Seacoast Transportation Corridor Vulnerability Assessment

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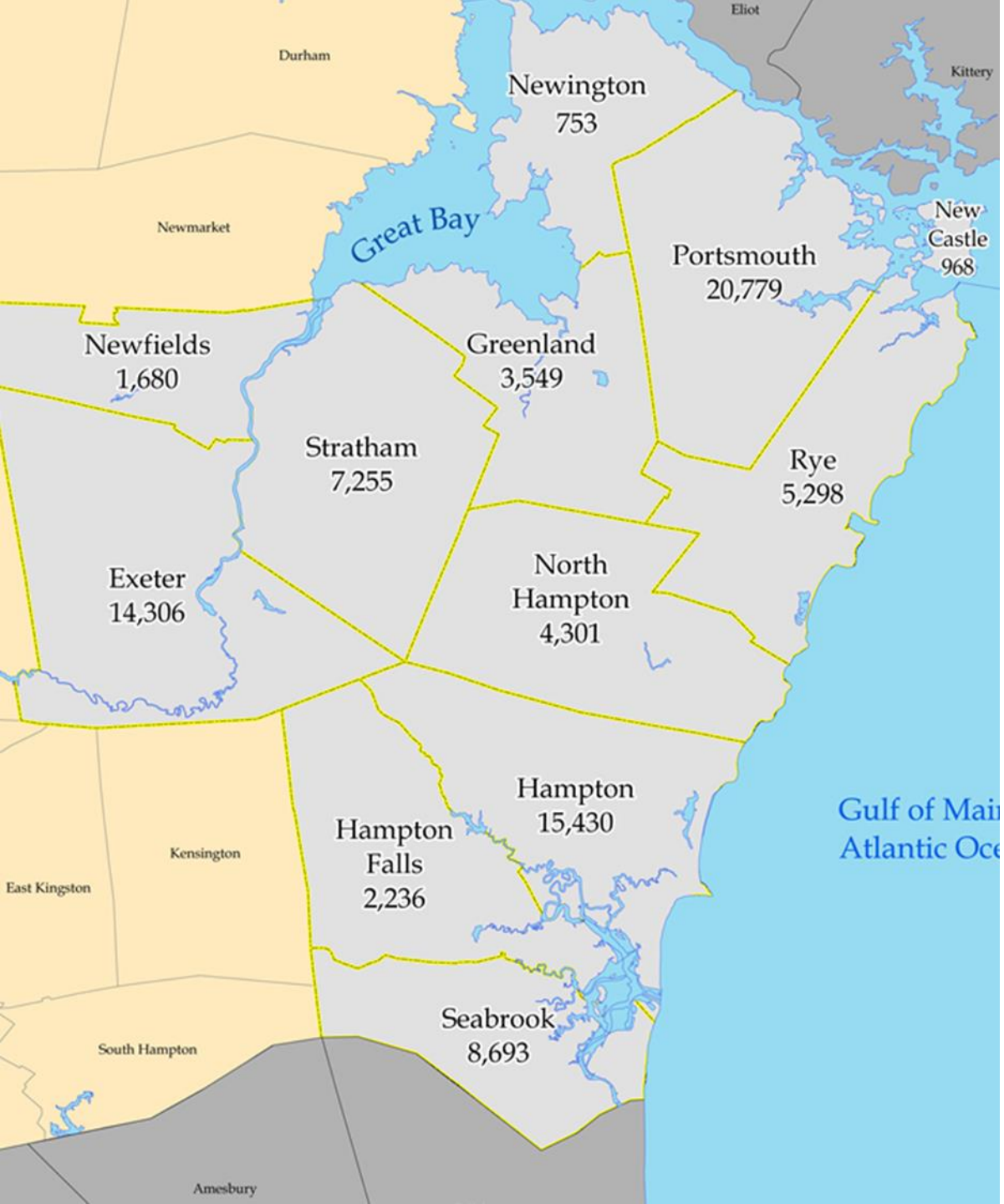
Community Updates & Engagement

Winter, 2022

Image Courtesy of EcoPhotography

Agenda

Project Summary	15 Minutes
Transportation Network Impacts	15 Minutes
Conceptual Adaptation Options	15 Minutes
Community Feedback	30 Minutes



Seacoast Transportation Corridor Vulnerability Assessment (STCVA)

- Funded as a 2019 NOAA Project of Special Merit
- A partnership between:
  - Rockingham Planning Commission
  - NH DES Coastal Program
  - NH Department of Transportation
  - University of New Hampshire
  - 10 NH coastal municipalities

This project was funded,in part, by NOAA's Office for Coastal Management under the Coastal Zone Management Act in conjunction with the New Hampshire Department of Environmental Services Coastal Program.

STCVA Goals

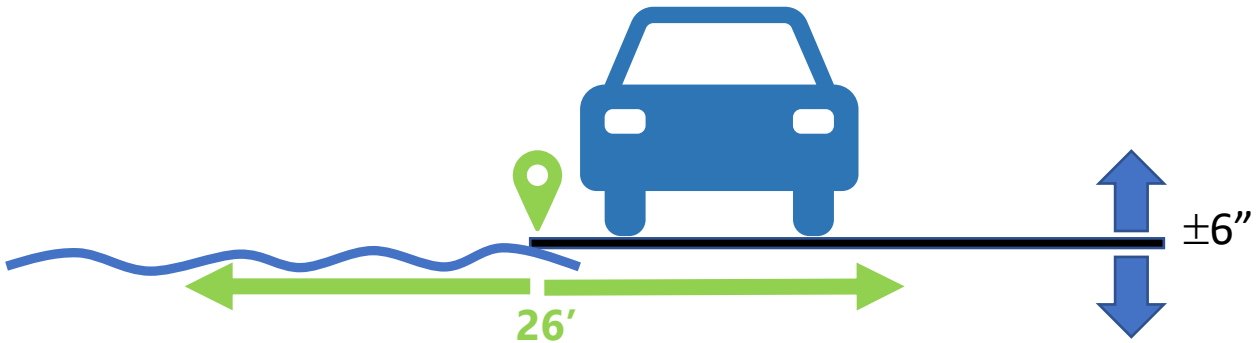
- Assess the impacts of projected sea-level rise on the seacoast transportation network (1', 1.7', 4', and 6.3' sea-level rise scenarios.
- Evaluate changes in traffic volume, travel patterns, road capacity, road conditions due to SLR
- Identify & prioritize sites impacted by flooding for further evaluation
- Identify adaptation and resilience strategies for priority sites
- Improve RPC/MPO decision making processes

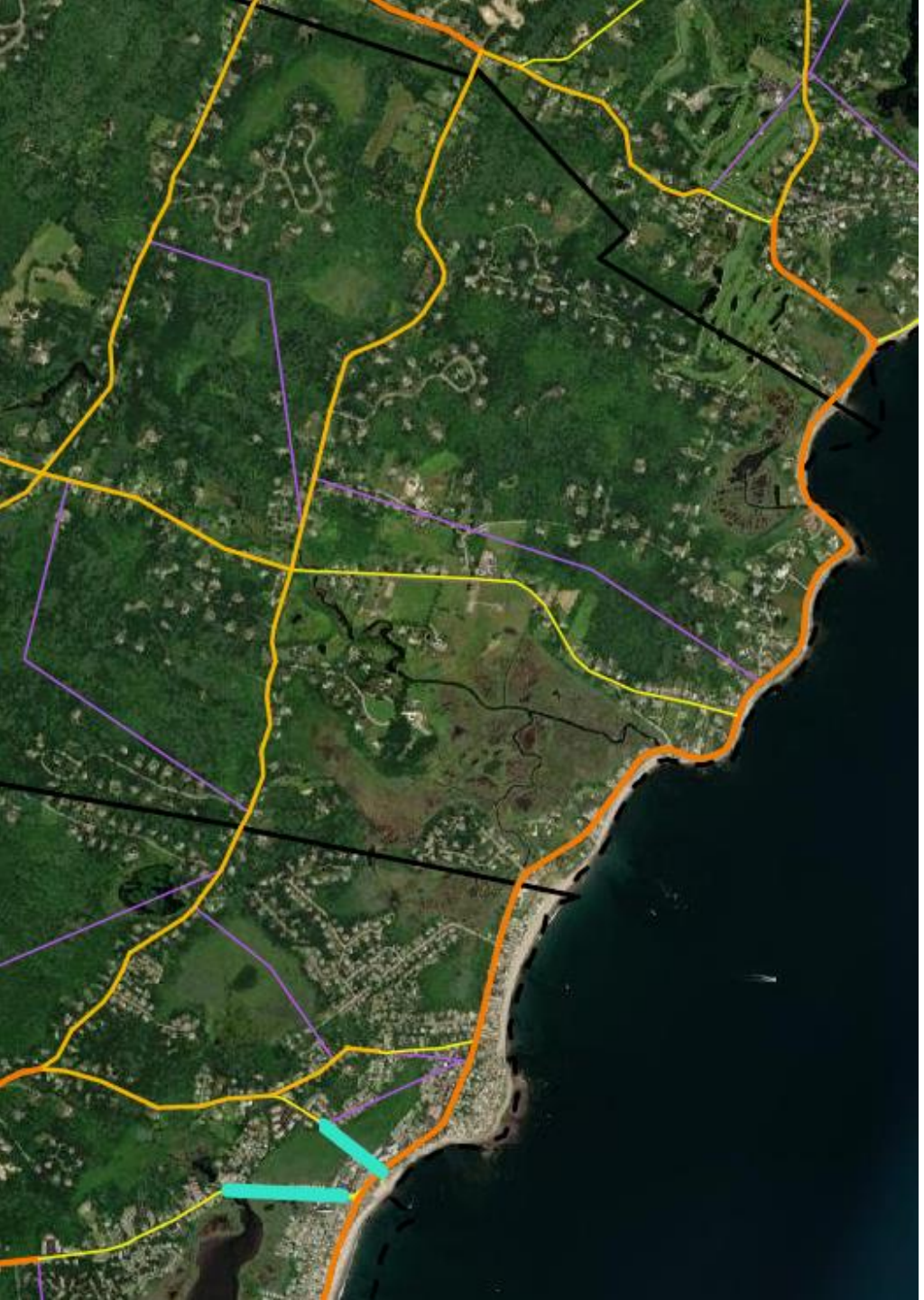
STCVA Transportation Planning Outcomes

- Enhanced understanding of risks to transportation network from climate change
- Critical links identified and impacts of closures on the transportation network assessed
- Improvement concepts and costs developed for priority locations to better understand scope and scale of building a more resilient system
- Improved resiliency factors for the general project selection process
- Data and analysis available for other planning and project development efforts.
- Policies defined that can facilitate a more resilient transportation system

LIDAR Data Accuracy

- Based on Light Detection and Ranging (LIDAR) data from 2011
- LIDAR data has roughly ±6" vertical accuracy
- Horizontal accuracy is roughly 13' – We know a point is somewhere within a 26' diameter circle
- Important to recognize when examining edges and smaller sites





Travel Demand Model Caveats

- Model is primarily intended to look at big-picture traffic patterns but can provide insight into local movement
- Model includes many, but not all, local roadways
- Land use aggregated into zones (Houses create traffic, businesses receive it)
- Trips are loaded from zones to roadway network via load links (purple lines)
- Placement of load links can create odd outcomes
- What the model believes is the most efficient route can sometimes diverge from what is seen in real life

Identifying & Prioritizing Impacted Roadways

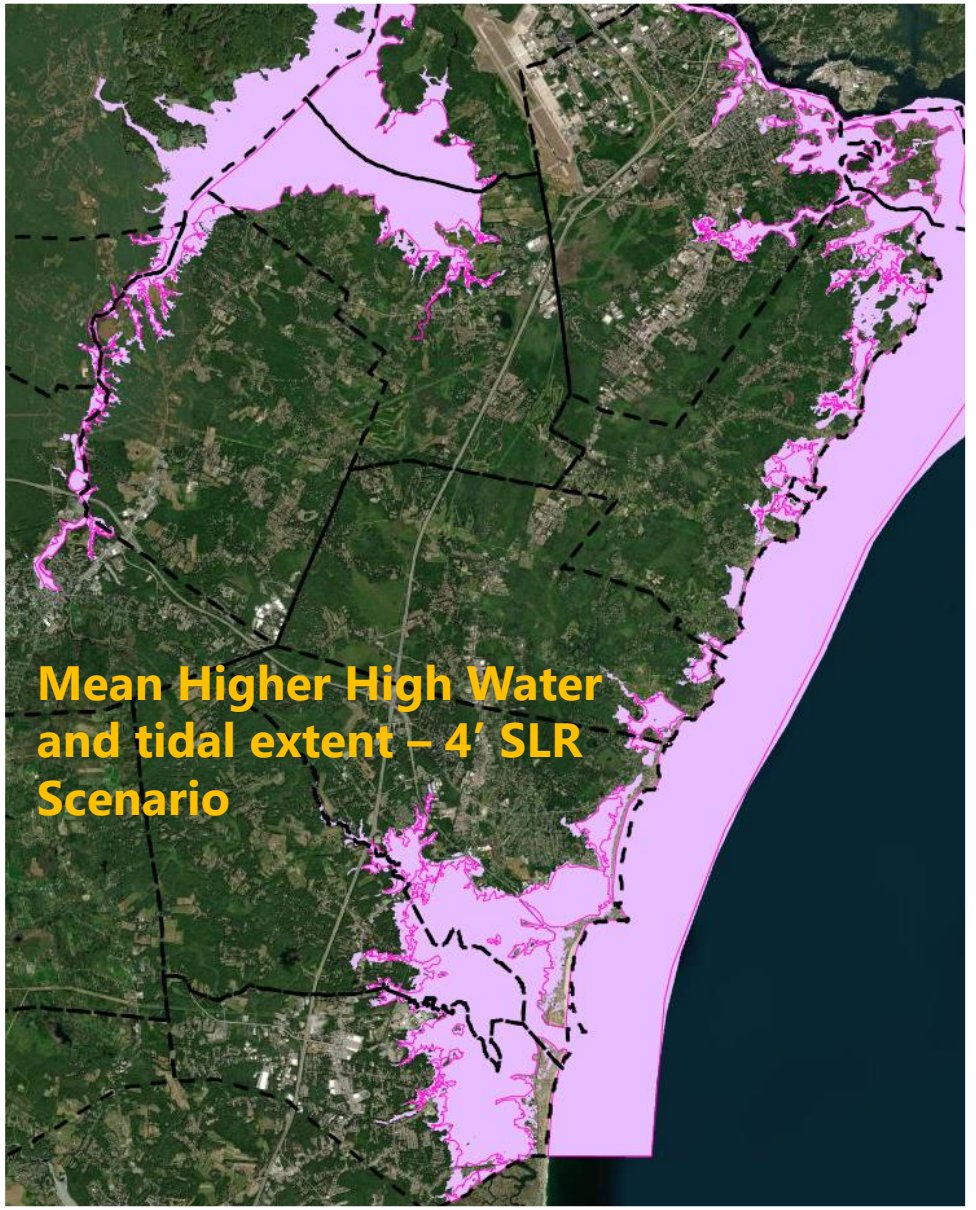
Previous Work on Sea Level Rise Impacts

- Tides to Storms
- Coastal Risks and Hazards Commission
- 2020 NH Science Summary

Regional Travel Demand Model

- Travel Patterns based on residential and employment distribution
- All State Roadways and many local Roads

Transportation System Impacts of Sea Level Rise



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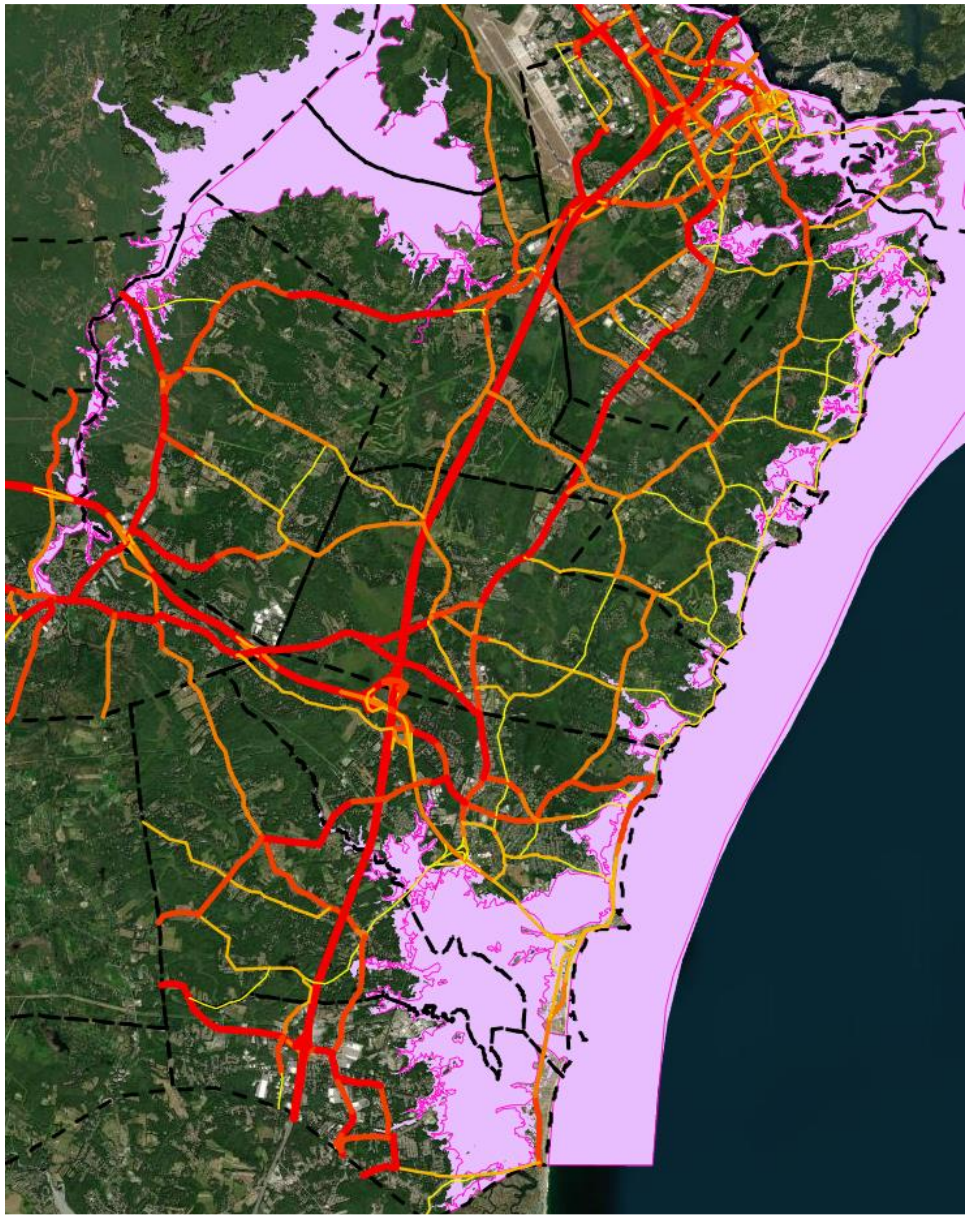

Travel Demand Model links – 4’ SLR Scenario

Identifying & Prioritizing Impacted Roadways

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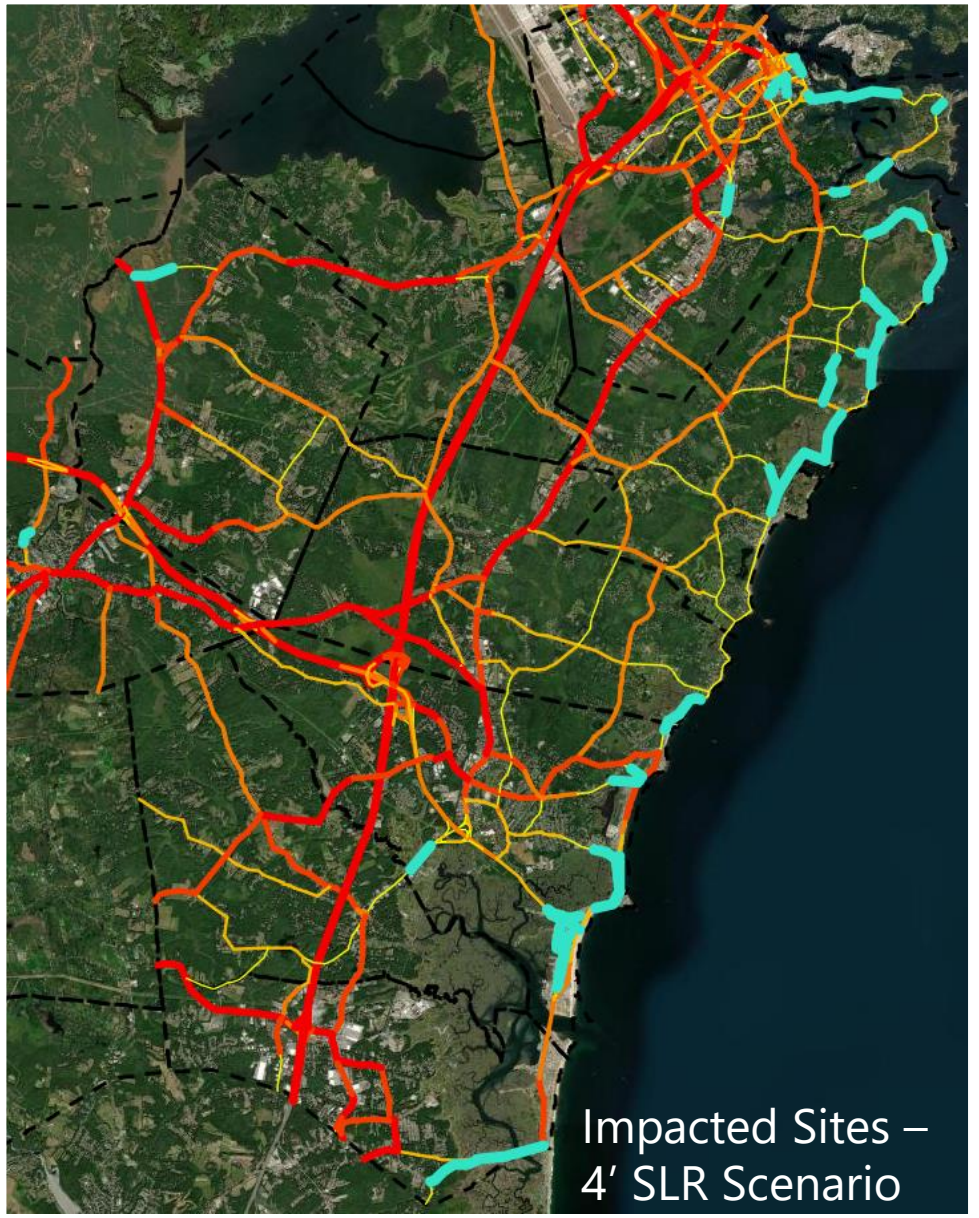
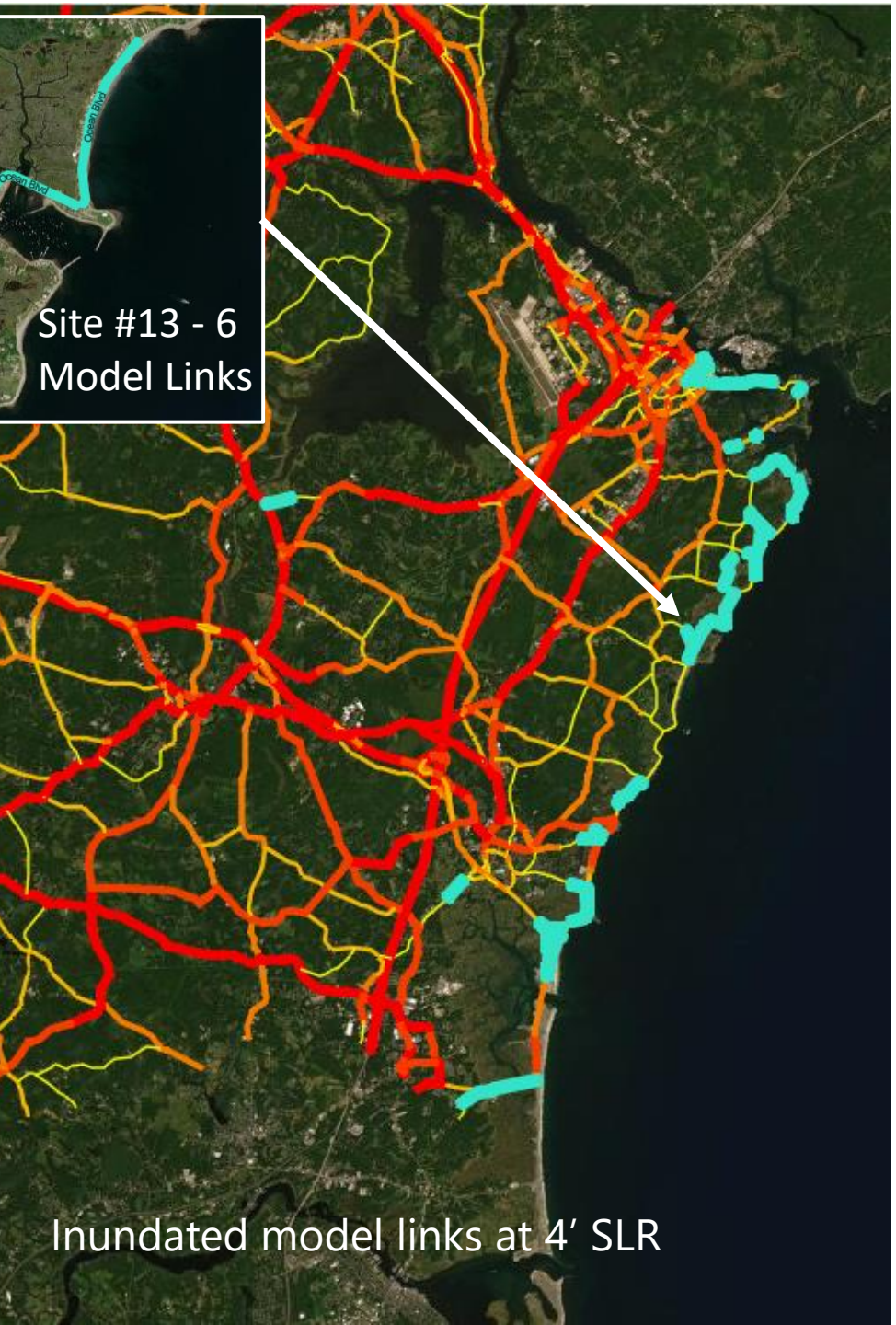
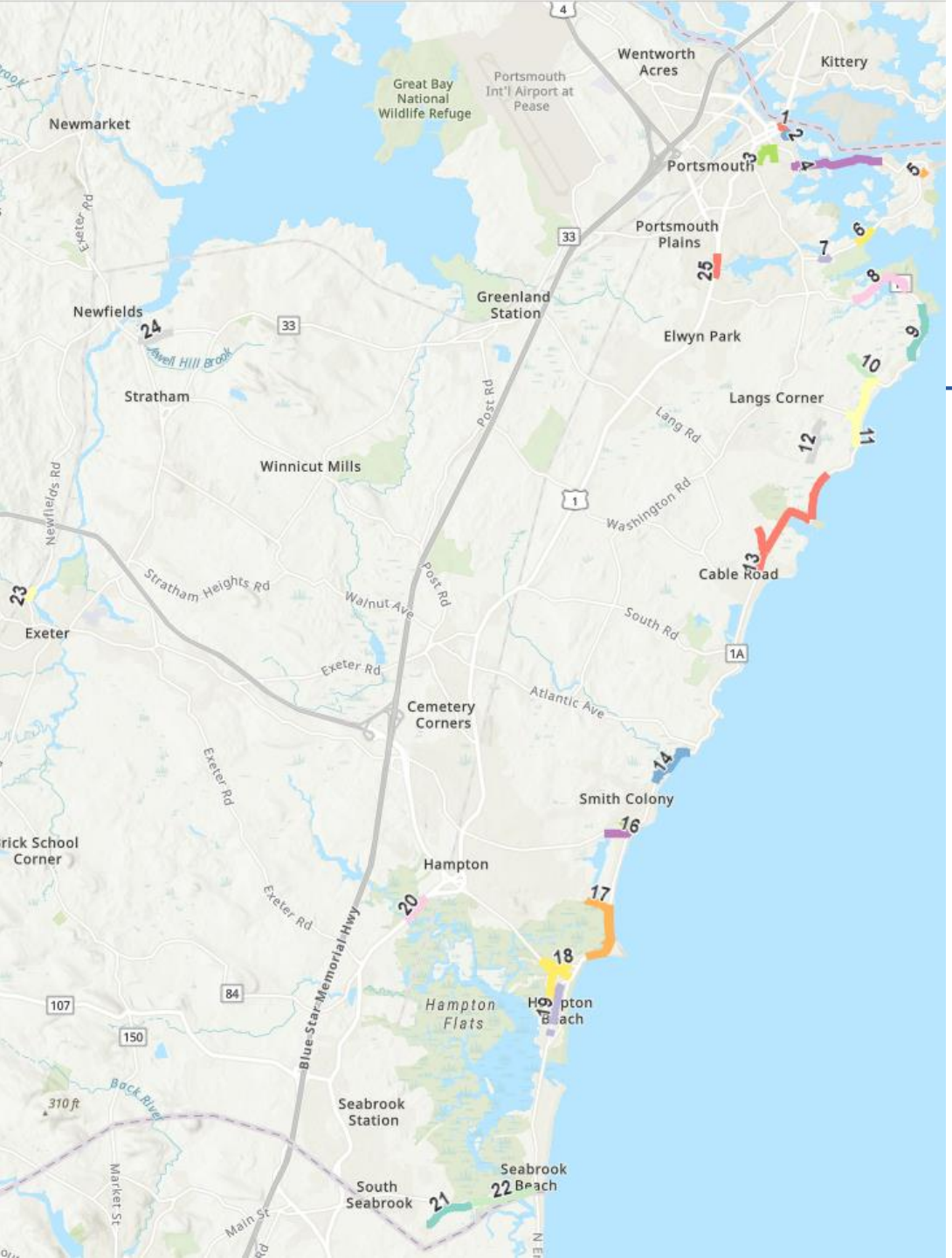


Impacted Sites – 4' SLR Scenario



Identify Impacted Model Links and Group into Sites

Scenario	Impacted Model Links	Approx. Miles Impacted	Evaluation Sites
1'	4 model links	0.5	3
1.7'	13 model links	1.0	5
4'	126 model links	16.8	25
6.3'	259 model links	28.0	50+



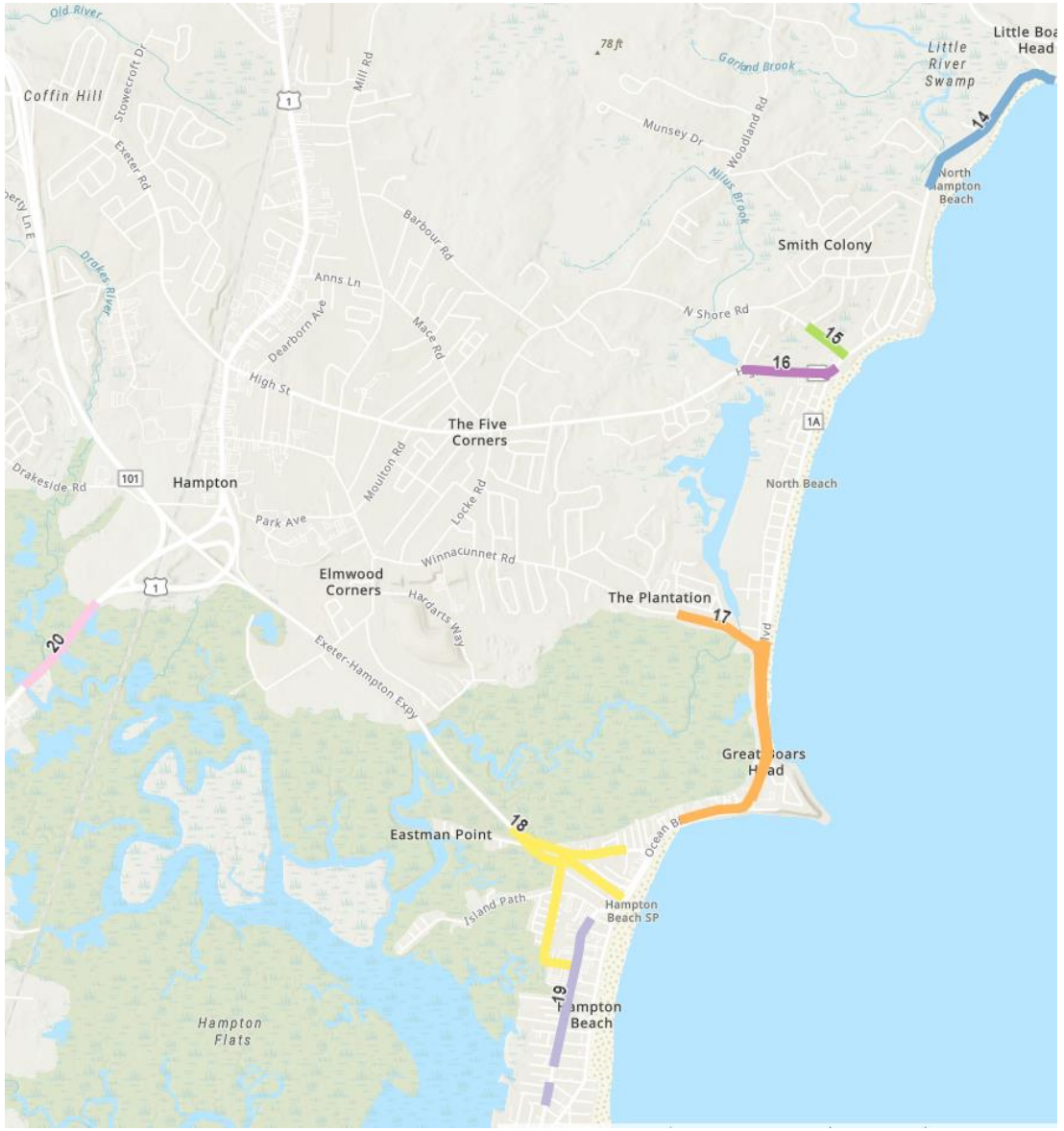
Identify Priority Sites for Evaluation

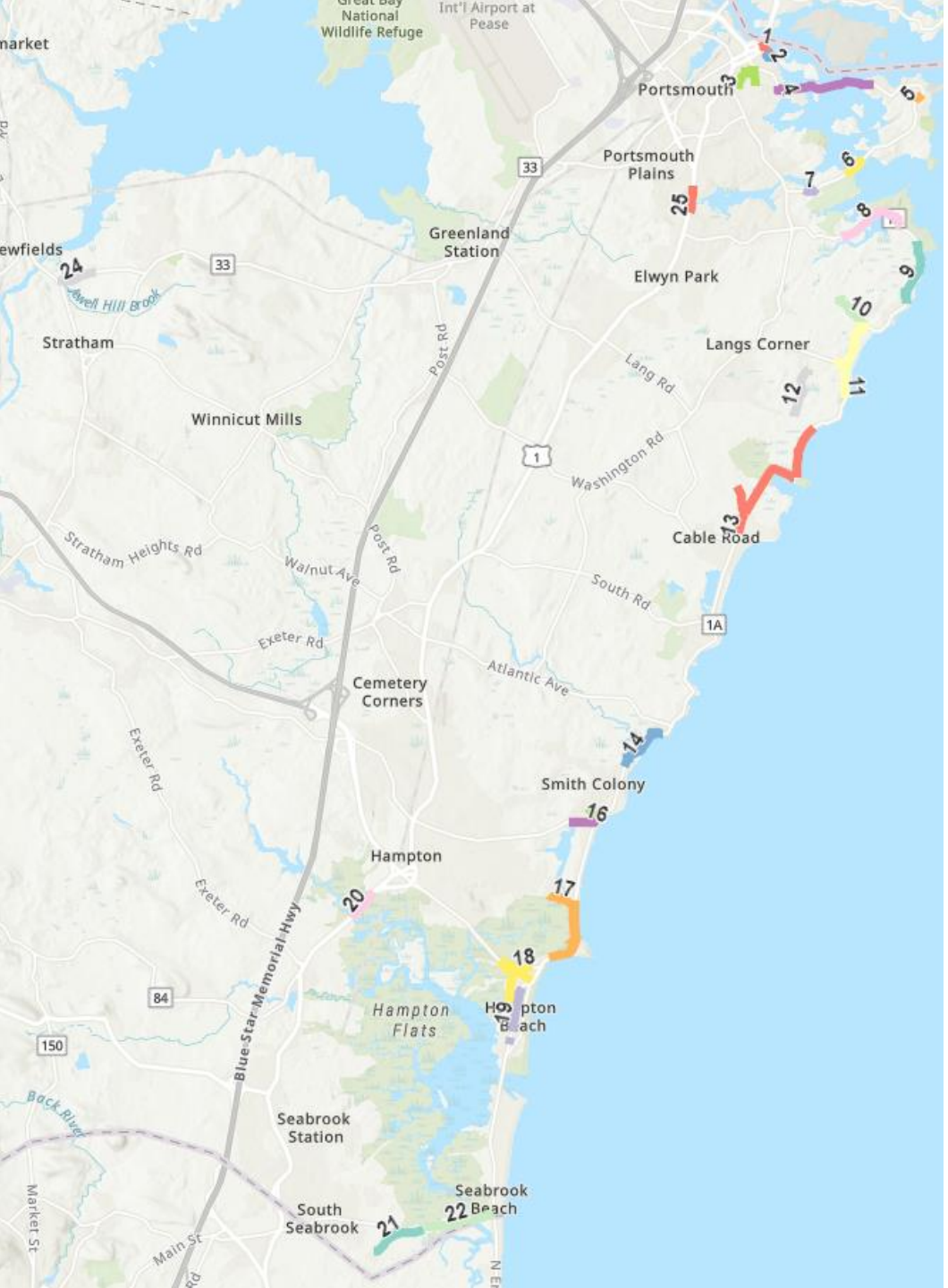
- Preliminary list of sites developed based on criteria composed of operational, health and safety, socio-economic factors
- List Sent to NHDOT and other partners for feedback
- 10 candidate sites Selected
  - Assemble site profiles
  - Assess types of impacts and potential adaptation measures
  - Apply New Hampshire Coastal Flood Risk Guidance
- 2 sites selected for more detailed examination

Hampton Sites

- Highland Avenue and High Street impacted at 1 foot of SLR
- Church Street, Brown Avenue, and Cusack Road impacted at 1.7’ SLR
- US 1, Winnacunnet Road, Ashworth Avenue, and Ocean Blvd Impacted at 4’ SLR

Town	Site	Map number	SLR Impact level
Hampton/North Hampton	Ocean Blvd	14	4’
Hampton	Cusack Road	15	1.7’
Hampton	High Street	16	1’
Hampton	Winnacunnet Rd/Ocean Blvd	17	4’
Hampton	NH 101/Church St/Highland Ave/Brown Ave	18	1’
Hampton	Ashworth Avenue	19	4’
Hampton	Lafayette Road (US 1)	20	4’





Priority Sites for Evaluation

Town	Site	Site #	SLR Impact level
New Castle/ Rye	Wentworth Rd/NH 1B	5,6,7	4'
Rye	Marsh Rd, Parsons Rd	10	1'
Rye	Ocean Blvd, Wallis Rd	11	4'
Rye	Locke Rd, Ocean Blvd	13	4'
Hampton	Cusack Rd	15	1.7'
Hampton	High St	16	1'
Hampton	NH 1A SB On ramp, Ocean Blvd, Winnacunnet Rd	17	4'
Hampton	Brown Ave, Church St, Glade Path, Highland Ave, NH Rt 101	18	1'
Hampton	Lafayette Rd	20	4'
Seabrook	South Main St/ NH 286	21,22	4'


Questions?

Transportation Impacts

Previous Work on Sea Level Rise Impacts

- Tides to Storms
- Coastal Risks and Hazards Commission
- 2020 NH Science Summary

Regional Travel Demand Model

- Travel Patterns based on residential and employment distribution
- All State Roadways and many local Roads

Transportation System Impacts of Sea Level Rise

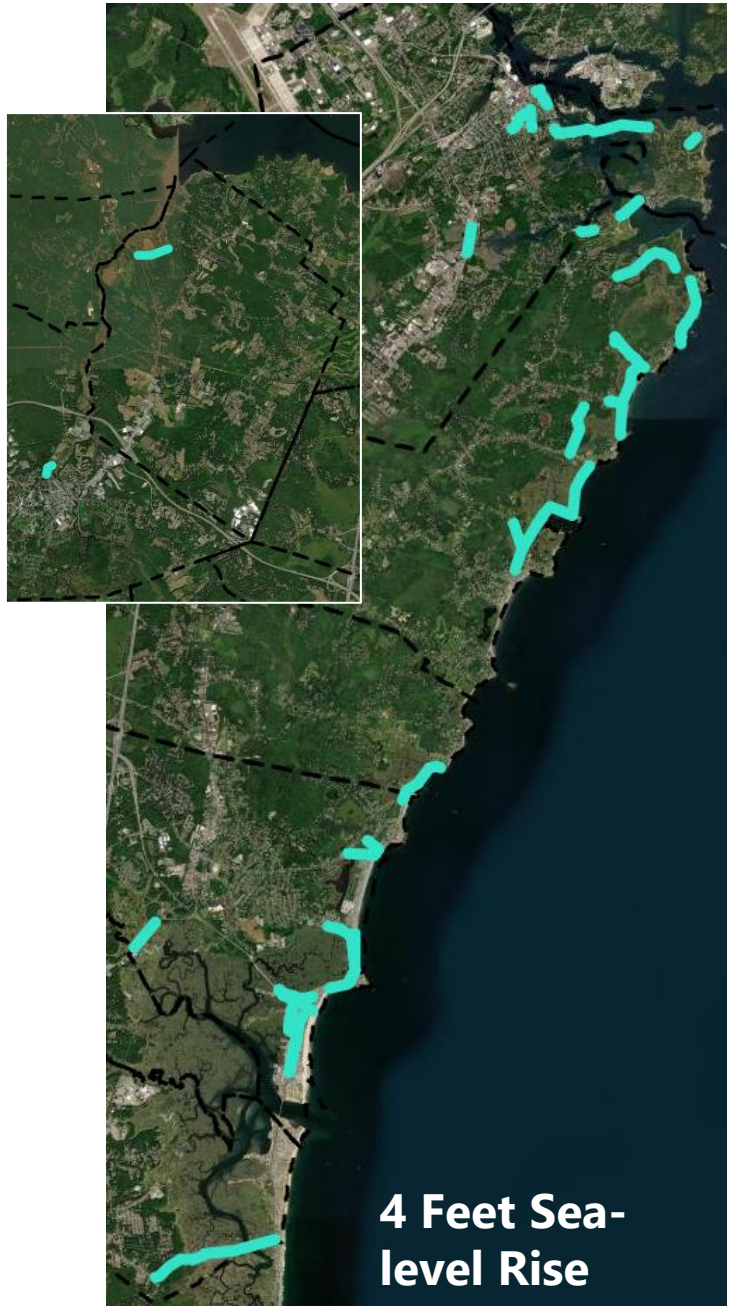
Direct Transportation Network Impacts

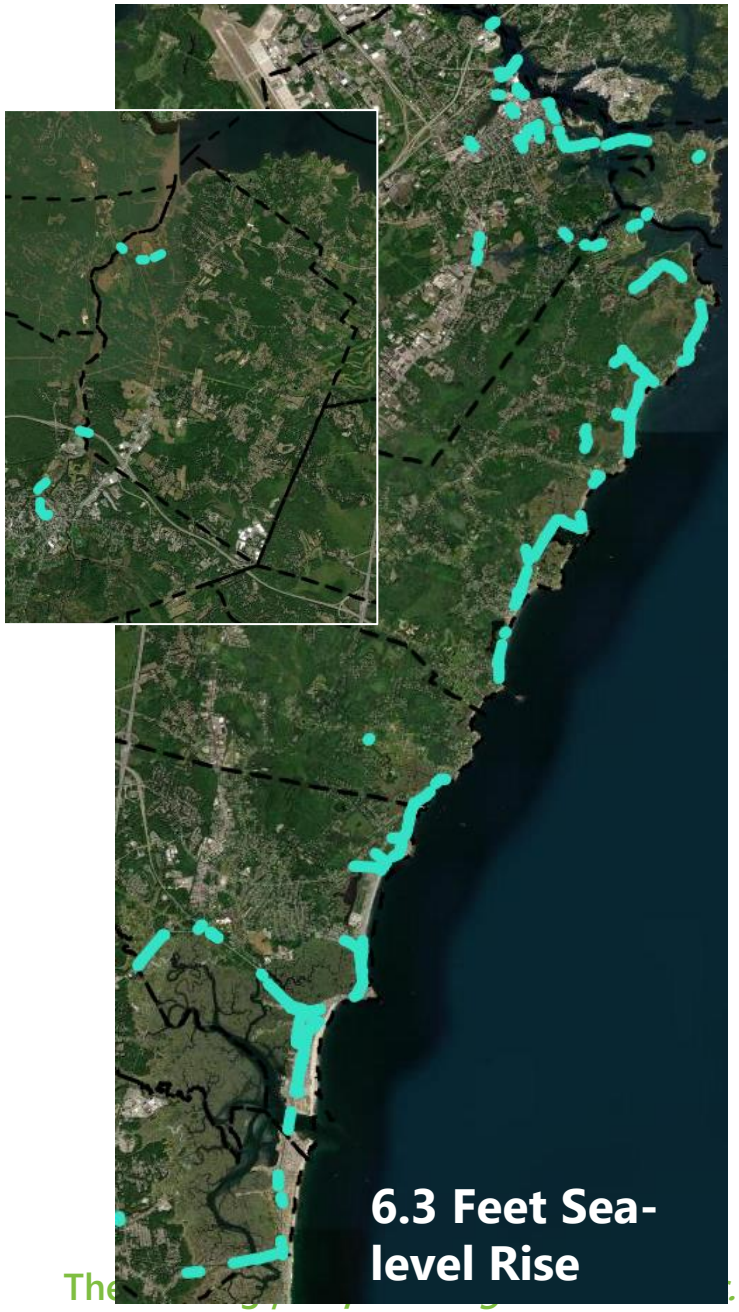
- Inundated Links
- Isolated Areas
- Impacts of flooding on infrastructure

Indirect Transportation Network Impacts

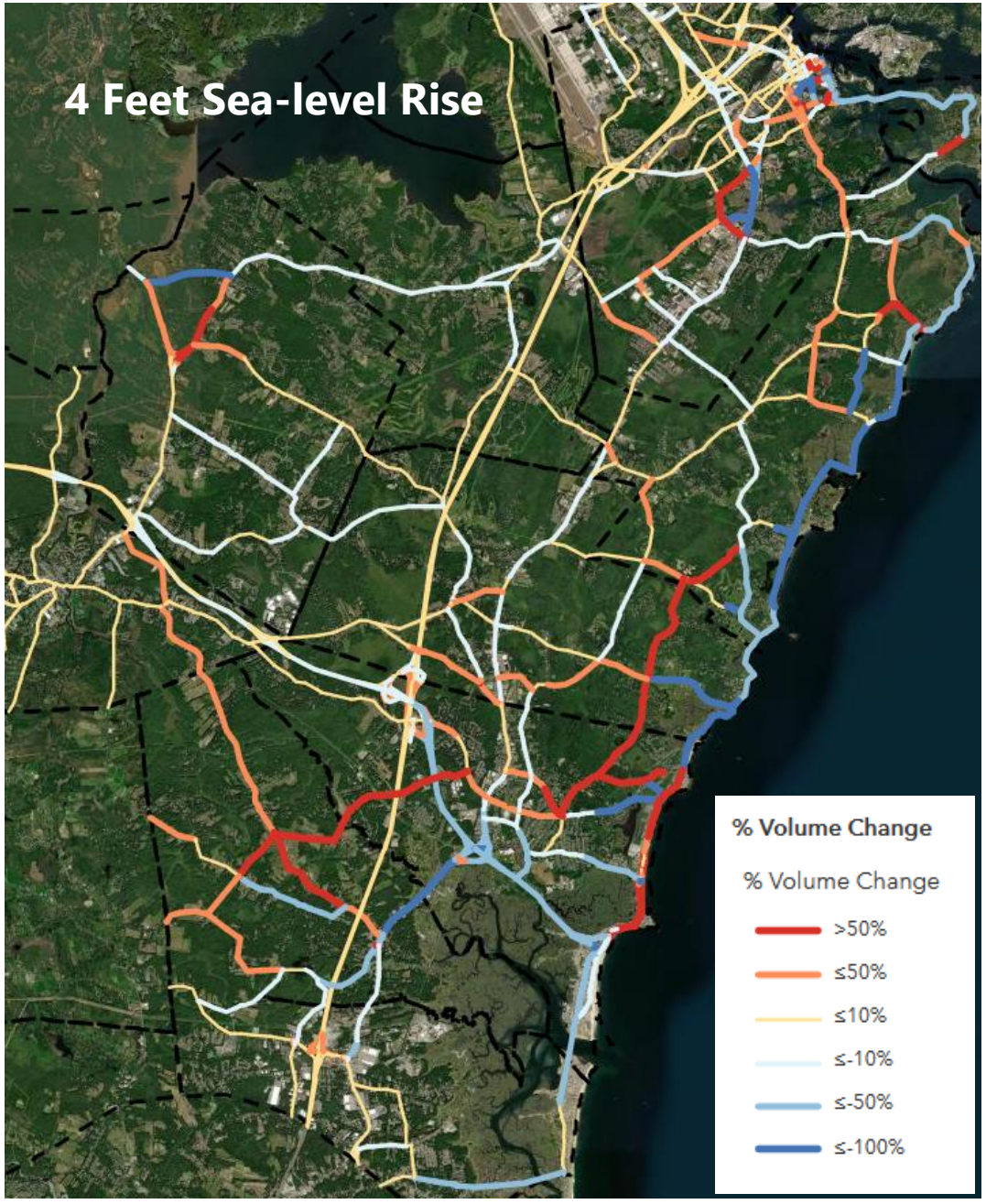
- Travel Pattern Changes
- Traffic Volume Changes
- Impacts on Roadway capacity and condition

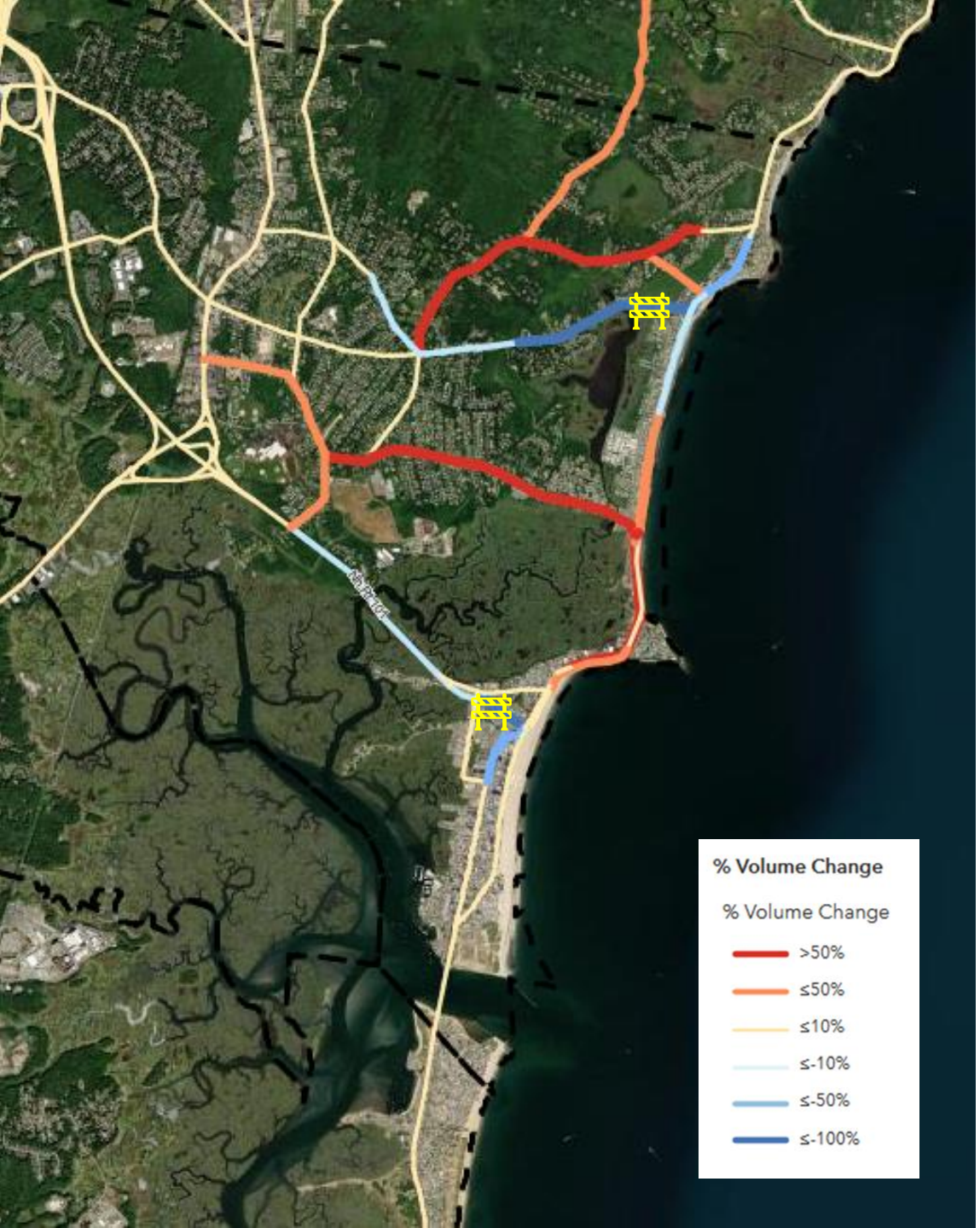
Areas of Anticipated Inundation





Estimate Traffic Impacts of Road Closures





Traffic Impacts 1' SLR

- Highland Avenue & High Street Impacted Directly
- Shifts Traffic to alternate routes
- Traffic shifts to:
  - Brown Avenue: +5,000-6,000 Annual Average Daily Traffic (AADT). Island Path also likely impacted.
  - Winnacunnet Rd: +1,500-2,000 AADT
  - Woodland Rd/North Shore Rd: +1,500-2,000 AADT
- Landing Road & Cusack Road also see minor increases in volume (<1000 AADT)

Traffic Impacts 1.7' SLR

- Highland Avenue area expands to include Church St, NH 101, and Brown Avenue. No access to Hampton Beach via NH 101.
- High Street and Cusack Road Impacted
- Traffic shifts to Winnacunnet Road & Woodland Rd
  - Winnacunnet 20,000-25,000 vehicles per day (Currently 6,000)
  - Woodland: 4,000-4,500 vehicles per day (currently 1,400)
- NH 286 in Seabrook (+50%) and Atlantic Avenue in North Hampton (+70%) see increased volumes
- More traffic in Hampton Downtown

Traffic Impacts at 4’ SLR

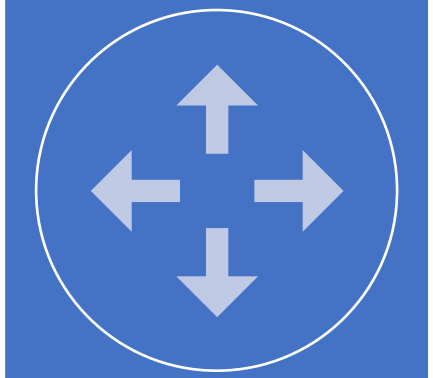
- US 1 through Hampton Marsh
- Ashworth Avenue
- Winnacunnet Road and adjacent portions of Ocean Blvd
- Ocean Blvd near N. Hampton town line
- NH 101/Highland Ave/Church St/Brown Ave impact area expands
- North Shore Rd becomes only way to access coast in Hampton.
- NH 286 Closed in Seabrook


Questions?

Actions Considered

No Action

Do nothing



Avoid

Prioritize investment out of the water's way

Accommodate

Options that allow you to better live with the water

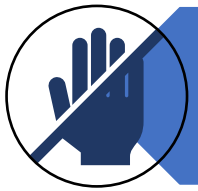
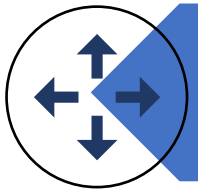
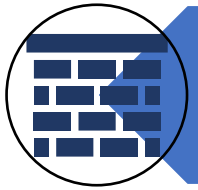
Resist

Options that keep the water away

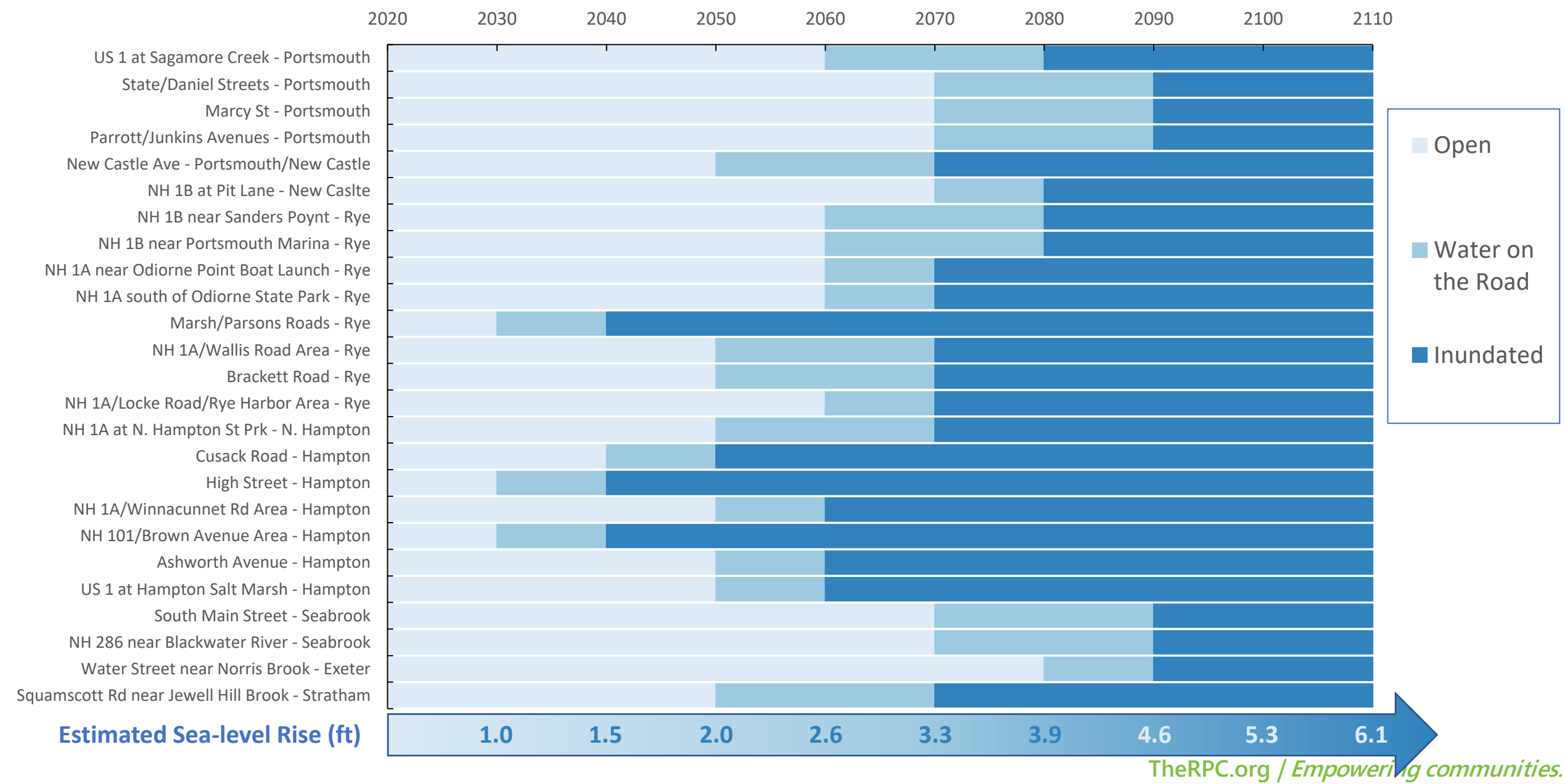
Relocate

Move assets of facilitate retreat away from the water

Actions - Based on Coastal Flood Risk Guidance

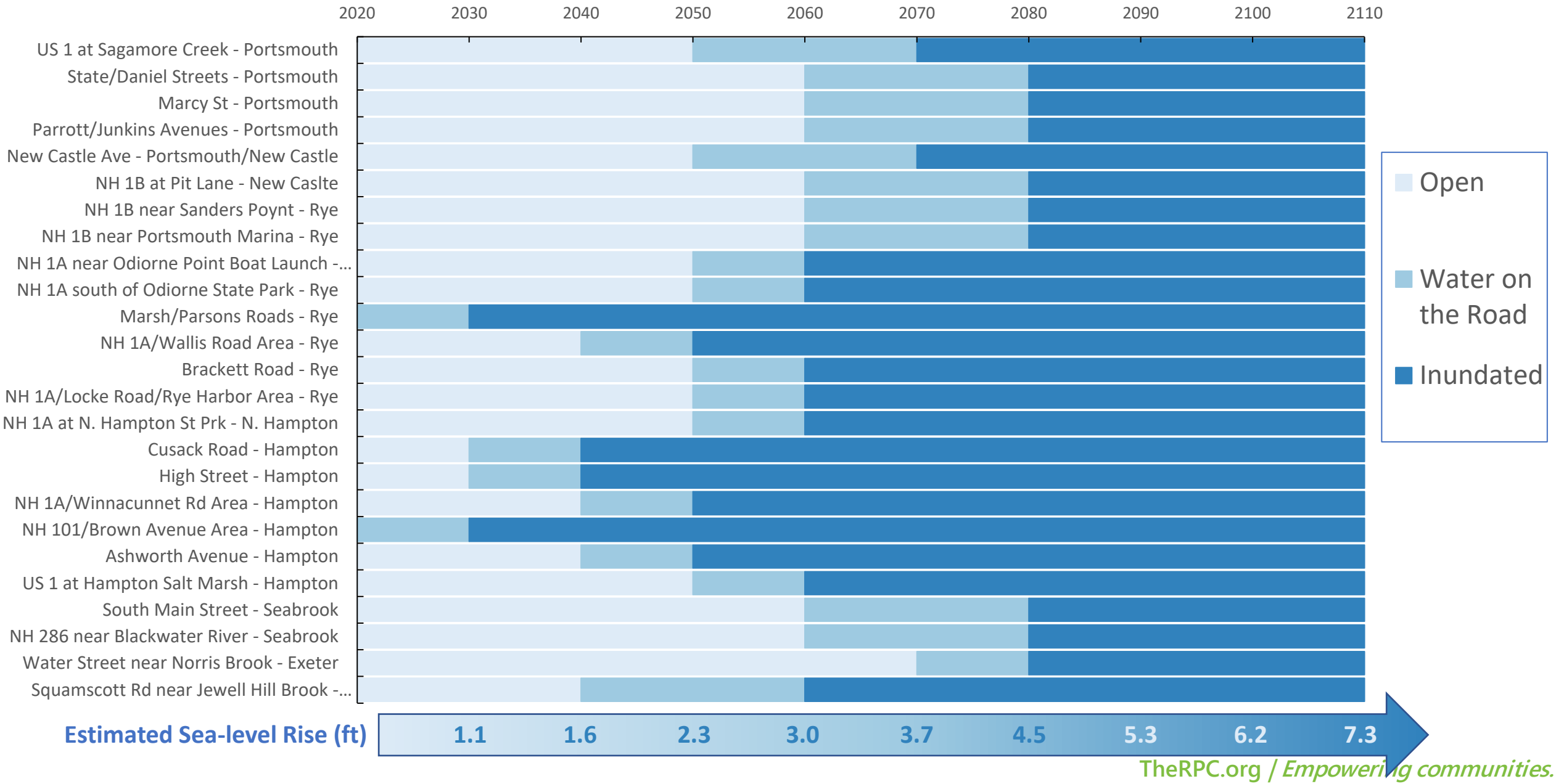
	Level of Risk for Coastal Flooding	Tolerance for Flood Risk
 No Action	Very Low to Low	High
 Avoid	Very Low	Medium to Very Low
 Accommodate	Moderate	Medium
 Resist	High	Low to Very Low
 Relocate	High	Low to Very Low

Planning Timeframes



Planning Timeframes

Road Surface Status - Very Low Tolerance For Flood Risk

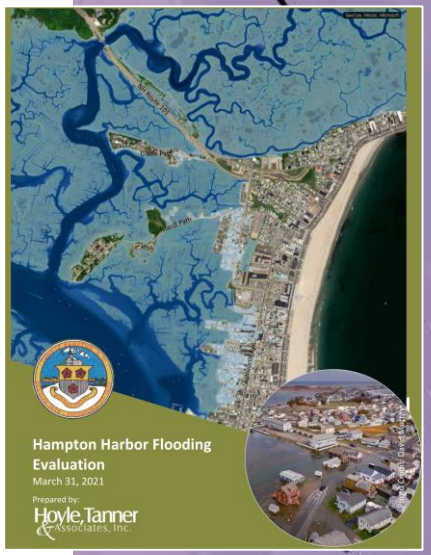


Lafayette Road

- **Accommodate**
  - Reconstruct with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
  - Causeway or Bridge – Expanding existing bridge may allow for improved tidal flow.
  - Detours – Not viable due to high traffic volume
- **Resist**
  - Raising roadway to elevate pavement surface above expected SLR levels. Likely to impact adjacent wetlands with need for increased shoulder area and embankments.
  - Berms would be unlikely to be effective as they would simply move the water elsewhere.
- **Retreat/Relocate**
  - Not desired – due to importance of US 1 and high traffic volumes.

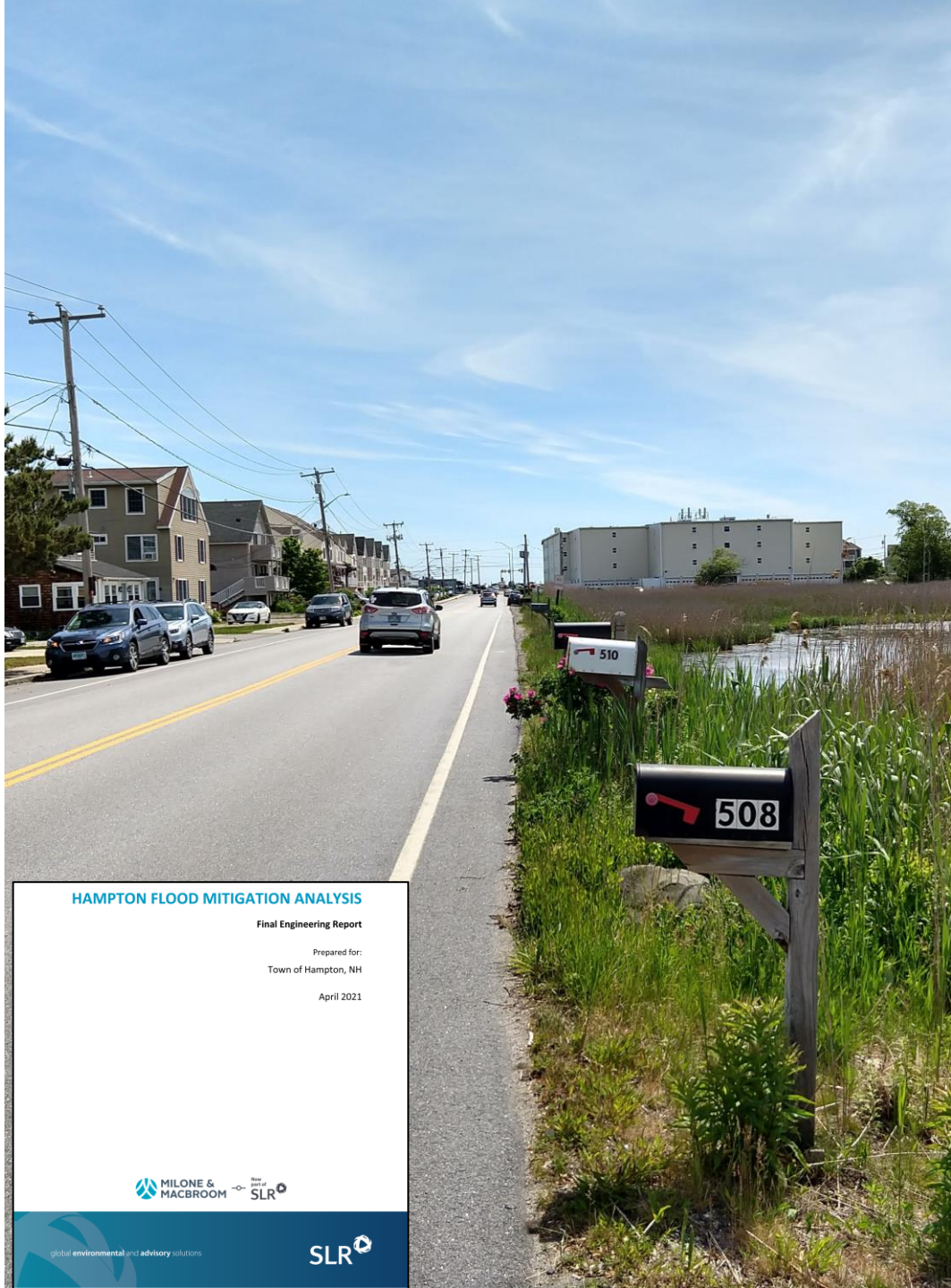
NH 101

- **Accommodate**
  - Reconstruct with more resilient materials
  - Evaluate utility of larger culverts/improved drainage
  - Causeway or Bridge – Not a viable option given short distances impacted
  - Detours – Using Brown Ave/Island Path could work in short-term
- **Resist**
  - Roadway could be raised and rebuilt above expected SLR levels. This could require increased shoulder area – potential wetland impacts
  - Berms would need to incorporate adjacent development
- **Retreat/Relocate**
  - Not Desired – Primary Access point to Hampton Beach
  - Retreat may be necessary at higher SLR



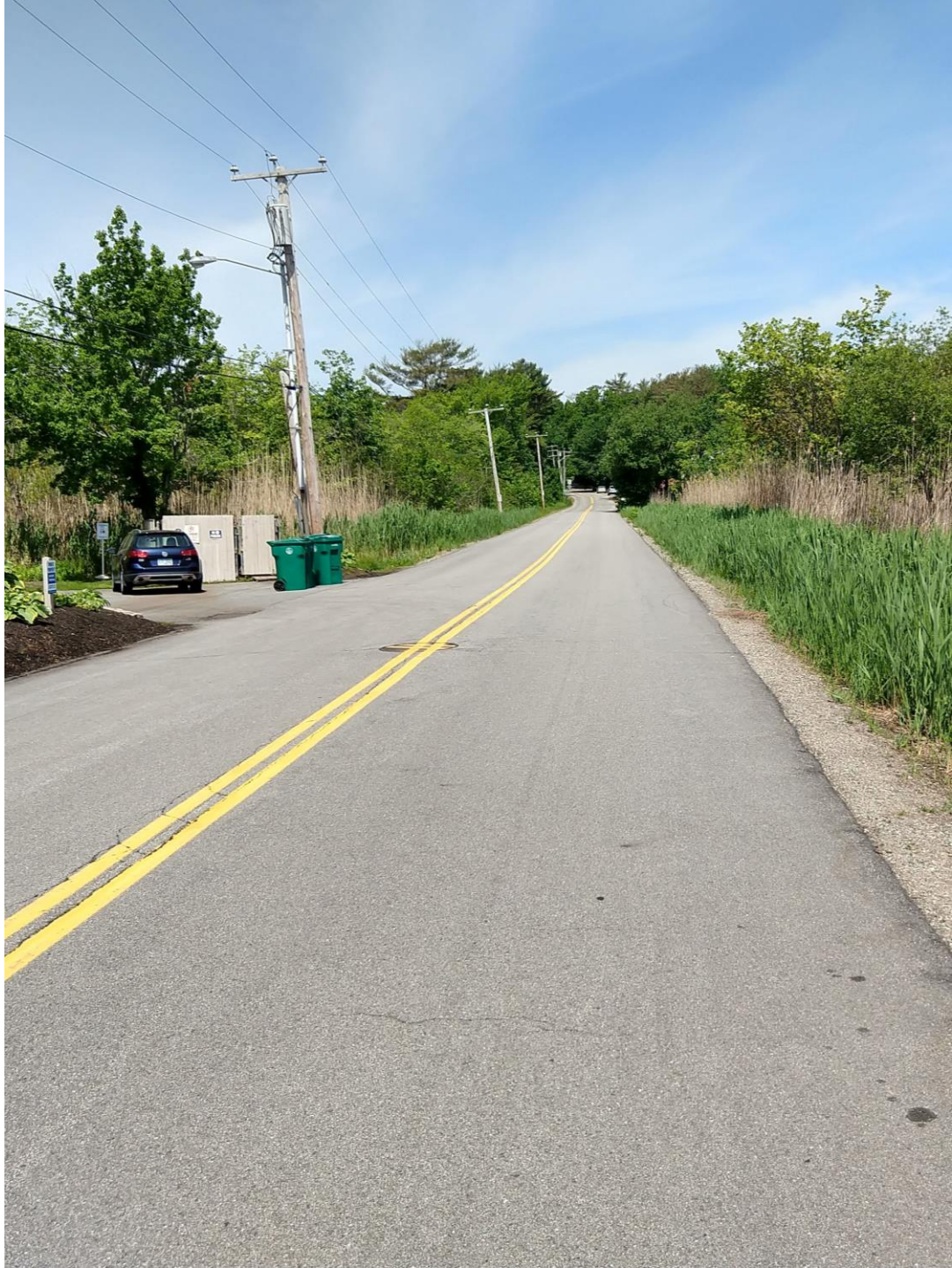
High Street

- **Accommodate**
  - Reconstruct with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
  - Expand Culvert – Evaluate the effectiveness of increasing culvert size. Existing culvert is high replacement priority
  - Causeway or Bridge – Not a viable option given adjacent housing
  - Detours – Close road during high water and redirect traffic to Winnacunnet Road
- **Resist**
  - Raising Roadway – Would keep water out but leave adjacent development prone to flooding. Potential wetlands impacts.
- **Retreat/Relocate**
  - Retreat may be necessary at higher SLR



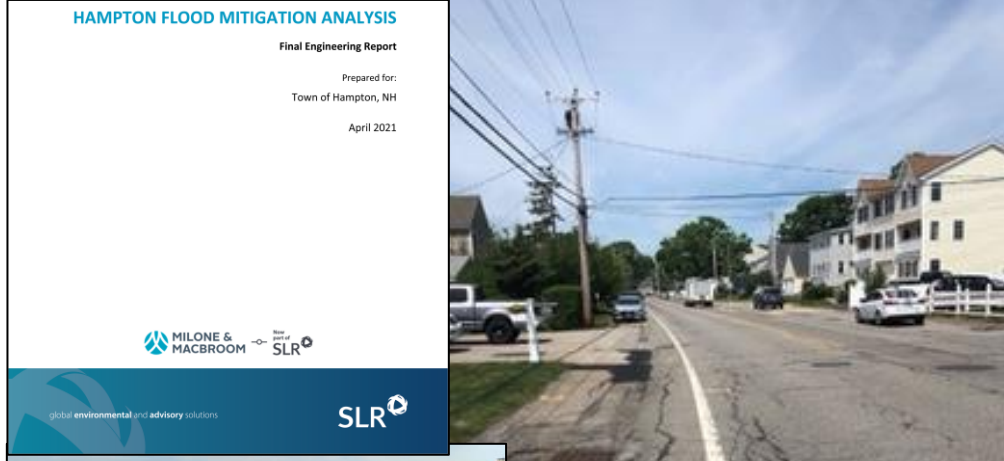
Cusack Road

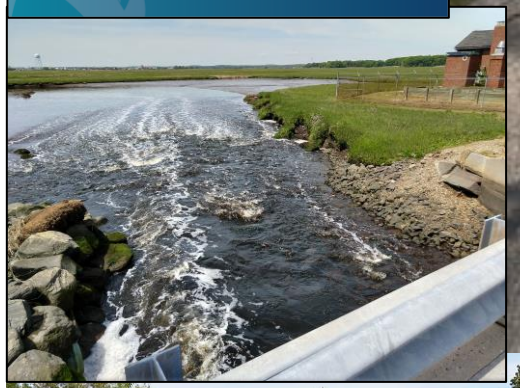
- **Accommodate**
  - Reconstruct with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
  - Detours – Close road during high water and redirect traffic to Winnacunnet Road. Install signage/barriers to facilitate high water closures
- **Resist**
  - Raising Roadway – Would keep water out but leave adjacent development prone to flooding. Potential wetland impacts.
  - Berms are potentially viable given the lack of adjacent development but may push water to developed areas
- **Retreat/Relocate**
  - Retreat may be necessary at higher SLR. Lack of development along roadway makes this a viable option with limited direct impacts to adjacent properties.



Winnacunnet Rd/Ocean Blvd

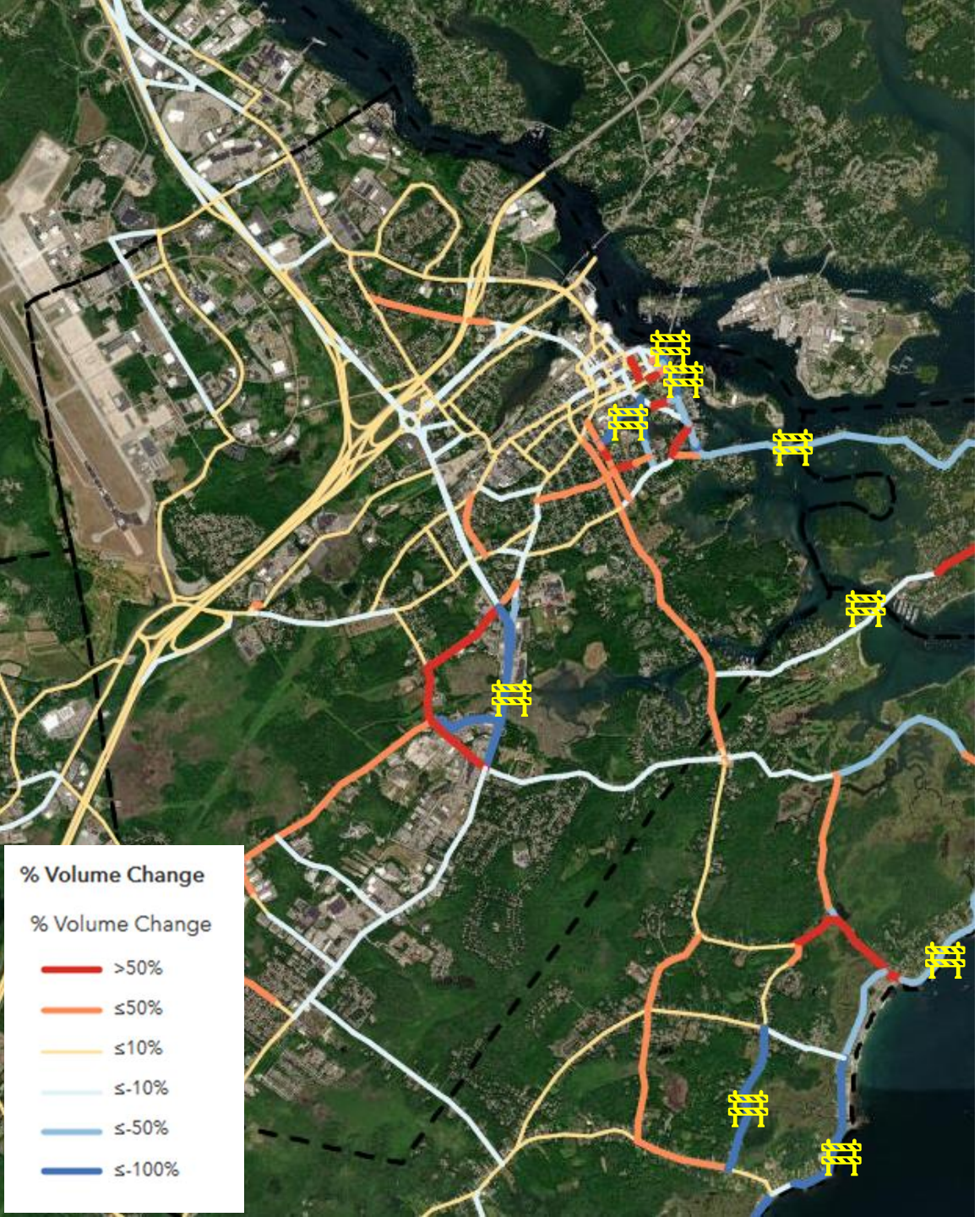
- **Accommodate**
  - Reconstruct with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
  - Bridge – Modeling indicates that lengthening the bridge would worsen upstream flooding with minimal benefit
  - Detours – Alternate route also impacted by SLR
- **Resist**
  - Raising Roadway would limit roadway flooding but would not protect adjacent property. Potential wetland impacts.
  - Berms – would keep water off of the roadway but shift it into other developed areas. Potential wetland impacts.
- **Retreat/Relocate**
  - Not desired –
  - Retreat may be necessary at higher SLR





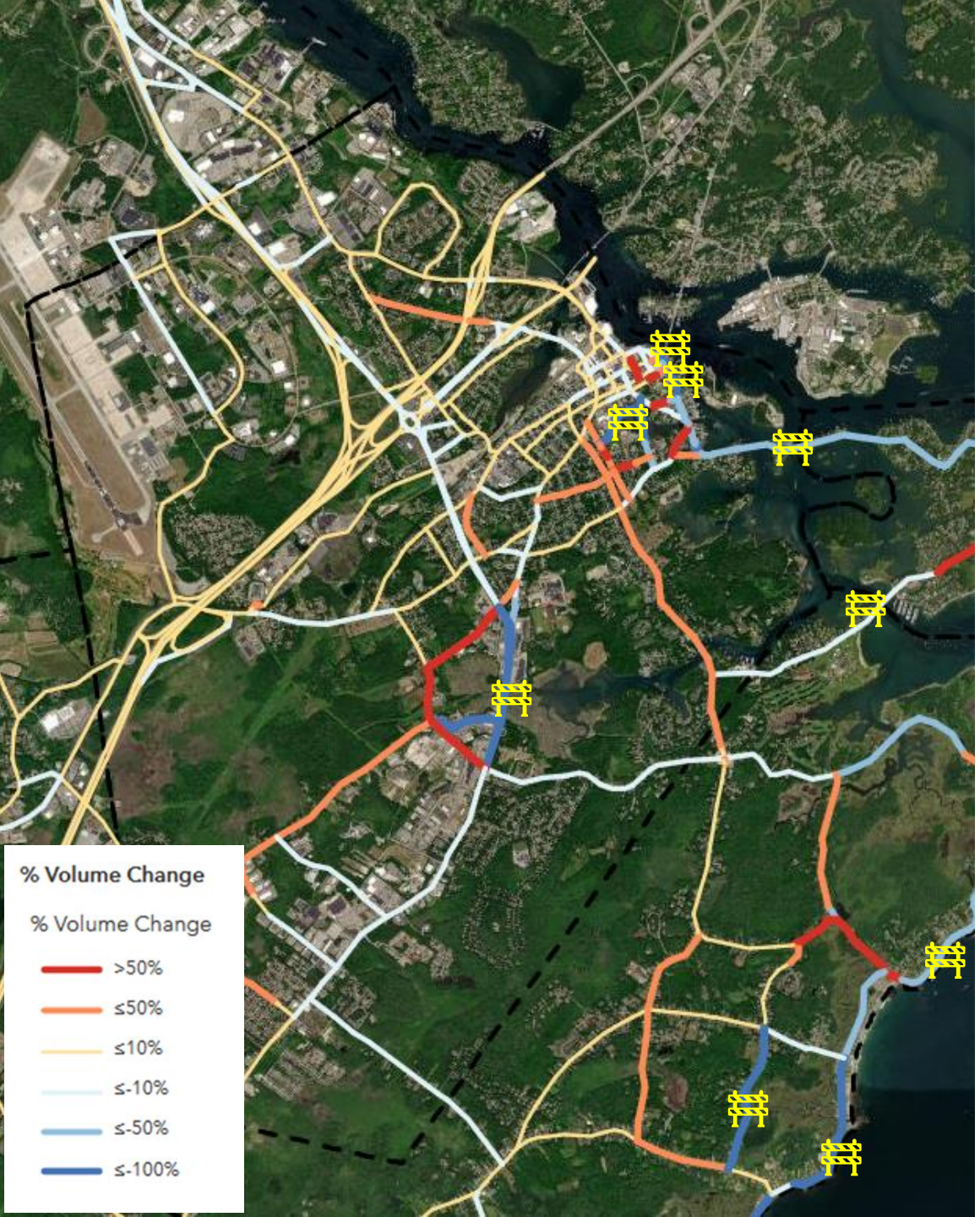
Ashworth Avenue

- **Accommodate**
  - Reconstruct with materials less susceptible to changes in moisture levels. Accommodates SLR up to pavement surface
  - Detours – Ocean Blvd could possibly be made two-way
- **Resist**
  - Raising Roadway would limit roadway flooding but would not protect adjacent property.
  - Berms/Barriers – Extensive barriers along the marsh and harbor.
- **Retreat/Relocate**
  - Not desired
  - Retreat may be necessary at higher SLR



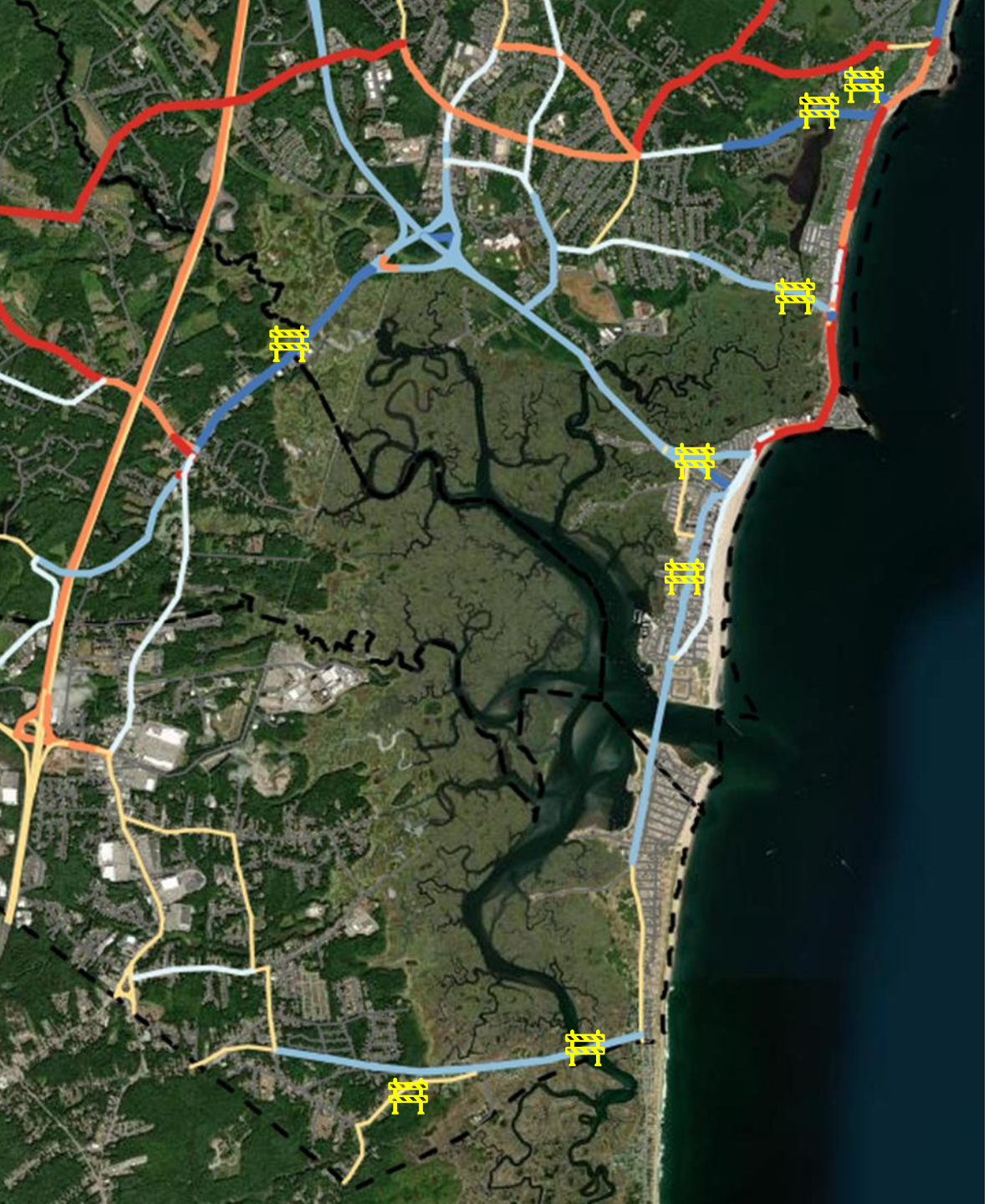
Next Steps

- Complete community meetings
- Development of site profiles
- Continue to refine traffic analysis (Some discussion of 6' SLR Impacts)
- Refining analysis of ten selected locations
- Completing in-depth look at two sites
  - Lafayette Road in Hampton
  - Marsh Rd/Parsons Road/NH 1A in Rye
- Public Meetings this winter
- Finalize project report for March 2022



Beyond the STCVA

- Integrate findings and potential transportation projects into Long Range Transportation Plan
- Refine resiliency criteria in project selection process
- Refine Travel Demand model to include more local roads in seacoast (Component of another study)
- Update and Integrate findings from State Hydrodynamic model after that is complete
- Look for additional grant opportunities to pursue further analysis, design, and engineering
    - Neil Pit Lane/Lavender Creek Culvert Analysis



Feedback

- General thoughts on project?
- Something that we missed?
- Options for addressing concerns?
- Output that would be helpful for community?
- Ideas for further analysis?


Questions?

For More Information

RPC Project Staff

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https://www.therpc.org/STCVA