while simultaneously giving underprivileged neighborhoods much-needed relief by investing in green spaces, parks, and natural buffers. The possibility of moving people from high-risk locations to safer, more living communities with access to resources and amenities will be investigated as part of the suburban urbanization movement.

Emergency preparedness and accessibility will be greatly aided by transportation. During extreme weather events, vulnerable populations can be efficiently evacuated and provided with shelter thanks to well-designed bus routes and emergency response protocols. This will be crucial for safeguarding people during heat waves and power outages who don't have access to air conditioning or private cars.



In addition to being an issue of social justice, resolving Houston's historical inequity and segregation is essential to creating a resilient city. Through equitable resource allocation, investment in marginalized groups, and a focus on their health and well-being, Houston can forge a more integrated and coherent urban fabric that is more resilient to the effects of climate change.

Although the Houston 2045 goal is lofty, it is a vital step toward a future in which the city not only faces environmental challenges but also moves past its historical wounds. It acknowledges that resolving the underlying causes of inequality and giving historically oppressed people's demands top priority is necessary for achieving true resilience.

Houston can become a leader in urban transformation by combining environmental, infrastructural, and social initiatives. It will show that cities can adapt to climate change while also promoting fairness, justice, and inclusivity for all of their citizens.

## References

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