Resilient South Norwalk

Public Workshop #1
January 12, 2023
Spanish interpretation is available during this meeting. In your meeting controls on the toolbar at the bottom of the screen, click the Interpretation icon (the small globe) and click the language that you would like to hear.
Resilient South Norwalk

Public Workshop #1
January 12, 2023
PROJECT TEAM

CITY OF NORWALK

- Steven Kleppin, Director, Planning & Zoning Department
- Michelle Andrzejewski, Senior Planner, Planning & Zoning Department
- Alexis Cherichetti, Assistant Director & Senior Environmental Officer, Planning & Zoning Department
- Louise Washer, Mayor’s Water Quality Committee Member
- Lisa Shanahan, Common Council Member & Chair of Ad Hoc Sustainability and Resilience Committee
- Nicholas Kantor, Planning and Zoning Commission Member
- Katherine Knight-Sellschop, Conservation Commission Member
- Alan Huth, CEO & General Manager of SNEW
- Brian Bidolli, Executive Director of Norwalk Redevelopment Agency
- Michele Deluca, Deputy Director of Emergency Management (city staff)
- Robert Stowers, Director of Recreation and Parks (city staff)
- Vanessa Valadares, Chief of Operation & Public Works/Principal Engineer (city staff)
- Laoise King, Chief of Staff (city staff)
- Jessica Vonashek, Chief of Community and Economic Development (city staff)
CIRCA
- John Truscinski, CFM, Director of Resilience Planning
- David Murphy, PE, CFM, Director of Resilience Engineering
- Yaprak Onat, Assistant Director of Research

AECOM
- Lorayne Black, RLA, Project Manager
- Geoffrey Morrison-Logan, Lead Urban Planner and Community Outreach
- Edwina Lam, P.E., Lead Stormwater/Green Infrastructure Engineer
- Megan Gibbons, EIT, Civil Engineer
- Ellie Peterson, Landscape Designer
AGENDA

- Project Overview
- Heat Risk
  - Community Input + Discussion
- Flood Risk
- North Study Zone
  - Community Input + Discussion
- Central Study Zone
  - Community Input + Discussion
- South Study Zone
  - Community Input + Discussion
- Next Steps
PROJECT OVERVIEW
Phase I
Resilient Connecticut Planning Framework
January 2020

Phase II
Resilient Connecticut Vulnerability Assessment Report
Fall 2021

Phase III
RESILIENT SOUTH NORWALK
To be Completed May 2023
PHASE III FOCUS

- Heat Vulnerability
- Flood Vulnerability
- Social Vulnerability

Water Street December 12, 2022

Norwalk ‘Summer Safety’ Bottle

Soundview Landing
GOALS

Develop Innovative Ideas and Strategies to Lessen Impacts of Climate Change.

Focus on Heat and Flood Impacts within South Norwalk Study Area

Determine Stakeholder and Community Member Priorities
What are the ways Flooding and Extreme Heat are impacting your community?
HEAT RISK
POTENTIAL EXTREME HEAT SOURCES:

1) Excess Pavement and Dark Roof/Pavement Colors
2) Lack of Urban Tree Canopy
3) High Surface Land Temperature + Lack of Air Flow

Prediction for 2050 in Connecticut:
- Average temperature expected to rise 5 degrees
- Summer Days (annual number of days with daily max. temperature above 77 degrees) to rise from 81 to 118
HEAT VULNERABILITY:

Land Surface Temperature Relative to Regional Mean

-20 °C : (-36.0 °F)
-16 °C : (-28.8 °F)
-8 °C : (-14.4 °F)
-4 °C : (-7.2 °F)
-2 °C : (-3.6 °F)
0 °C : (0.0 °F)
+2 °C : (3.6 °F)
+4 °C : (7.2 °F)
+8 °C : (14.4 °F)
+16 °C : (28.8 °F)
+20 °C : (36.0 °F)

Range of Temperature Increase in South Norwalk

City Approved Cooling Centers in South Norwalk

Data gathered from National Landsat-8 Thermal Infrared Sensor Data, 2015
HEAT VULNERABILITY:

Source: The Impacts of Climate Change on Human Health, A Scientific Assessment (US, Global Changes Research Project)

Norwalkct.org
HEAT VULNERABILITY:

Source: The Impacts of Climate Change on Human Health, A Scientific Assessment (US, Global Changes Research Project)
**HEAT VULNERABILITY:**

**A** Upper Water Street: Multi-family residential vs. marine/industrial conditions

- **LACK OF SHADE STRUCTURES**
- **REDUCED TREE CANOPY**
- **LARGE BUILDINGS ABSORB HEAT & BLOCK OUT WIND**
- **DARKER SURFACE COLORS ABSORB HEAT**

**TEMPERATURE OVER AVERAGE REGIONAL TEMPERATURES DURING A HEAT WAVE EVENT**

Data sourced from Landsat Land Surface Temperature Database, 2015
HEAT VULNERABILITY:

Upper Woodward Ave: Single family residential neighborhood

INCREASED ATMOSPHERIC POLLUTION VIA HVAC SYSTEMS & VEHICLES

+7.2 °F
+4 °C

REDUCED TREE CANOPY

TEMPERATURE OVER AVERAGE REGIONAL TEMPERATURES DURING A HEAT WAVE EVENT

Data sourced from Landsat Land Surface Temperature Database, 2015
HEAT VULNERABILITY:

© Longshore Drive: Roadway & Wetlands

- HEAVY VEHICULAR TRAFFIC TRAPS SOLAR RADIATION
- INCREASED GREEN SPACE & TREE CANOPY
- WATER WARMS AT A SLOWER RATE THAN LAND

TEMPERATURE OVER AVERAGE REGIONAL TEMPERATURES DURING A HEAT WAVE EVENT

Data sourced from Landsat Land Surface Temperature Database, 2015
HEAT VULNERABILITY | Discussion

A Upper Water Street: Multi-family residential vs. marine/industrial conditions

- Reduced tree canopy
- Larger buildings absorb heat & block out wind
- Darker surface colors absorb heat
- Increased atmospheric pollution via HVAC systems & vehicles

B Upper Woodward Ave: Single family residential neighborhood

- Reduced tree canopy
- +7.2 °F
- +4 °C

C Longshore Drive: Roadway & Wetlands

- Increase green space & tree canopy
- +3.6 °F
- +2 °C
- Water warms at a slower rate than land

Data sourced from Landsat Land Surface Temperature Database, 2015

TEMPERATURE OVER AVERAGE REGIONAL TEMPERATURES DURING A HEAT WAVE EVENT
HEAT VULNERABILITY:

Land Surface Temperature
Relative to Regional Mean

Δ -20 °C : (-36.0 °F)
Δ -16 °C : (-28.8 °F)
Δ -8 °C : (-14.4 °F)
Δ -4 °C : (-7.2 °F)
Δ -2 °C : (-3.6 °F)
Δ < 0 °C : (< 0.0 °F)
Δ > 0 °C : (> 0.0 °F)
Δ 2 °C : (3.6 °F)
Δ 4 °C : (7.2 °F)
Δ 8 °C : (14.4 °F)
Δ 16 °C : (28.8 °F)
Δ 20 °C : (36.0 °F)

Range of Temperature Increase in South Norwalk

City Approved Cooling Centers in South Norwalk

Data gathered from National Landsat-8 Thermal Infrared Sensor Data, 2015
POTENTIAL FLOODING SOURCES:

1) Inland Overflow from Tidal Waters + Storm Surge
2) Extreme Rainfall
3) Stormwater Infrastructure

Affected by: Sea Level Rise > Frequency of Storm Events > Severity of Storm Event

Prediction for 2050 in Connecticut:
- Average precipitation expected to increase about 8%, or 4 inches per year
- Sea level will rise 20 inches
100 Year Flood Limits…

- 1% statistical likelihood chance of annual flood

- Each storm is an individual probability event of 1 out of 100

What does that mean for study area?

- Study incorporated 100-year model limit as a snapshot
- Modeling of flood limits does not take storm drainage issues into consideration
Storm Surge is the abnormal rise in seawater level during a storm, above normal tide, caused by storm’s winds pushing water onshore.

- Air patterns in hurricanes travel counterclockwise

- Water gets pushed into the Long Island Sound where it gets trapped and piles up to move onto normally dry ground
- Shape of the coastline affects storm surge
- Inlets in the coastline create pockets to trap water

**Study Assumptions:**
- 100-Year Storm
- 20" Sea Level Rise
- Future 2050 Conditions
- Shape of the coastline affects storm surge
- Inlets in the coastline create pockets to trap water

**Study Assumptions:**
- 100-Year Storm
- 20" Sea Level Rise
- Future 2050 Conditions
STORM SURGE | South Study Zone

- Shape of the coastline affects storm surge
- Inlets in the coastline create pockets to trap water

Study Assumptions:
- 100-Year Storm
- 20" Sea Level Rise
- Future 2050 Conditions

Storm Surge Direction

Flooding Depth, Ft

Harborview

Harbor Shores
Pipe Capacity: The volume of water that can flow freely through a pipe
Pipe diameter and volume of water entering the system affect capacity.
- Pipe diameter and volume of water entering the system affect capacity.
Pipe diameter and volume of water entering the system affect capacity.
100 YEAR FLOOD LIMITS

STUDY AREA

- 100 Year Flood Limits
- 20” Sea Level Rise
EXISTING AND FUTURE FLOOD CONDITIONS

- Selected Seven (7) Representative Examples
- Examples have Diverse Land Use Conditions within each Study Zone
- Reviewed Existing and Future Flood Conditions

100-Year Storm, 20" Sea Level Rise, Future 2050 Conditions
EXISTING AND FUTURE CONDITIONS: North Study Zone

Existing Conditions:

- Current 100-Year Storm
- No additional sea level rise
EXISTING AND FUTURE CONDITIONS: North Study Zone

**Future Conditions:**

- 100-Year Storm in 2050
- 20” Sea Level Rise

Limit of 20” Sea Level Rise Above Mean High Water (MHW)

100-Year Storm, 20” Sea Level Rise, Future 2050 Conditions
EXISTING AND FUTURE CONDITIONS: North Study Zone

Future Conditions:

- 100-Year Storm in 2050
- 20” Sea Level Rise

1. Northern End of Water Street: Multi-family Residential and Marine/Industrial Land Use
Future Conditions:

- 100-Year Storm in 2050
- 20” Sea Level Rise

1. **Northern End of Water Street:** Multi-family Residential and Marine/Industrial Land Use

2. **Southern End of Water Street:** Private businesses vs. municipal/public lots

100-Year Storm, 20” Sea Level Rise, Future 2050 Conditions
STUDY 1 | Multi-Family Residential and Marine/Industrial Waterfront on Water Street

Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022
STUDY 1 | Multi-Family Residential and Marine/Industrial Waterfront on Water Street

TARGET ZONE

APPROXIMATE FLOOD LEVELS
STUDY 2 | Office/ Commercial and Waterfront Municipal on Water Street

Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022
STUDY 2 | Office/ Commercial and Waterfront Municipal on Water Street

NORTH ZONE

APPROXIMATE FLOOD LEVELS
Discussion | Northern Study Zone

1. **NORTHERN END OF WATER STREET**

2. **SOUTHERN END OF WATER STREET**
EXISTING AND FUTURE CONDITIONS: North Study Zone

Future Conditions:

- 100-Year Storm in 2050
- 20" Sea Level Rise

1. Northern End of Water Street: Multi-family Residential and Marine/Industrial Land Use

2. Southern End of Water Street: Private businesses vs. municipal/public lots

100-Year Storm, 20" Sea Level Rise, Future 2050 Conditions
CENTRAL ZONE
EXISTING AND FUTURE CONDITIONS: Central Study Zone

Existing Conditions:

- Current 100-Year Storm
- No additional sea level rise
Future Conditions:

- 100-Year Storm in 2050
- 20” Sea Level Rise

Limit of 20” Sea Level Rise Above Mean High Water (MHW)
Future Conditions:

- 100-Year Storm in 2050
- 20" Sea Level Rise

Northern Woodward Ave: Single family residential neighborhood
EXISTING AND FUTURE CONDITIONS: Central Study Zone

Future Conditions:

- 100-Year Storm in 2050
- 20” Sea Level Rise

Northern Woodward Ave:
Single family residential neighborhood

Meadow Street:
Industrial Zone

100-Year Storm, 20” Sea Level Rise, Future 2050 Conditions
Future Conditions:

- 100-Year Storm in 2050
- 20" Sea Level Rise

Northern Woodward Ave: Single family residential neighborhood

Meadow Street: Industrial Zone

Southern Woodward Ave: Industrial & Single-Family Residential

100-Year Storm, 20" Sea Level Rise, Future 2050 Conditions
STUDY 3 | Single-Family Residential Neighborhood on Woodward Avenue

Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022
STUDY 3 | Single-Family Residential Neighborhood on Woodward Avenue

APPOTXIMATE FLOOD LEVELS

TARGET ZONE

Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022
STUDY 4 | Industrial Zone on Meadow Street

NO FLOODING

100 YEAR STORM, 2050

Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022
STUDY 4 | Industrial Zone on Meadow Street

APPROXIMATE FLOOD LEVELS
STUDY 5 | Industrial Zone and Single Family Residential on Woodward Avenue

Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022
DISCUSSION | Central Study Zone

3 RESIDENTIAL NEIGHBORHOOD ON WOODWARD AVE

4 INDUSTRIAL AREA ON MEADOW ST

5 INDUSTRIAL AREA ON WOODWARD AVE
Future Conditions:

- 100-Year Storm in 2050
- 20” Sea Level Rise

**Northern Woodward Ave:** Single family residential neighborhood

**Meadow Street:** Industrial Zone

**Southern Woodward Ave:** Industrial & Single-Family Residential

100-Year Storm, 20” Sea Level Rise, Future 2050 Conditions
SOUTH ZONE
EXISTING AND FUTURE CONDITIONS: South Study Zone

Existing Conditions:

- 100-Year Storm currently
- No additional sea level rise
EXISTING AND FUTURE CONDITIONS: South Study Zone

Future Conditions:

- 100-Year Storm in 2050
- 20” Sea Level Rise

Limit of 20” Sea Level Rise Above Mean High Water (MHW)
Future Conditions:

- 100-Year Storm in 2050
- 20” Sea Level Rise

**Lower Woodward Ave:**
Open space recreational area & single-family residential
Future Conditions:

- 100-Year Storm in 2050
- 20” Sea Level Rise

6 Lower Woodward Ave: Open space recreational area & single-family residential

7 Longshore Drive: Protected open space, wetlands, & Harborview evacuation route
Study 6 | Open Space Recreational and Single-Family Residential on Woodward Avenue

Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022
Study 6 | Open Space Recreational and Single-Family Residential on Woodward Avenue

TARGET ZONE

APPROXIMATE FLOOD LEVELS

North
Study 7 | Open Space and Wetlands on Longshore Drive

Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022
DISCUSSION | South Study Zone

6. WOODWARD AVENUE PARK

7. WETLANDS ON LONGSHORE DR
EXISTING AND FUTURE CONDITIONS: South Study Zone

Future Conditions:

- 100-Year Storm in 2050
- 20” Sea Level Rise

6 Lower Woodward Ave:
Open space recreational area & single-family residential

7 Longshore Drive:
Protected open space, wetlands, & Harborview evacuation route
NEXT STEPS
Evaluate next steps incorporating **PERSISTS** decision support criteria:

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<th>Permittable</th>
<th>Can be authorized through necessary federal, state, and local permits</th>
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<td>Equitable</td>
<td>Ensures that benefits are equitable among populations</td>
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<td>Realistic</td>
<td>Can be realistically engineered and is plausibly fundable</td>
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<td>Safe</td>
<td>Reduces risks to people and infrastructure</td>
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<td>Innovative</td>
<td>Process has considered innovative options</td>
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<td>Scientific</td>
<td>Apply and improve on the best available science</td>
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<td>Transferrable</td>
<td>Can serve as model for other communities</td>
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<td>S</td>
<td>Sustainable</td>
<td>Socially, economically, and ecologically sustainable and supported by the public and leadership</td>
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### Resilient South Norwalk Revised 1.10.23

**Assume NTP October 1, 2022**

#### WORK SCHEDULE

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<td>3. Current and Future Conditions Analysis</td>
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<td>Review Previous Plans</td>
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THANK YOU!