RESILIENT FAIR HAVEN

CURRENT + FUTURE CONDITIONS ANALYSIS

CIRCA Connecticut Institute for Resilience and Climate Adaptation

NHV New Haven

FUSS & O'NEILL

Dewberry

RESILIENT FAIR HAVEN

The Fair Haven neighborhood is home to nearly 14,000 residents and is located within the City of New Haven along the coast of Long Island Sound. The neighborhood forms a peninsula bounded by the Mill and Quinnipiac Rivers, which flow into the tidal estuary of New Haven Harbor. According to the City Planning Department, the neighborhood has a high percentage of residents that are either essential workers or cannot work from home. Therefore, transportation and transit are critical. This project focuses on adapting to current and future climate induced flooding impacts to transportation routes and major corridors within the neighborhood and mitigating extreme heat impacts for residents.

This memo summarizes the results of Task 3 Current & Future Conditions Analysis and examines the climate vulnerabilities related to flooding and heat in the Fair Haven community.

PROJECT TEAM

CIRCA

John Truscinski – Project Lead

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City of New Haven

Giovanni Zinn – City Engineer

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Consultant Team

Fuss & O'Neill

Dewberry

Citizen + Technical Advisory Committee (CTAC)

Xochitl Garcia	Project Community Liaison
Claudia Herrera	Board of Alders (9-D)
Sarah Miller	Board of Alders (14-D)
Chris Ozyck	Urban Resources Initiative
Dominic Seraphin	Fair Haven Community Clinic
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RESILIENT FAIR HAVEN

CONTEXT + PROJECT GOALS

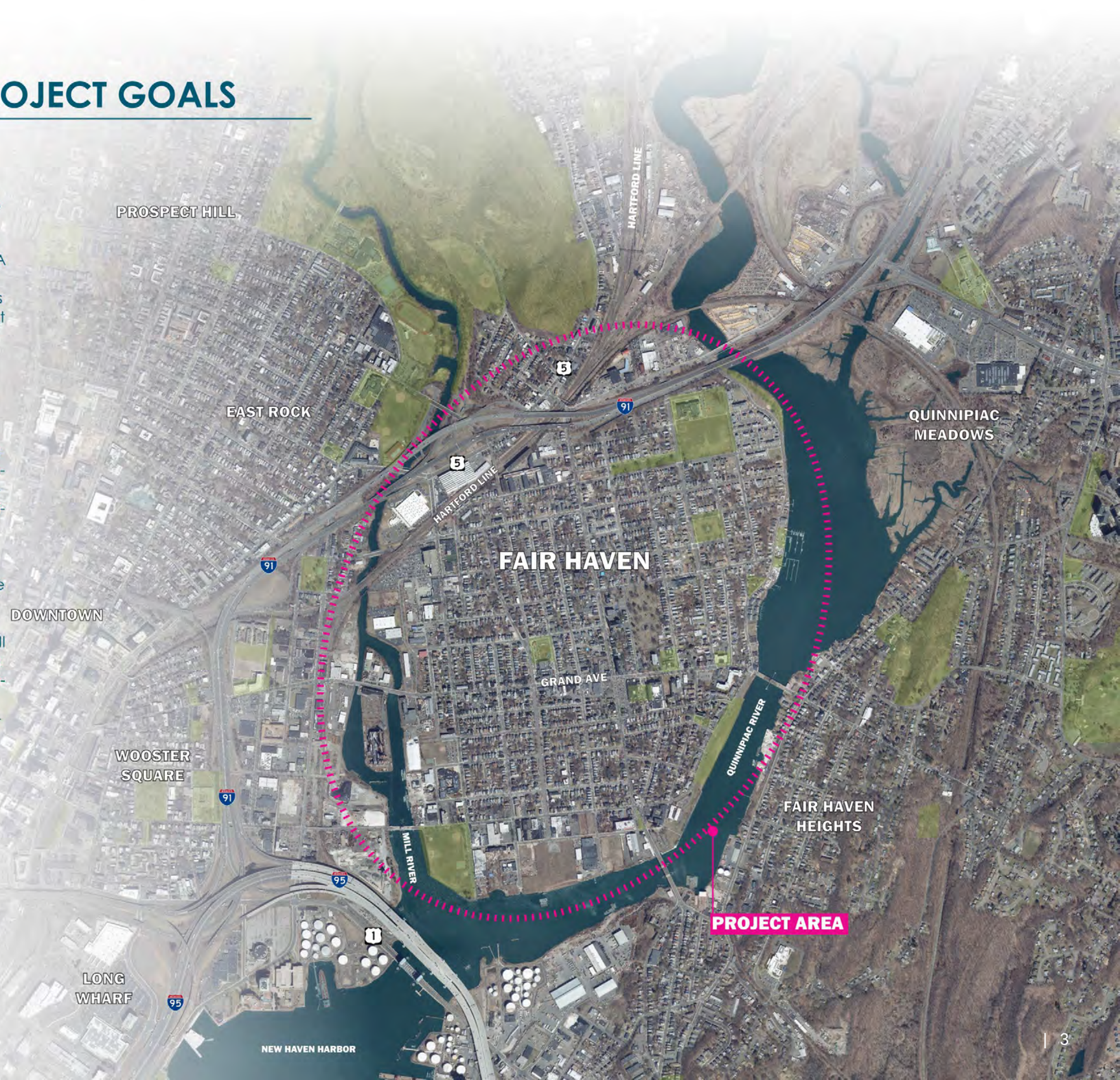
The Fair Haven neighborhood – home to nearly 14,000 residents and numerous businesses within the City of New Haven – is situated on a peninsula bounded by the Mill and Quinnipiac Rivers, which flow into nearby New Haven Harbor. The area is located between the Downtown, Wooster Square, and East Rock neighborhoods to the west and the Fair Haven Heights and Quinnipiac Meadows neighborhoods to the east, as well as near the intersection of Interstates 95 and 91 and major rail lines. A number of critical roads connect the Fair Haven neighborhood to other parts of the city via bridges and underpasses. The neighborhood also has a high percentage of residents that are either essential workers or cannot work from home. Therefore, transportation and transit are critical lifelines for the neighborhood, which includes a large Hispanic population.

Fair Haven is vulnerable to flooding from coastal storm surge, high tides, sea level rise, and heavy rainfall events given its proximity to the tidally influenced Mill and Quinnipiac Rivers and extensive urbanization. Flooding in the Fair Haven neighborhood threatens public safety and impedes access to critical lifelines and evacuation routes during storms. The neighborhood is also vulnerable to extreme heat due to the high social vulnerability within the community, combined with dense housing, high impervious cover, disconnected green spaces, and long distances to potential cooling centers and/or shelters.

This project builds on prior planning and assessment of flood and extreme heat vulnerabilities by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) for the Fair Haven neighborhood completed as part of Phases I and II of Resilient Connecticut. This project (Phase III of Resilient Connecticut) focuses on developing adaptation strategies to mitigate current and future climate induced flooding impacts to community assets and transportation corridors in Fair Haven, as well as developing strategies to help mitigate the impacts of extreme heat for community residents.

PROJECT GOALS:

1. Develop strategies and implementable project concepts to reduce flood and heat risks
2. Work with stakeholders in Fair Haven to develop strategies and projects
3. Position projects for federal and state funding



LEGEND

- Open Space
- Project Area

RESILIENT FAIR HAVEN

IN CONTEXT WITH THE BIGGER PICTURE

In Fair Haven/New Haven, like elsewhere, resilience is a shared responsibility across multiple levels of government. Decisions around land use and floodplain management are subject to a hierarchy of rules and regulations at various scales of jurisdiction. With resilience layered in at multiple levels of government, this can make for a confusing web to navigate.

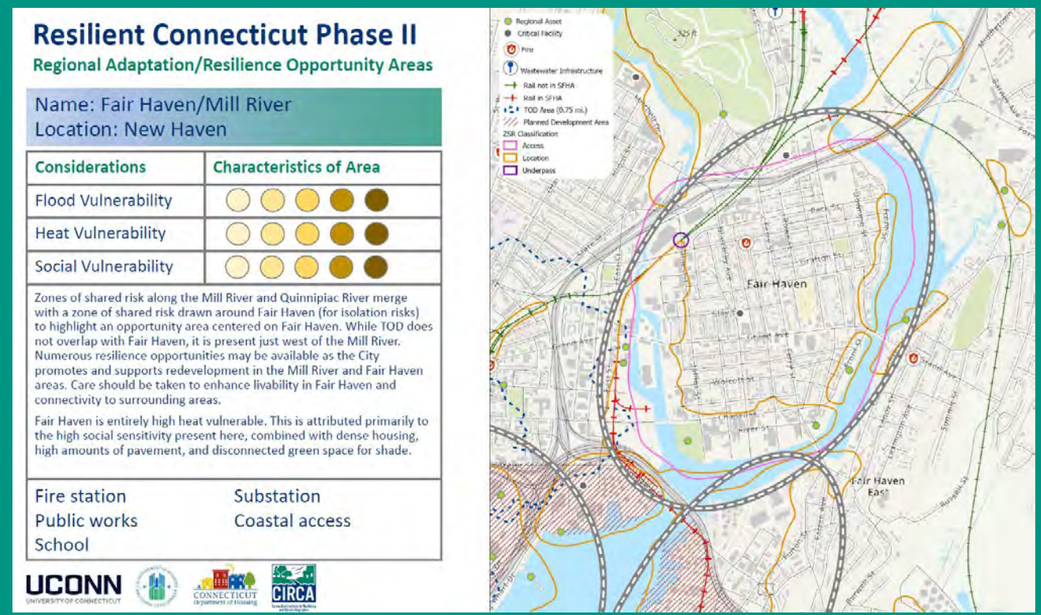
There have been, and continue to be, numerous resilience-related planning initiatives in the New Haven area over the last decade. This project looks to tie into these initiatives and plans where possible to capitalize on the work already performed and expand on the City's goals as well as the benefits that all these initiatives can together provide to the community of Fair Haven.

The graphic to the right shows just a small selection of the municipal and regional resilience initiatives in the New Haven area, including the Resilient Fair Haven project.

LEAD PLANNING ENTITIY:

1 - Save the Sound
2 - South Central Regional Council of Governments
3 - City of New Haven
4 - City of New Haven
5 - City of New Haven
6 - Connecticut Institute for Resilience & Climate Adaptation (CIRCA)
7 - City of New Haven
8 - Quinnipiac River Watershed Association

ONE PIECE OF A LARGER EFFORT



Resilient Connecticut Phase II

Regional Adaptation/Resilience Opportunity Areas

Name: Fair Haven/Mill River
Location: New Haven

Considerations	Characteristics of Area
Flood Vulnerability	○ ○ ○ ● ●
Heat Vulnerability	○ ○ ○ ● ●
Social Vulnerability	○ ○ ○ ● ●

Zones of shared risk along the Mill River and Quinnipiac River merge with a zone of shared risk drawn around Fair Haven (for isolation risks) to highlight an opportunity area centered on Fair Haven. While TOD does not overlap with Fair Haven, it is present just west of the Mill River. Numerous resilience opportunities may be available as the City promotes and supports redevelopment in the Mill River and Fair Haven areas. Care should be taken to enhance livability in Fair Haven and connectivity to surrounding areas.

Fair Haven is entirely high heat vulnerable. This is attributed primarily to the high social sensitivity present here, combined with dense housing, high amounts of pavement, and disconnected green space for shade.

Fire station
Public works
School
Substation
Coastal access

RESILIENT
FAIR HAVEN

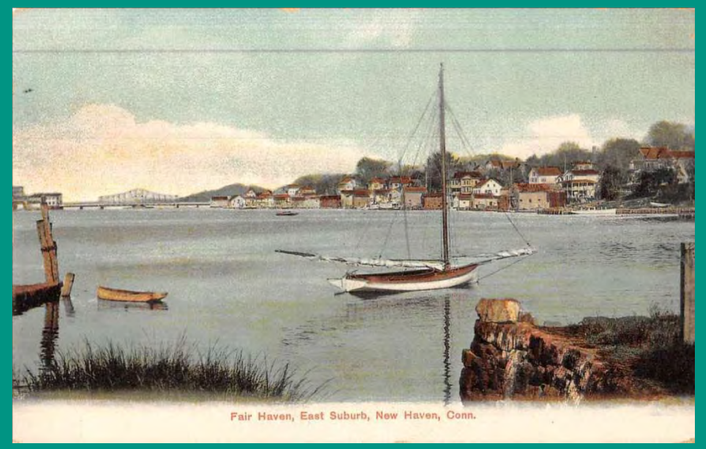
HISTORICAL CONTEXT + BACKGROUND

Fair Haven has a unique history shaped by the adjacent rivers and nearby New Haven Harbor. Its development and growth paralleled, yet were independent of, the New Haven Colony. The area was farmed by Native Americans prior to the first European settlements in the 1630s. During the 17th century, Fair Haven was an oystering village as the area was a source of oysters and other products of the rivers and nearby harbor. The oyster industry and related waterfront businesses thrived through the 19th century.

By the mid- to late-1800s, the oyster industry began to decline due to natural predators, a shift in the industry's base to Long Island, and an increase in pollution. During the 1860s following the Civil War, the area east of the Mill River became a street-car suburb inhabited by European immigrants, most notably Irish immigrants. In 1837, Fair Haven withdrew from the jurisdiction of New Haven and then rejoined New Haven in 1870. Following this period, Fair Haven developed rapidly, transforming from an oystering village into a mix of businesses, industry, and residential dwellings and home to many immigrant workers.

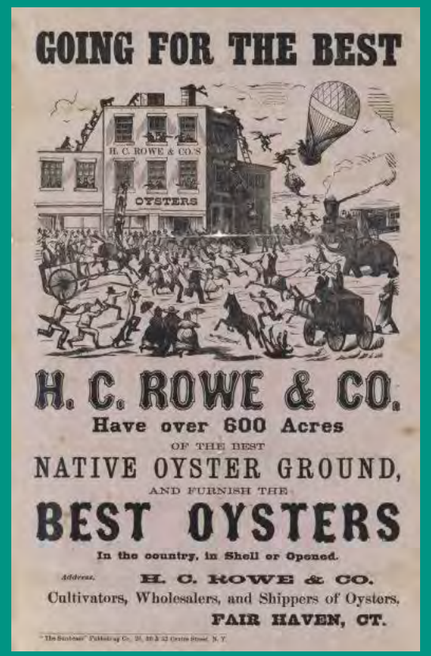
The 20th century brought more industry and the problems of industrialization to the area. Overcrowded living conditions, pollution and crime were among the challenges of this period. Many black and Latinx families migrated into Fair Haven by the 1960s. Fair Haven developed a strong sense of community as families formed a close relationship to the area. The residents of Fair Haven lived, worked, shopped, played, and worshipped close to their home.

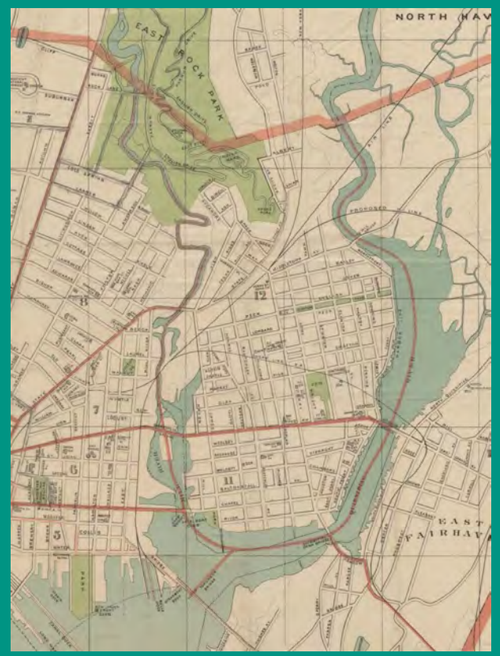
As industry moved out of Fair Haven, the community changed. Deterioration of neighborhoods increased, and people moved away for various reasons. Unlike other areas of New Haven, Fair Haven escaped, to a large degree, the downtown demolition of the 1960s. The area has retained many structures that provide a link to its past. The waterfront area along Front Street has been redeveloped in the past 20 years. Other areas of Fair Haven have been targeted for reinvestment and redevelopment, including the industrial waterfront areas along the Mill River and the Grand Avenue business district.



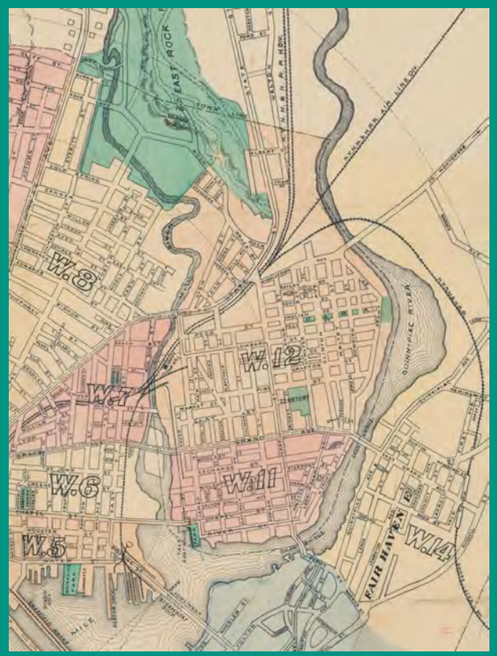
1898

1868





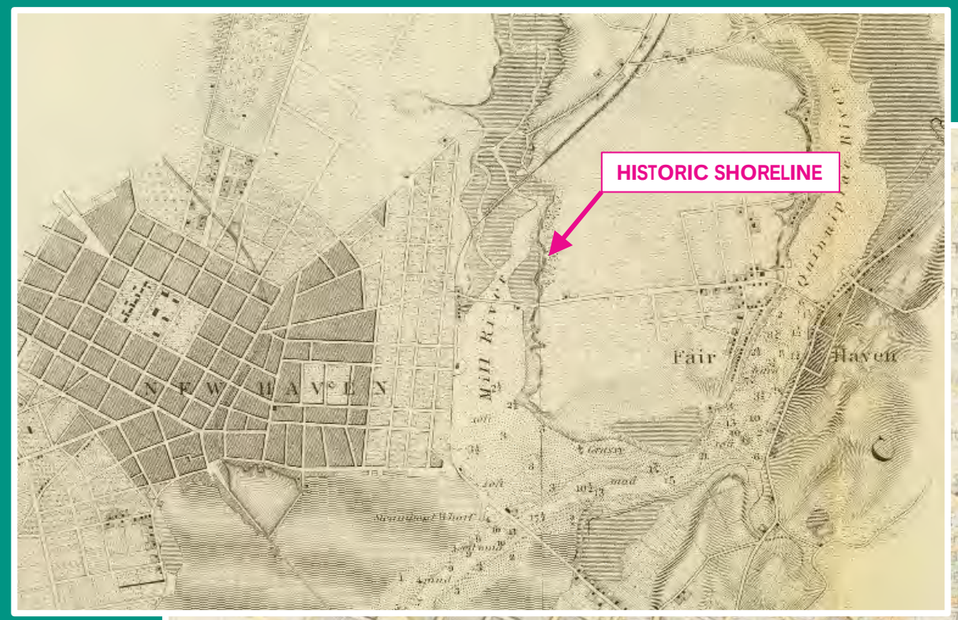
1893



1898

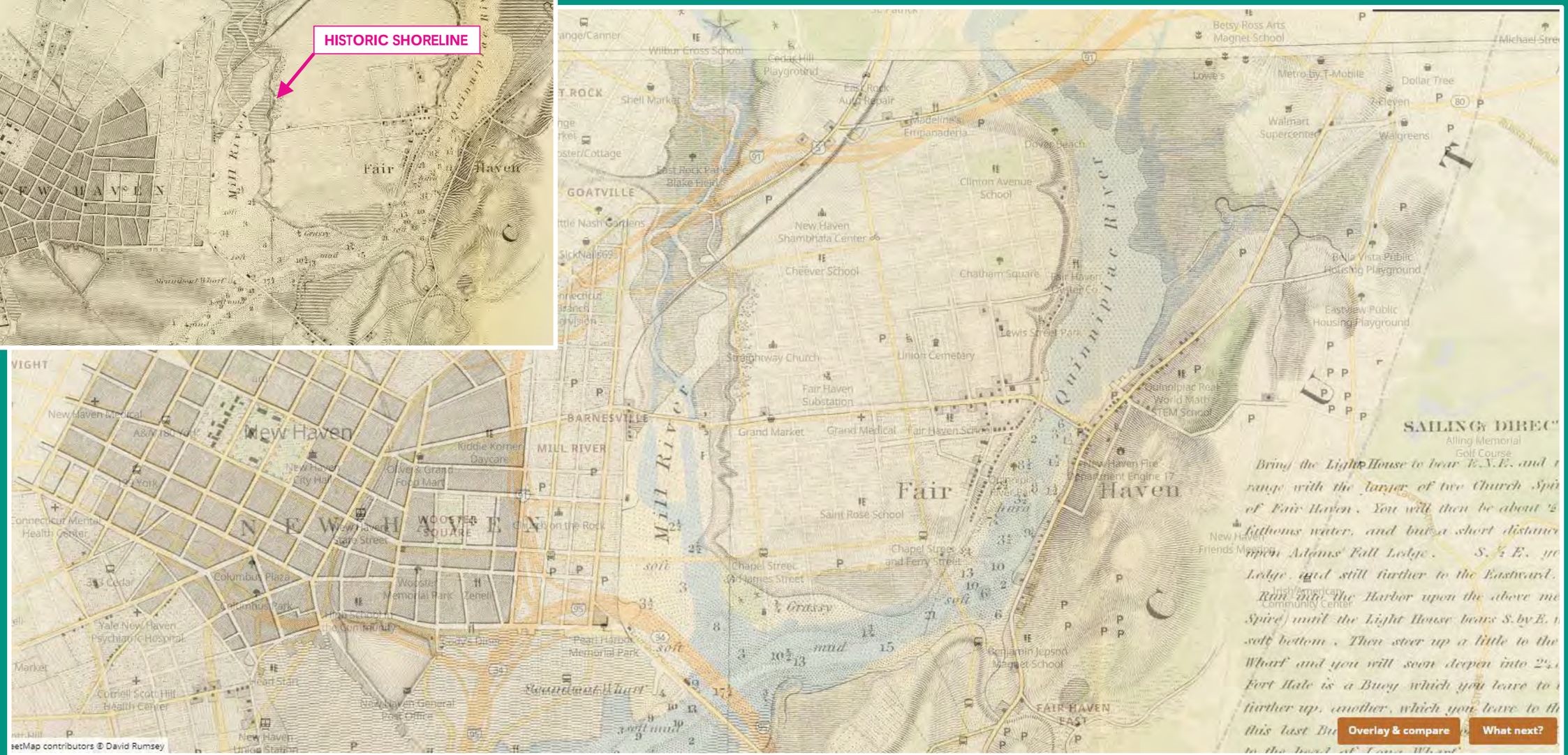
SOURCE: Fair Haven: An Historical and Ecological Field Study, Yale-New Haven Teachers institute, Curriculum Units by Fellows of the Yale-New Haven Teachers Institute, 1979 Volume III: Remarkable City: Industrial New Haven and the Nation, 1800-1900. https://teachersinstitute.yale.edu/curriculum/units/1979/3/79.03.05.x.html

FAIR HAVEN'S CHANGING SHORELINE



1846

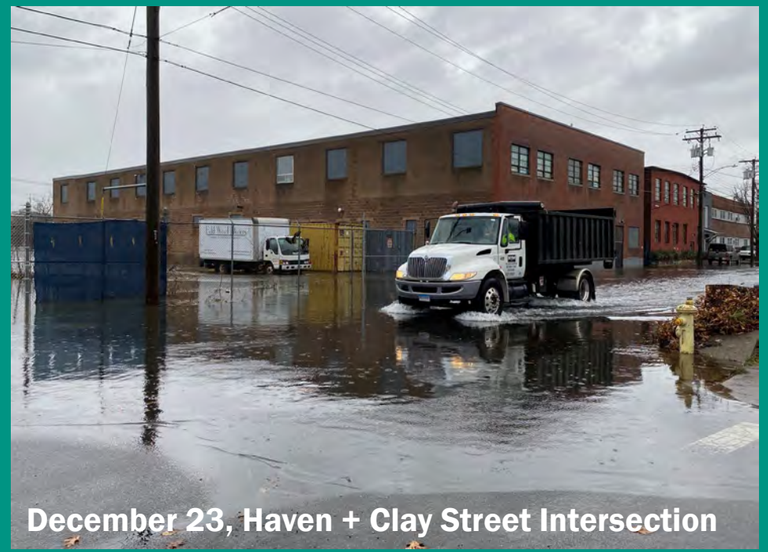
The image at left is an early map of the Fair Haven area with the historic shoreline noted with a dark and undulating line. The bottom image shows this same map from 1846 projected onto the current day Fair Haven street map. From this exercise it is revealed how much of Fair Haven's waterfront areas have been built up with fill over the years to accommodate development on the peninsula. The areas which have been filled were previously open water or marsh and correlate closely to areas of present-day flooding and future projected coastal flooding.



SOURCE: Old Maps Online

FAIR HAVEN PRESENT-DAY FLOODING


Superstorm Sandy, Humphrey St Underpass


December 23, Haven + Clay Street Intersection


December 23, Lloyd Street Street end


December 23, Front Street Backyard Flooding


December 23, Criscuolo Park


December 23, Quinnipiac River Park

FAIR HAVEN SOCIAL VULNERABILITIES

Vulnerability is the propensity or predisposition to be adversely affected. Areas that are more vulnerable to climate change are ones where people, infrastructure, and/or ecological assets are more likely to experience harm as temperatures rise, floods worsen, and high winds increase. Vulnerability is a complex concept and encompasses a variety of elements including physical exposure, sensitivity or susceptibility to harm, and lack of capacity to cope and adapt. Understanding vulnerability helps us to make decisions about resource allocation, policy development, and project prioritization, siting, and design.

Non-English speaking, young, elderly, homeless, or physically disabled people are more likely to need support to prepare, respond to, or recover from a climate events like flooding and heat waves. Minority and elderly populations are also less likely to have equal access to financial and physical resources to do the same.

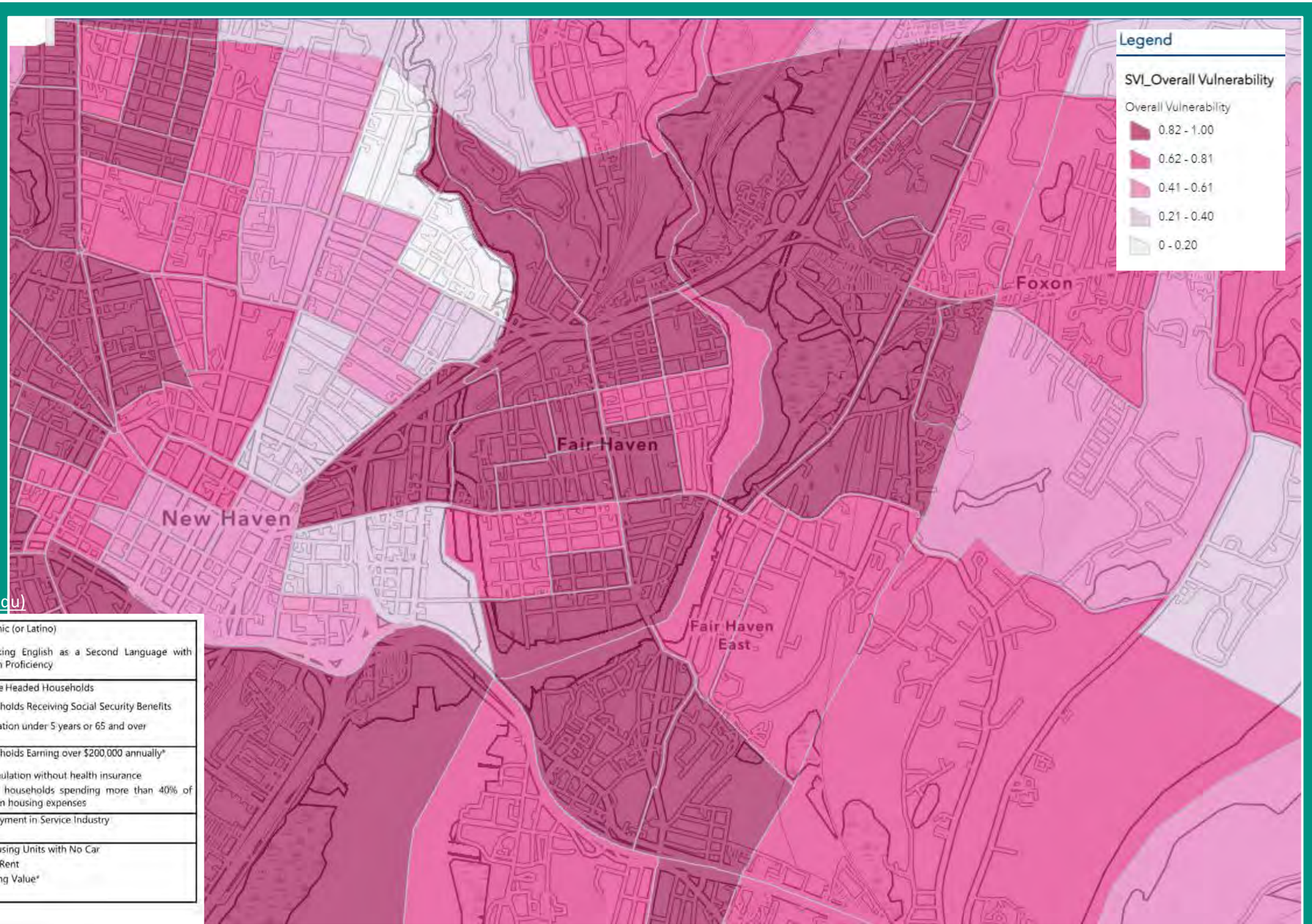
A history of exclusionary policy has inequitably distributed resources so that Black and Latinx communities are disproportionately vulnerable to flooding, high urban heat, air pollution, and proximity to hazardous waste. There are also specific communities such as the elderly and those with disabilities that are at higher risk.

SVI – Contributing Factors:

Link: Climate Change Vulnerability Index | Resilient Connecticut (uconn.edu)

Minority Status and Language	Percent Female Percent Black Percent Native American Percent Asian	Percent Hispanic (or Latino) Percent Speaking English as a Second Language with Limited English Proficiency
Household Composition & Disability	People per Unit Median Age Independent Living Difficulties Percent Children Living in 2-parent families*	Percent Female Headed Households Percent Households Receiving Social Security Benefits Percent Population under 5 years or 65 and over
Socioeconomic Status	Percent Poverty Per Capita Income* Percent Civilian Unemployment Percent with Less than 12th Grade Education	Percent Households Earning over $200,000 annually* Percent of population without health insurance Percent of all households spending more than 40% of their income on housing expenses
Labor Force	Percent Female Participation in Labor Force Percent Employment in Blue Collar Industries	Percent Employment in Service Industry
Housing Type and Transportation	Percent Unoccupied Housing Units Percent Renters Percent Mobile Homes Hospitals Per Capita **	Percent of Housing Units with No Car Median Gross Rent Median Housing Value*

* Indicates a variable where inverse percentile was used for calculations
** Indicates county level data



Resilient Connecticut developed a Social Vulnerability Index (SVI) to aid in identifying populations that may be more vulnerable to the impacts of climate change.

Link: https://storymaps.arcgis.com/stories/d7066d4217b54cce9bbd68773c05b778

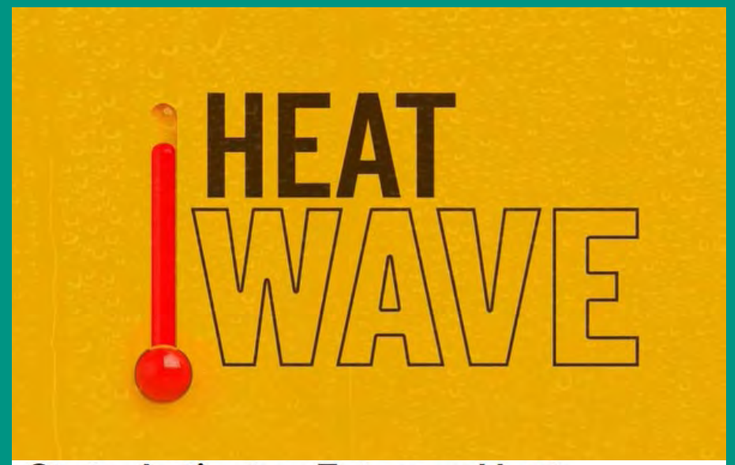
FAIR HAVEN + EXTREME HEAT

PRIMARY IMPACTS

Primary impacts from extreme heat include heat-related health effects such as heat stroke, dehydration, and dizziness. In extreme cases, these can lead to death. Primary impacts are often harder to attribute to an extreme heat event because they effect people who are already vulnerable, such as children, the elderly, and those with pre-existing medical conditions. One way to determine the overall primary impact of extreme heat is to compare hospital statistics for heat-related illnesses or deaths to standard averages. This can be done to overcome the issue of extreme heat not being recognized as the underlying cause because other ailments were also present (and exasperated by the heat).

SECONDARY IMPACTS

Secondary impacts from extreme heat are the potential delay of outside work, such as construction, during intense episodes. Even If work is not halted completely, safe working conditions would require an increase in breaks and time out of the heat. This would slow overall work. Additionally, higher temperatures increase electricity consumption due to air conditioning usage, leading to power outages. This would impact homes, businesses, and general operations throughout Fair Haven. If the power outage is extensive or occurs for a long period of time, a positive feedback loop can start. With the power out, air conditioning becomes unavailable for most. The lack of air conditioning makes people more vulnerable to the extreme heat, leading to even more heat-related health issues.



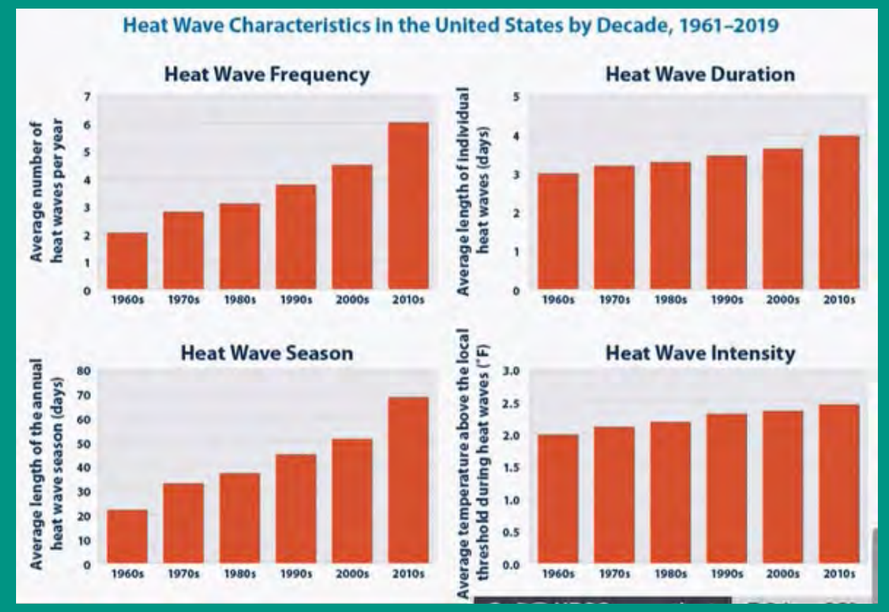
State Activates Extreme Heat Protocol, New Haven Cooling Centers Open

Cooling centers include city senior centers and all branches of the New Haven Free Public Library. Splash pads are another way to cool off.

Ellyn Santiago, Patch Staff

Posted Tue, Jul 19, 2022 at 11:23 am ET

Reply

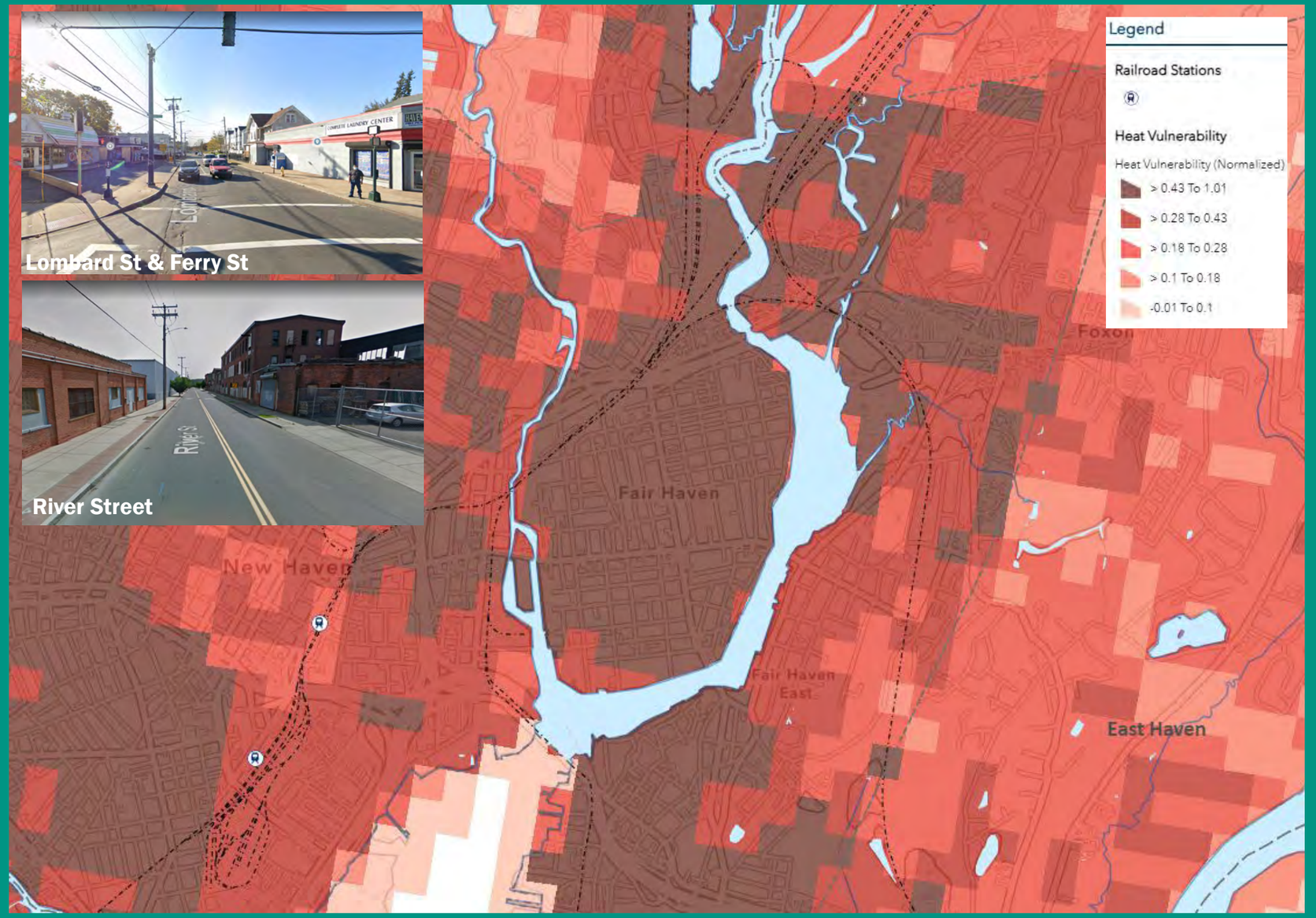


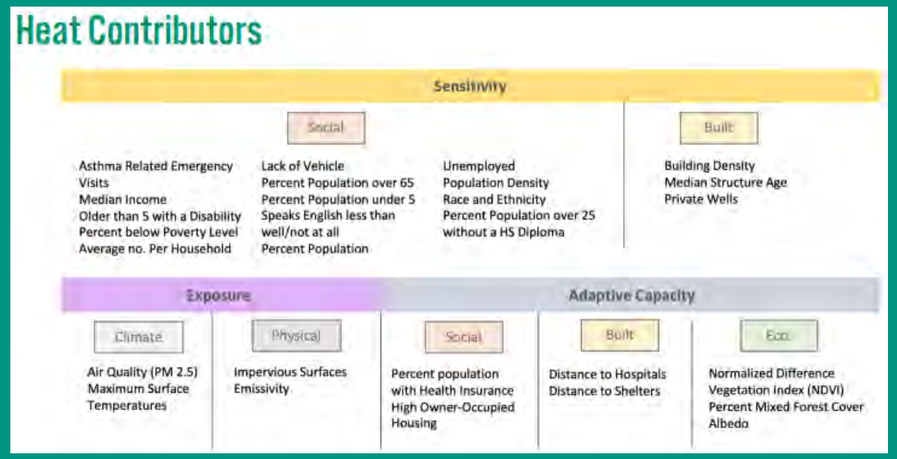
FAIR HAVEN + EXTREME HEAT

The social impact is also evident. As the mercury rises, children can't concentrate in school, pregnant women are at greater risk of miscarriage, and the elderly and people with a variety of existing health conditions are prone to develop heatstroke owing to their decreased capacity to adapt to changes in body temperature. When thermometers hit 100°F (37.78°C), the risk of injuries increases by 15% for manufacturing plant and warehouse workers*. Heat disproportionately affects the most vulnerable people, and this problem is exacerbated in densely populated urban areas.

Fair Haven is entirely high heat vulnerable. This is attributed primarily to the high social sensitivity present here, combined with dense housing, high amounts of pavement, and disconnected green space for shade.

**UCLA Luskin School of Public Affairs*

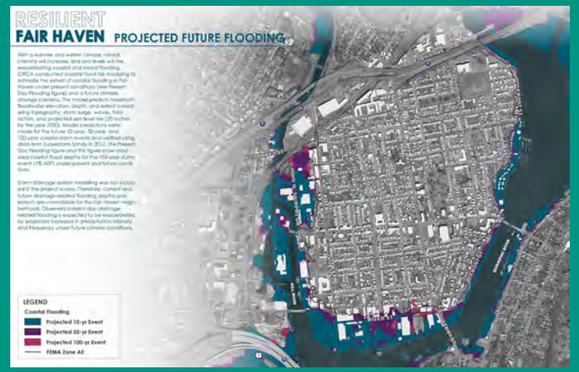




CIRCA Climate Change Vulnerability Index – Contributing Factors
Link: https://resilientconnecticut.uconn.edu/ccvi/

CIRCA Climate Change Vulnerability Index (CCVI) Heat Vulnerability Map

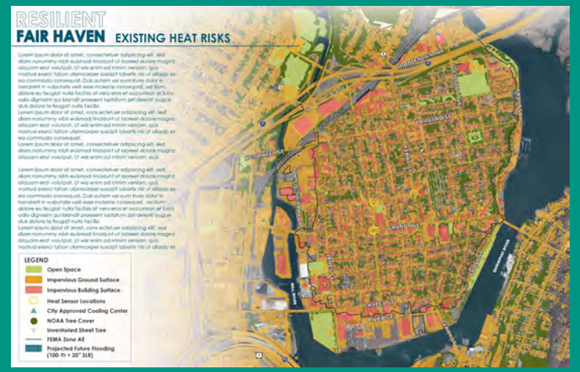
DEFINING THE RISKS



PRESENT + FUTURE FLOOD EXTENTS

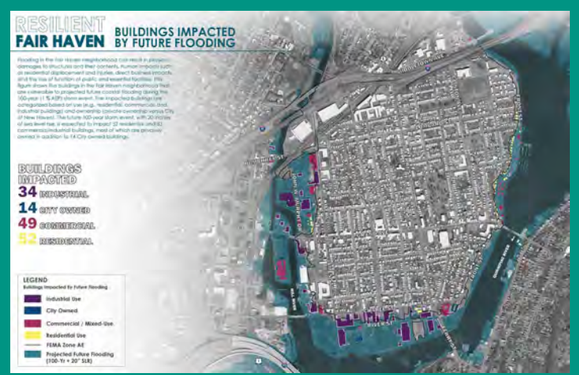
PRESENT + FUTURE FLOOD DEPTHS

INDUSTRIAL LEGACY + CONTAMINATION



EXTREME HEAT VULNERABILITIES

WHAT'S AT RISK?



BUILDINGS IMPACTED BY FLOODING

TRANSPORTATION INFRASTRUCTURE

WATER INFRASTRUCTURE

CRITICAL COMMUNITY ASSETS

DEFINING THE RISKS

RESILIENT FAIR HAVEN

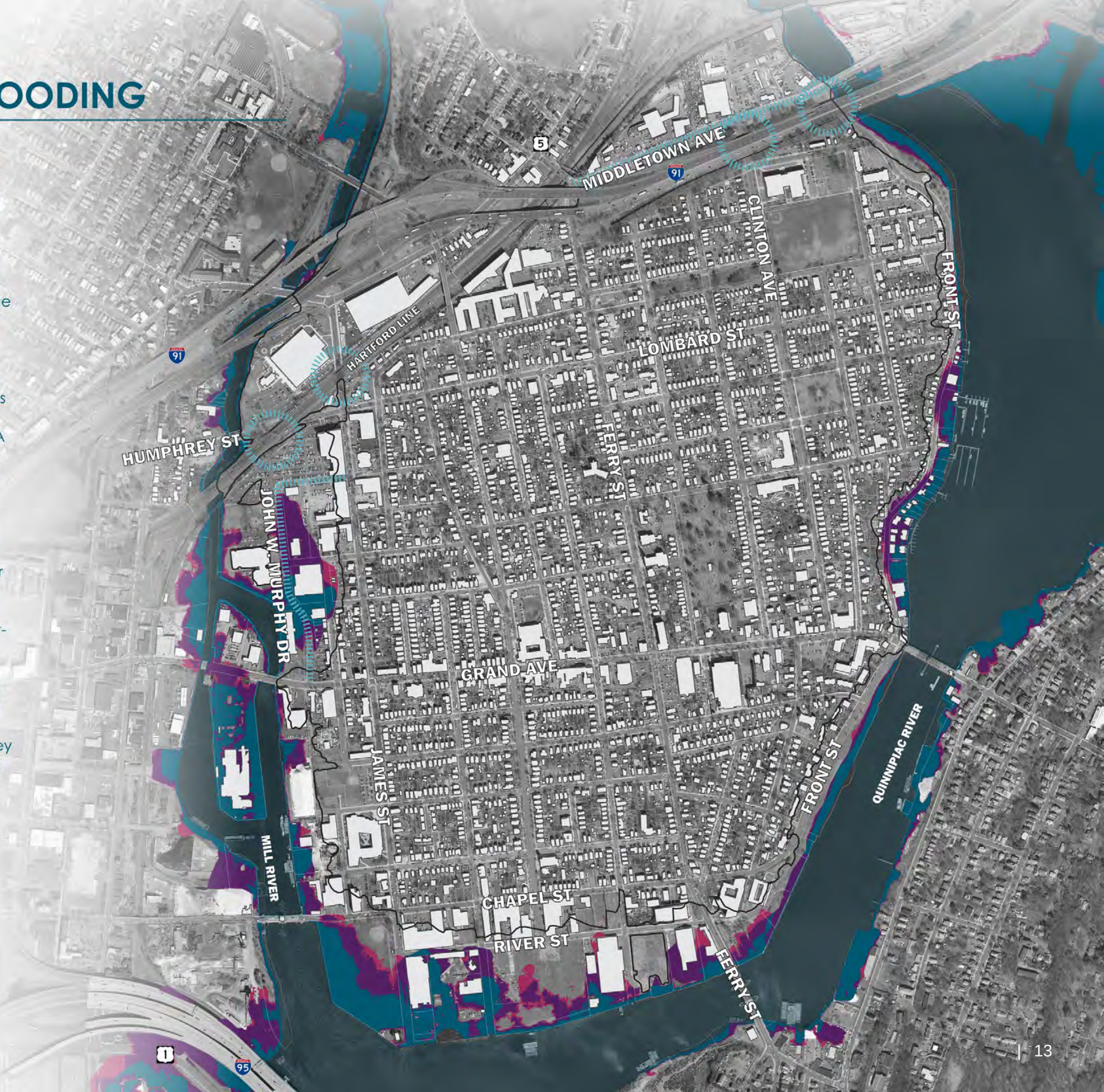
PRESENT DAY FLOODING

The Fair Haven neighborhood is vulnerable to coastal and drainage-related flooding. Coastal flooding is caused by storm surge, high tides, sea level rise, and heavy rainfall as water from the tidally influenced Mill and Quinnipiac Rivers inundates low-lying portions of the Fair Haven shoreline. Flooding and wave action from coastal storms can cause shoreline erosion and related damage to the Fair Haven waterfront, and floodwaters can inundate land along much of the shoreline, resulting in damage to infrastructure and buildings in low-lying areas. Drainage-related flooding occurs when stormwater runoff from heavy precipitation exceeds the capacity of the existing drainage system or combined storm and sanitary sewers due to the imperviousness of the landscape, topography, drainage problems, and tidal influence.

This figure shows the modeled extent of present day coastal flooding in the Fair Haven neighborhood for storm events with various recurrence intervals as described in terms of annual exceedance probability (AEP), which is the probability of a storm event being equaled or exceeded in any given year. A storm event with a 10% AEP is often referred to as the 10-year storm event. Similarly, the 50-year storm event has a 2% AEP and the 100-year storm event has a 1% AEP.

Coastal flooding occurs on the western shore of the Quinnipiac River along Front Street and Quinnipiac River Park, as well as portions of the Fair Haven waterfront and commercial/industrial district along River Street and the lower Mill River from Criscuolo Park north to Grand Avenue and Humphrey Street. Most of Ball Island, situated within the lower Mill River and crossed by Grand Avenue, and the western shore of the lower Mill River are also prone to coastal flooding.

Observed areas of drainage related flooding, as documented by the City of New Haven, are also shown on the figure. Areas of regular drainage-related flooding in Fair Haven during larger storms and even smaller, high-intensity rainfall events include Middletown Avenue, railroad underpasses at Humphrey Street, James Street, Clinton Avenue, and Front Street, and areas along John W. Murphy Drive.



LEGEND

Coastal Flooding

- Present 10-yr Event
- Present 50-yr Event
- Present 100-yr Event

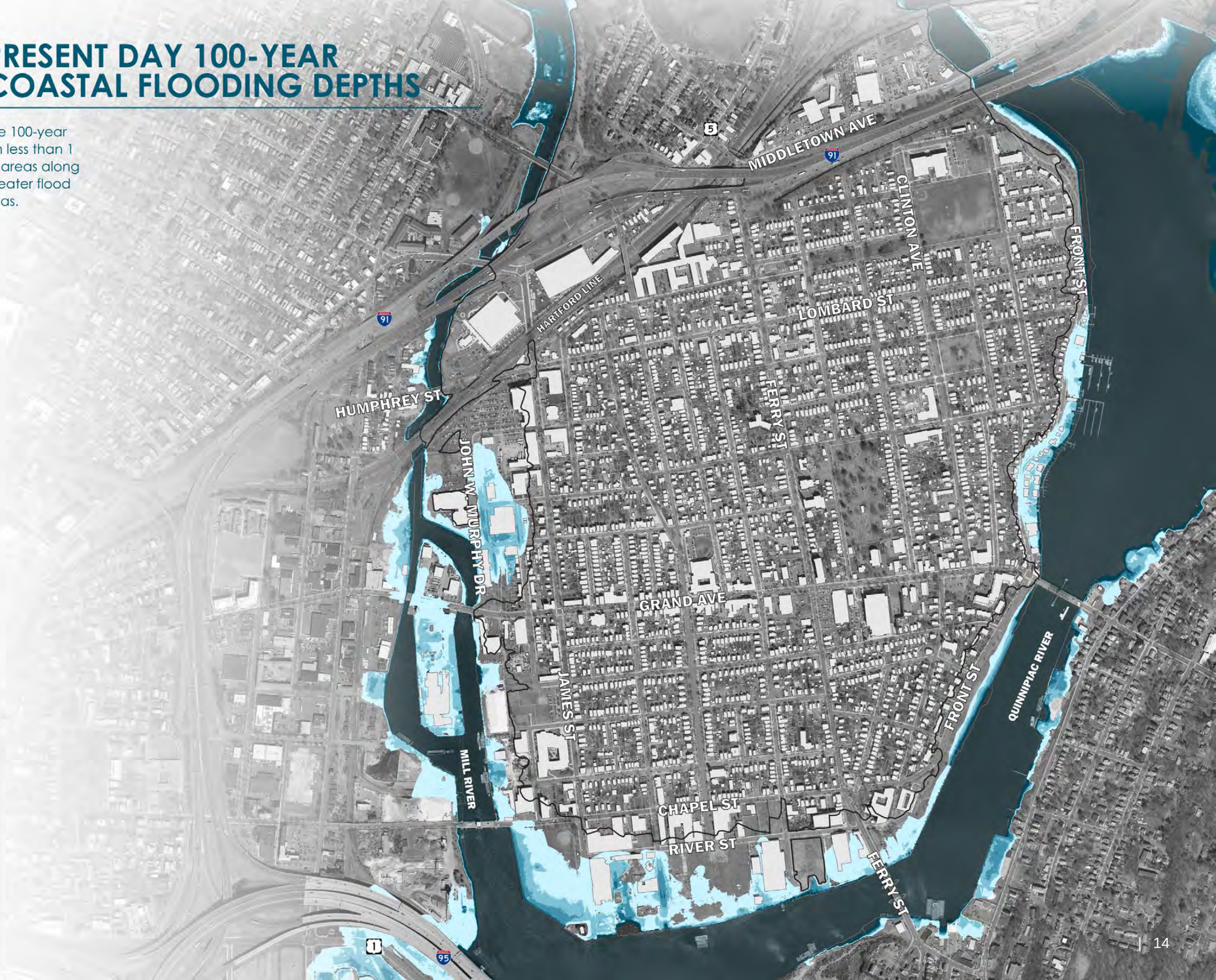
Drainage Related Flooding

- Observed Drainage Flooding
- FEMA Zone AE

RESILIENT FAIR HAVEN

PRESENT DAY 100-YEAR COASTAL FLOODING DEPTHS

Present day coastal flooding depths for the 100-year storm event (1% AEP) generally range from less than 1 foot up to 3 feet for most of the impacted areas along the Fair Haven shoreline. Locations with greater flood depths (3-5 feet) exist in a few isolated areas.



LEGEND

Present Flood Depth

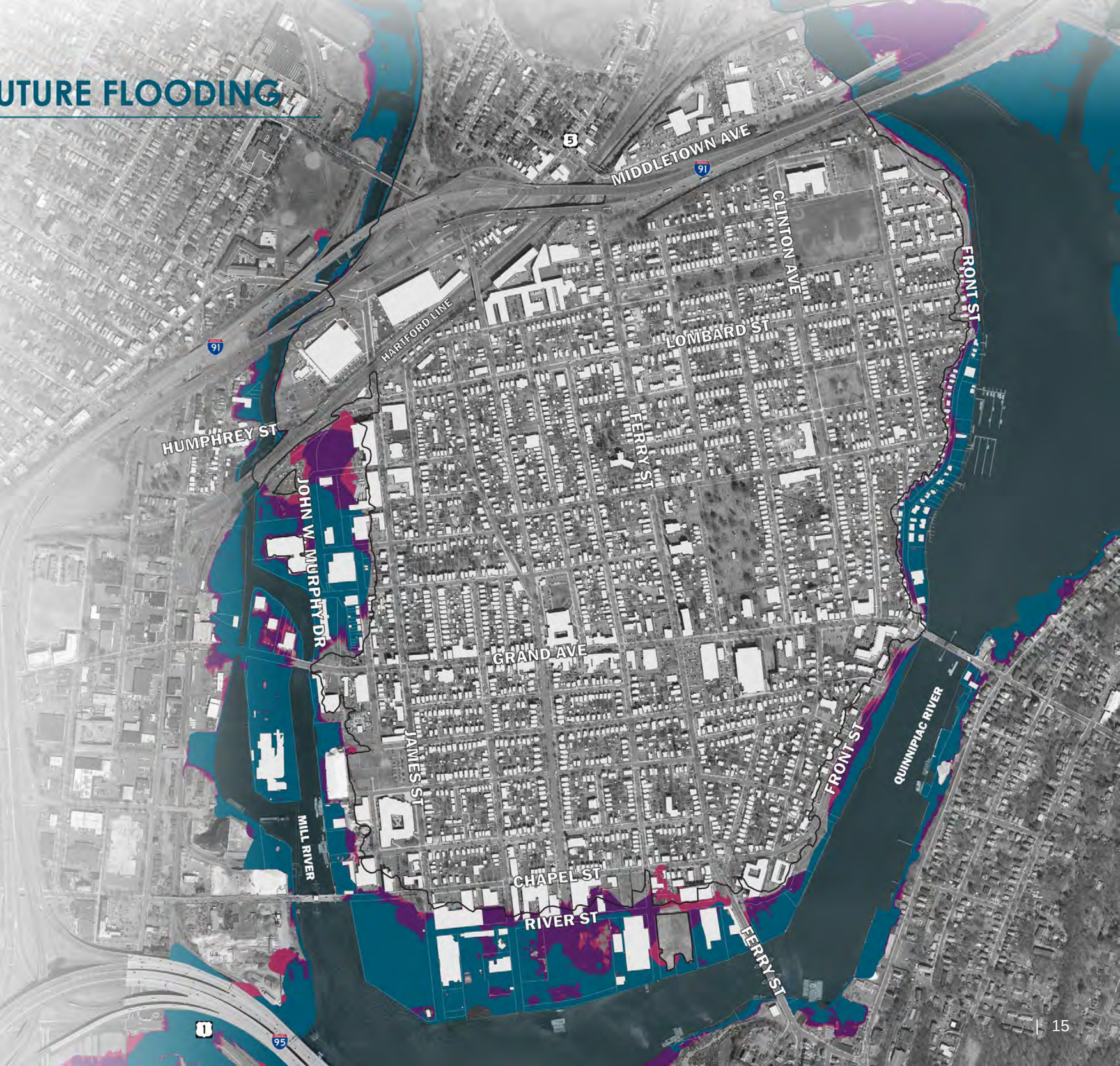
- < 1 ft
- 1 - 2 ft
- 2 - 3 ft
- 3 - 4 ft
- > 4 ft
- FEMA Zone AE

RESILIENT FAIR HAVEN

PROJECTED FUTURE FLOODING

With a warmer and wetter climate, rainfall intensity will increase, and sea levels will rise, exacerbating coastal and inland flooding. CIRCA conducted coastal flood risk modeling to estimate the extent of coastal flooding in Fair Haven under present conditions (see Present Day Flooding figure) and a future climate change scenario. The model predicts maximum floodwater elevation, depth, and extent considering topography, storm surge, waves, tidal action, and projected sea level rise (20 inches by the year 2050). Model predictions were made for the future 10-year, 50-year, and 100-year coastal storm events and verified using data from Superstorm Sandy in 2012. The Present Day Flooding figure and this figure show modeled coastal flood depths for the 100-year storm event (1% AEP) under present and future conditions.

Storm drainage system modeling was not included in the project scope. Therefore, current and future drainage-related flooding depths and extents are unavailable for the Fair Haven neighborhood. Observed present-day drainage related flooding is expected to be exacerbated by projected increases in precipitation intensity and frequency under future climate conditions.



LEGEND

Coastal Flooding

- Projected 10-yr Event (w/ 20" of Sea Level Rise)
- Projected 50-yr Event (w/ 20" of Sea Level Rise)
- Projected 100-yr Event (w/ 20" of Sea Level Rise)
- FEMA Zone AE

RESILIENT FAIR HAVEN

PROJECTED FUTURE 100-YEAR COASTAL FLOODING DEPTHS

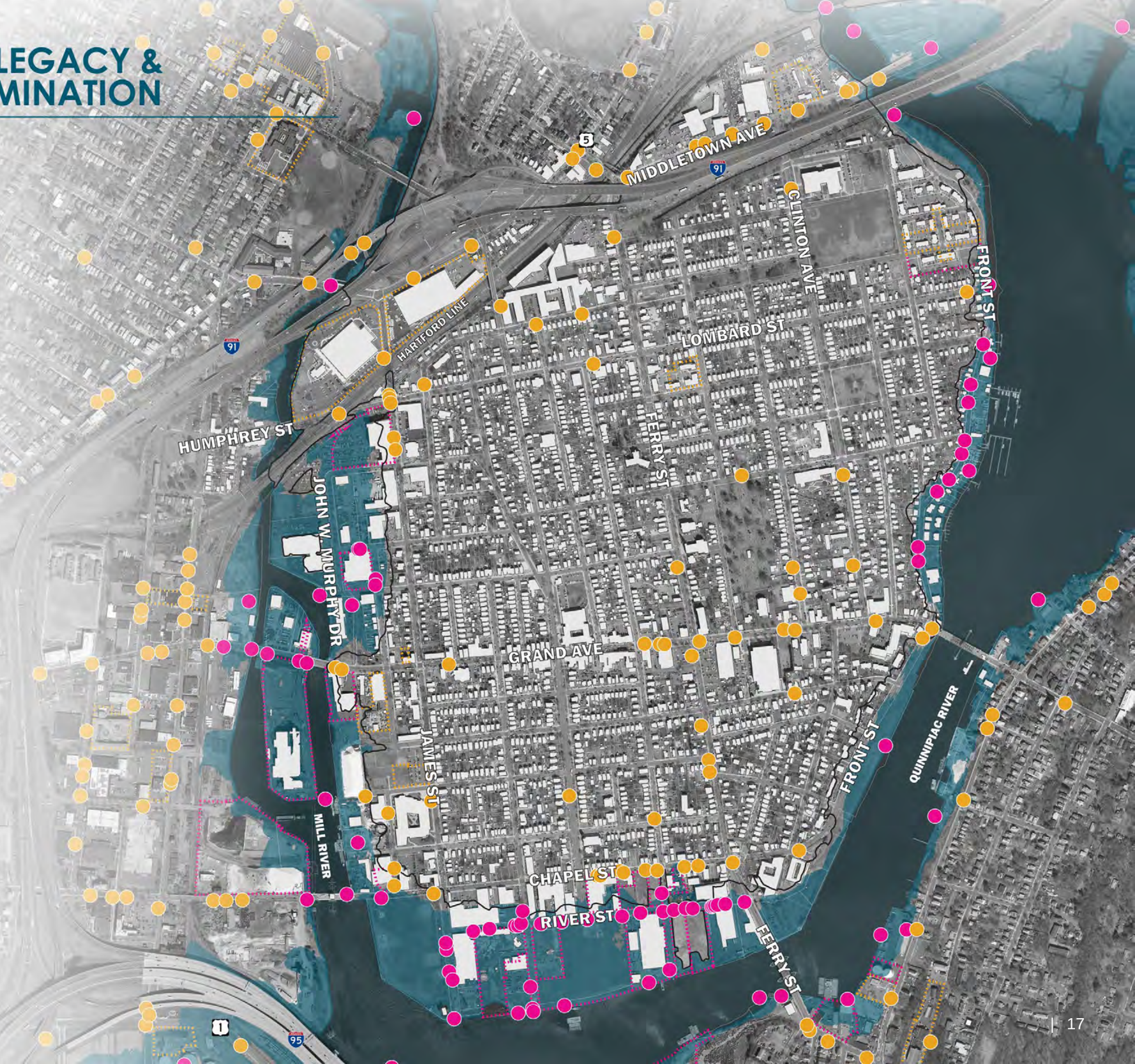
In the projected future 100-year storm event, the extent of flooding along the Fair Haven shoreline is significantly expanded compared to the present day 100-year event, encompassing most of the waterfront parcels and additional portions of critical roadways and transportation corridors linking Fair Haven to other parts of the city. The greatest increases in the extent of coastal flooding and areas with flood depths of 3-5 feet are predicted for the commercial/industrial waterfront south of Chapel Street and along the Mill River.

RESILIENT FAIR HAVEN

INDUSTRIAL LEGACY & SITE CONTAMINATION

The Fair Haven waterfront along the Mill River and south of River Street is characterized by a long history of commercial and industrial uses, including a current mix of active commercial and industrial properties as well as vacant and underutilized land. Many of these floodprone properties are contaminated because of their past industrial use and/or are potential pollutant sources given their current commercial and industrial use. A number of these properties are listed on the CT DEEP Brownfields Inventory, which includes sites that have received state or federal grants or loans for assessment and/or remediation or sites that have been accepted into a formal cleanup program. Approximately 18 brownfield sites along the Fair Haven waterfront are vulnerable to coastal flooding, and another 60 sites potential sources of contaminants during floods given their current industrial/commercial use.

The Mill River District, which includes Fair Haven's western shoreline, and the River Street section of the Fair Haven neighborhood are target areas for redevelopment of large, underutilized sites. Cleanup of legacy contamination and vulnerability of this area to current and future flooding are major obstacles to redevelopment of the Fair Haven waterfront, including providing public access to the river and implementing coastal flood resilience measures.



LEGEND

- Contaminated Site - Flood Impacts
- Contaminated Site
- Potential Contamination Source - Flood Impacts
- Potential Contamination Source
- FEMA Zone AE
- Projected Future Flooding (100-Yr + 20" SLR)

RESILIENT FAIR HAVEN

EXISTING HEAT RISKS

HEAT EXISTING CONDITIONS
Impervious Ground Surface
Impervious Building Surface
Lack of Tree Canopy
Lack of Open Space

GREEN INFRASTRUCTURE MITIGATION + HEAT ADAPTATION SITING CRITERIA
Vacant or Partially Vacant City-Owned Parcels
Other Vacant Parcels
Tree Canopy Percentages
Buffers to Public Transit
Walkability
Buffers to School Parcels
Percent Impervious
Social Vulnerability Ranking
Heat Sensor Data

CRITERIA FOR POTENTIAL COOLING CENTER LOCATIONS
Public Buildings
Churches
Schools
Area Available in Buildings
Building Accessibility
Buffers to Public Transit
Walkability
Social Vulnerability Ranking
Heat Sensor Data

LEGEND

- Open Space
- Impervious Ground Surface
- Impervious Building Surface
- Heat Sensor Locations
- City Approved Cooling Center
- NOAA Tree Cover
- Inventoried Street Tree
- FEMA Zone AE
- Projected Future Flooding (100-Yr + 20" SLR)

WHAT'S AT RISK?

RESILIENT FAIR HAVEN

BUILDINGS IMPACTED BY FUTURE FLOODING

Flooding in the Fair Haven neighborhood can result in physical damages to structures and their contents, human impacts such as residential displacement and injuries, direct business impacts, and the loss of function of public and essential facilities. This figure shows the buildings in the Fair Haven neighborhood that are vulnerable to projected future coastal flooding during the 100-year (1 % AEP) storm event. The impacted buildings are categorized based on use (e.g., residential, commercial, and industrial buildings) and ownership (private ownership versus City of New Haven). The future 100-year storm event, with 20 inches of sea level rise, is expected to impact 52 residential and 83 commercial/industrial buildings, most of which are privately owned in addition to 14 City owned buildings.

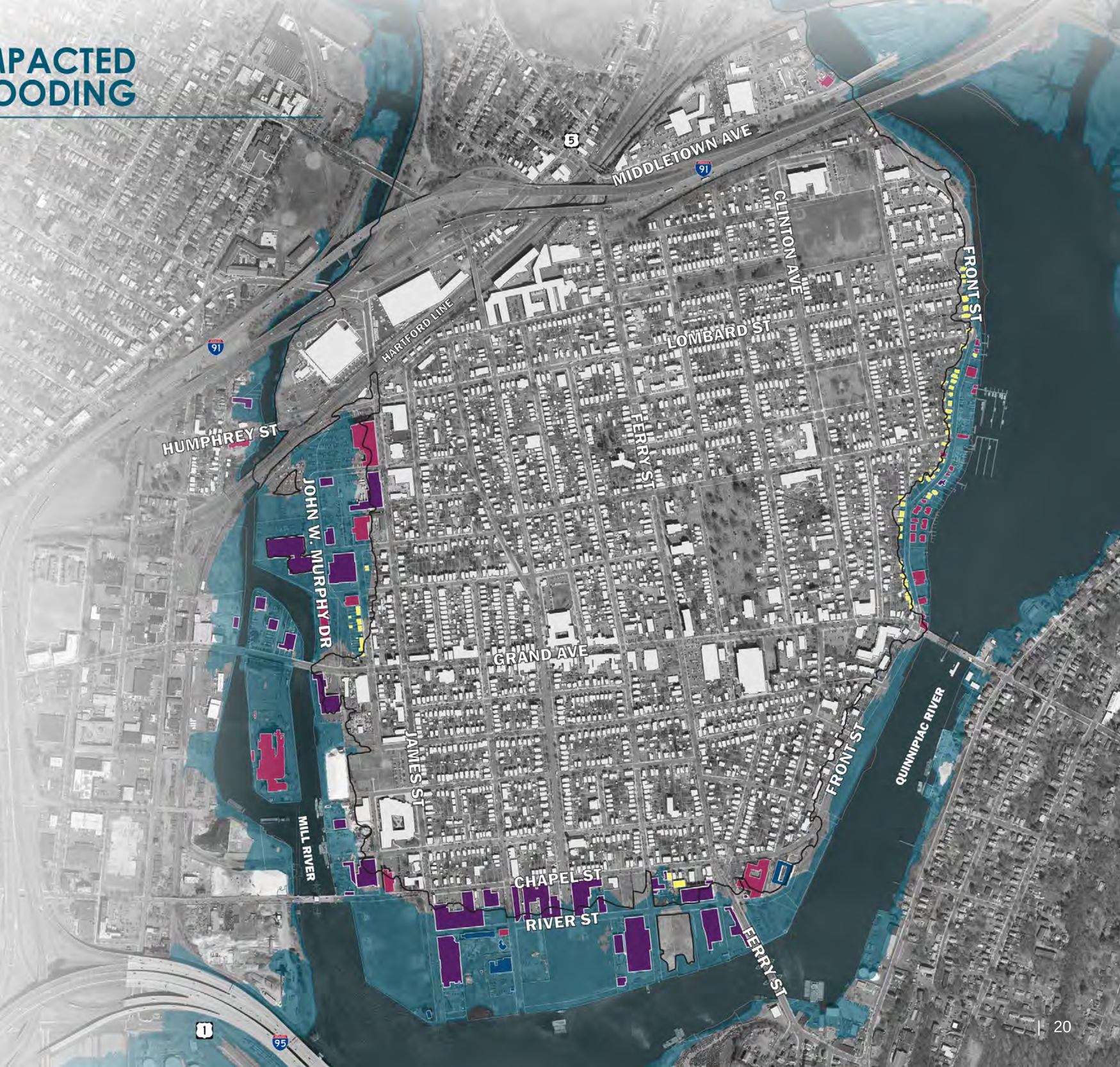
BUILDINGS IMPACTED

34 INDUSTRIAL

14 CITY OWNED

49 COMMERCIAL

52 RESIDENTIAL



LEGEND

Buildings Impacted By Future Flooding

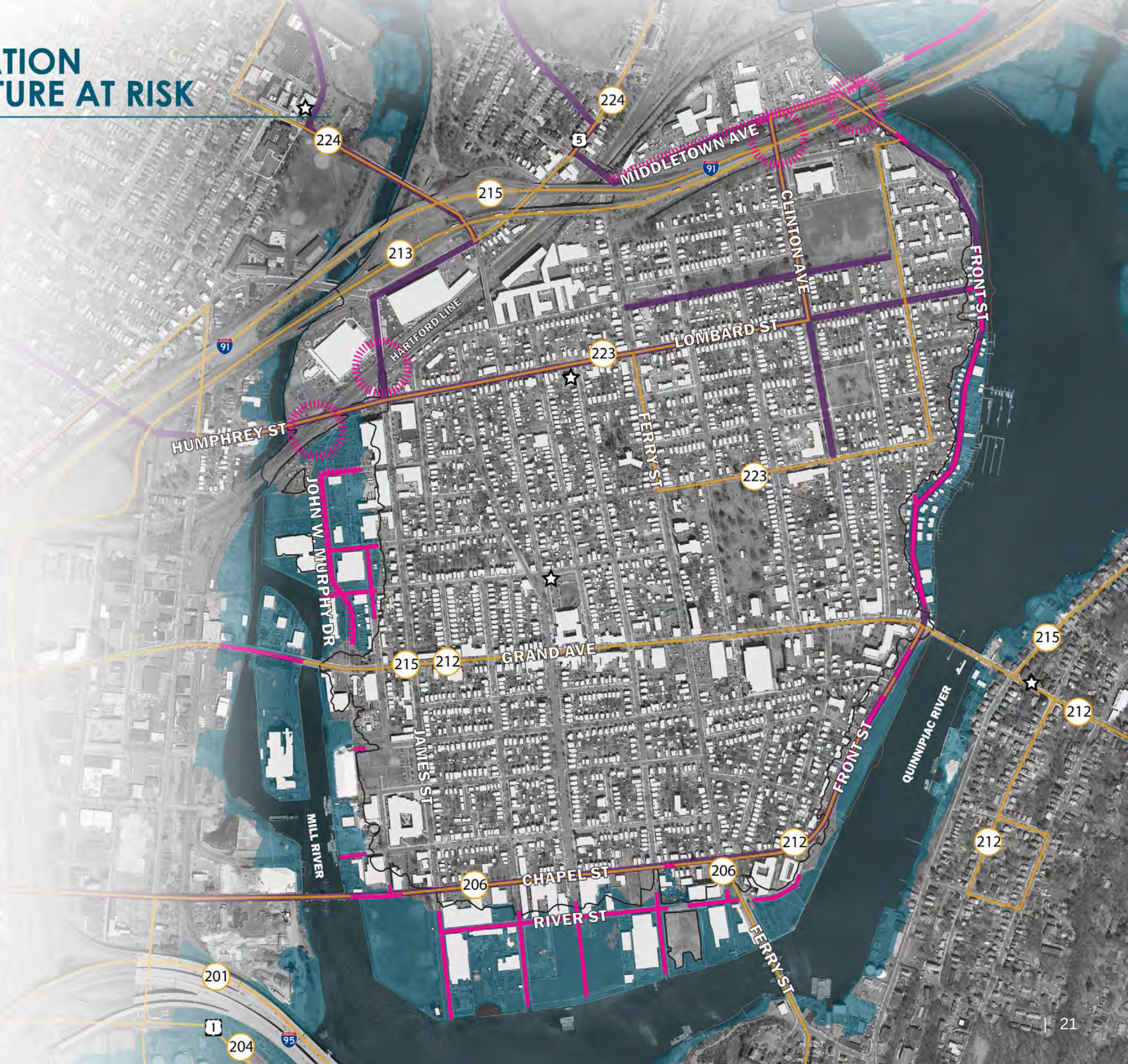
- Industrial Use
- City Owned
- Commercial / Mixed-Use
- Residential Use
- FEMA Zone AE
- Projected Future Flooding (100-Yr + 20" SLR)

RESILIENT FAIR HAVEN

TRANSPORTATION INFRASTRUCTURE AT RISK

Coastal and drainage-related flooding in the Fair Haven neighborhood impacts critical roadways and transportation corridors, including local bus service and bicycle lanes/routes, both within the community and that connect Fair Haven to the rest of the city. As shown on this figure, low-lying segments of several major roads along the Fair Haven shoreline (Front Street, River Street, John W. Murphy Drive) will be impacted by coastal flooding in the projected future 100-year event with 20 inches of sea level rise. The approaches to the bridges/water crossings at East Grand Avenue and Chapel Street are also predicted to experience flooding during this future event, potentially disrupting traffic and emergency services including evacuation routes that serve the Fair Haven neighborhood.

Similarly, roadways that that serve as critical linkages to points north and west pass under the rail line (Humphrey Street and James Street) and Interstate 91 (State Street, Willow Street, Ferry Street, Clinton Avenue, and Front Street). These underpasses are low points that regularly flood during heavy rainfall, restricting vehicle passage and posing a public safety hazard. The railroad underpasses at Humphrey Street and James Street generally experience more significant flooding than the other impacted underpasses that serve Fair Haven. Also notable is the Middletown Avenue underpass near Foxon Boulevard, located just northeast of Fair Haven and a major connection to the Quinnipiac Meadows area, which experiences flooding multiple times per year.



LEGEND

- Projected Future Flooding (100-Yr + 20" SLR)
- Bus Route
- Dedicated Bike Lane
- Streets with Coastal Flood Risk
- Observed Drainage Flooding
- ☆ Emergency Response (Police, Fire Department, EMS)
- FEMA Zone AE

RESILIENT FAIR HAVEN

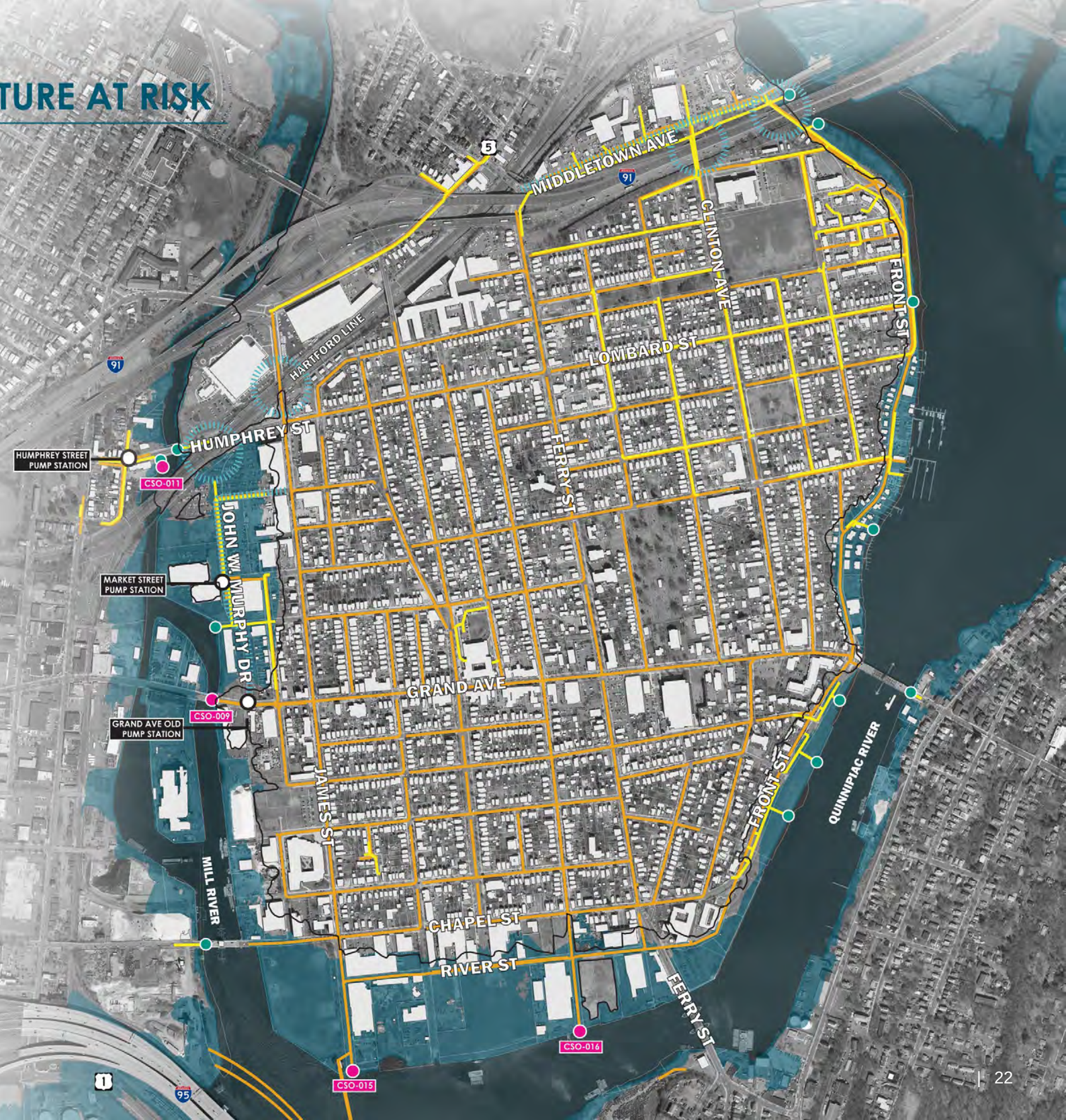
WATER INFRASTRUCTURE AT RISK

Most of the Fair Haven neighborhood is served by combined storm and sanitary sewers operated by the Greater New Haven Water Pollution Control Authority. Combined sewer systems carry a mixture of sanitary sewage and stormwater to a treatment facility via a single pipe. During wet weather, the combined flows can exceed the capacity of the system, resulting in overflow of sanitary sewage and stormwater to surface water bodies (i.e., combined sewer overflows or CSOs). The combined sewer system in the Fair Haven neighborhood includes various collectors, force mains, and the James Street interceptor, pump stations at Grand Avenue and Market Street, and 3 remaining active CSO regulators and outfalls (CSO-009, CSO-015, and CSO-016).

The northeast portion of Fair Haven and areas along the Quinnipiac and Mill Rivers have separate storm drainage and sanitary sewer systems. The storm drainage system collects and conveys stormwater runoff to the Quinnipiac and Mill Rivers via stormwater outfalls. Outdated and undersized storm drainage systems contribute to drainage related flooding of roads and properties in the Fair Haven neighborhood during heavy precipitation events.

Coastal flooding can reduce the conveyance capacity of both combined sewers and storm drainage systems in flood prone areas. CSO and storm drainage outfalls can become inundated during coastal flooding, causing water to back up in combined and separate drainage systems. Sea level rise can also increase groundwater levels in coastal areas, which can exacerbate groundwater infiltration into storm and combined sewer pipes, further reducing system capacity.

The New Haven CSO Long Term Control Plan outlines specific strategies and timeframes for removing or controlling CSO discharges in the Fair Haven neighborhood, including additional sewer separation, installation of CSO storage tanks at several of the remaining CSO outfalls, and the use of green stormwater infrastructure to reduce runoff volumes to the combined sewer system.



LEGEND

- Projected Future Flooding (100-yr + 20" SLR)
- Combined Storm and Sanitary Sewer System
- Separated Storm Drainage System
- Stormwater Outfall
- Active CSO Outfall
- Pump Station
- Observed Drainage Related Flooding
- FEMA Zone AE

RESILIENT FAIR HAVEN

CRITICAL COMMUNITY ASSETS

Fair Haven is home to diverse neighborhoods with a rich cultural heritage (Hispanic) and strong community cohesion. There are a number of critical community assets in Fair Haven that serve the local residents and businesses. In addition to infrastructure such as roads, bridges, and utilities, critical community assets are those that are most essential for a community to thrive (i.e., provide community cohesion, character, and quality of life) including schools, childcare centers, public housing, health care facilities, senior centers, libraries, emergency response services, and other governmental services. These critical community assets are also particularly important given the area's high social vulnerability. This figure shows the critical community assets within and immediately surrounding Fair Haven.

Several national and local historic districts are located within Fair Haven, reflecting the area's maritime and industrial past and emphasis on historic preservation. The Quinnipiac River and Quinnipiac Avenue Historic Districts are located in the southeastern portion of Fair Haven, while the River Street Historic District is located just east of the Mill River. Remaining examples of historically significant architecture and structures exist in these areas, some of which are vulnerable to coastal flooding.

LEGEND

- River Street Historic District
- Quinnipiac River Historic District
- Quinnipiac Avenue Historic District
- Public Open Space
- FEMA Zone AE

Library / Post Office

01 FAIR HAVEN BRANCH LIBRARY
02 UNITED STATES POSTAL SERVICE

Emergency Response

01 NEW HAVEN POLICE DEPARTMENT
02 NEW HAVEN FIRE DEPARTMENT ENGINE 17
03 NEW HAVEN FIRE DEPARTMENT ENGINE 10/TRUCK 3
04 YALE NEW HAVEN HOSPITAL CENTER FOR EMS

Senior Center

01 ATWATER SENIOR CENTER
02 MARY WADE HOME

Healthcare Facility

01 COCENTRA URGENT CARE + DEPT. OF SOCIAL SERVICES CT
02 NEW HAVEN PHARMACY
03 PIONEER REHAB DBA + PHYSICAL THERAPY
04 FAIR HAVEN COMMUNITY HEALTHCARE
05 NEW HAVEN MEDICAL CENTER

School

01 FARNAM NEIGHBORHOOD HOUSE + NURSERY SCHOOL
02 ELM CITY COLLEGE PREPARATORY ELEMENTARY SCHOOL
03 FAMILY ACADEMY
04 LITTLE ESTRELLITAS LICENSED FAMILY HOME DAYCARE
05 JOHN S. MARTINEZ SCHOOL
06 COLD SPRING SCHOOL
07 FAIR HAVEN SCHOOL
08 TITI TANIA'S DAYCARE
09 AUNTIE ROSE CHILDCARE DEVELOPMENT CENTER
10 ALL SAINTS CATHOLIC ACADEMY
11 LITTLE SKY FAMILY CHILDCARE
12 TIA HILDA'S DAYCARE LLC
13 CLINTON AVENUE SCHOOL
14 BOSS BABY LEARNING + DAY CARE

Religious Center

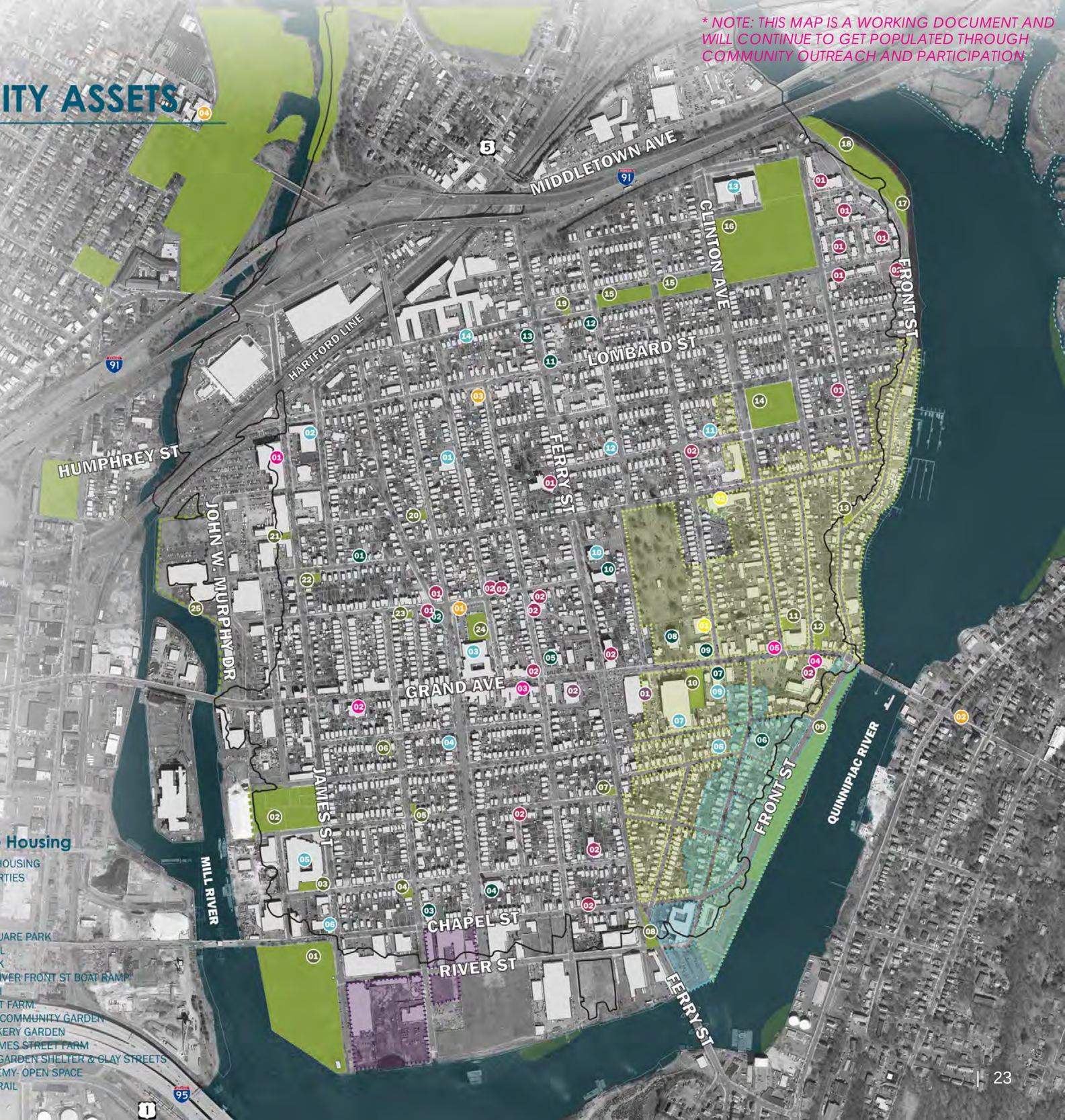
01 STRAIGHTWAY CHURCH
02 GLESIA SALVACION Y VIDA ETERNA
03 IGLESIA CRISTIANA ESTRELLA RESPLANDECIENTE DE JACOB
04 APOSTLE IMMIGRANT SERVICES
05 THE REDEEMED CHRISTIAN CHURCH OF GOD
06 IGLESIA DE DIOS PENTECOSTAL MI
07 IGLESIA BAUTISTA EL CALVARIO
08 CHURCH OF GOD OF PROPHECY
09 INSPIRATIONAL EVANGELISTIC
10 OUR LADY OF GUADALUPE PARISH
11 IGLESIA CRISTIANA DIOS DE PACTOS
12 IGLESIA CRISTIANA BETANIA AD
13 IGLESIA DE DIOS LA NUEVA JERUSALEN INC

Affordable Housing

01 HUD PUBLIC HOUSING
02 NHPD PROPERTIES

Public Open Space
(Park, Urban Farm, Community Garden)

01 CRISCUOLO PARK
02 MILL RIVER TRAIL- OPEN SPACE
03 JOHN S. MARTINEZ SCHOOL- OPEN SPACE
04 ESMERALDA PARK
05 WOLCOTT & LLOYD COMMUNITY GREENSPACE
06 WOOLSEY ST COMMUNITY GARDEN
07 WOLCOTT & FERRY STREET FARM
08 FERRY STREET TRIANGLE
09 QUINNIPIAC RIVER PARK
10 FAIR HAVEN SCHOOL- OPEN SPACE
11 CLINTON AVE- OPEN SPACE
12 GRAND ACRES COMMUNITY GARDEN
13 LEWIS STREET PARK
14 CHATHAM SQUARE PARK
15 ENGLISH MALL
16 CLINTON PARK
17 QUINNIPIAC RIVER FRONT ST BOAT RAMP
18 DOVER BEACH
19 FERRY STREET FARM
20 STALLWORTH COMMUNITY GARDEN
21 CHABASO BAKERY GARDEN
22 MARKET & JAMES STREET FARM
23 COMMUNITY GARDEN SHELTER & CLAY STREETS
24 FAMILY ACADEMY- OPEN SPACE
25 MILL RIVER TRAIL



** NOTE: THIS MAP IS A WORKING DOCUMENT AND WILL CONTINUE TO GET POPULATED THROUGH COMMUNITY OUTREACH AND PARTICIPATION.*