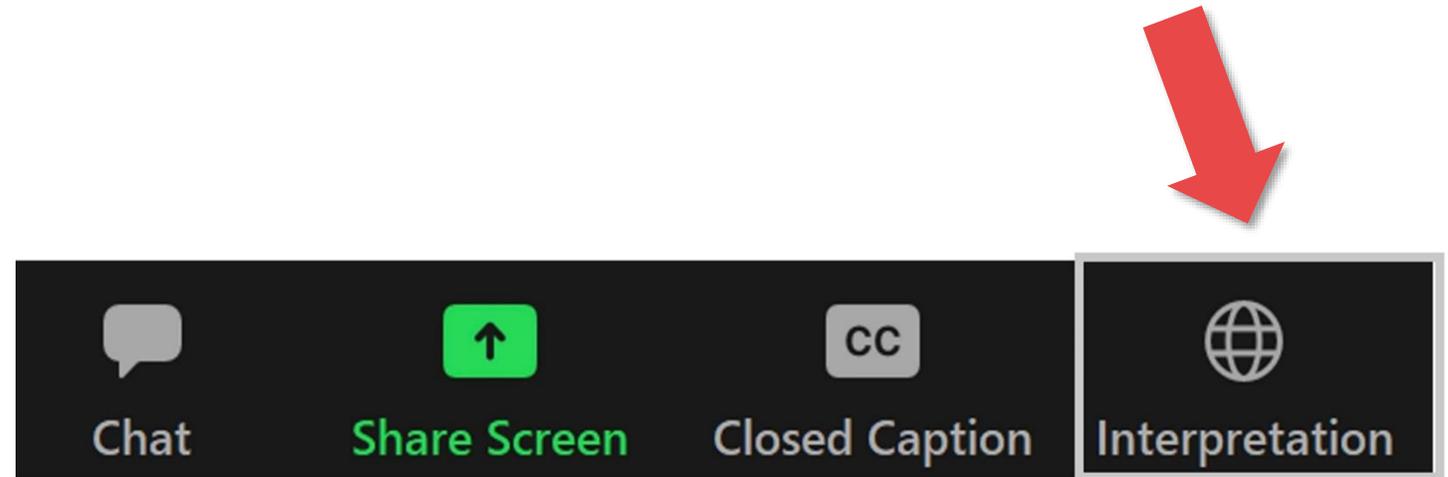


Resilient South Norwalk

*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



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

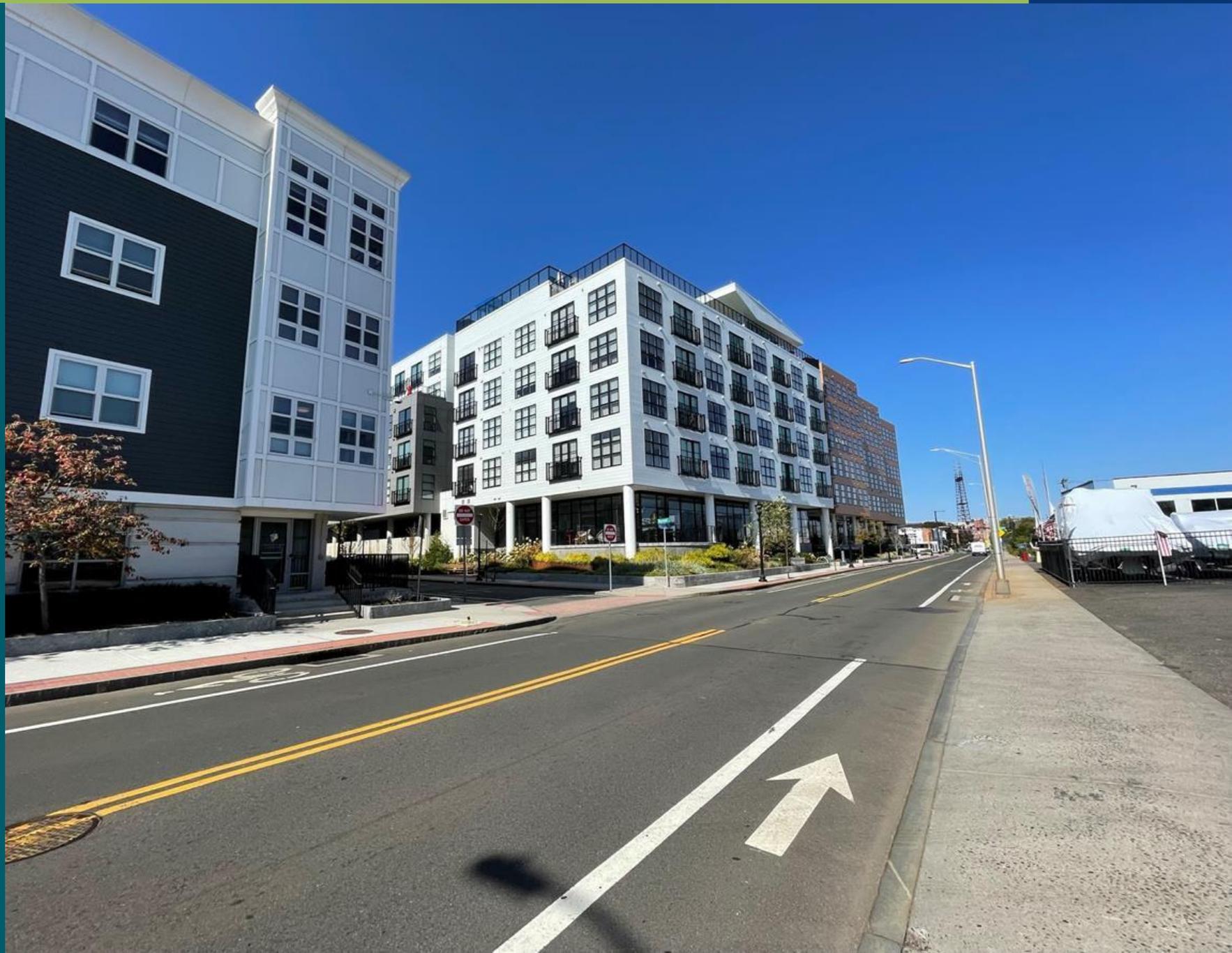
- John Truscinski, CFM, Director of Resilience Planning
- David Murphy, PE, CFM, Director of Resilience Engineering
- Yaprak Onat, Assistant Director of Research

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

Resilient Connecticut Phase II Regional Adaptation/Resilience Opportunity Areas

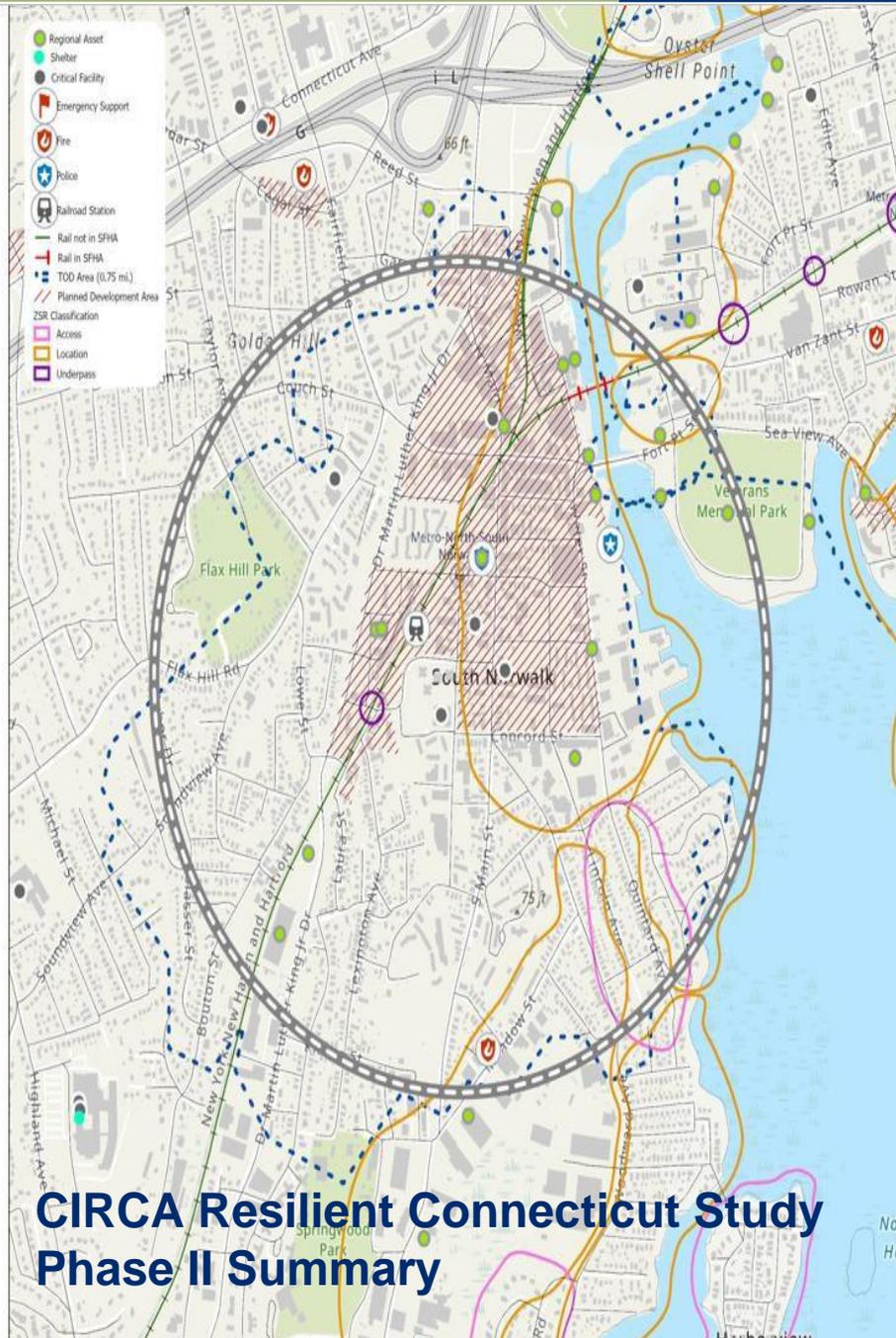
Name: South Norwalk
Location: Norwalk

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

The South Norwalk area contains a major railroad station, numerous critical facilities and historic resources, regional tourist attractions, flood risk associated with the Norwalk River estuary and Norwalk Harbor, and key connections to areas to the south that can be isolated by coastal flooding. The City is evaluating challenges and opportunities associated with commercial and water-dependent properties along Water Street, all in the coastal flood zone.

All of the SoNo area is high heat with dense commercial/industrial coverage along the waterfront with high impervious surfaces, and dense but green residential west of the railroad. This area is however high for social sensitivity contributing to the vulnerability.

- | | |
|-------------------------|----------------|
| Fire station 5 | Coastal access |
| Police dept. | Substation |
| Marine patrol | Commerce |
| Two schools | Shipping |
| Medical care facilities | |



**CIRCA Resilient Connecticut Study
Phase II Summary**

- Heat Vulnerability
- Flood Vulnerability
- Social Vulnerability



Norwalk 'Summer Safety' Bottle



Water Street December 12, 2022



Soundview Landing

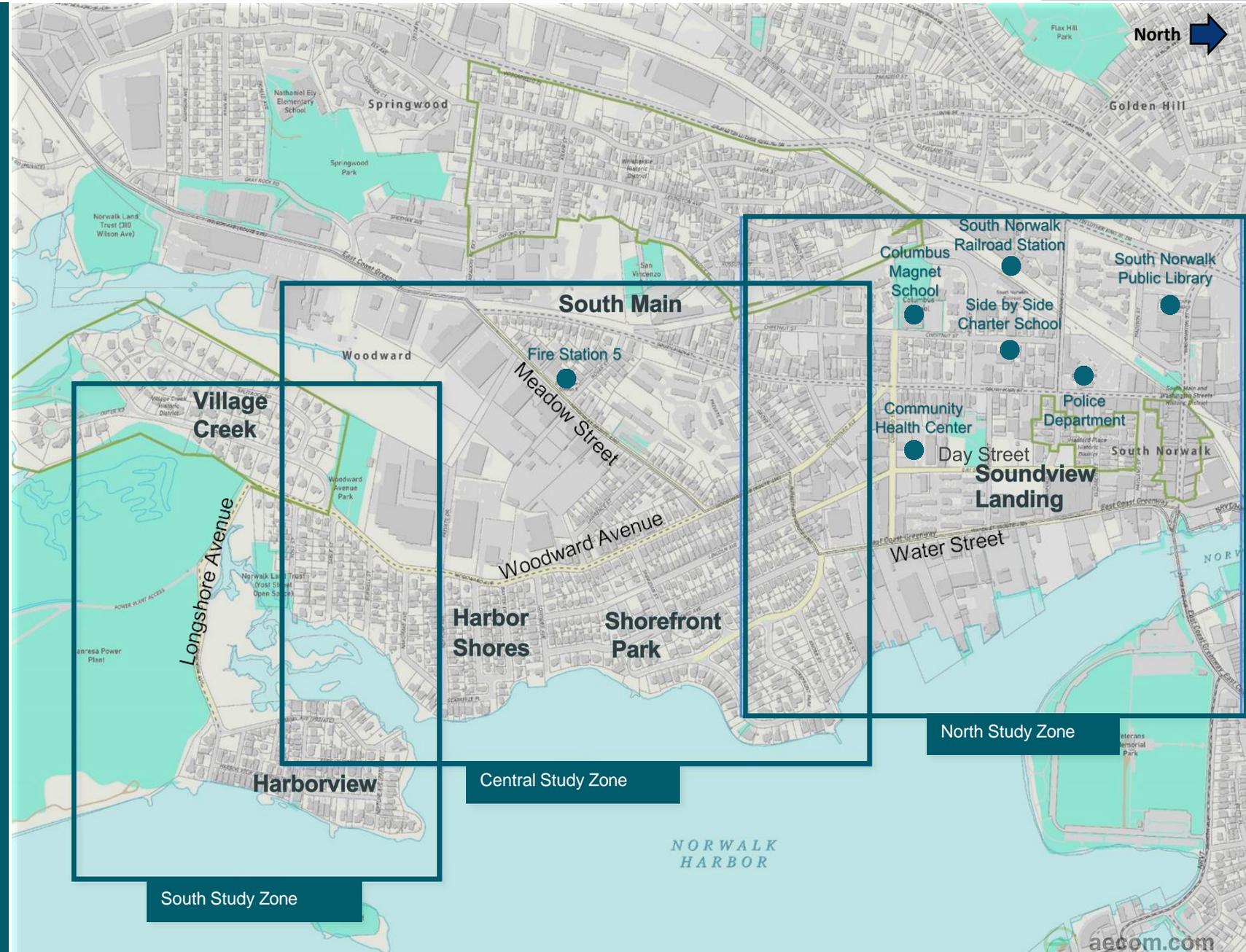
PROJECT GOALS

GOALS

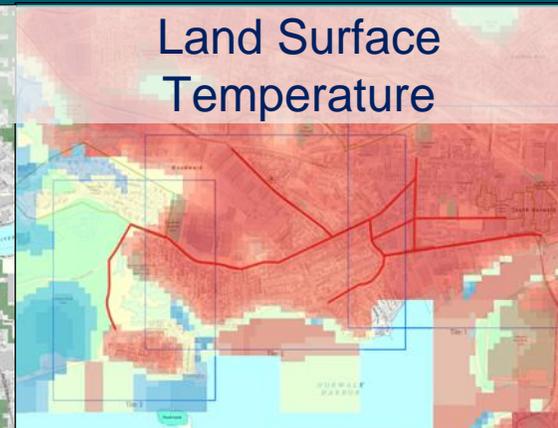
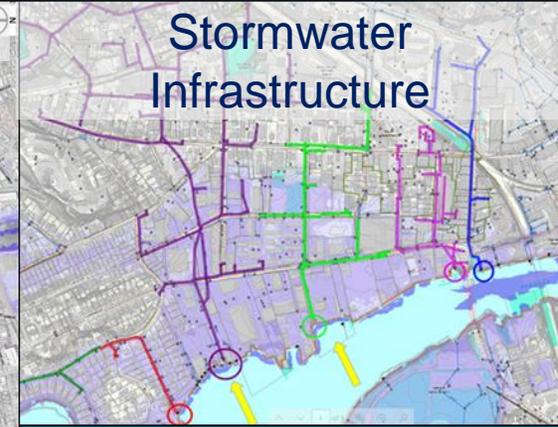
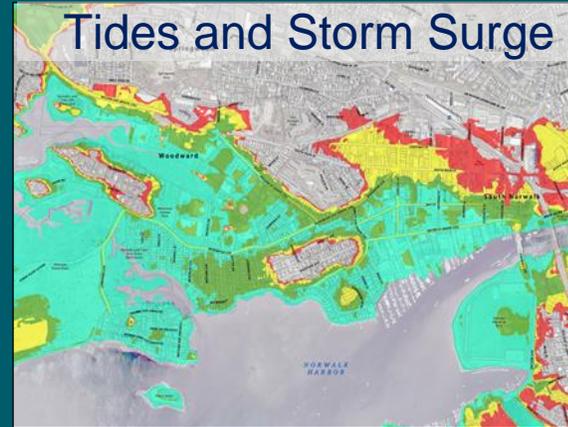
Develop Innovative Ideas and Strategies to Lessen Impacts of Climate Change.

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

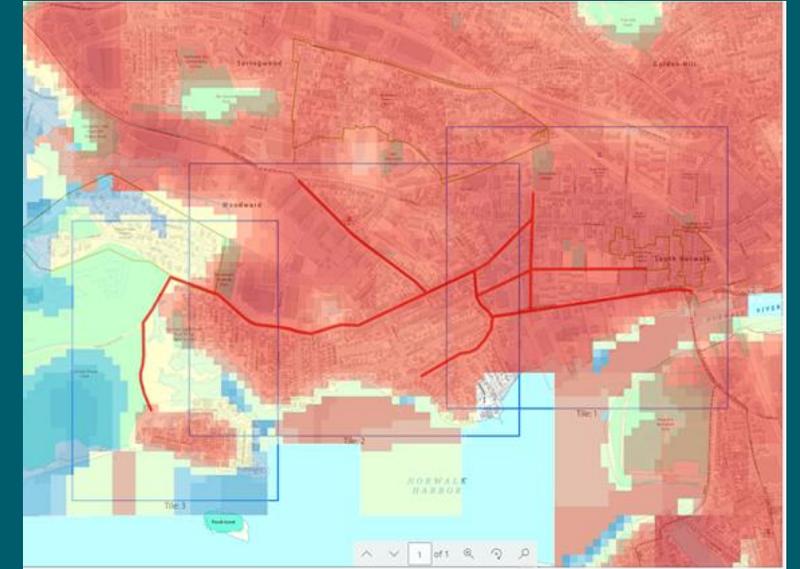
POTENTIAL EXTREME HEAT SOURCES:



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:

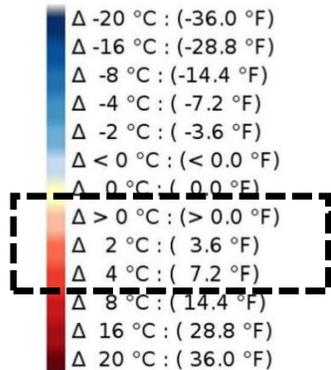
- Average temperature expected to rise 5 degrees
- Summer Days (annual number of days with daily max. temperature above 77 degrees) to rise from 81 to 118

HEAT VULNERABILITY:



Land Surface Temperature

Relative to Regional Mean



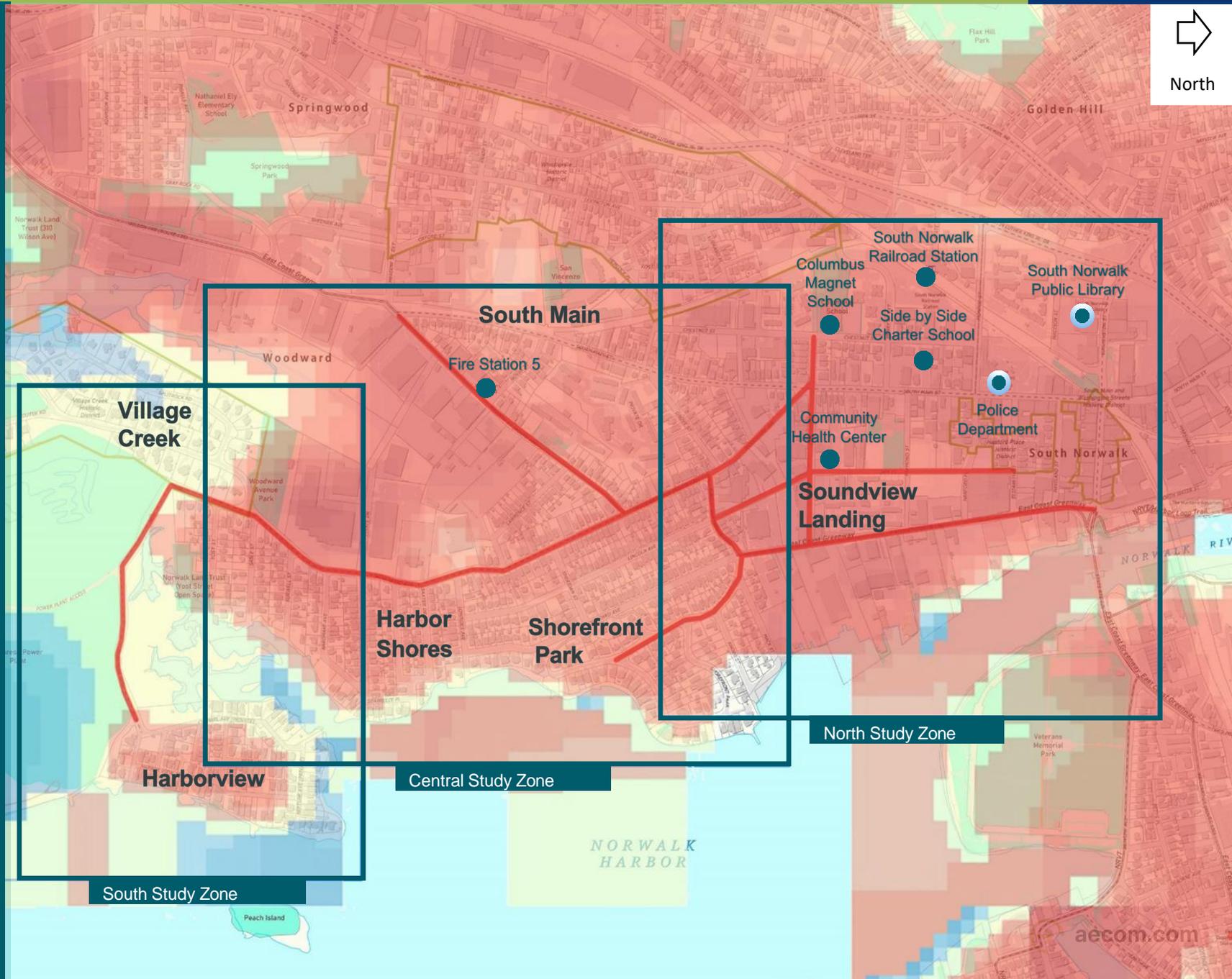
Range of Temperature Increase in South Norwalk



City Approved Cooling Centers in South Norwalk

*Land Surface Temperature Difference data derived from Landsat-8 Thermal Infrared Sensor Data.

Temperature values are the difference from the median surface temperature for each Landsat scene

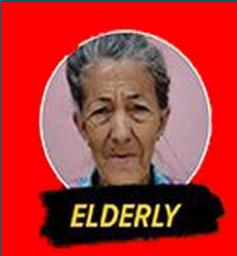


Data gathered from National Landsat-8 Thermal Infrared Sensor Data, 2015

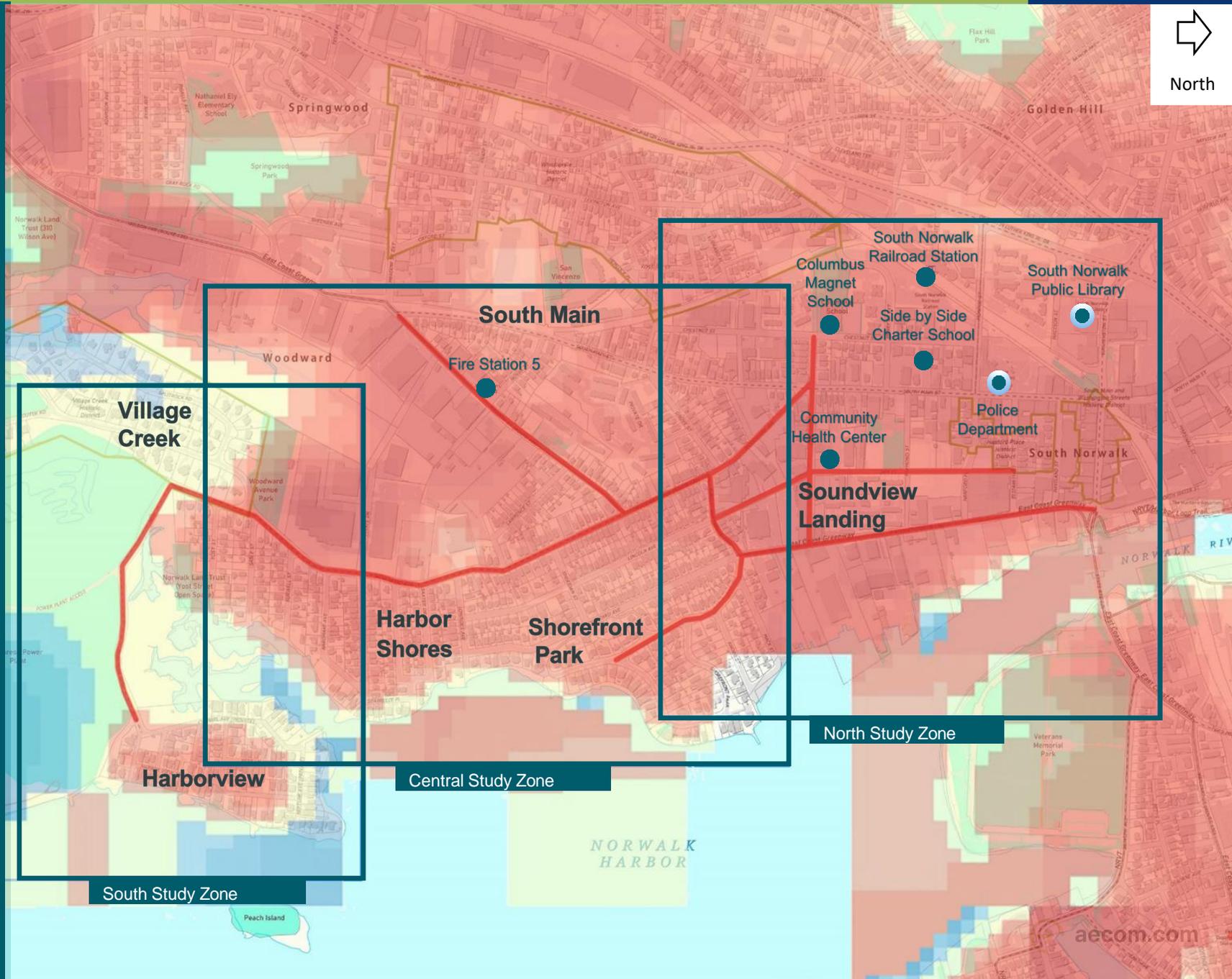
HEAT VULNERABILITY:



Heat Impacts: Vulnerable Populations



Norwalkct.org



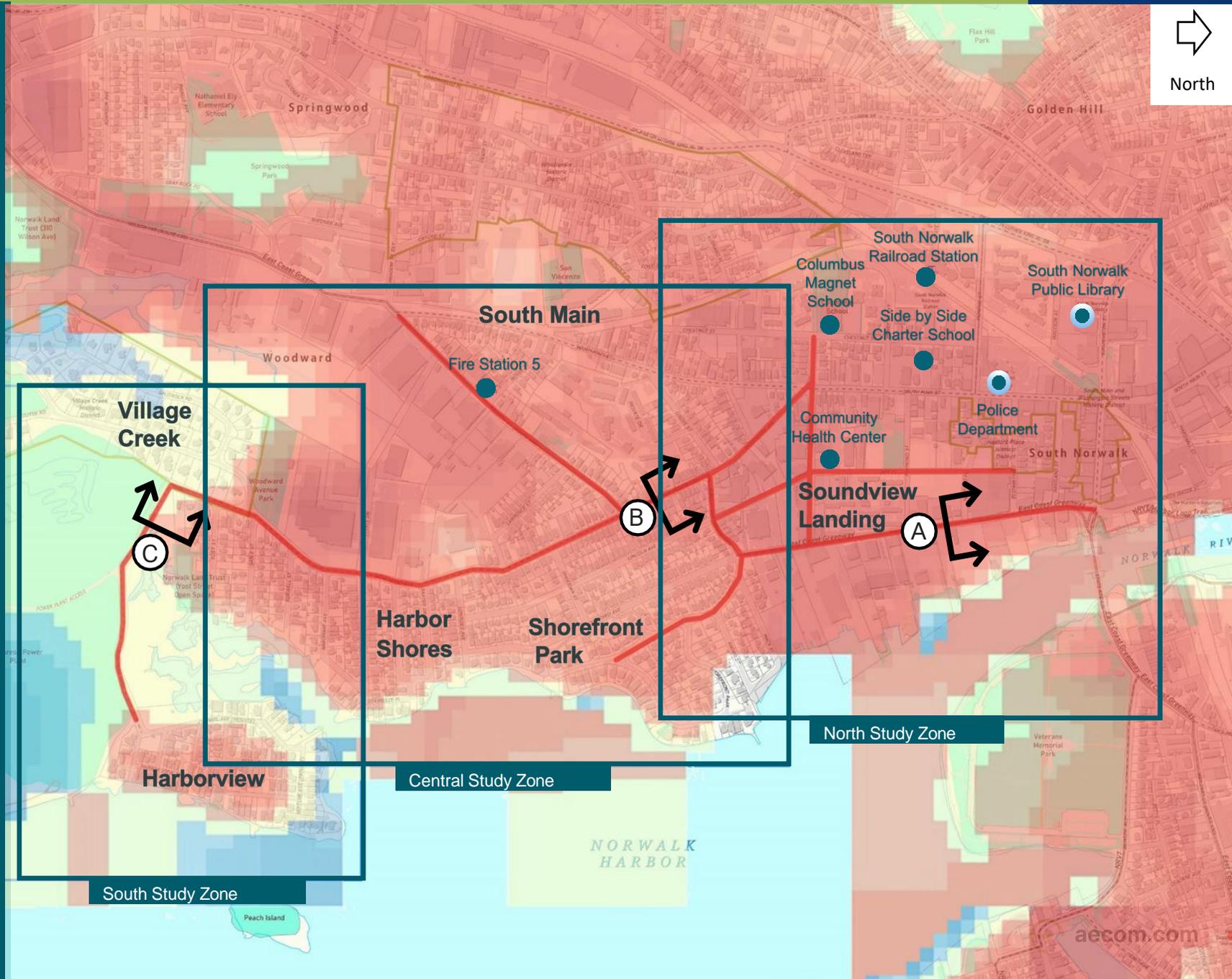
Source: *The Impacts of Climate Change on Human Health, A Scientific Assessment* (US, Global Changes Research Project)

HEAT VULNERABILITY:



North

Heat Impacts: Vulnerable Populations



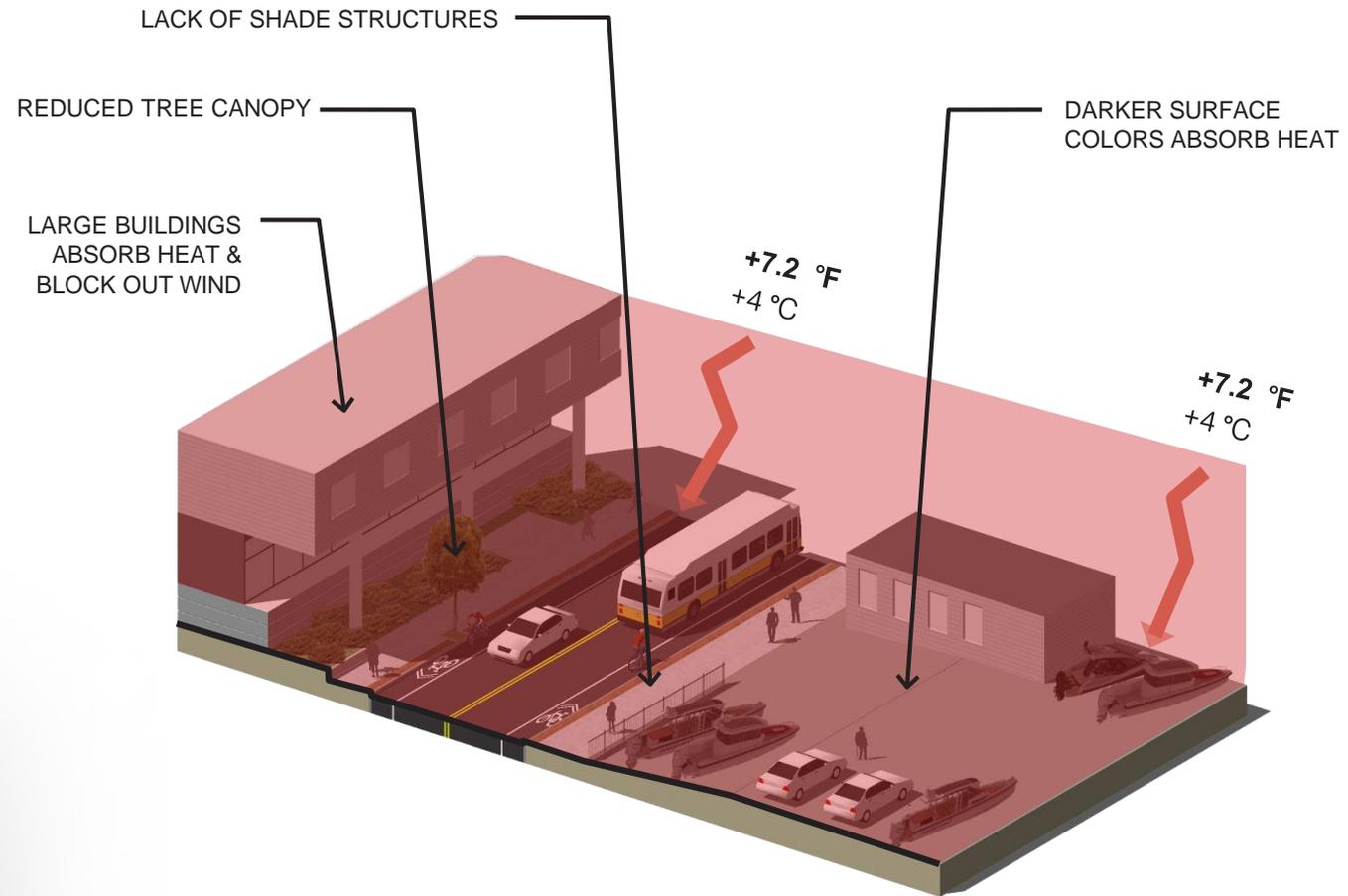
Source: *The Impacts of Climate Change on Human Health, A Scientific Assessment* (US, Global Changes Research Project)

HEAT VULNERABILITY:

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



NORTH ZONE

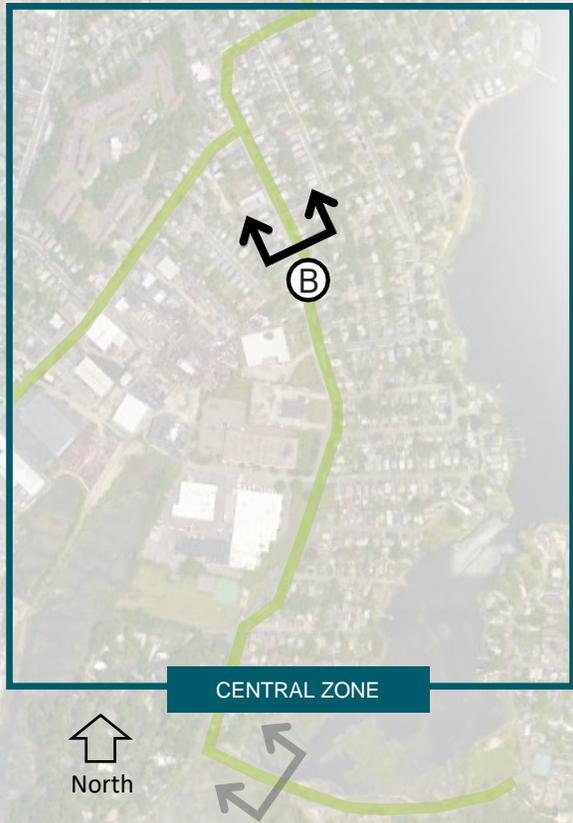


TEMPERATURE OVER AVERAGE REGIONAL TEMPERATURES DURING A HEAT WAVE EVENT

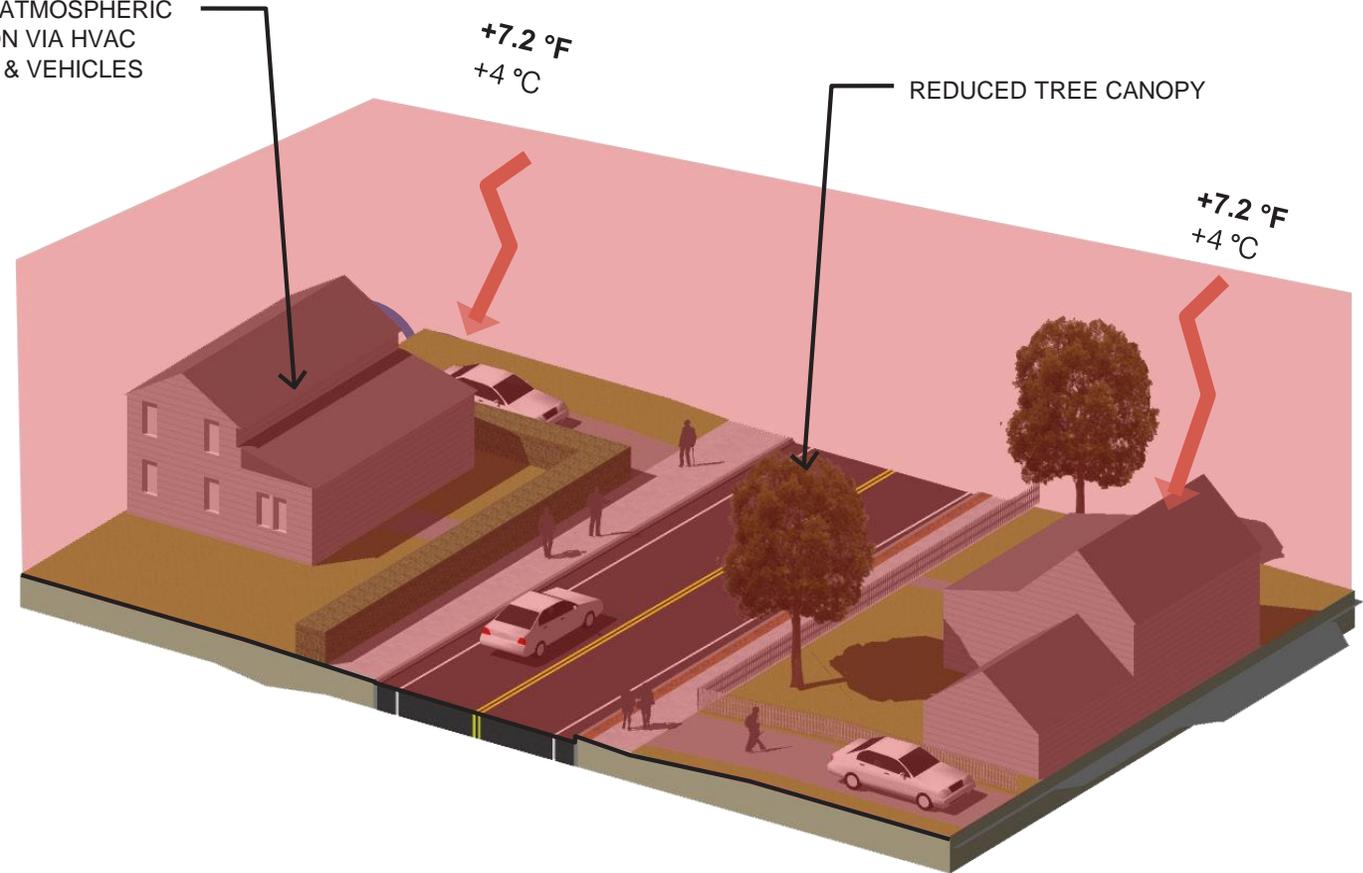


North

② Upper Woodward Ave: Single family residential neighborhood



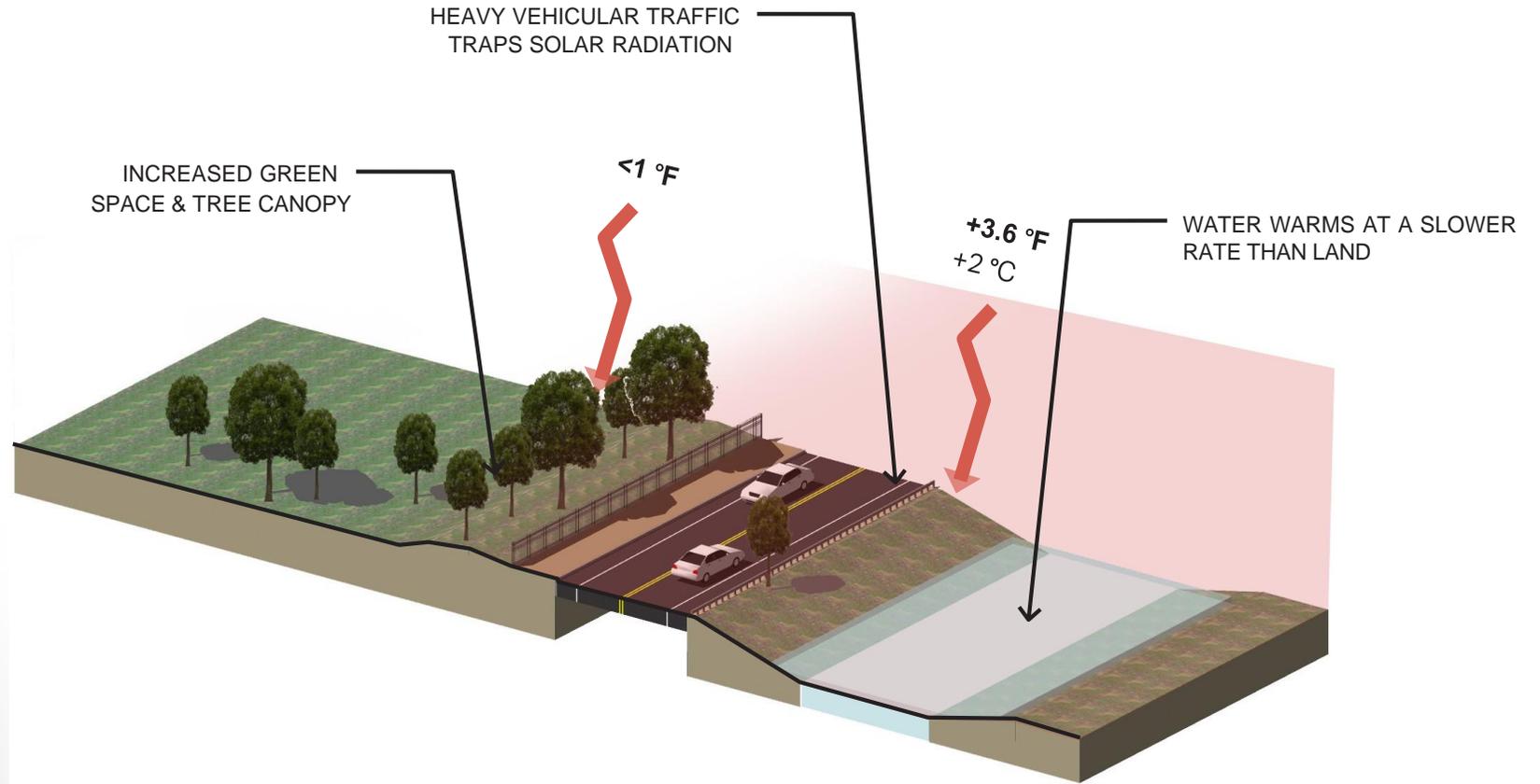
INCREASED ATMOSPHERIC POLLUTION VIA HVAC SYSTEMS & VEHICLES



TEMPERATURE OVER AVERAGE REGIONAL TEMPERATURES DURING A HEAT WAVE EVENT

Data sourced from Landsat Land Surface Temperature Database, 2015

© Longshore Drive: Roadway & Wetlands

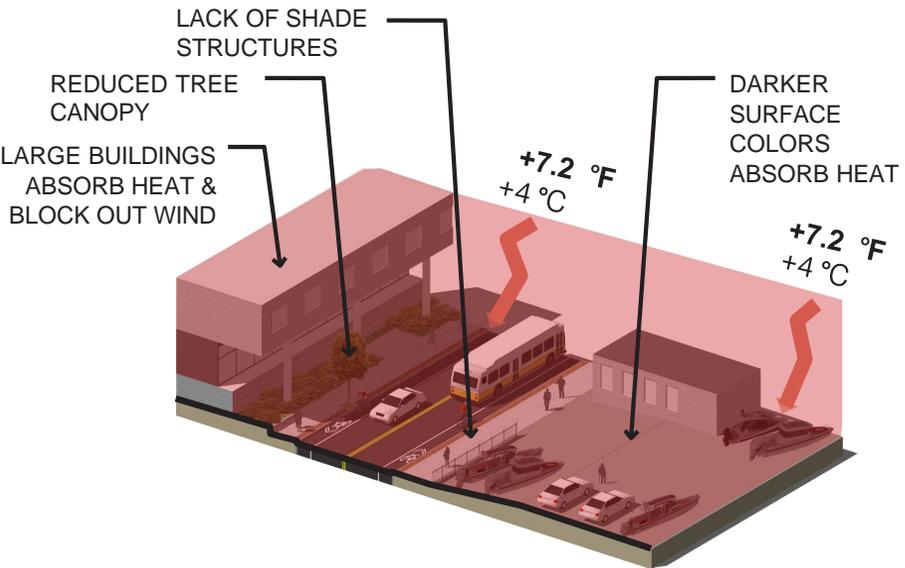


 TEMPERATURE OVER AVERAGE REGIONAL TEMPERATURES DURING A HEAT WAVE EVENT

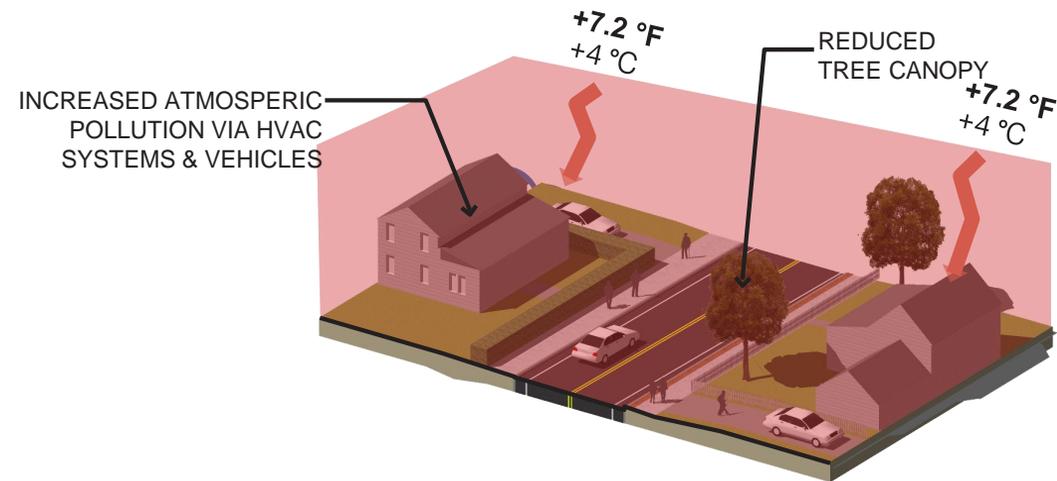
Data sourced from Landsat Land Surface Temperature Database, 2015



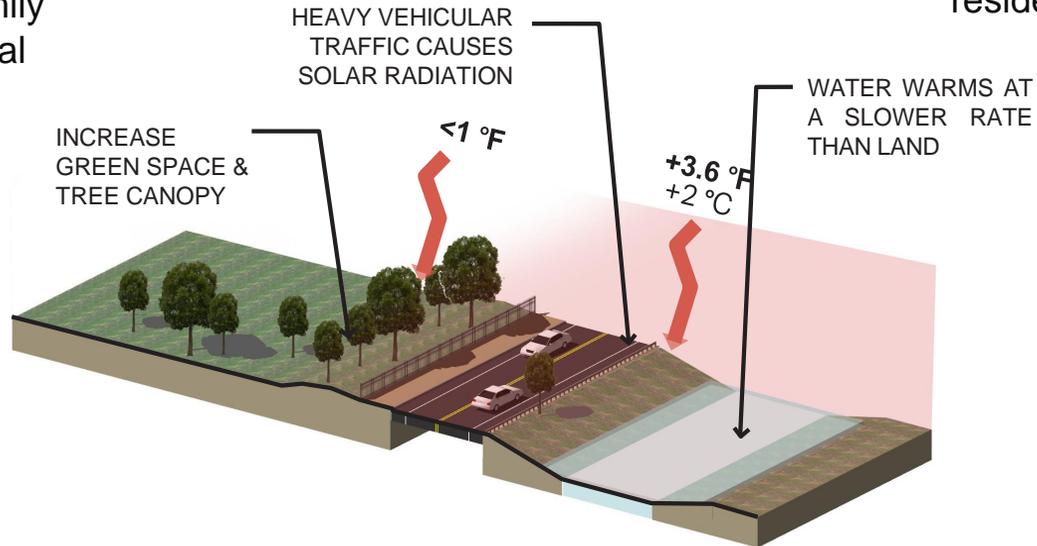
HEAT VULNERABILITY | Discussion



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



(B) Upper Woodward Ave: Single family residential neighborhood



(C) Longshore Drive: Roadway & Wetlands

TEMPERATURE OVER AVERAGE REGIONAL TEMPERATURES DURING A HEAT WAVE EVENT

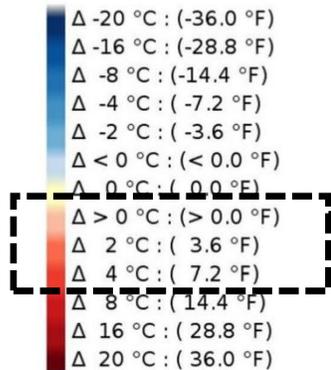
Data sourced from Landsat Land Surface Temperature Database, 2015

HEAT VULNERABILITY:



Land Surface Temperature

Relative to Regional Mean



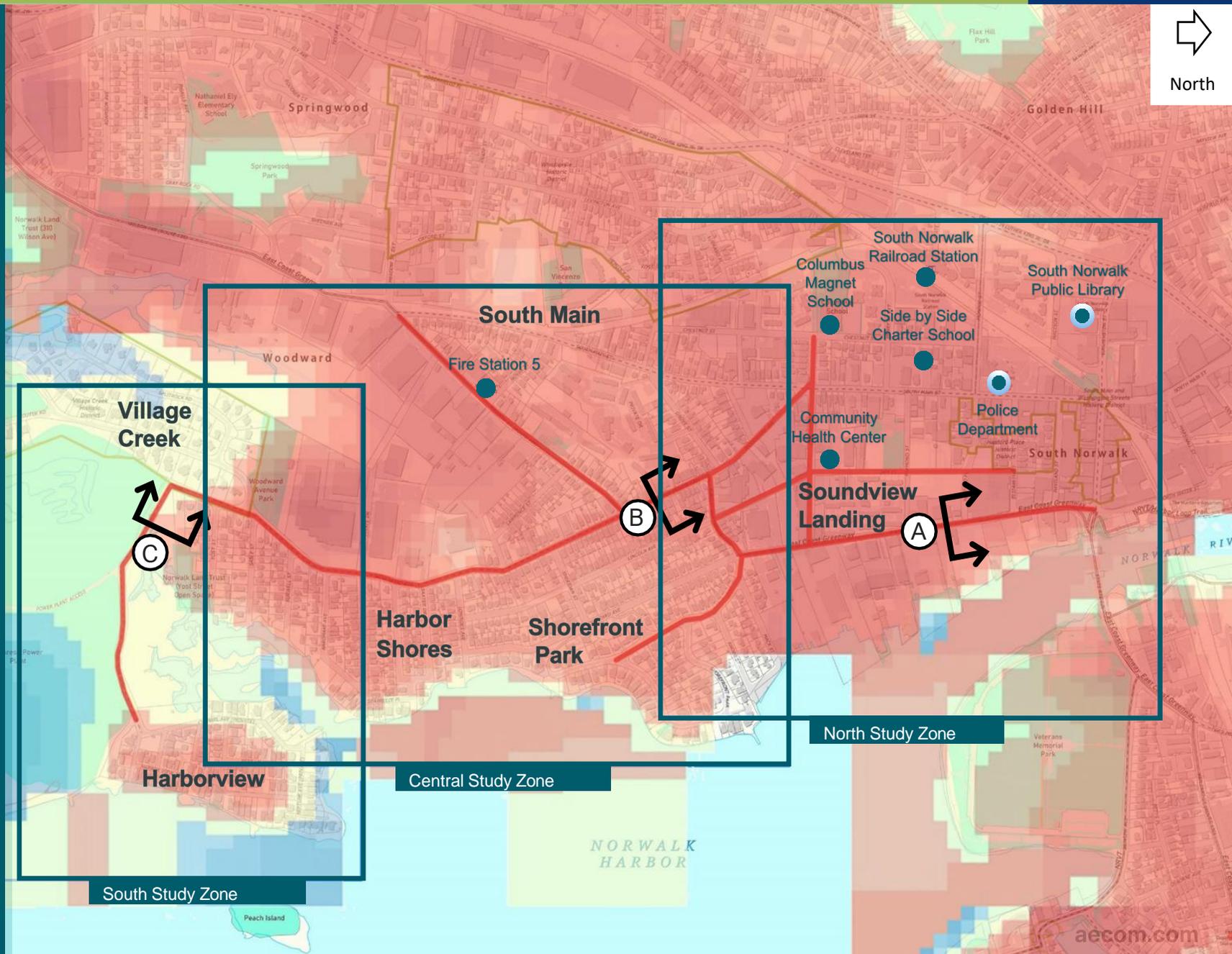
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*Land Surface Temperature Difference data derived from Landsat-8 Thermal Infrared Sensor Data.

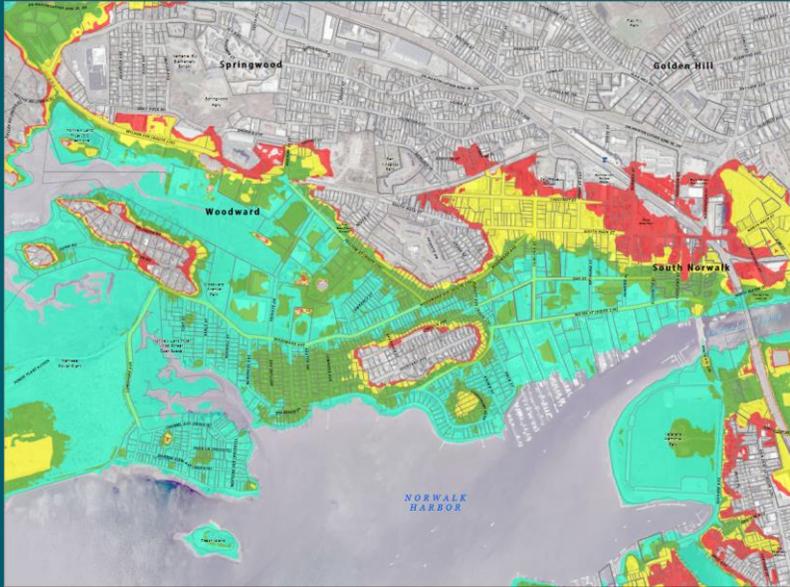
Temperature values are the difference from the median surface temperature for each Landsat scene



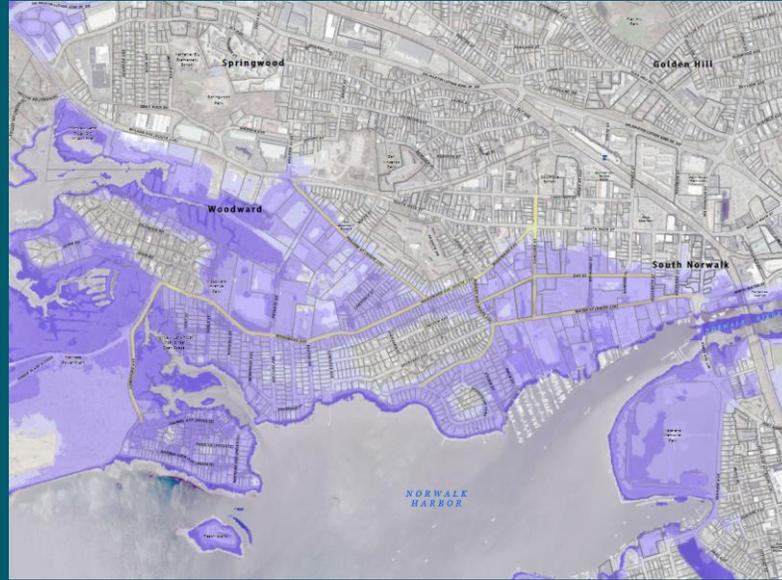
Data gathered from National Landsat-8 Thermal Infrared Sensor Data, 2015

FLOOD RISK

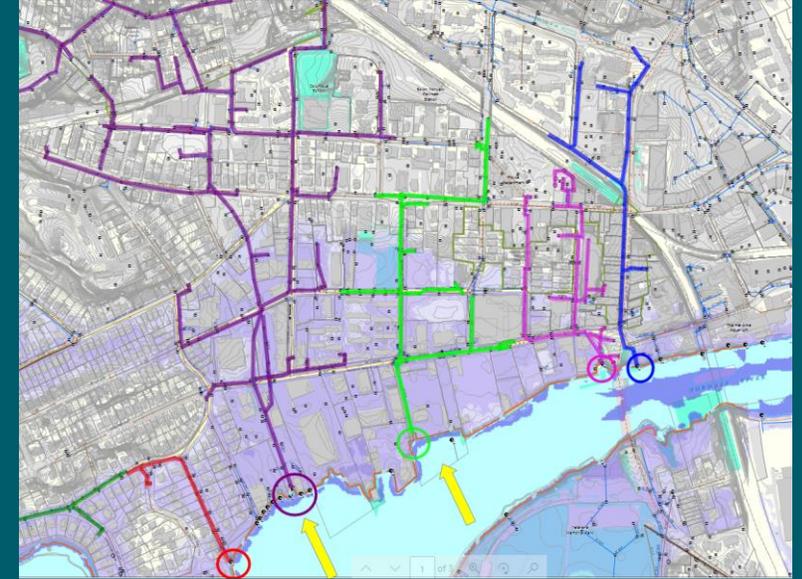
POTENTIAL FLOODING SOURCES:



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



25 Year Flood Zone



50 Year Flood Zone



100 Year Flood Zone



500 Year Flood Zone



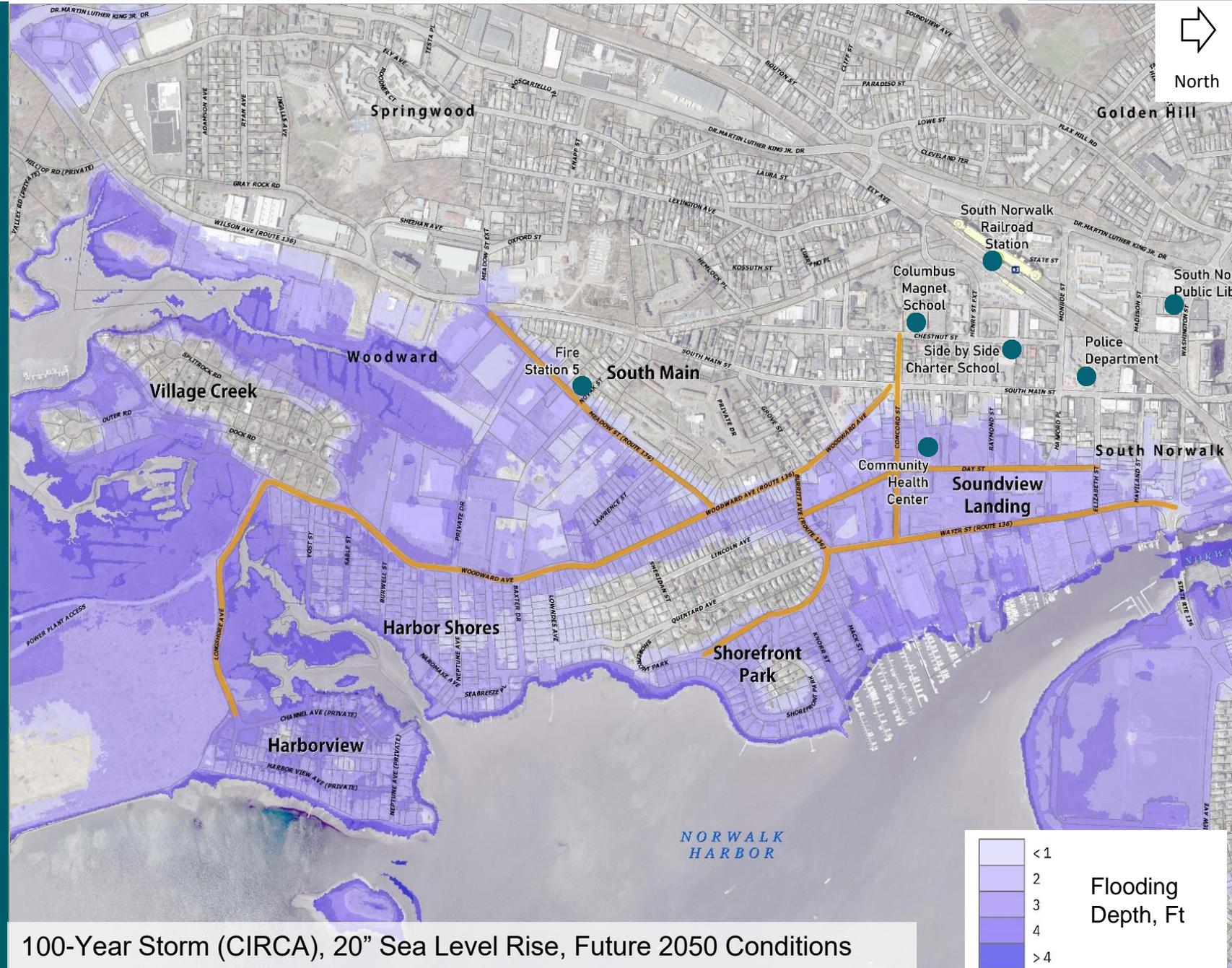
100 YEAR FLOOD

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 IMPACTS

- 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

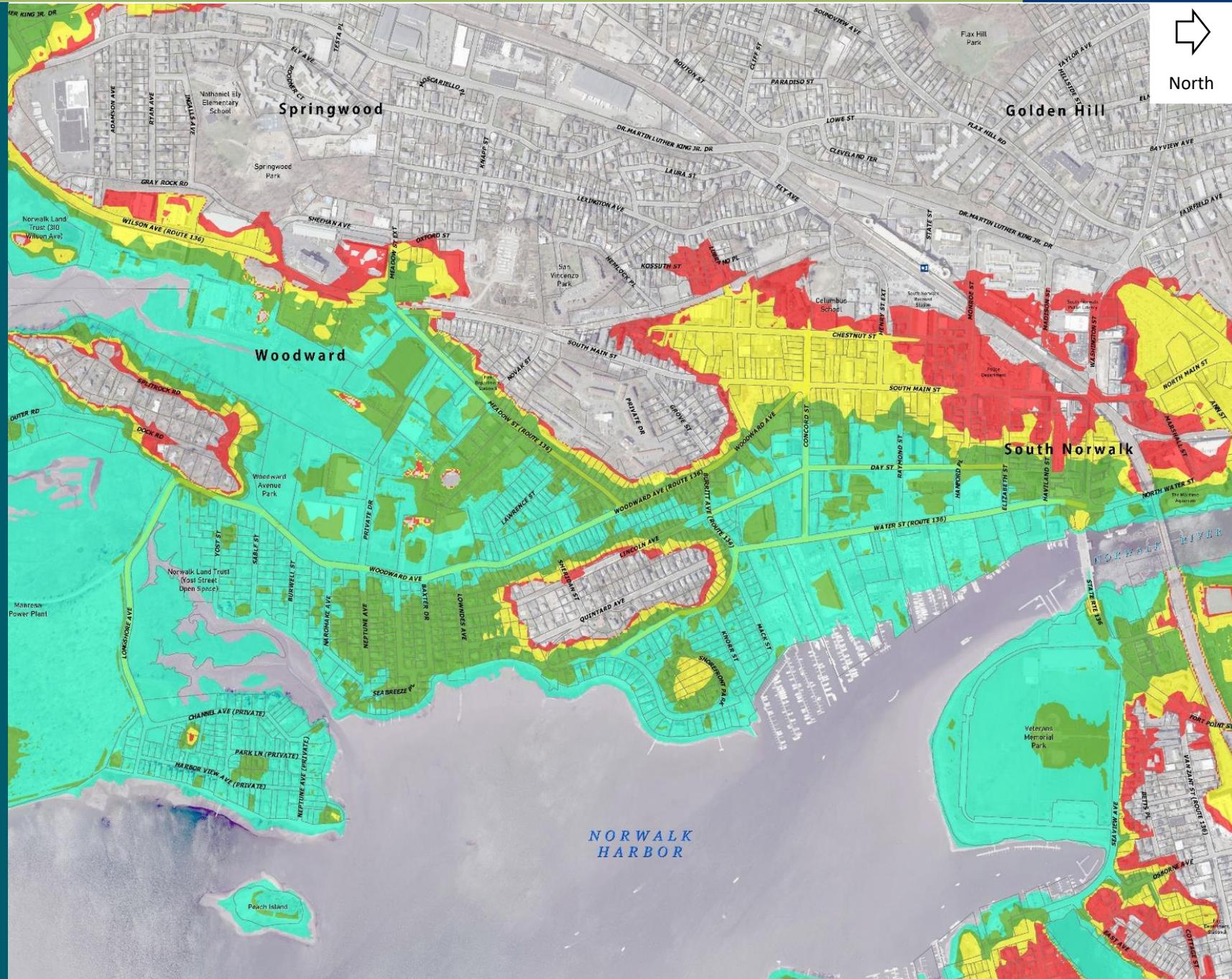
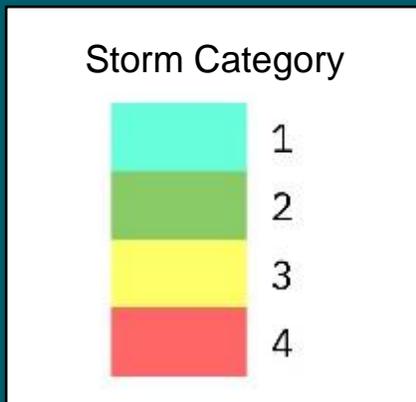


HURRICANE STORM SURGE



North

Hurricane Surge Inundation



Source: City of Norwalk, CTDEEP, DTECO
Date of Photo: 2019

STORM SURGE | North Study Zone

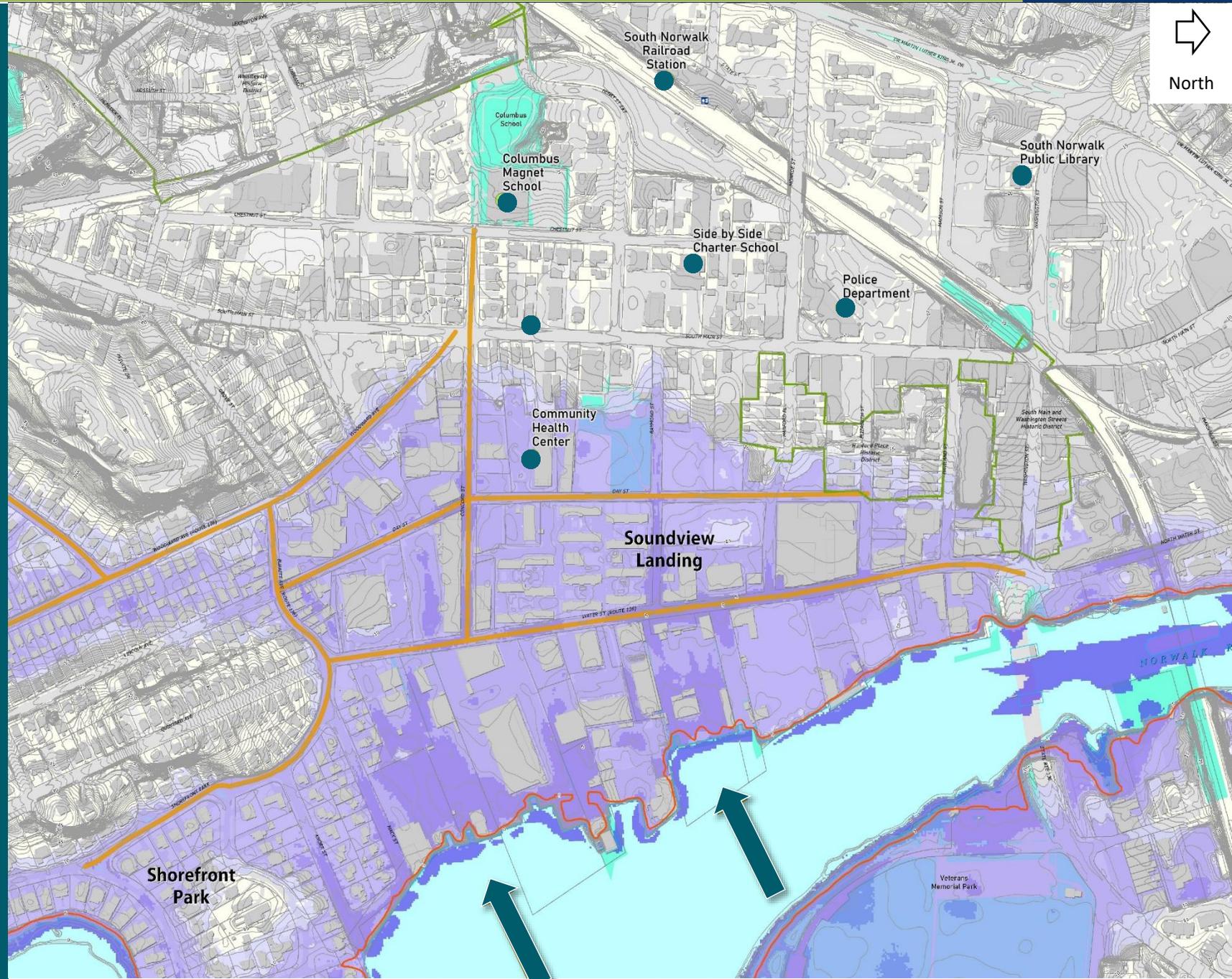
- Shape of the coastline affects storm surge
- Inlets in the coastline create pockets to trap water

Study

Assumptions:

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

← Storm Surge Direction



STORM SURGE | Central Study Zone

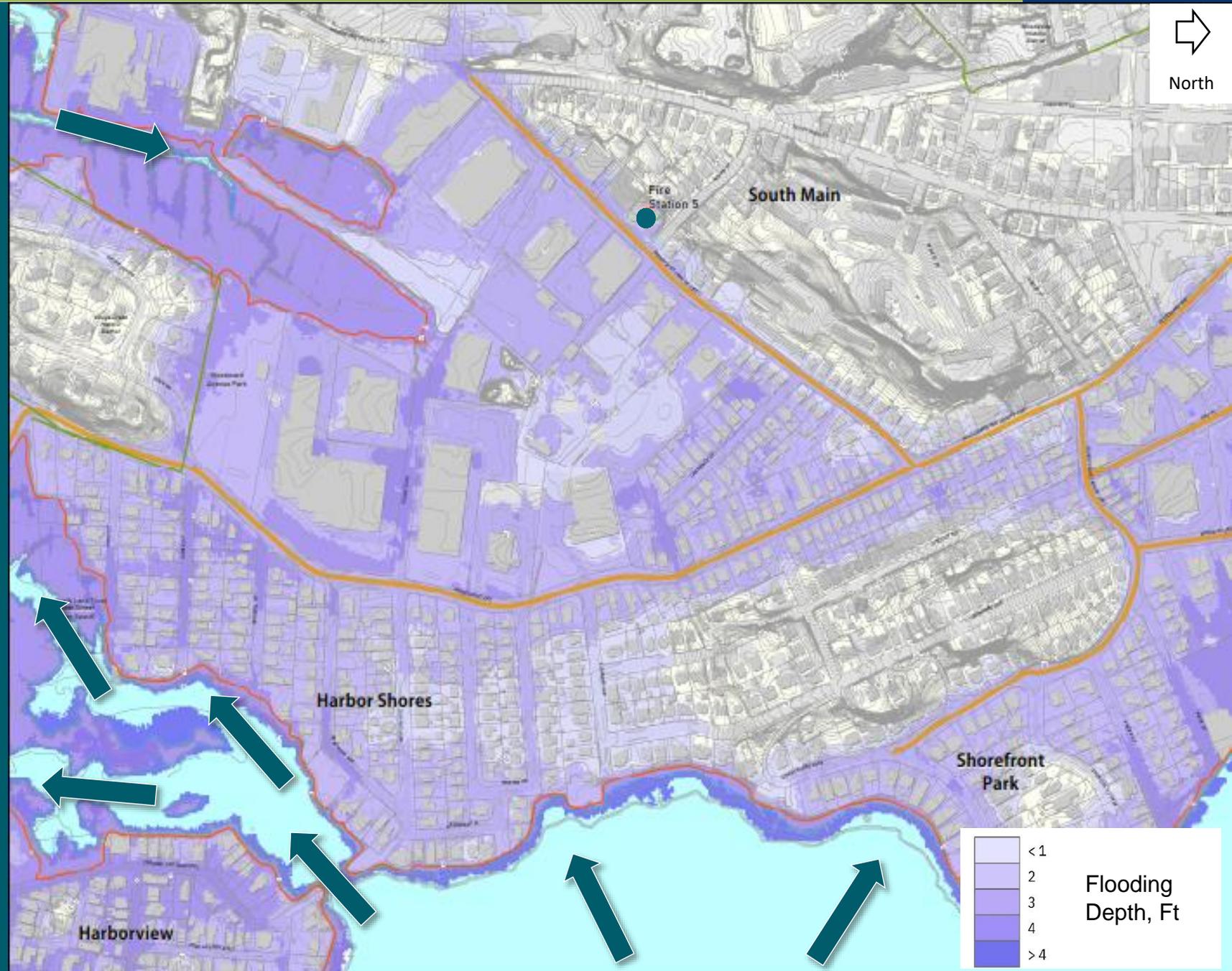
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Study

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

← Storm Surge Direction



STORM SURGE | South Study Zone

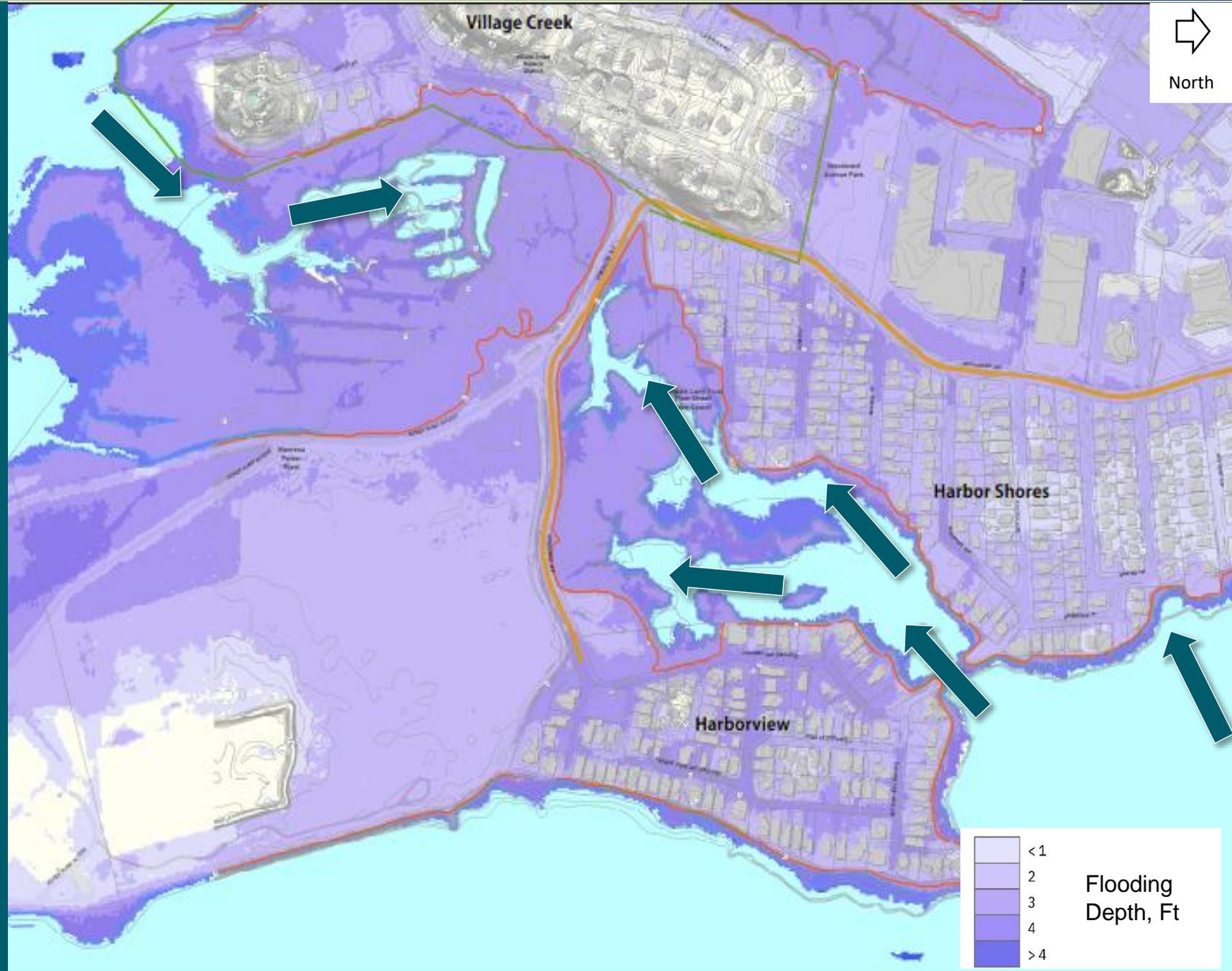
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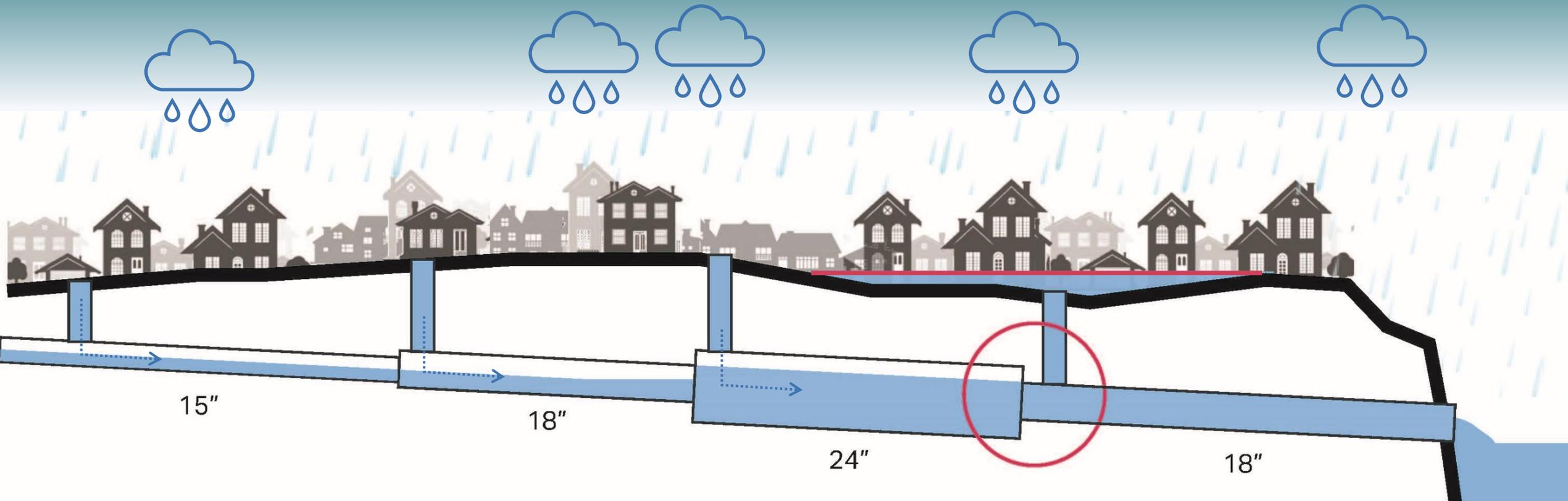
Study

Assumptions:

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

 Storm Surge Direction





Pipe Capacity: The volume of water that can flow freely through a pipe

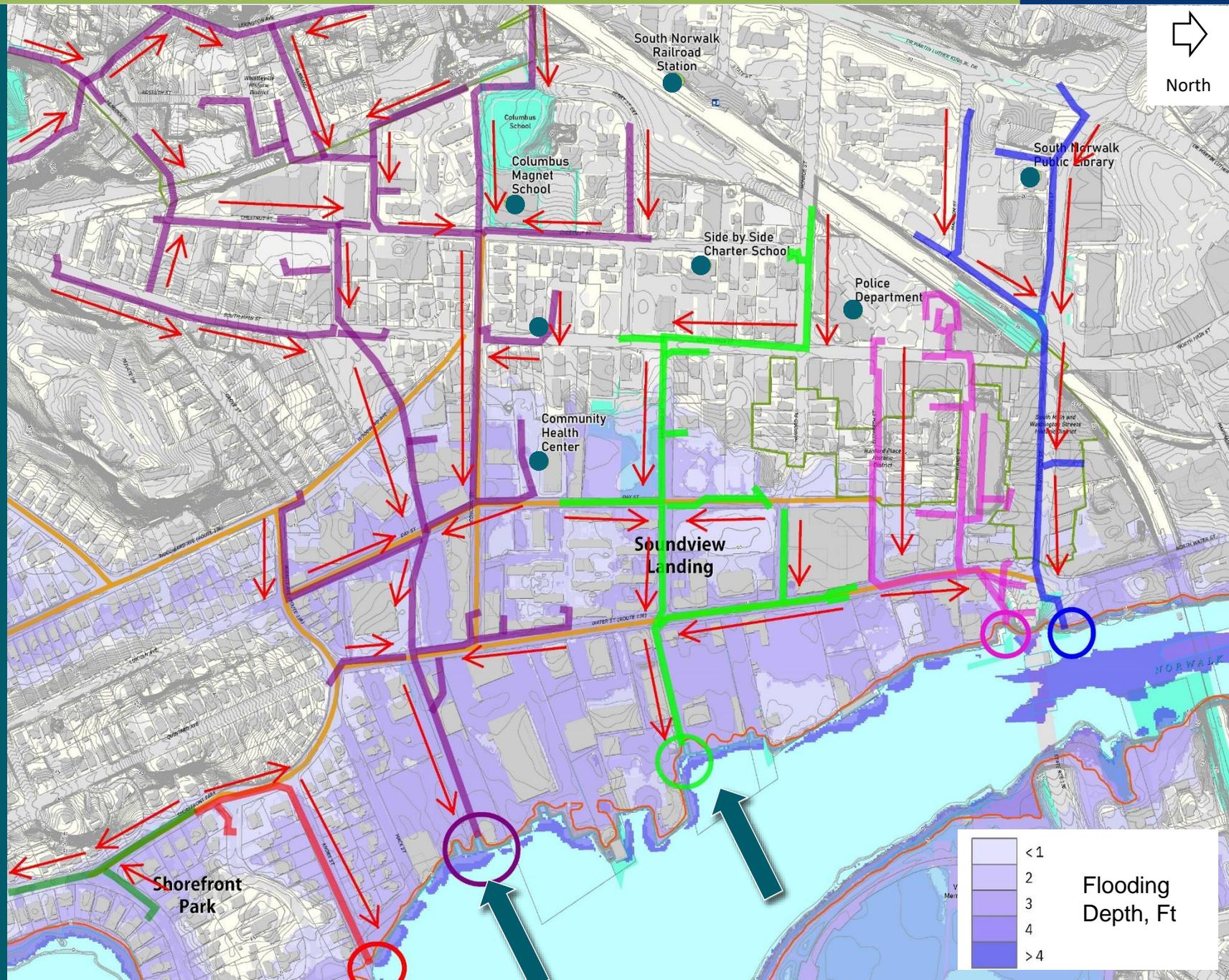
DRAINAGE INFRASTRUCTURE | North Study Zone

- Pipe diameter and volume of water entering the system affect capacity

← Storm Surge Direction

○ Outfall

← Direction of Water Flow



North

Flooding Depth, Ft
<1
2
3
4
>4

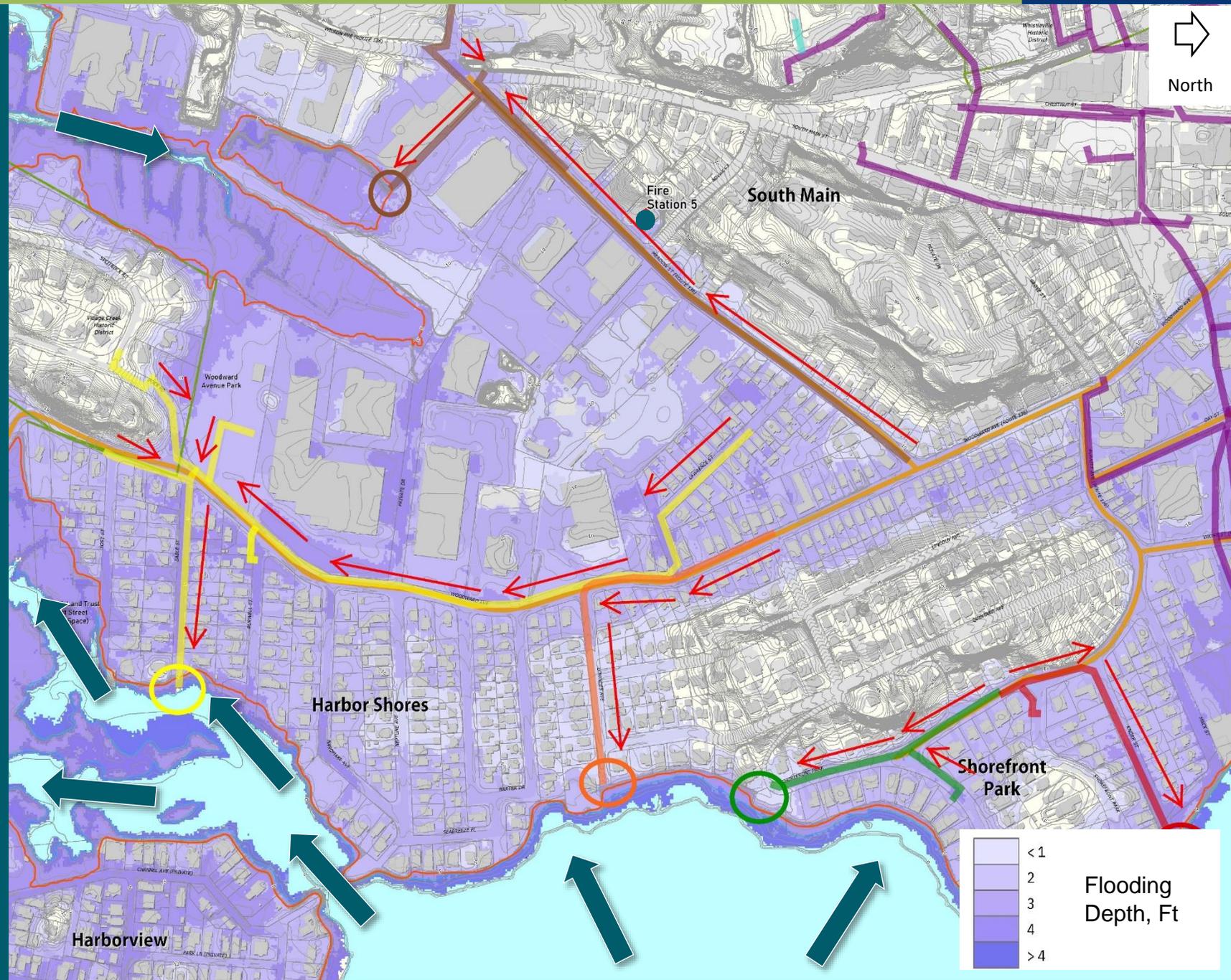
DRAINAGE INFRASTRUCTURE | Central Study Zone

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← Direction of Water Flow



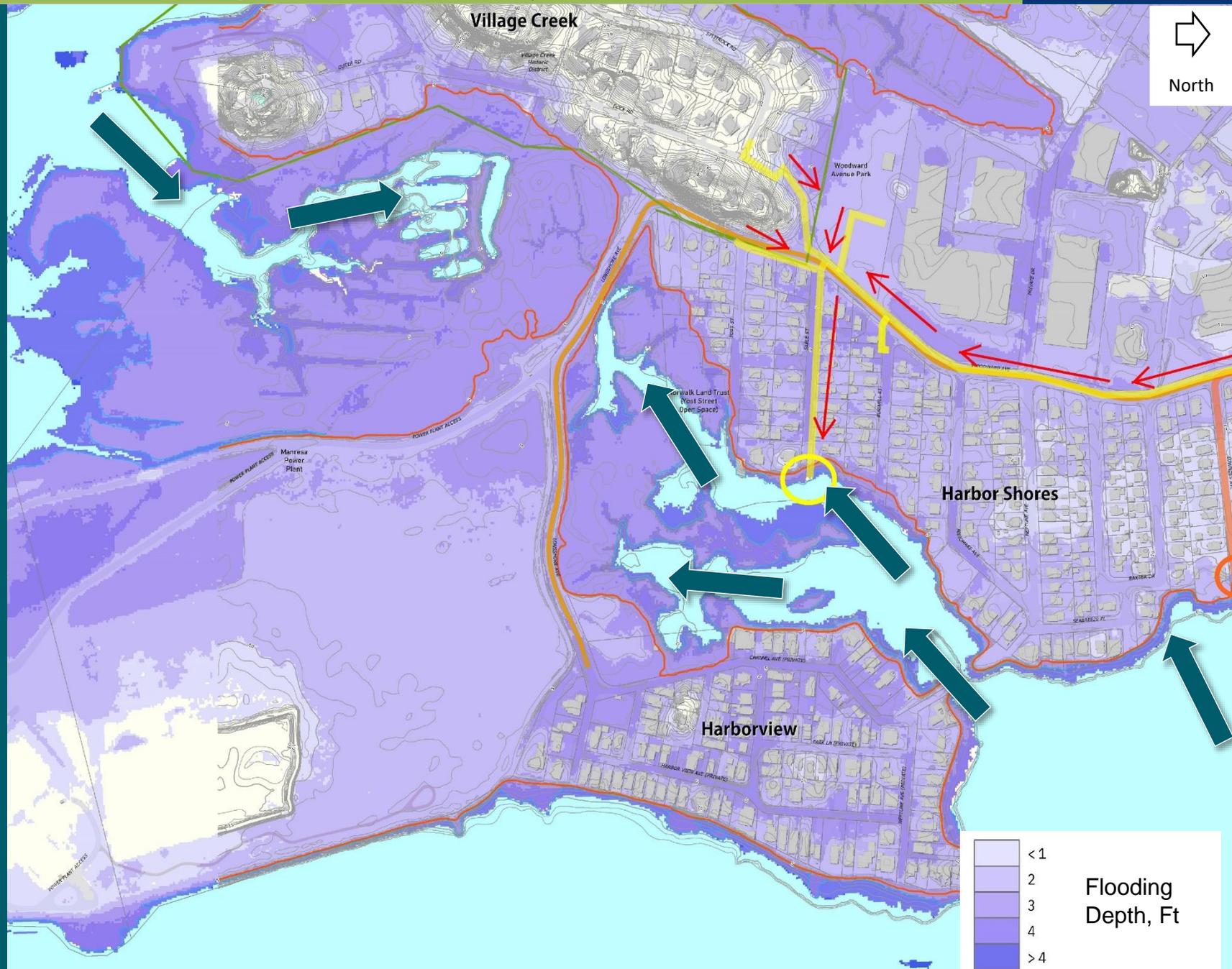
DRAINAGE INFRASTRUCTURE | South Study Zone

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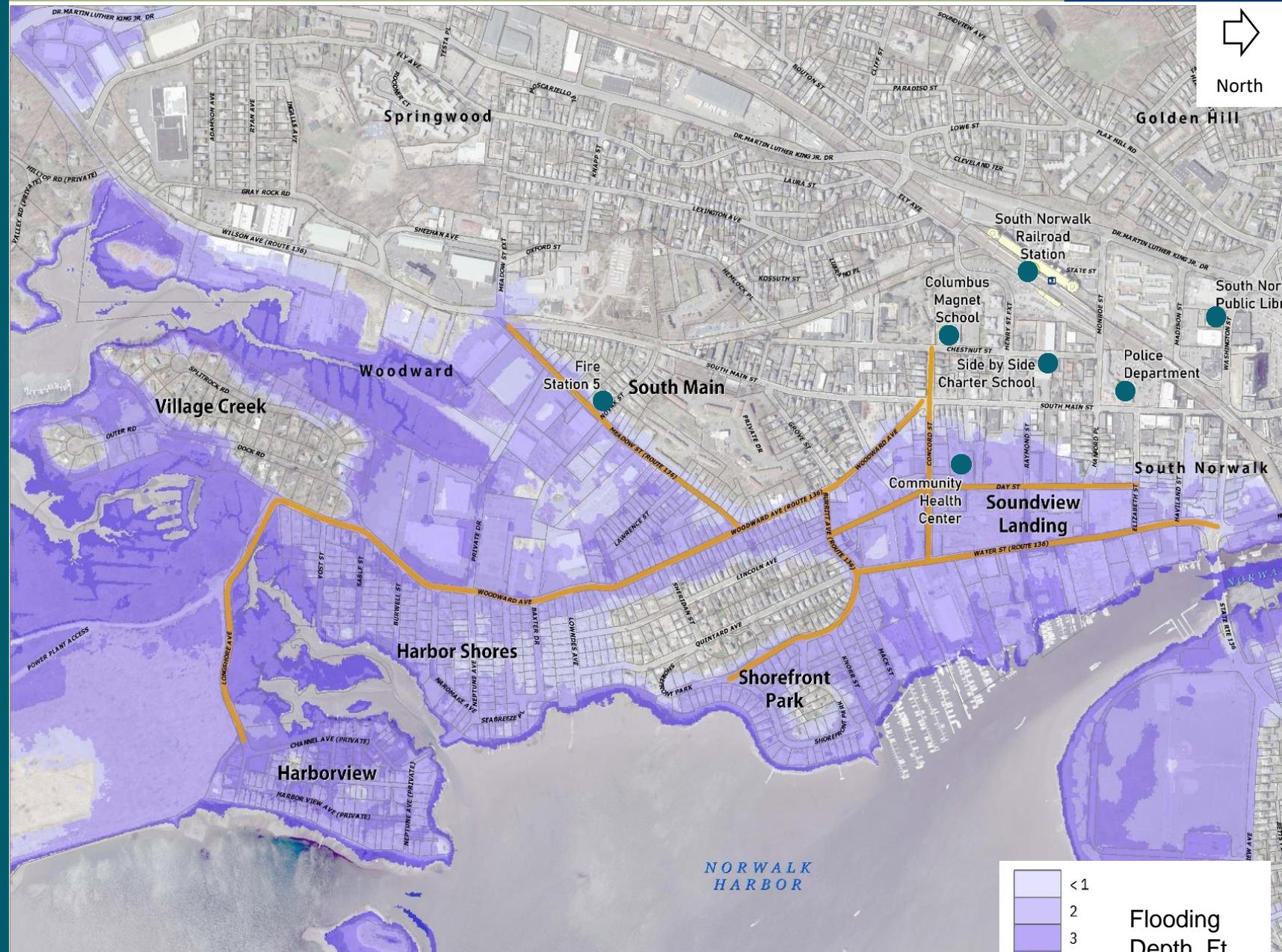
← Direction of Water Flow



100 YEAR FLOOD LIMITS

STUDY AREA

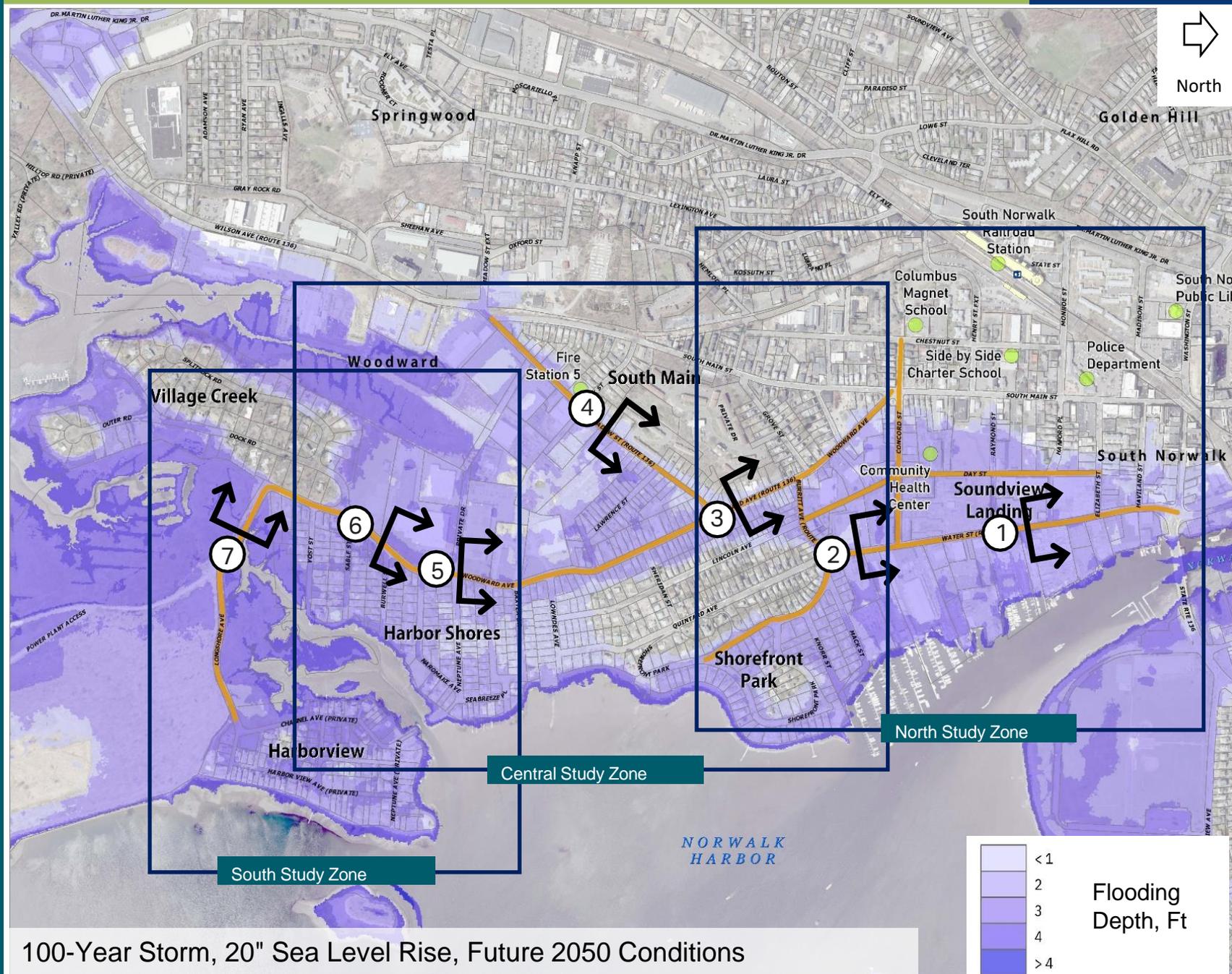
- 100 Year Flood Limits
- 20" Sea Level Rise



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

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

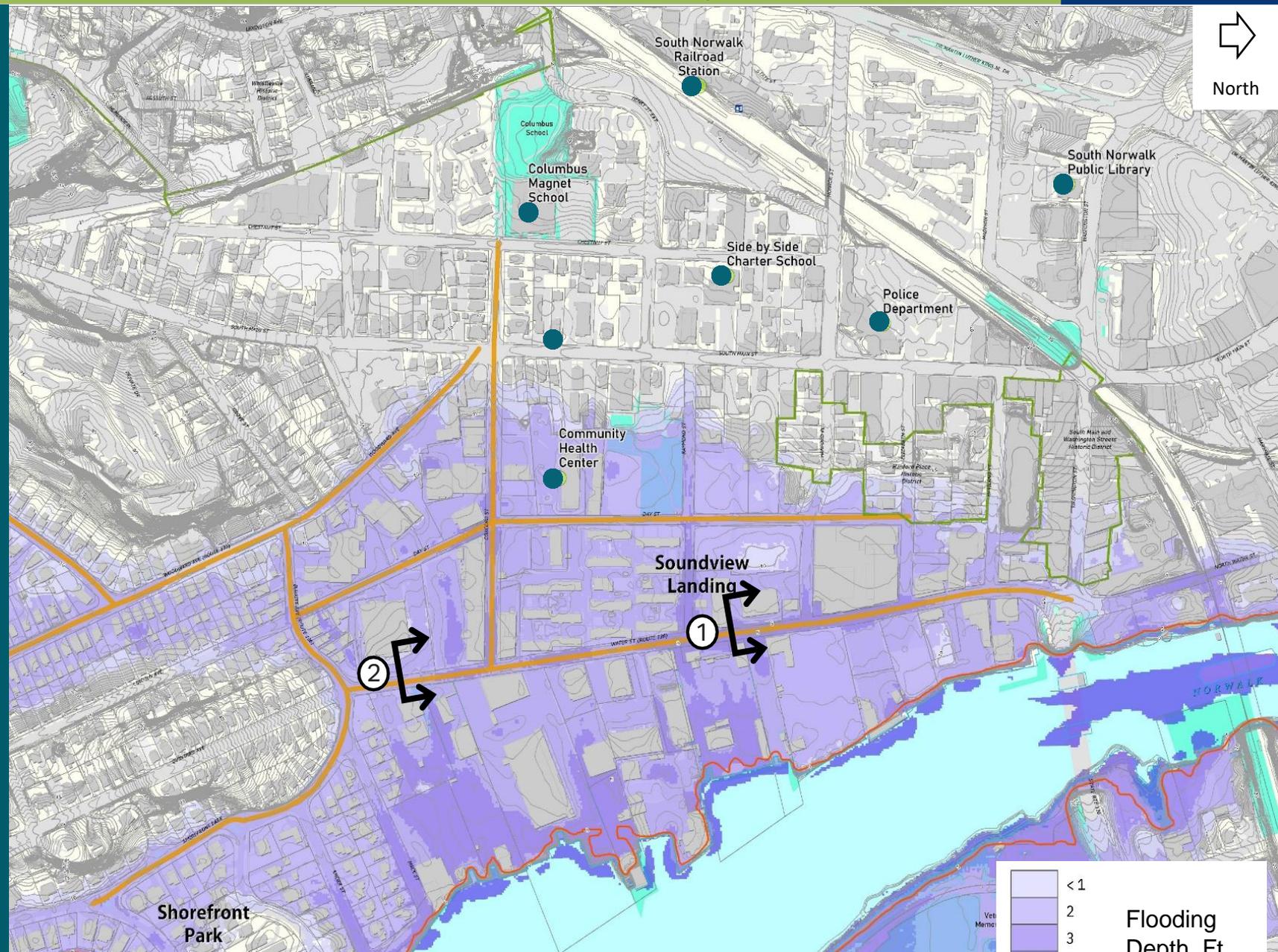
NORTH ZONE

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)



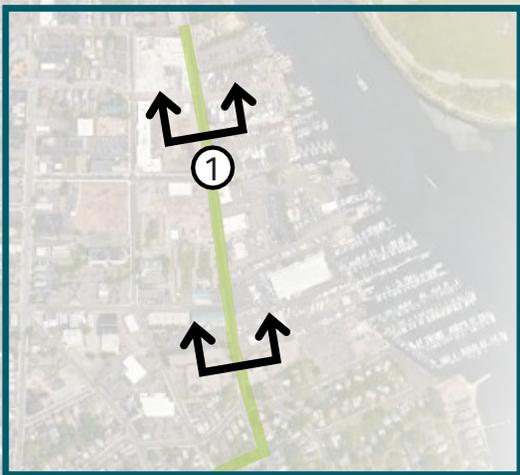
EXISTING AND FUTURE CONDITIONS: North Study Zone

Future Conditions:

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

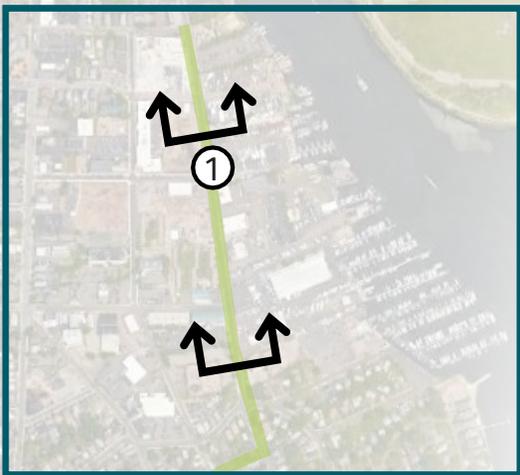
- ① Northern End of Water Street:
Multi-family Residential and Marine/Industrial Land Use
- ② Southern End of Water Street:
Private businesses vs. municipal/public lots





NORTH ZONE



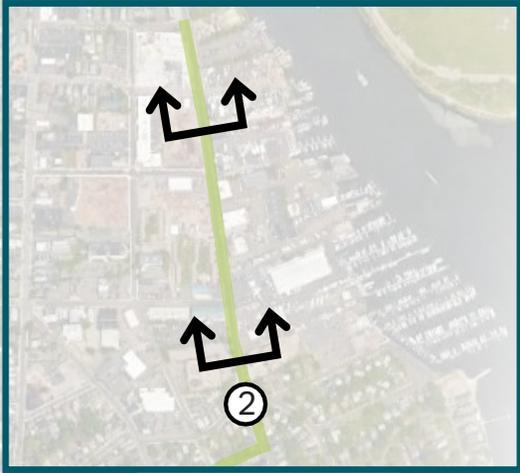


NORTH ZONE

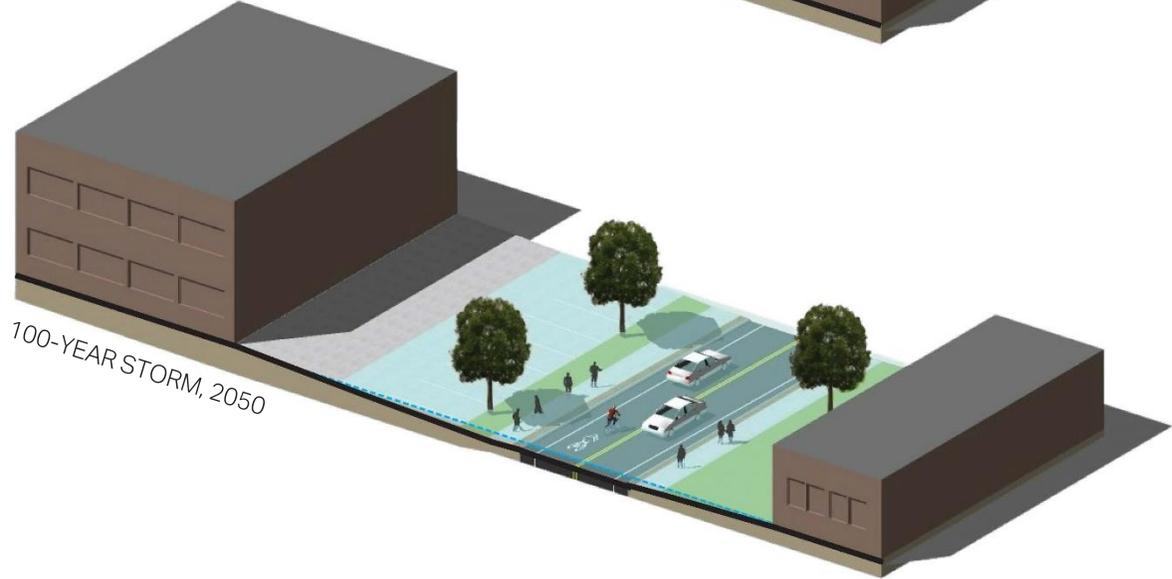
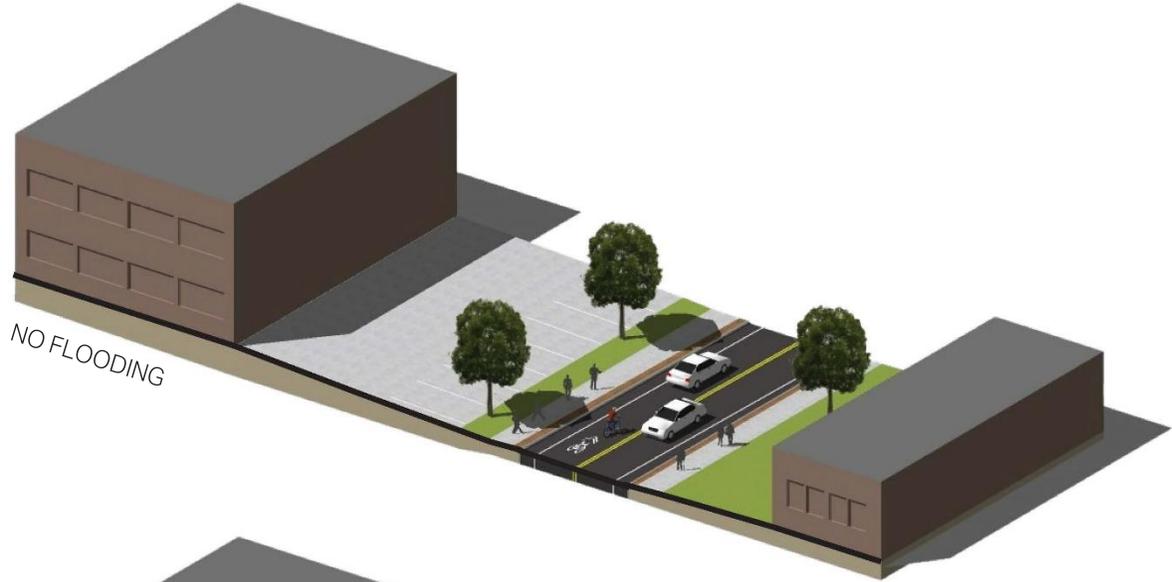


APPROXIMATE FLOOD LEVELS

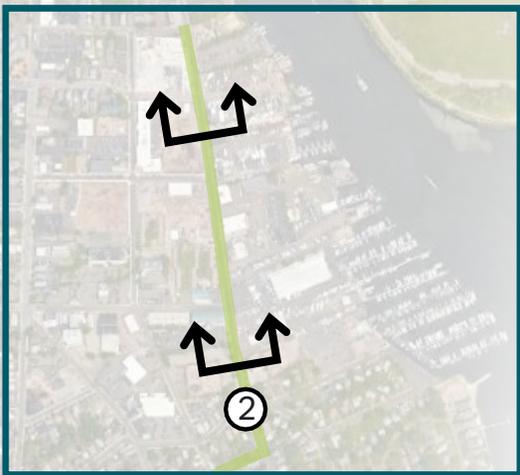




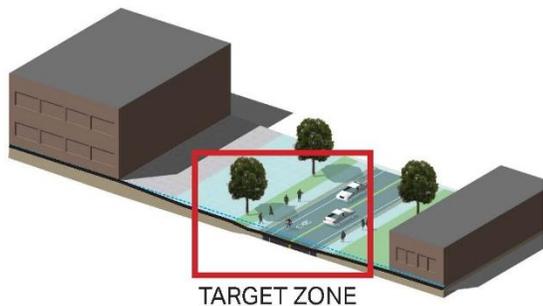
NORTH ZONE



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

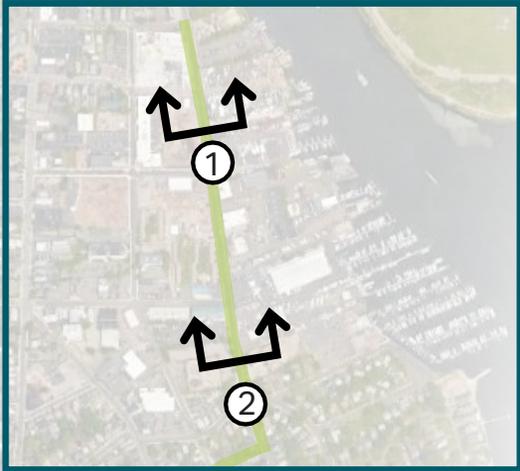


NORTH ZONE



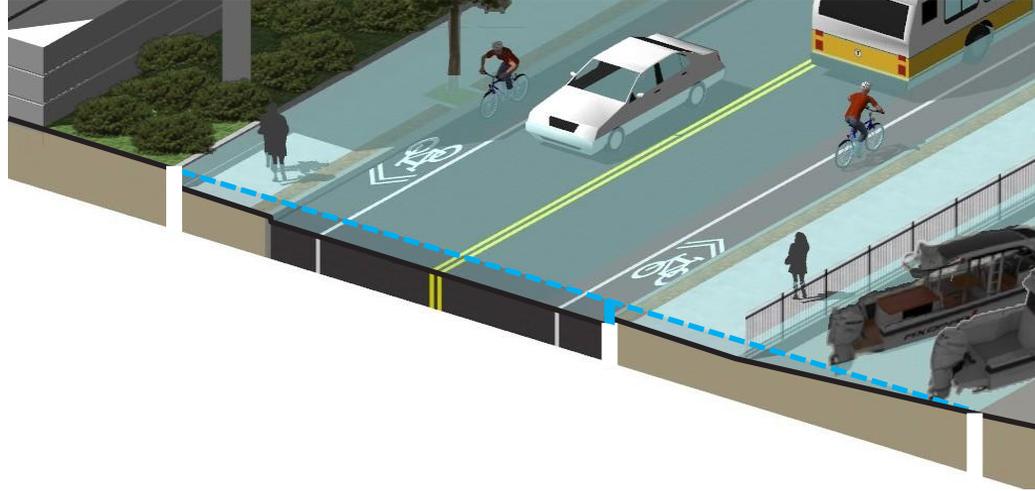
APPROXIMATE FLOOD LEVELS





NORTH ZONE

① NORTHERN END OF WATER STREET



② SOUTHERN END OF WATER STREET



North

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

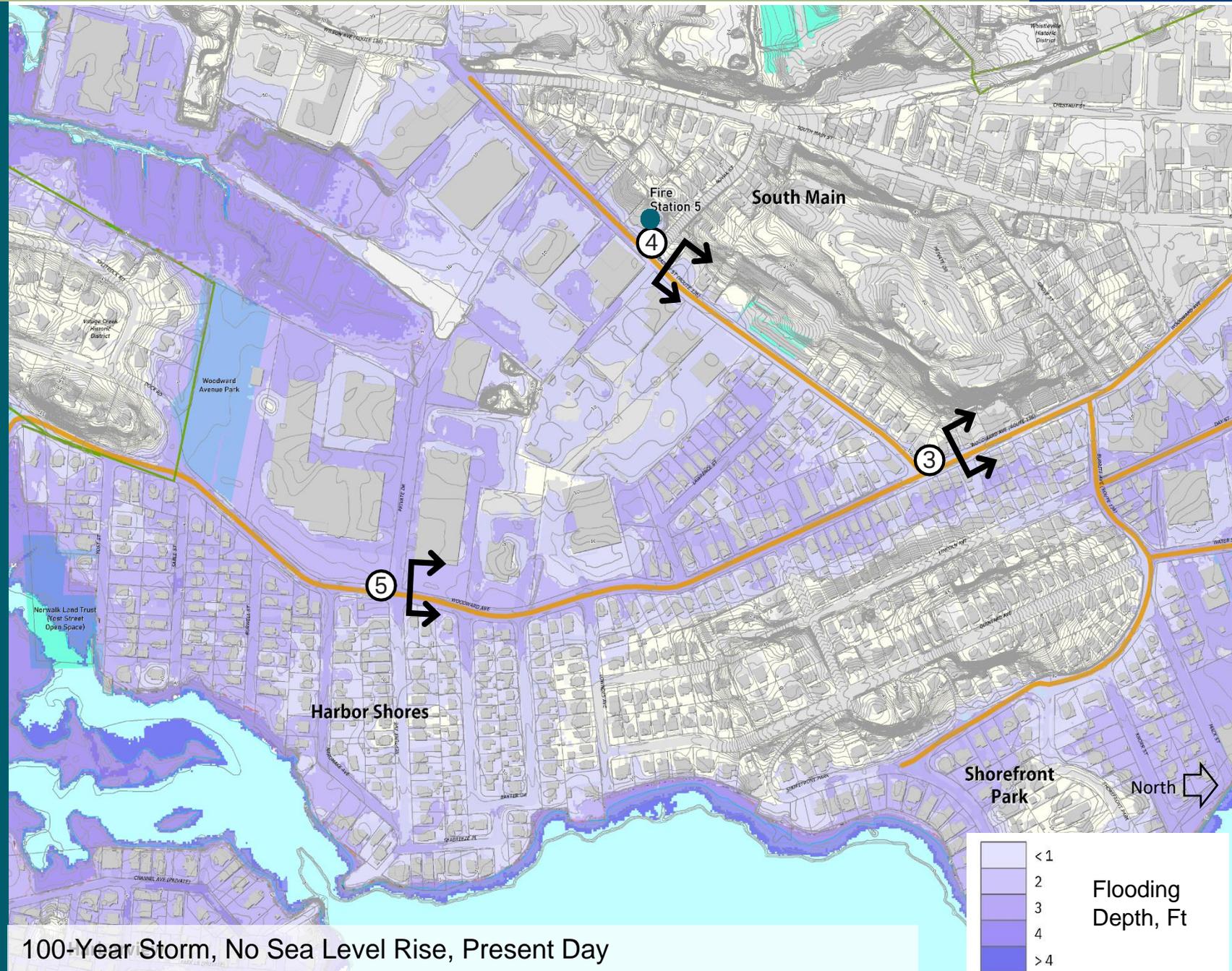


CENTRAL ZONE

EXISTING AND FUTURE CONDITIONS: Central Study Zone

Existing Conditions:

- Current 100-Year Storm
- No additional sea level rise



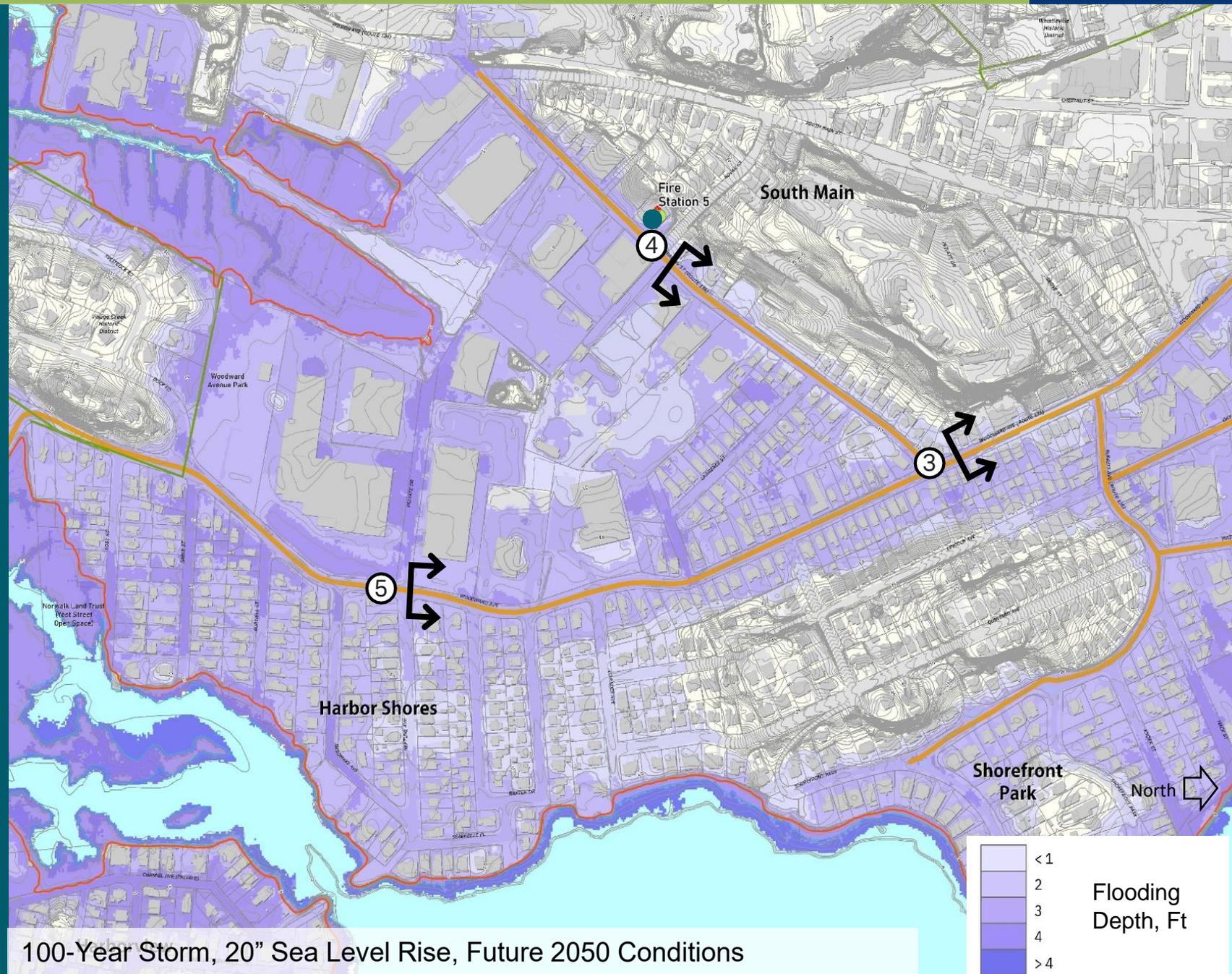
100-Year Storm, No Sea Level Rise, Present Day

EXISTING AND FUTURE CONDITIONS: Central Study Zone

Future Conditions:

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

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

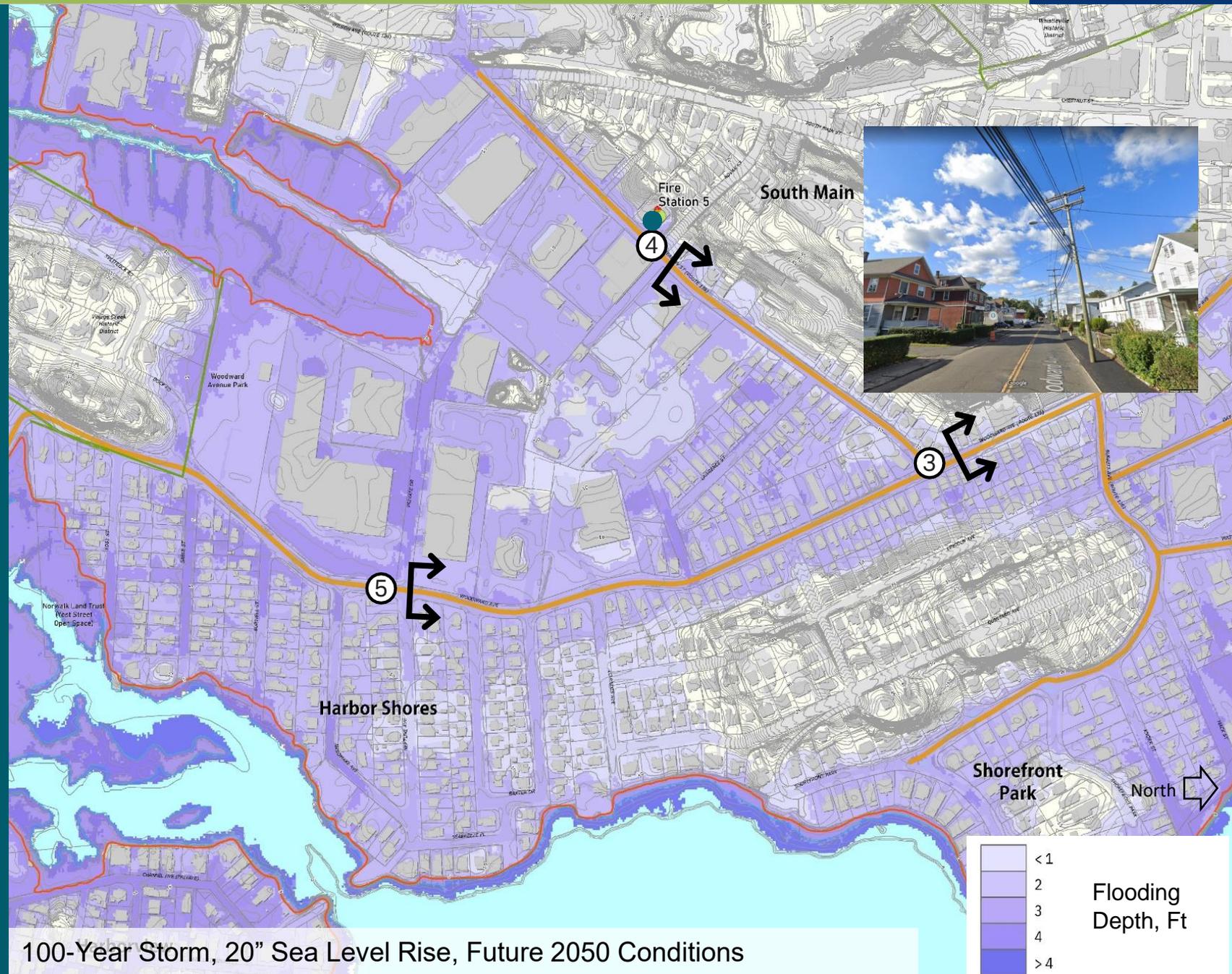


EXISTING AND FUTURE CONDITIONS: Central Study Zone

Future Conditions:

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

③ Northern Woodward Ave:
Single family residential neighborhood



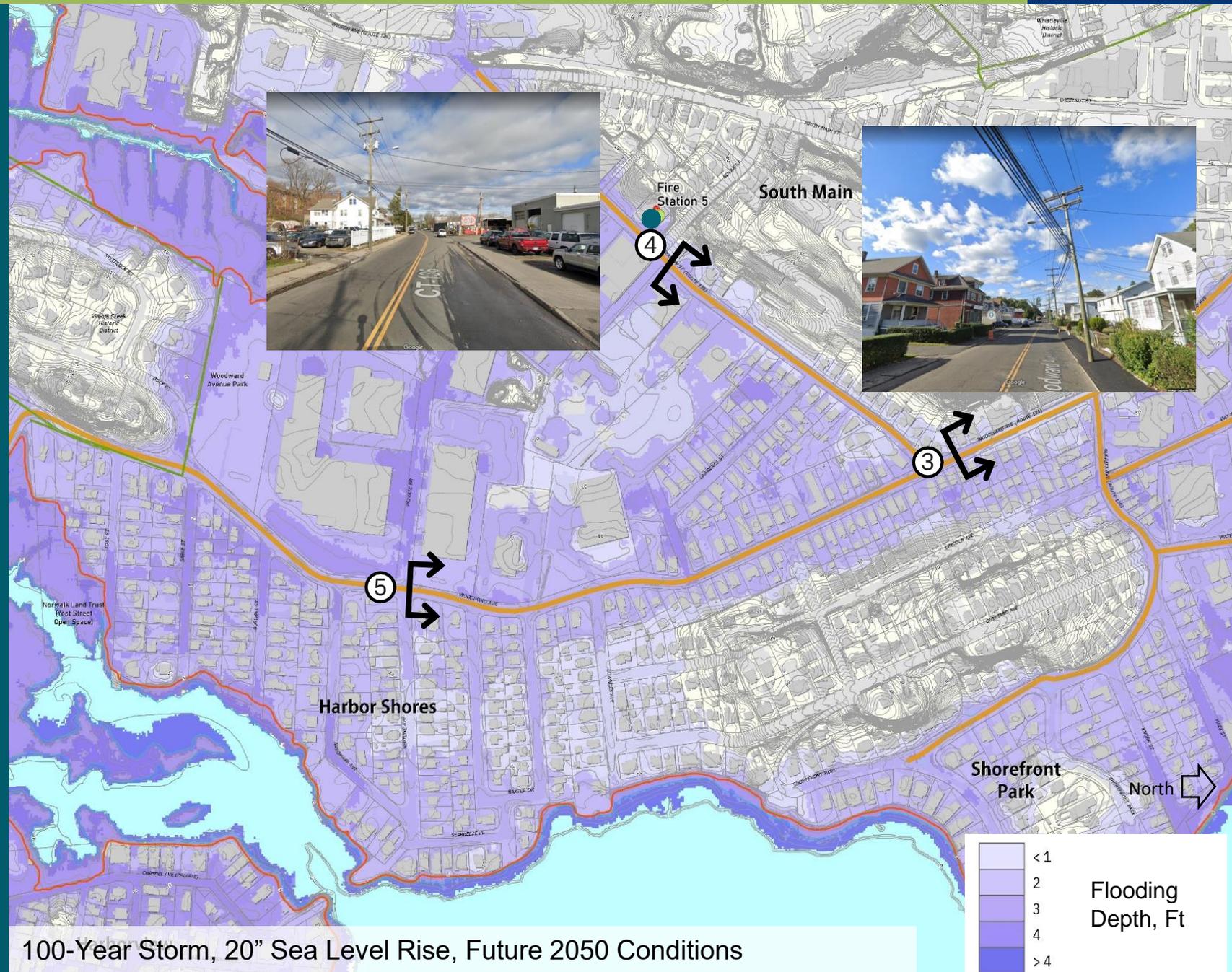
EXISTING AND FUTURE CONDITIONS: Central Study Zone

Future Conditions:

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

③ Northern Woodward Ave:
Single family residential neighborhood

③ Meadow Street:
Industrial Zone



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

EXISTING AND FUTURE CONDITIONS: Central Study Zone

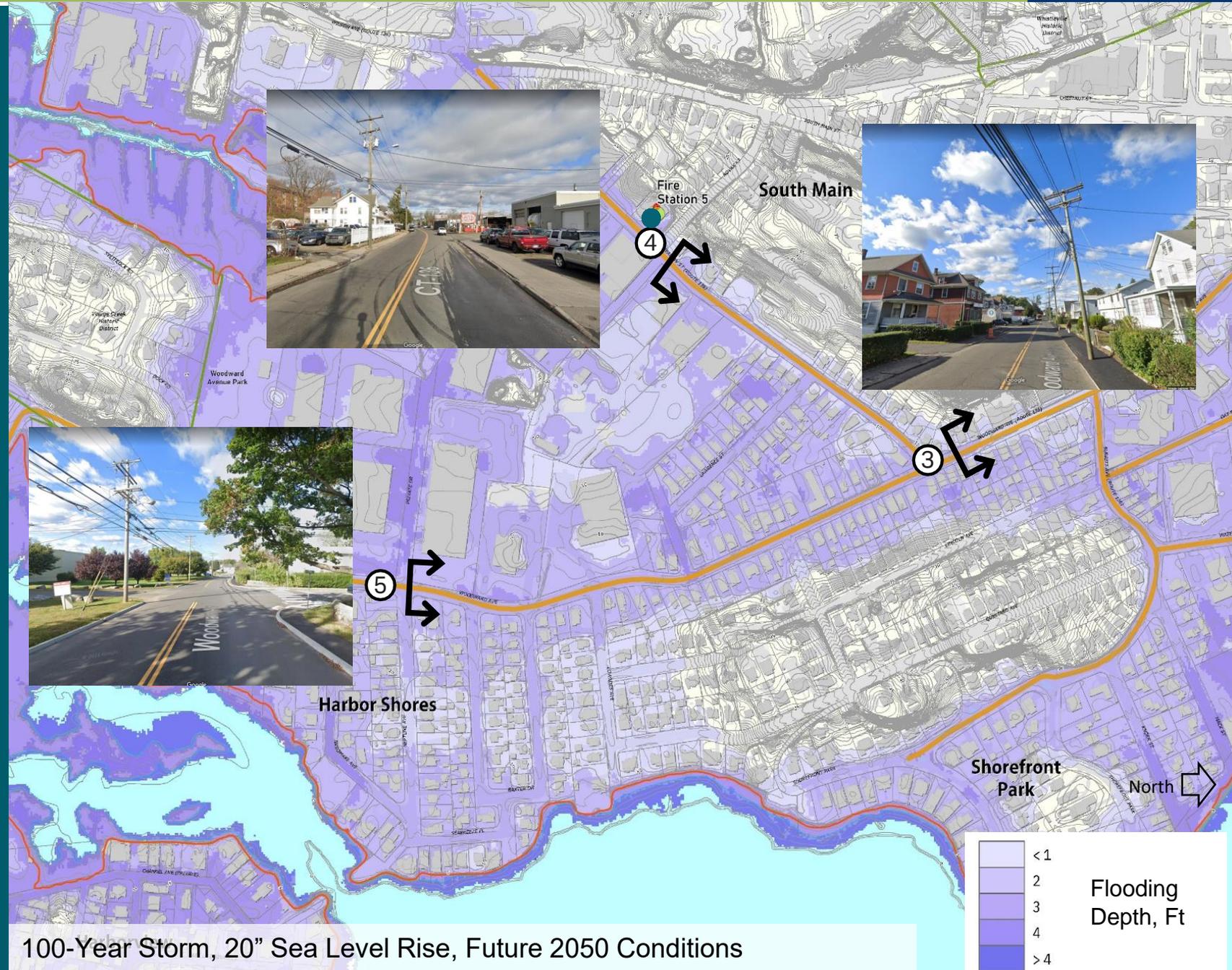
Future Conditions:

- 100-Year Storm in 2050
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Single family residential neighborhood

③ Meadow Street:
Industrial Zone

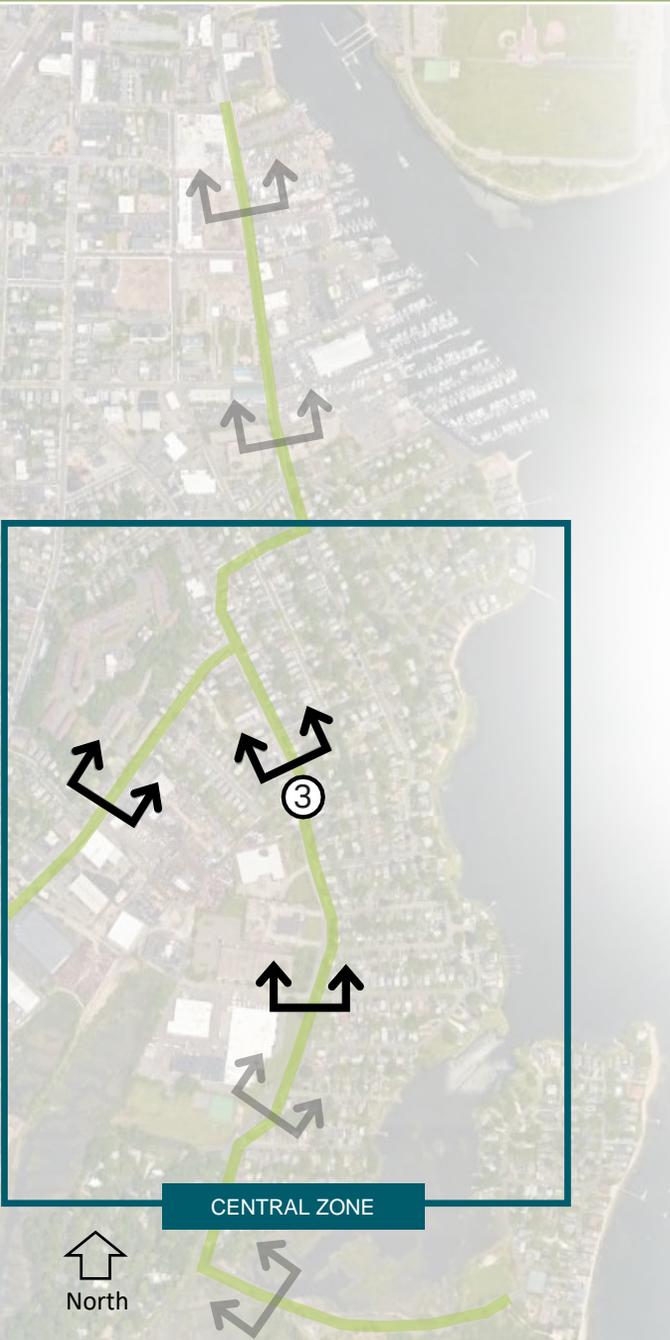
③ Southern Woodward Ave:
Industrial & Single-Family Residential



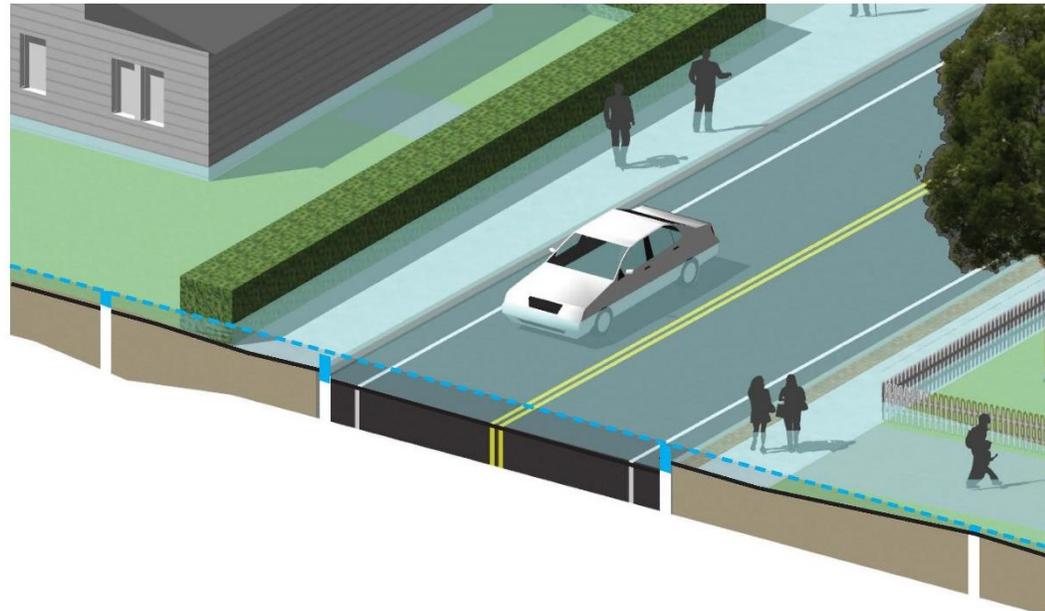
STUDY 3 | Single-Family Residential Neighborhood on Woodward Avenue

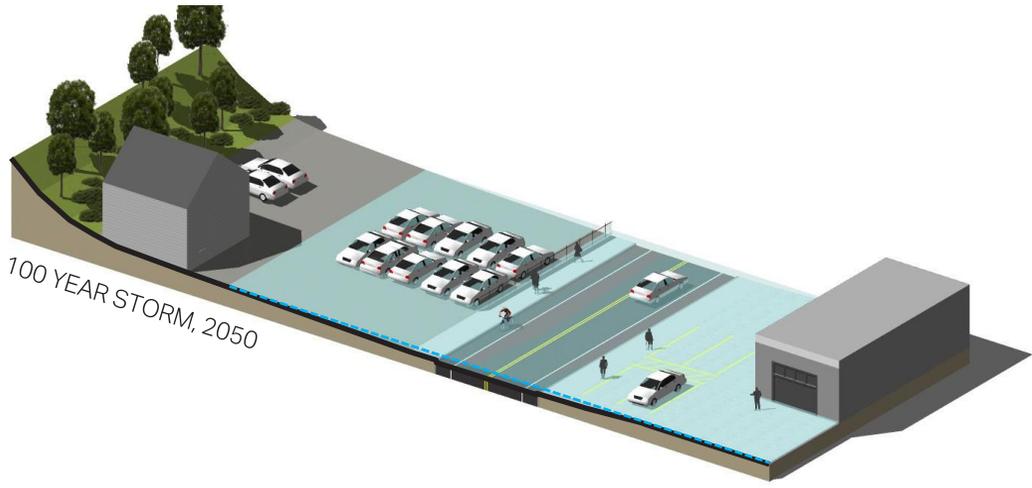
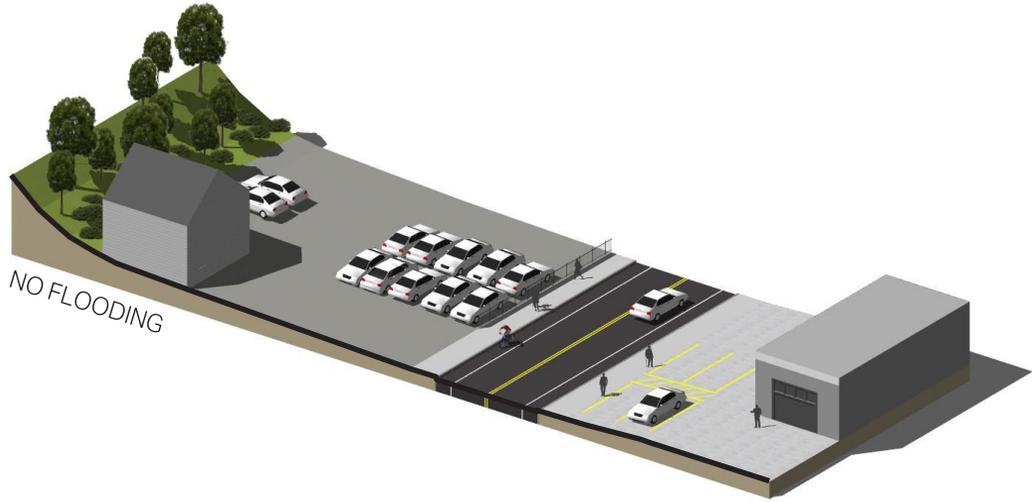


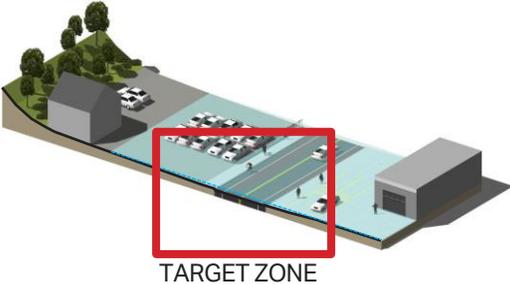
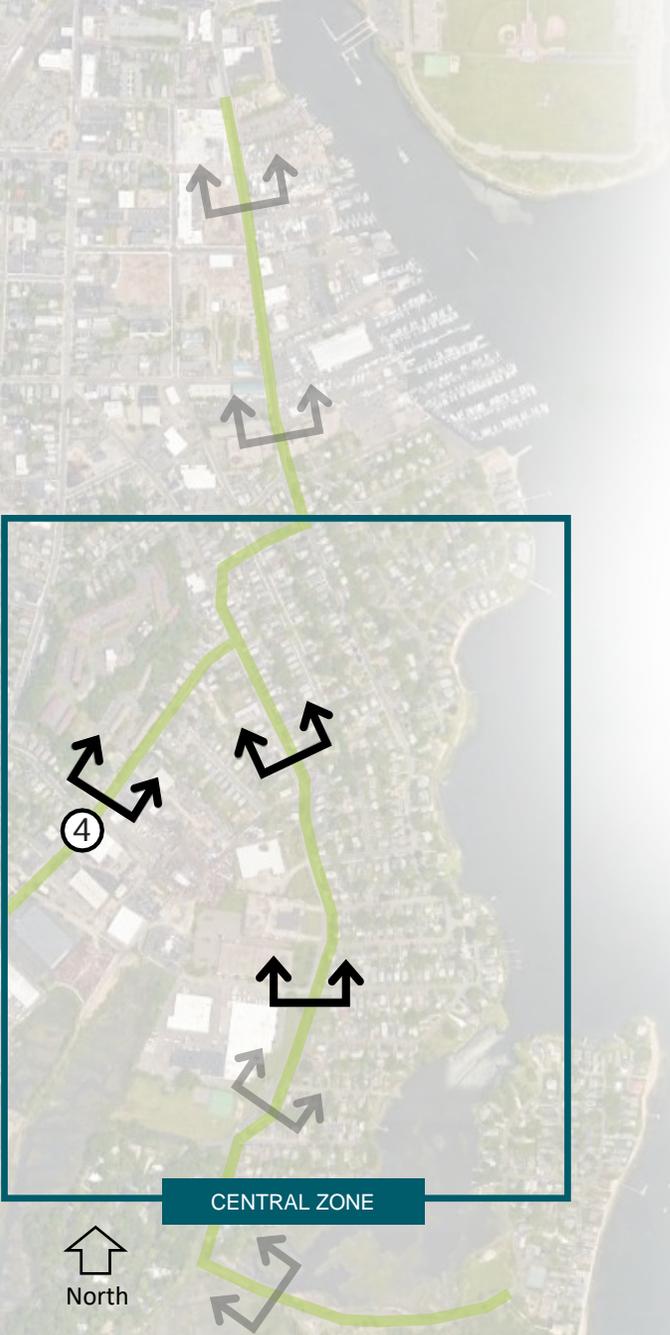
Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022



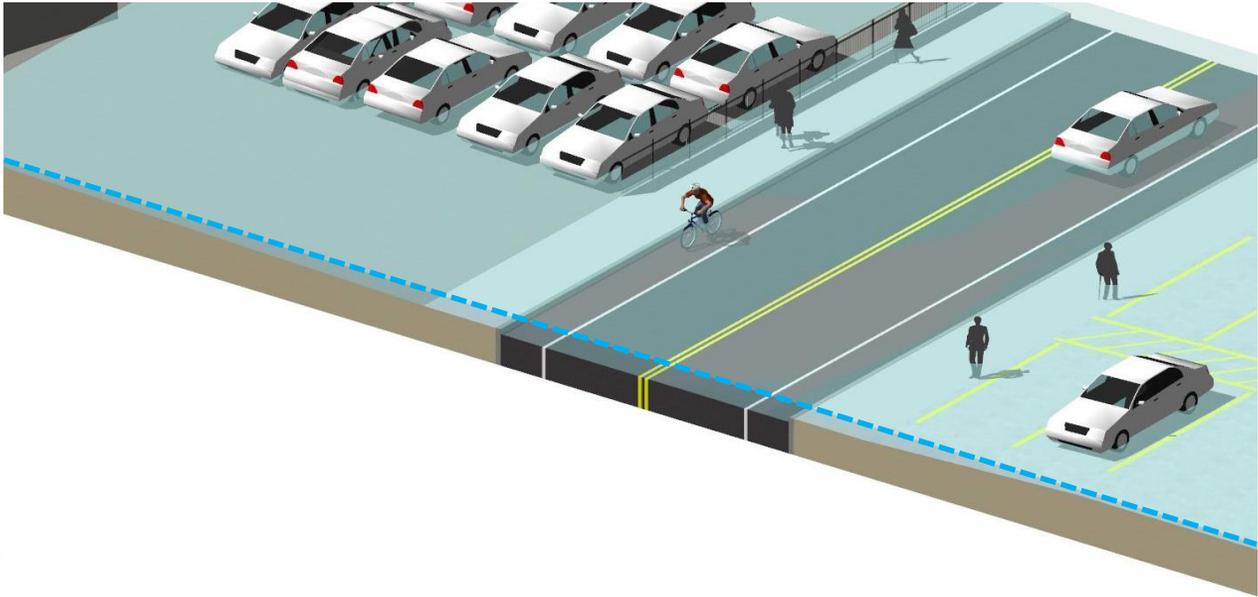
APPROXIMATE FLOOD LEVELS

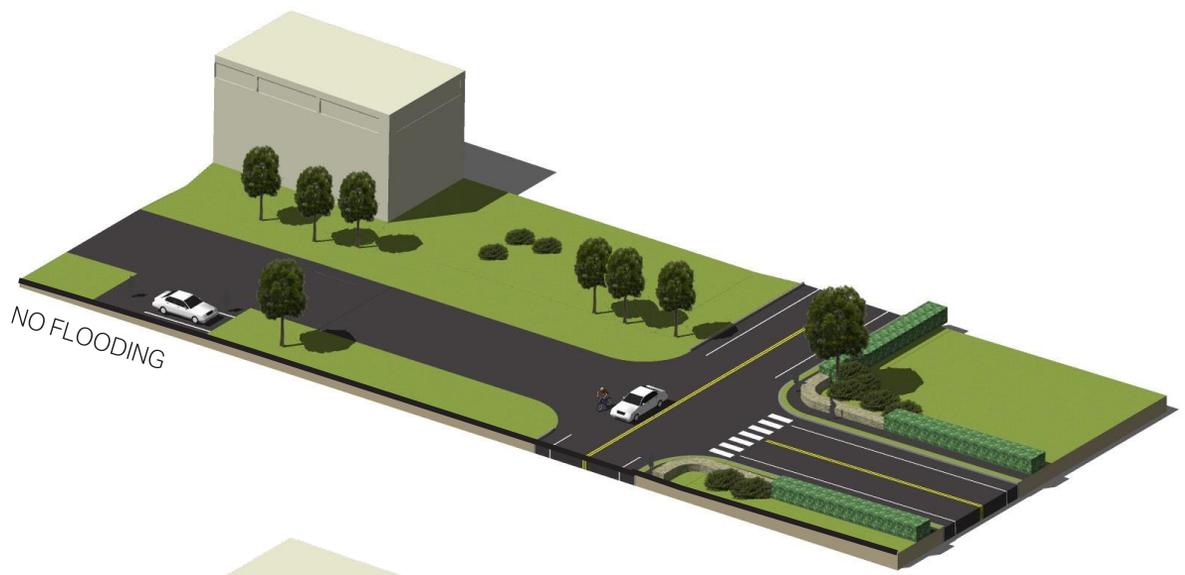
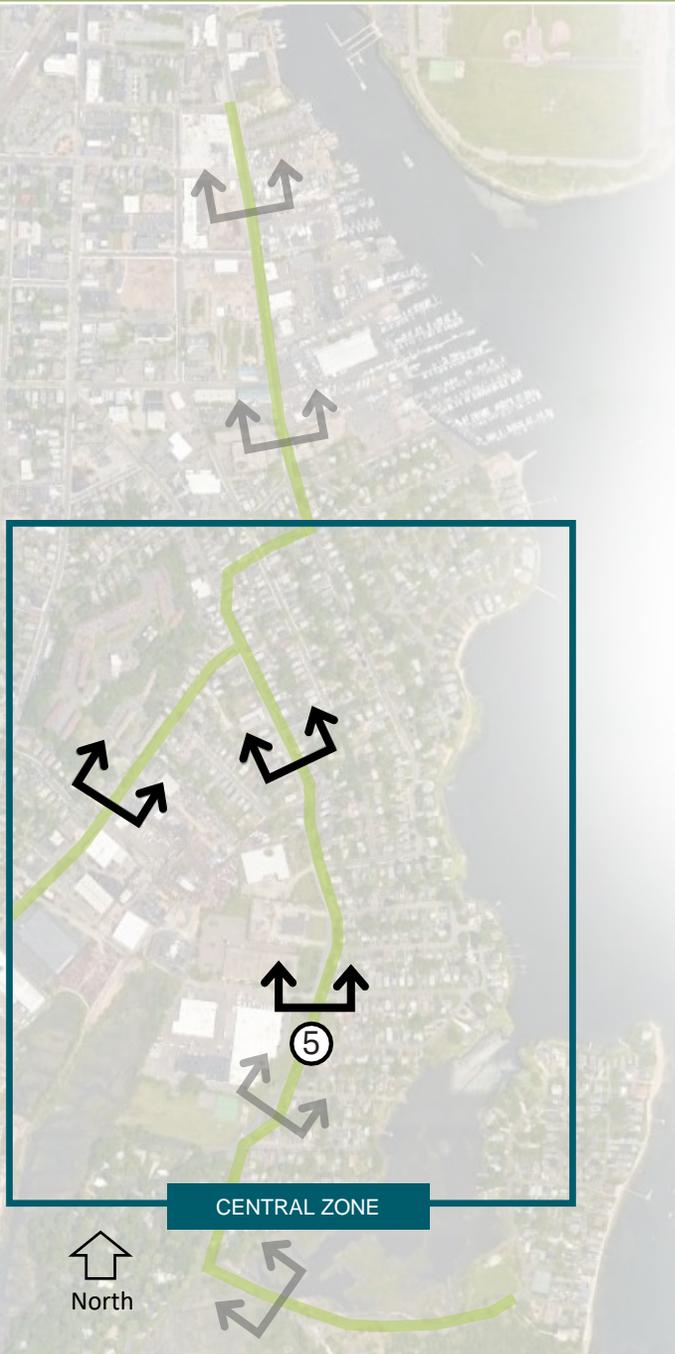


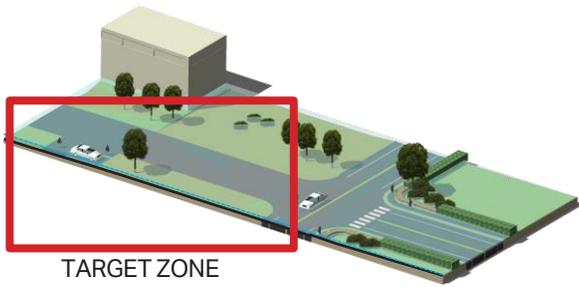
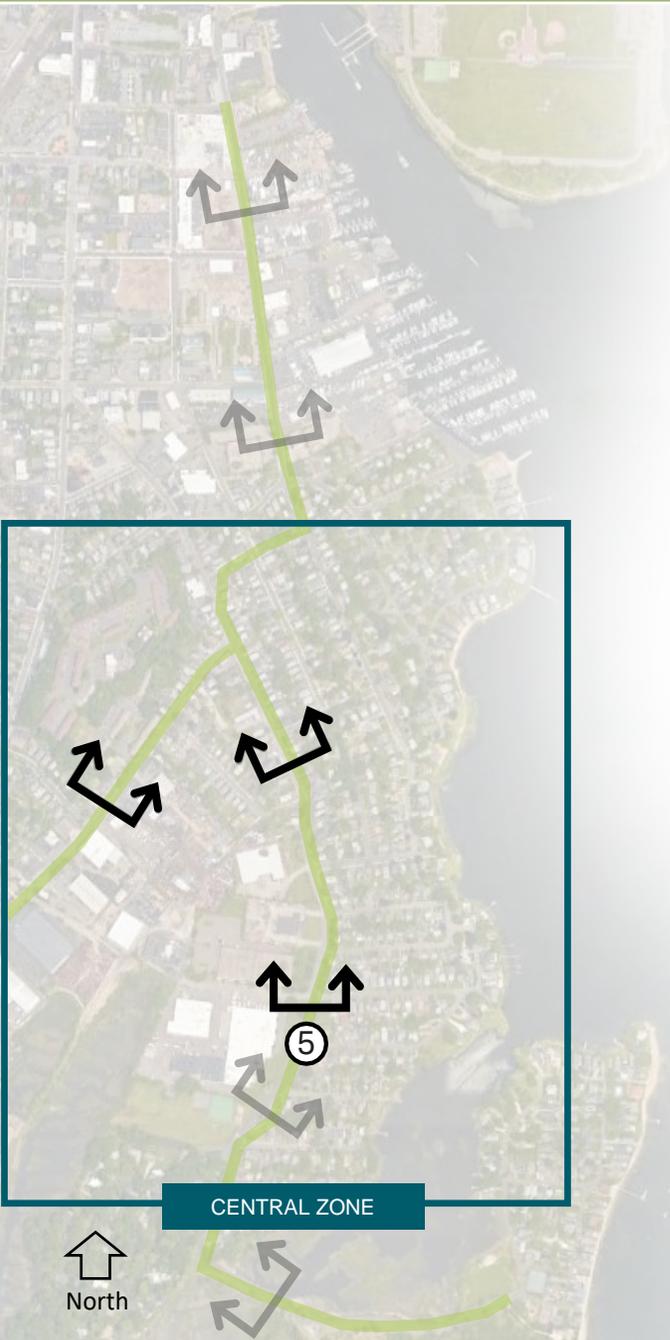




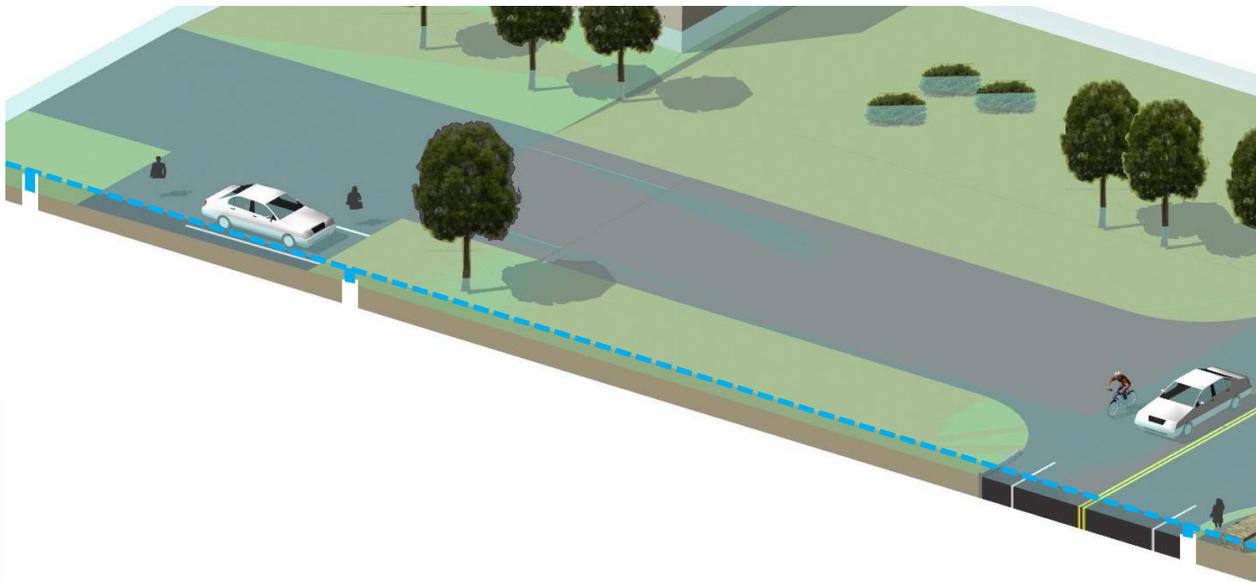
APPROXIMATE FLOOD LEVELS

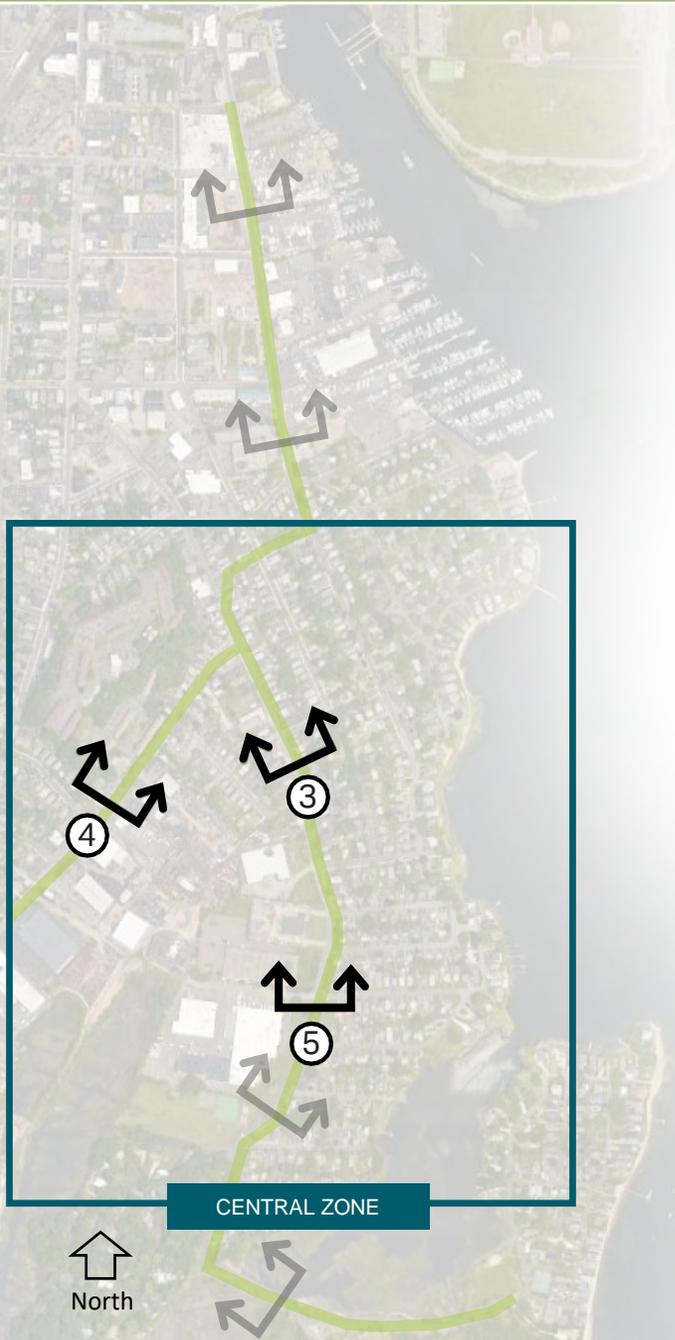




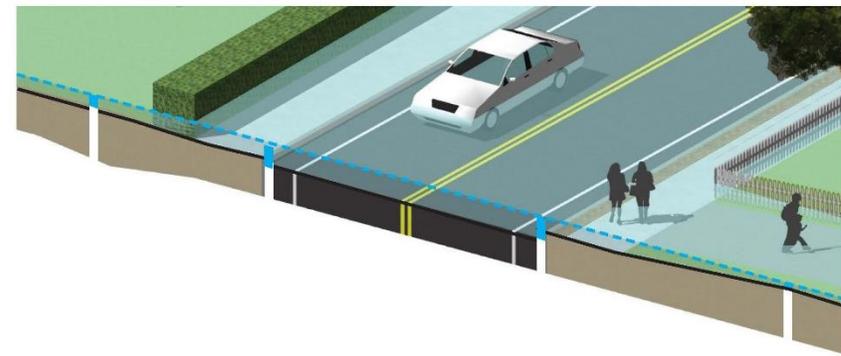


APPROXIMATE FLOOD LEVELS

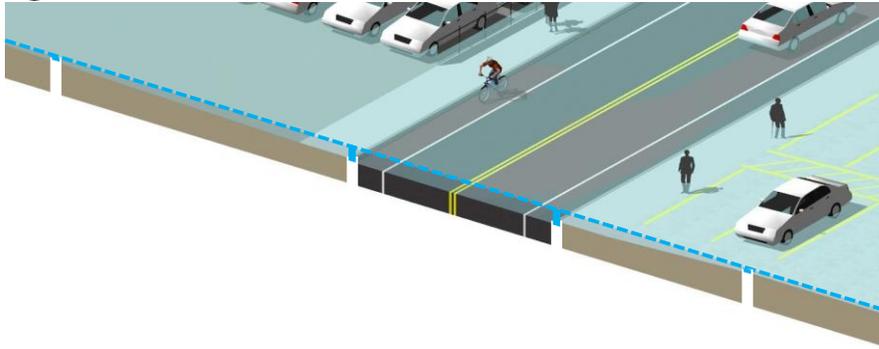




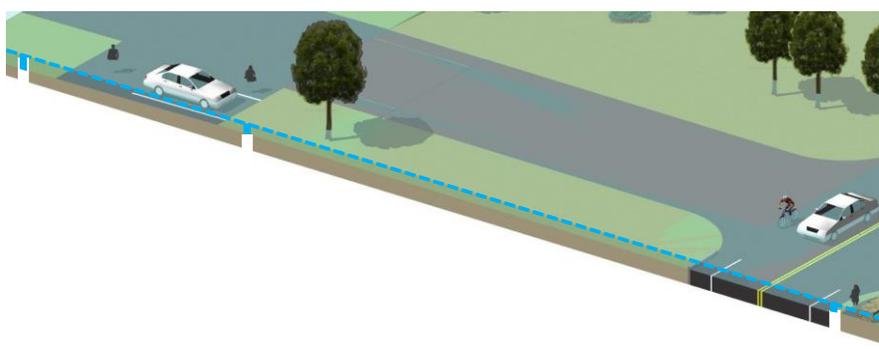
③ RESIDENTIAL NEIGHBORHOOD ON WOODWARD AVE



④ INDUSTRIAL AREA ON MEADOW ST



⑤ INDUSTRIAL AREA ON WOODWARD AVE



EXISTING AND FUTURE CONDITIONS: Central Study Zone

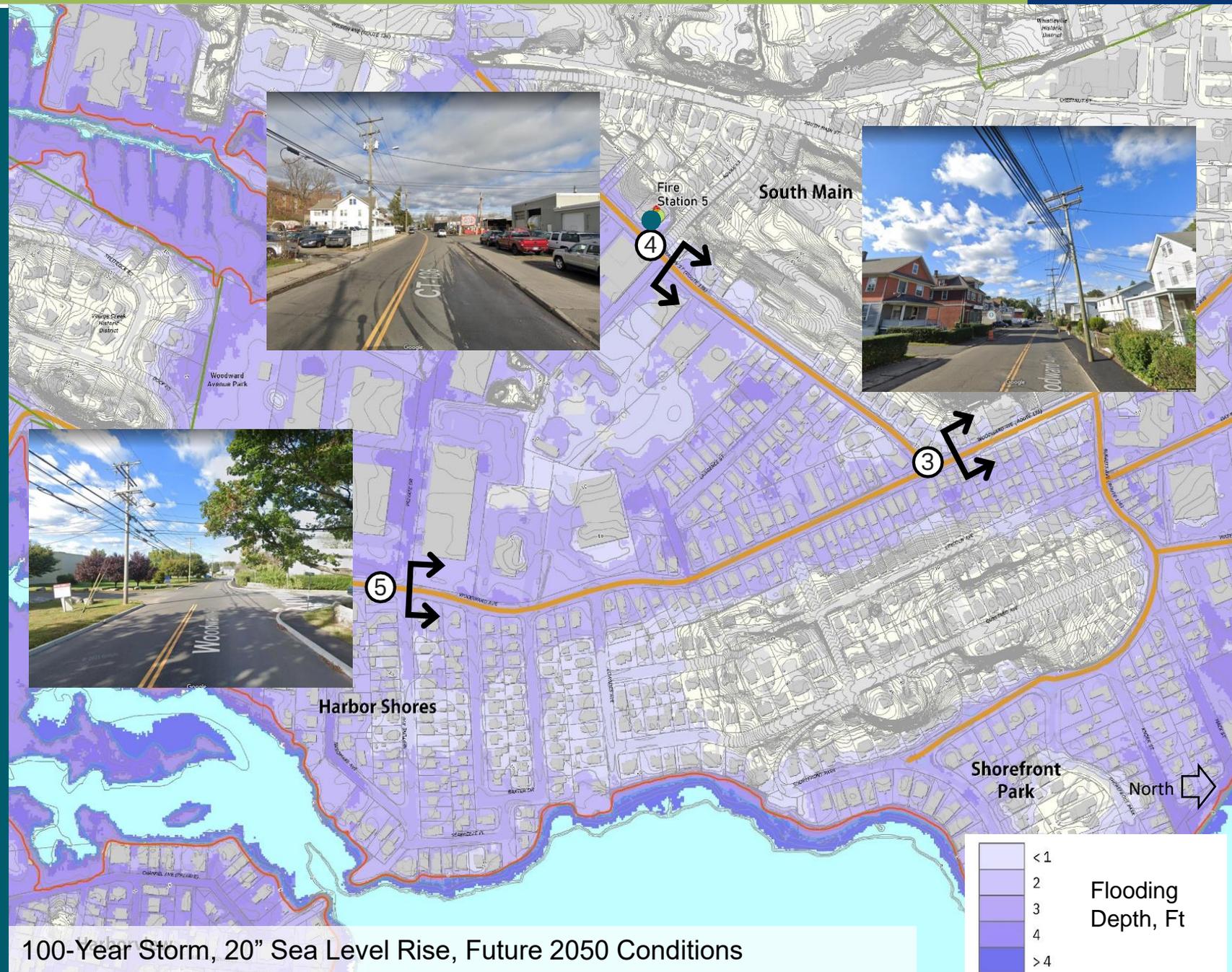
Future Conditions:

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

③ Northern Woodward Ave:
Single family residential neighborhood

③ Meadow Street:
Industrial Zone

③ Southern Woodward Ave:
Industrial & Single-Family Residential

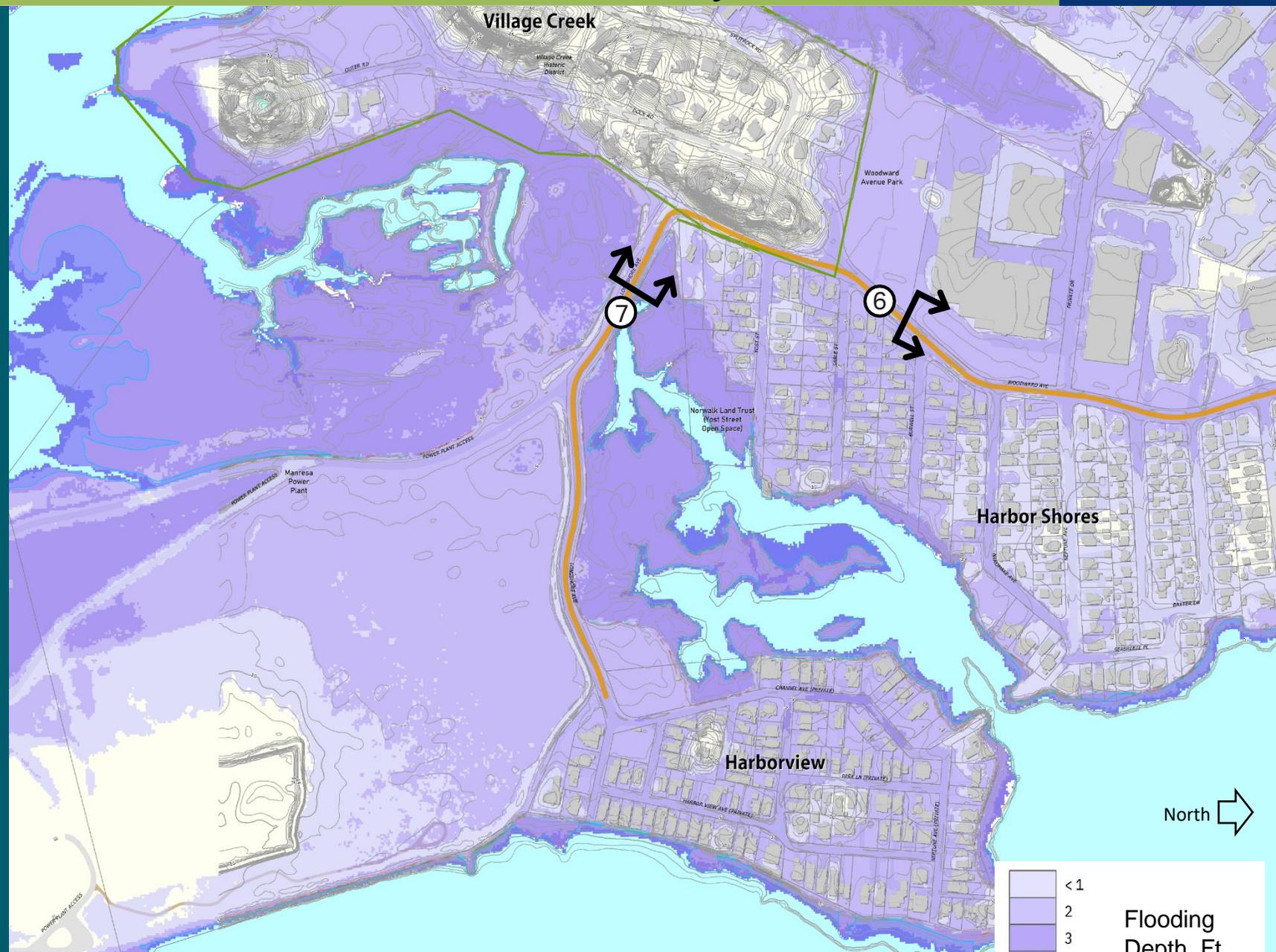


SOUTH ZONE

EXISTING AND FUTURE CONDITIONS: South Study Zone

Existing Conditions:

- 100-Year Storm currently
- No additional sea level rise



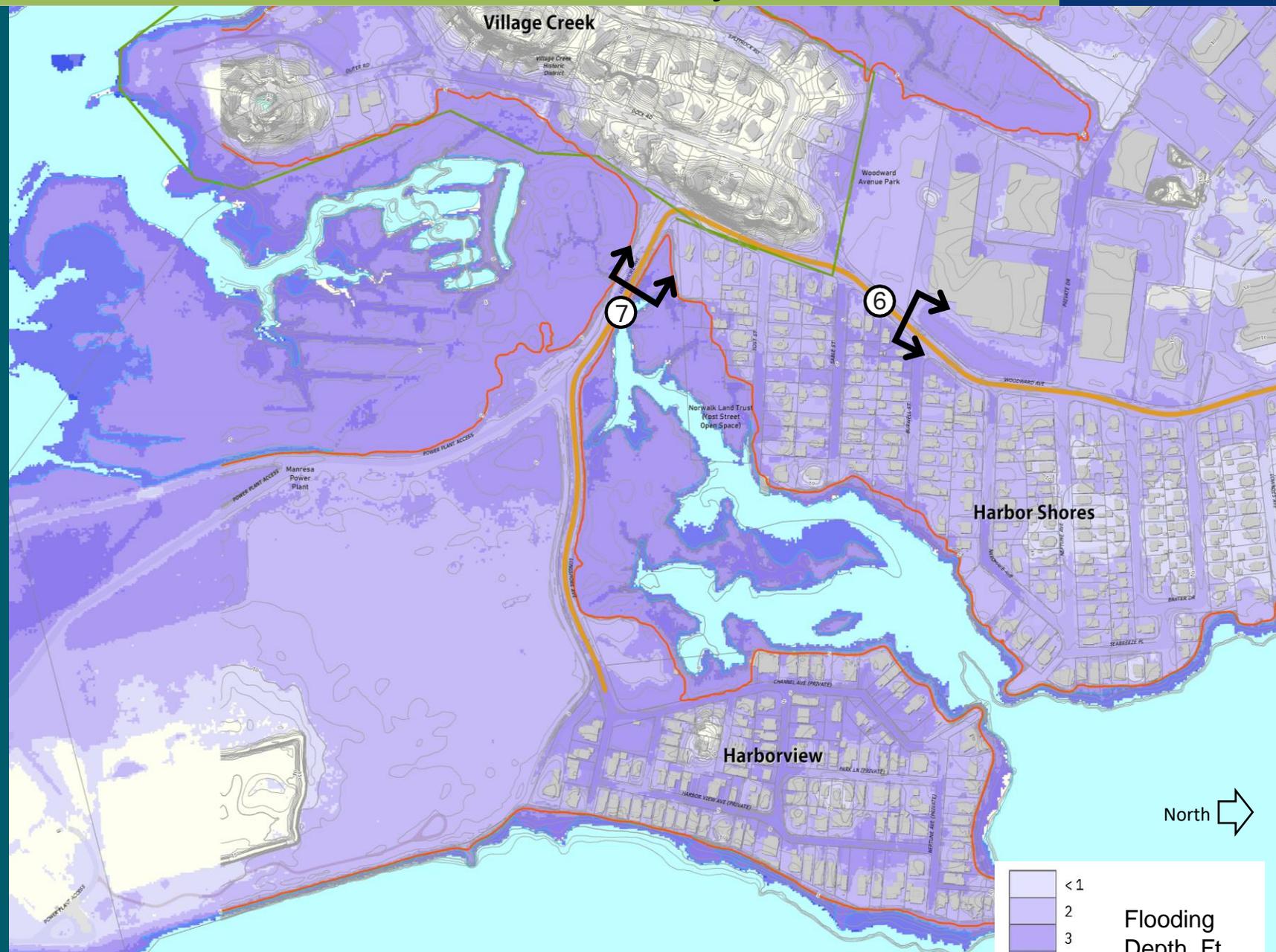
100-Year Storm, No Sea Level Rise, Present Day

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)



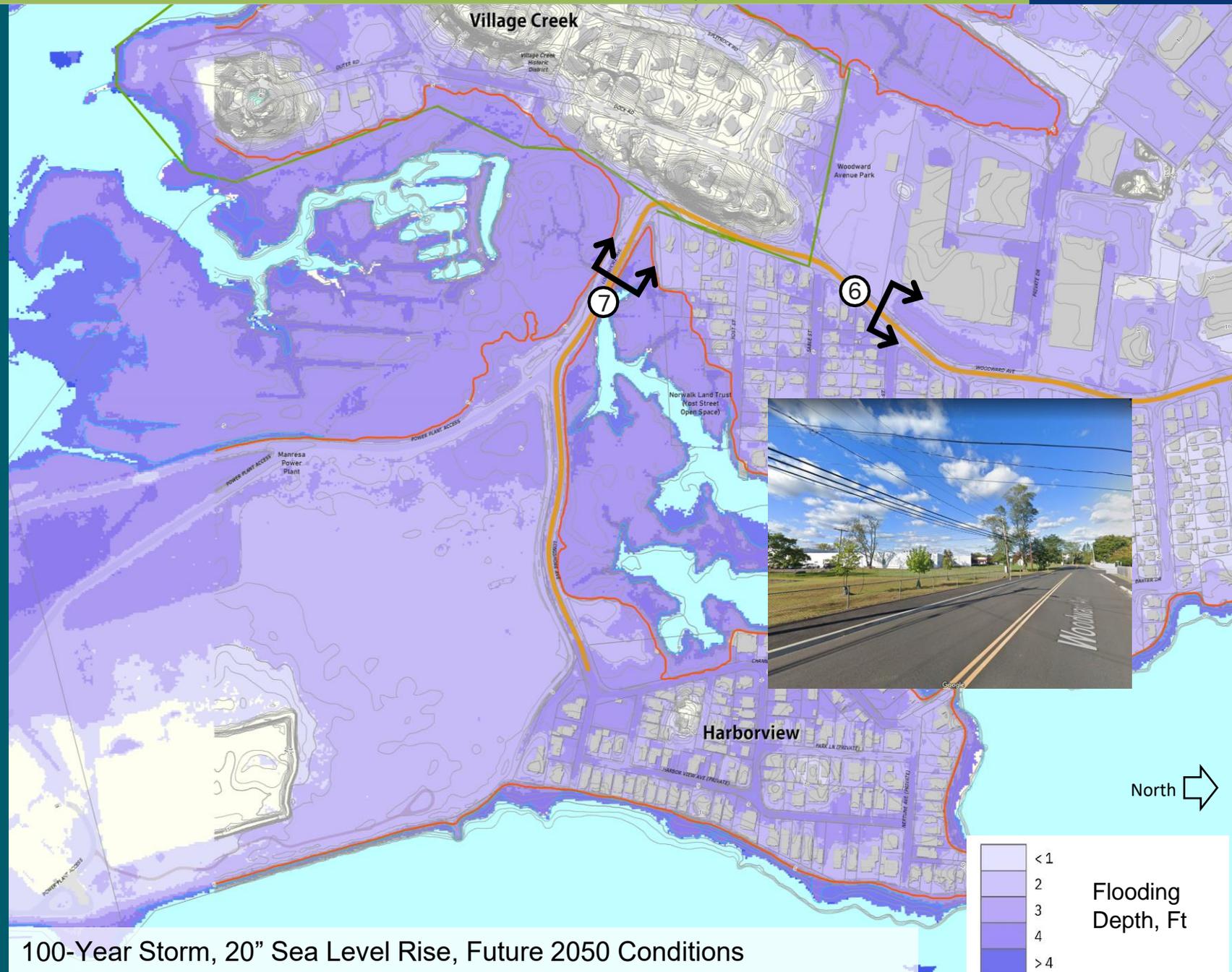
100-Year Storm, 20" Sea Level Rise, Future 2050 Conditions

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



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

EXISTING AND FUTURE CONDITIONS: South Study Zone

Future Conditions:

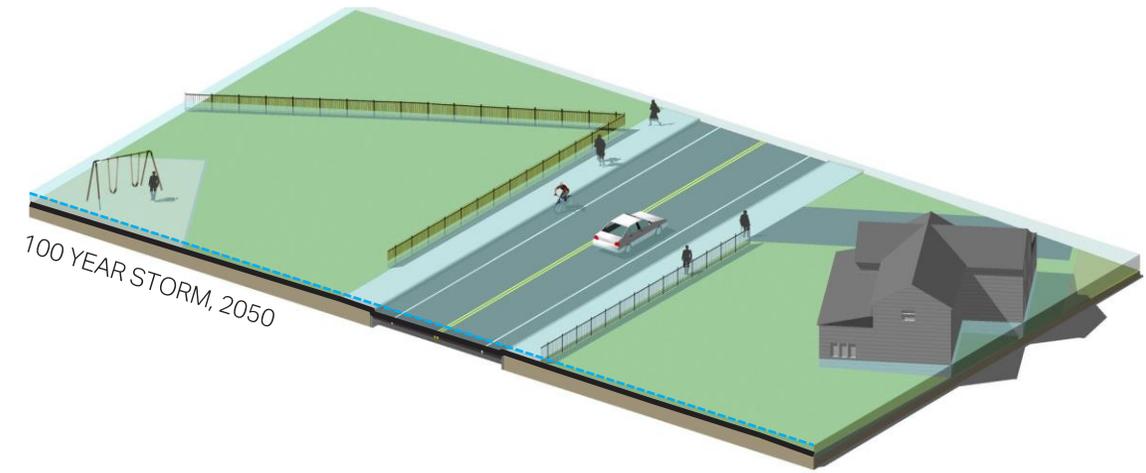
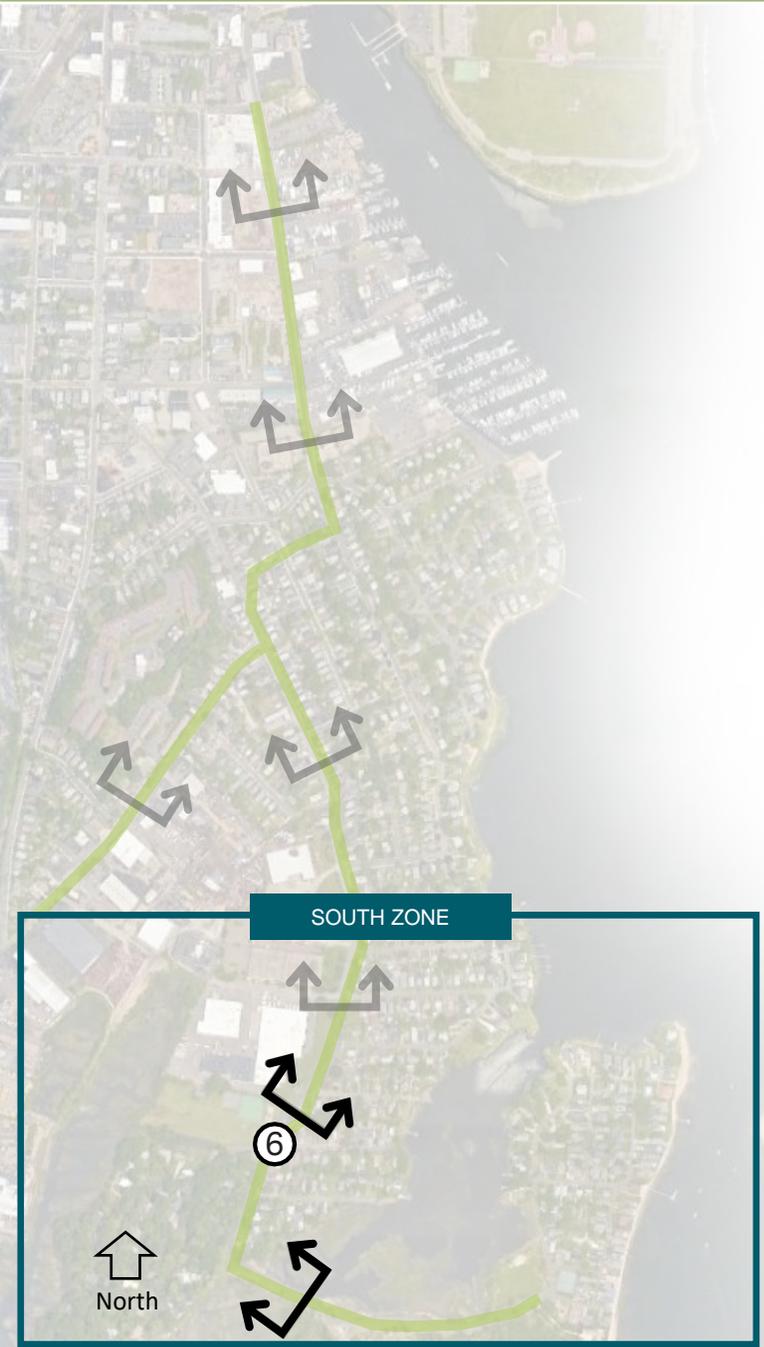
- 100-Year Storm in 2050
- 20" Sea Level Rise

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

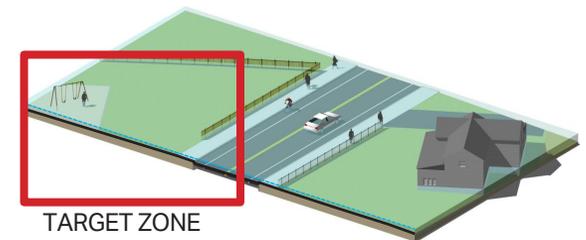
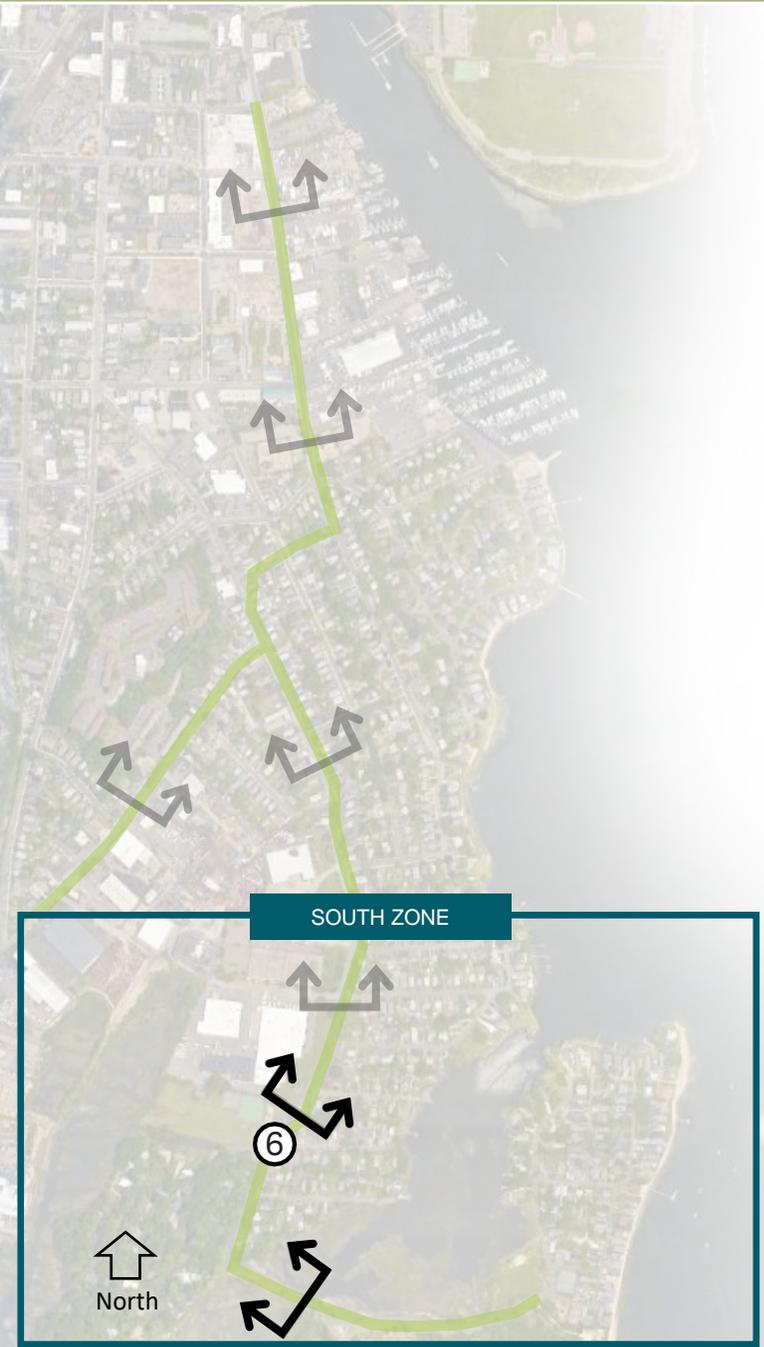
⑦ Longshore Drive:
Protected open space,
wetlands, & Harborview
evacuation route



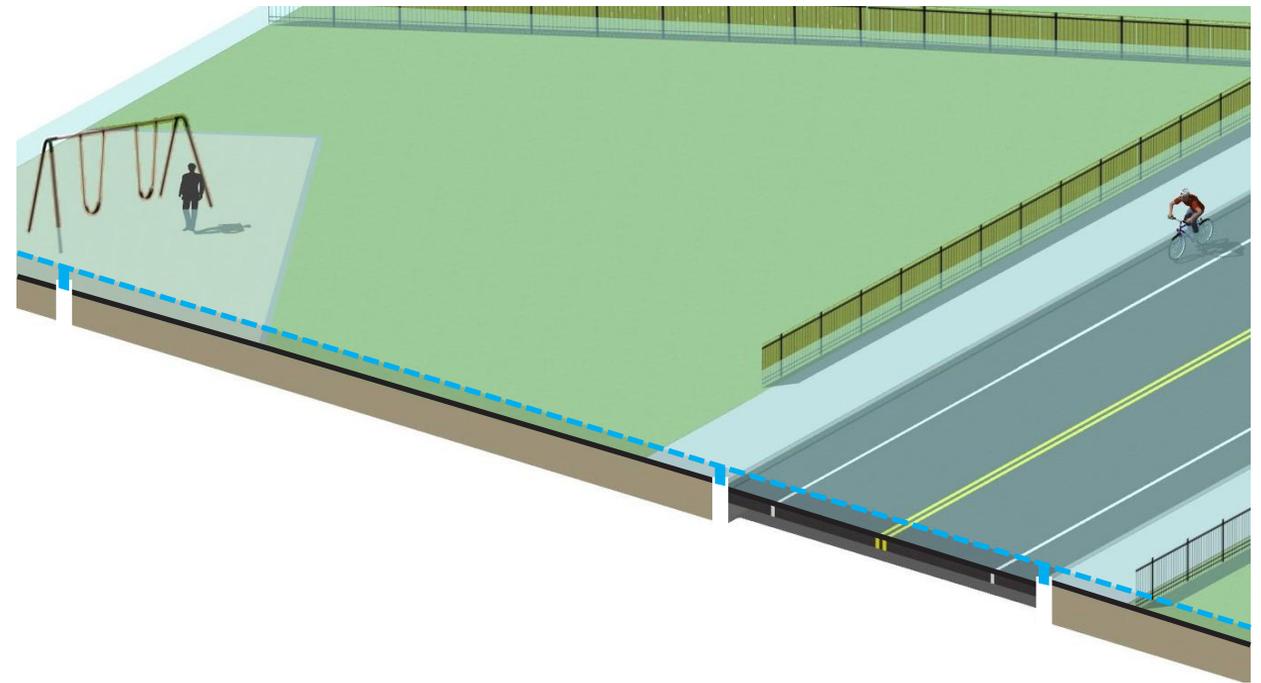
100-Year Storm, 20" Sea Level Rise, Future 2050 Conditions

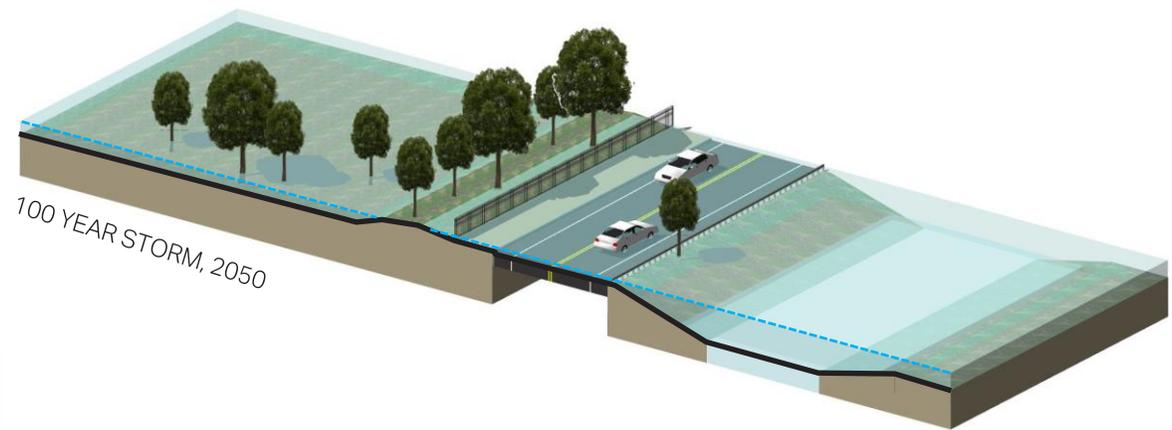
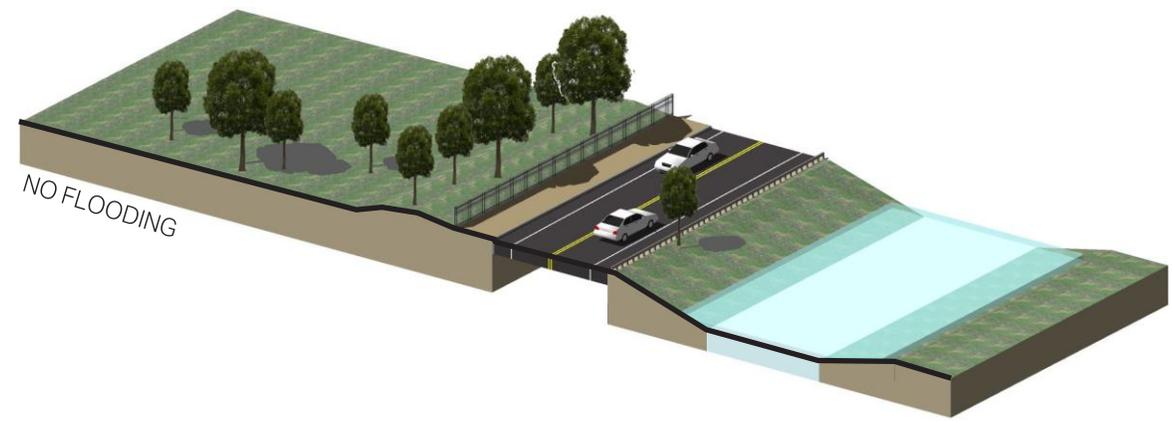
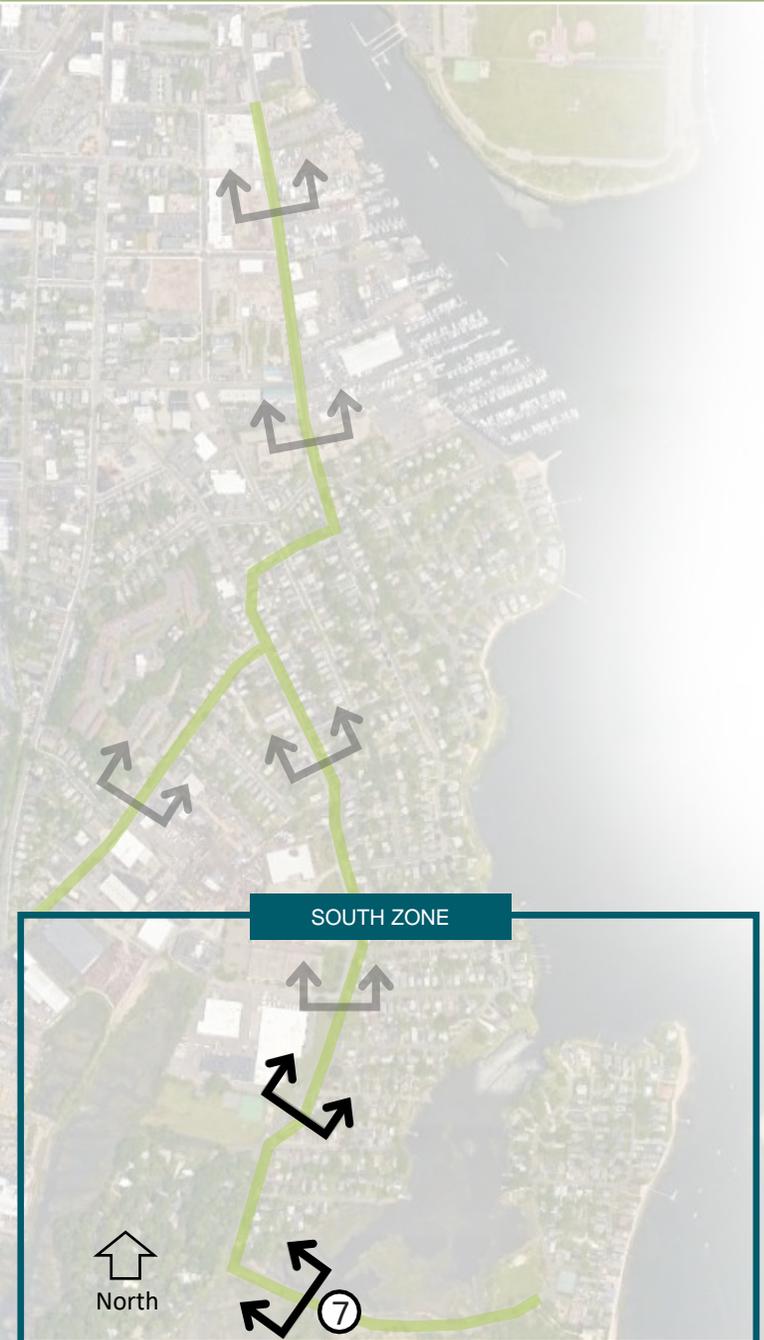


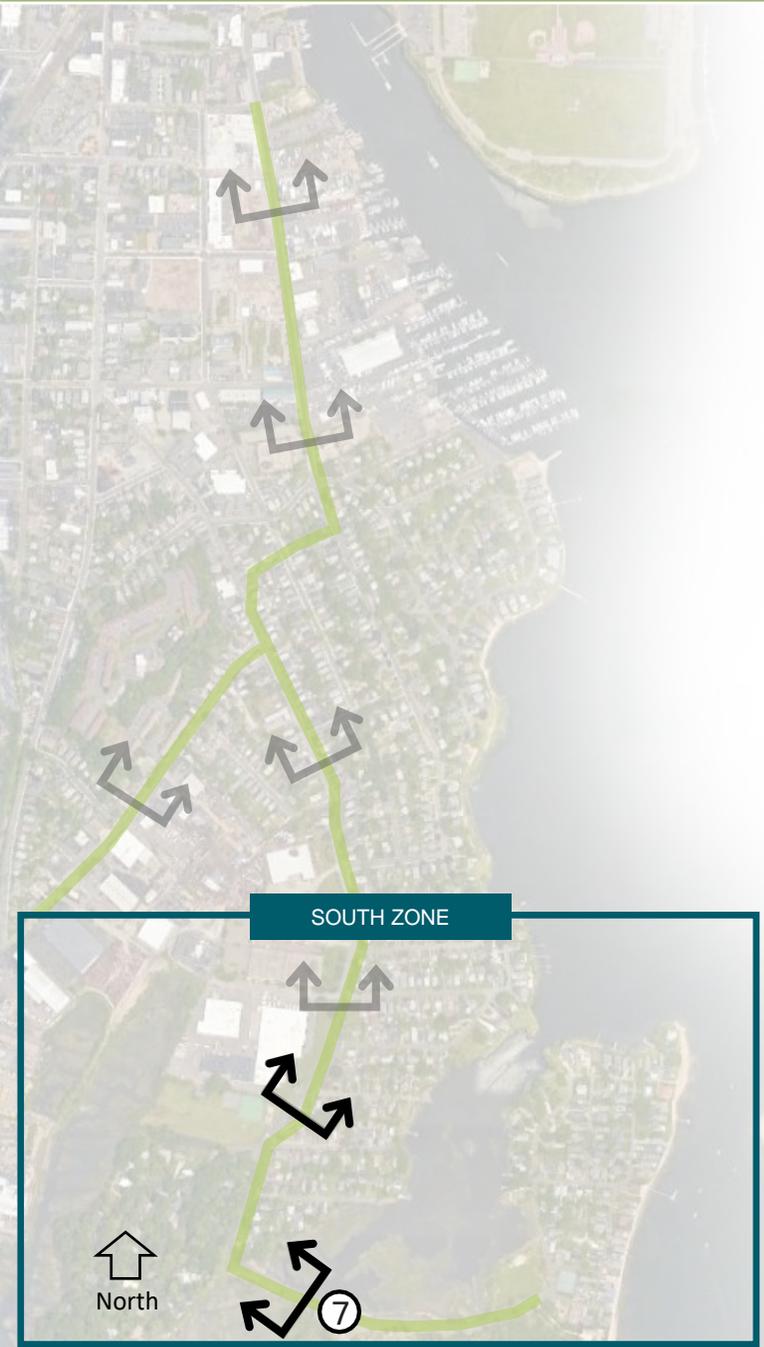
Data sourced from FEMA National Flood Hazard (NFHL) & CIRCA State Guidance Pages:18-82, 2022



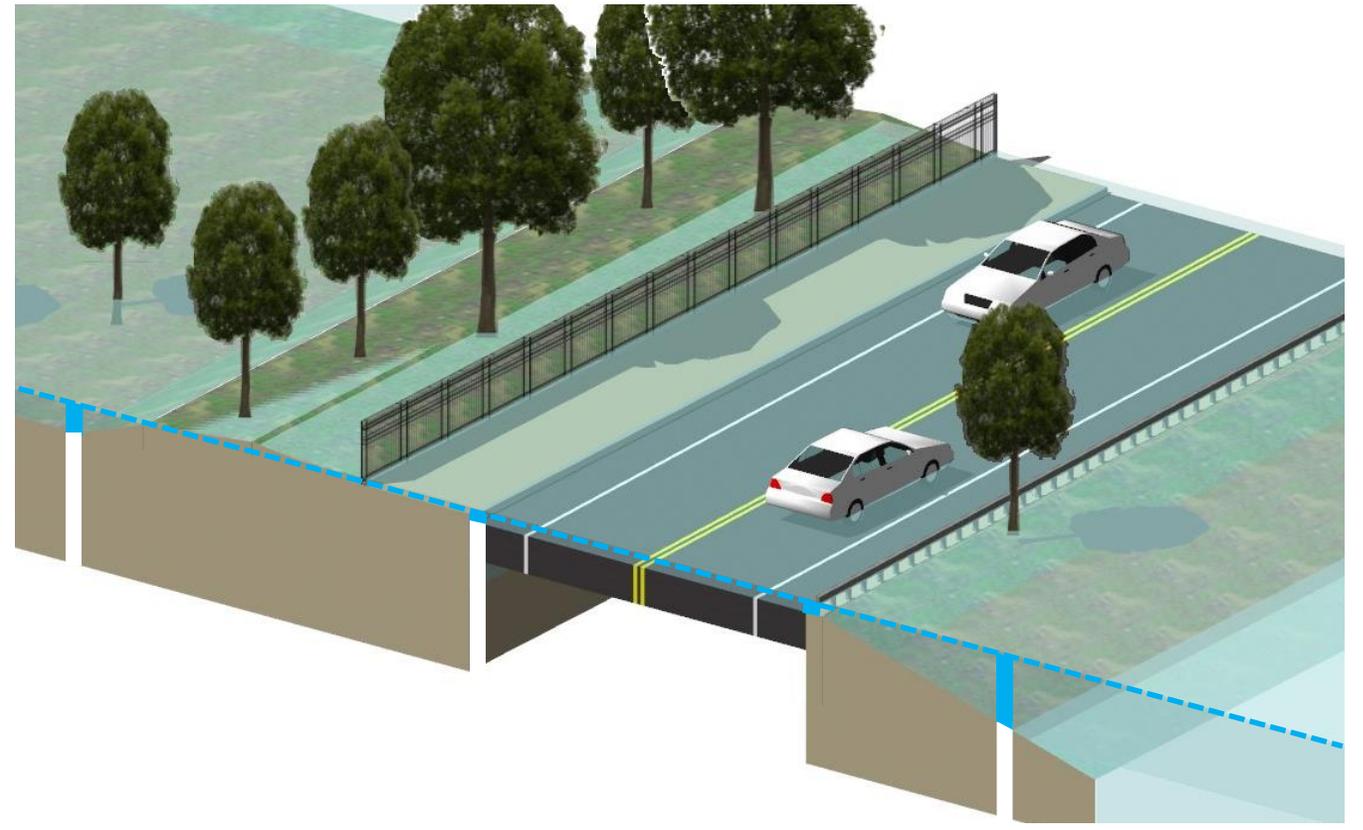
APPROXIMATE FLOOD LEVELS

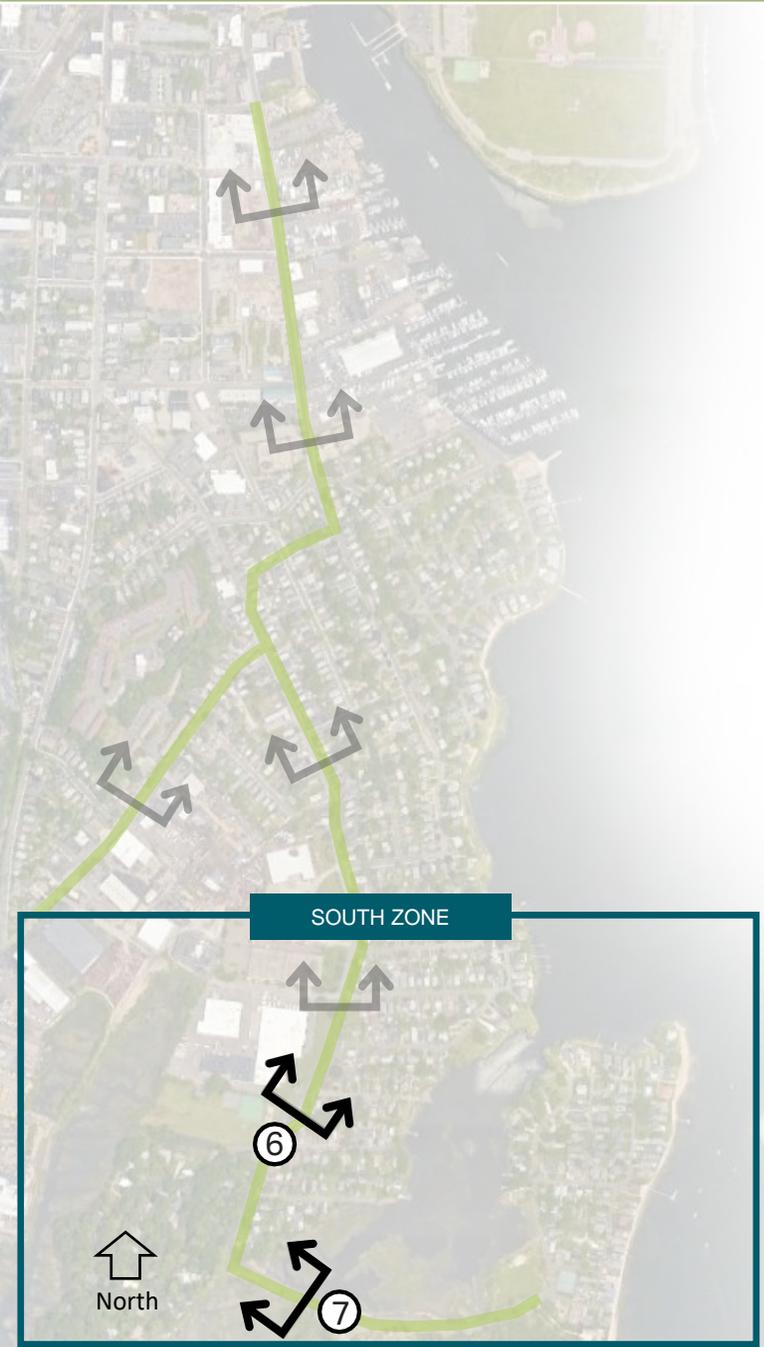




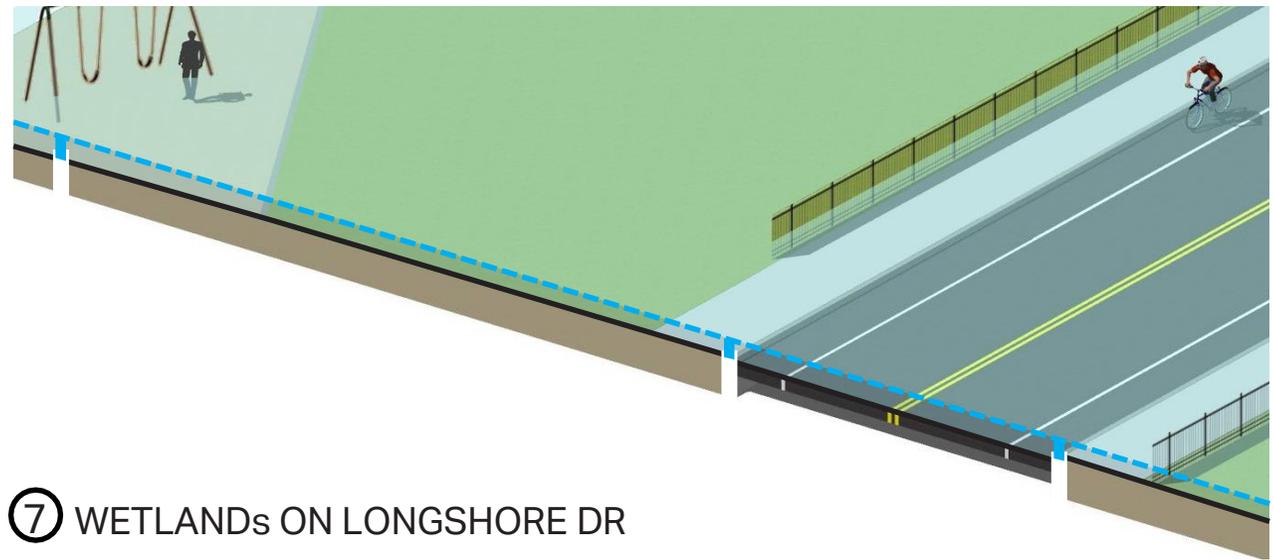


APPROXIMATE FLOOD LEVELS





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

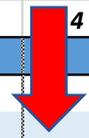
NEXT STEPS

Evaluate next steps incorporating **PERSISTS** decision support criteria:

P ermittable	Can be authorized through necessary federal, state, and local permits
E quitable	Ensures that benefits are equitable among populations
R ealistic	Can be realistically engineered and is plausibly fundable
S afe	Reduces risks to people and infrastructure
I nnovative	Process has considered innovative options
S cientific	Apply and improve on the best available science
T ransferrable	Can serve as model for other communities
S ustainable	Socially, economically, and ecologically sustainable and supported by the public and leadership

SCHEDULE

Resilient South Norwalk Revised 1.10.23													
<i>Assume NTP October 1, 2022</i>													
WORK SCHEDULE	2022	2022	2022	2022	2022	2022	2022	2022	2023	2023	2023	2023	2023
	JUNE	JULY	AUGUST	SEPT	OCT	NOV	DEC	JAN	FEB	MARCH	APRIL	MAY	
month	1	2	3	4	5	6	7	8					
1. Project Mgt													
Kick-Off					KO								
Project Coordination													
Establish Work Schedule													
Project Bi-monthly meetings (6)					PM		PM	PM		PM		PM	
2. Stakeholder Engagement													
Update Advisory Committee (4)						AC			AC	AC	AC	AC	
Organize Public Workshops (3)								PUB		PUB		PUB	
Develop Outreach Materials													
3. Current and Future Conditions Analysis													
Review Previous Plans													
Review Existing Conditions: flooding/storm surge/infrastructure													
Review Heat Data													
Apply Future Projections to Existing Conditions													
4. Adaptation Options and Conceptual Design													
Identify Priority Locations													
Evaluate Flood/heat risk mitigation strategies													
Develop one preferred flood related alternative													
Develop one preferred heat related alternative													
Develop one internal concept plan for buildings													
Identify any proposed easements													
5. Benefit/Cost Analysis													
Develop probable costs for each Concept													
Develop initial calculation of benefits for Concepts													
6. Final Report													
Develop Final Report													
Develop Executive Summary													



THANK YOU!