Bayside Adapts:

Bayside Adapts
DESIGN CHALLENGE
PORTLAND, MAINE
FEBRUARY–MAY 2017

Incremental Resiliency Planning Portland, Maine

Maine Waters Conference, Rain and Tides, March 30, 2017

Bill Needelman, Waterfront Coordinator

Sustainable Portland:

2007

Adopted

2009

"Ultimately, … .we must begin the conversation of how to adapt our lower lying neighborhoods and districts to rising sea level, and … to begin … to comprehend the magnitude of the financial burden that climate change will place on our City.

Climate change may be the greatest challenge to our City since the re-building after the Great Fire of 1866 …." ."

Excerpt from Sustainable Portland Report, Climate Change Sidebar, Page 5. Adopted 2009

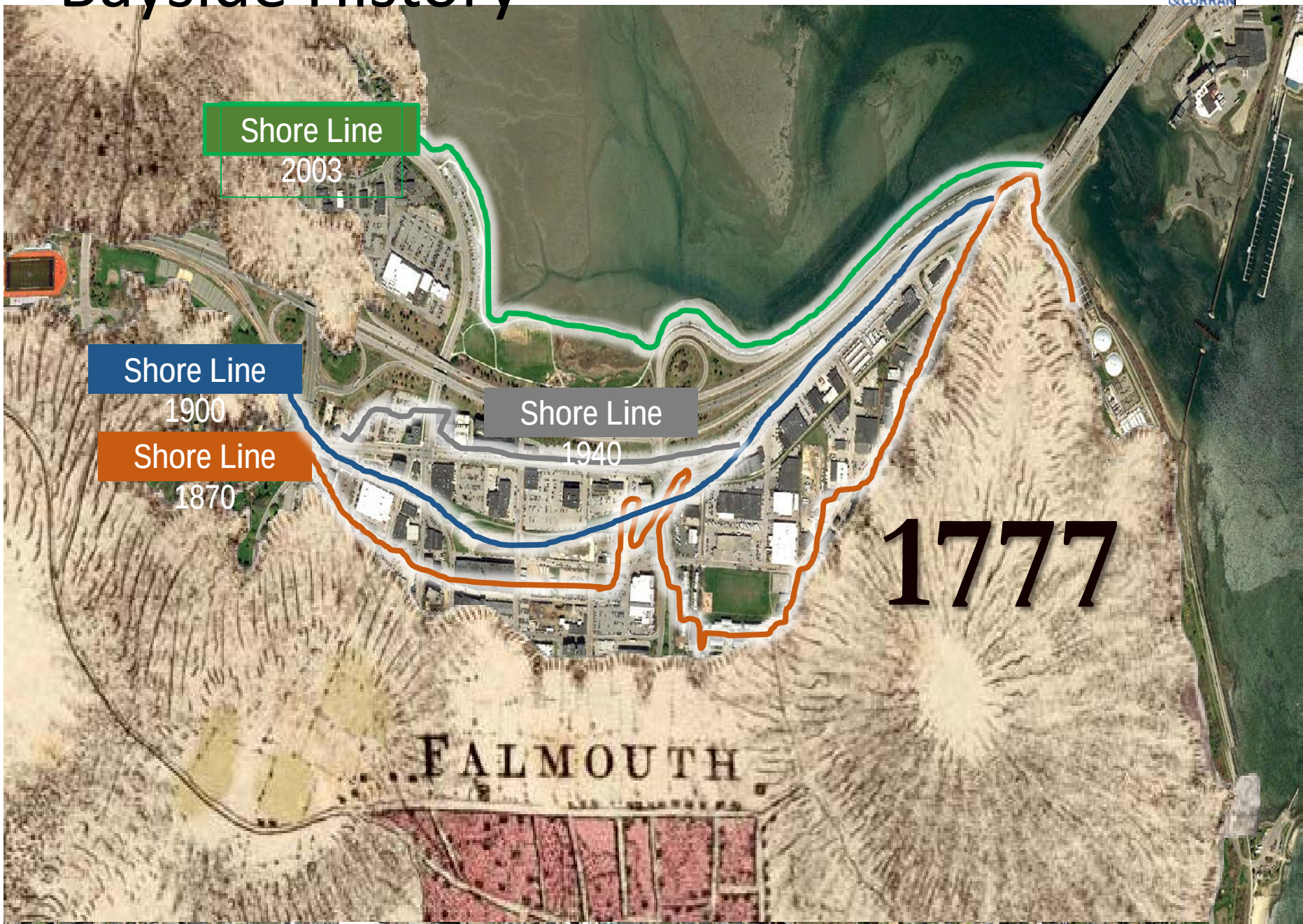
List of Actions and Processes to date

2007-2009 **Sustainable Portland** Report
2008 **Climate Action Plan**
2009-2010 **Maine Climate Change Adaptation Taskforce**
2011 **City Council Resolution** on Sea Level Rise Adaptation
2011 **Bayside Vulnerability** Assessment:
Portland Society for Architecture
New England Environmental Finance Center
State of Maine Geologic Survey
2013 Commercial Street /**Waterfront Vulnerability** Assessment
2014 **Urban Land Inst**itute - *Urban Resiliency Panel*
2014 **Department of Homeland Security** –
Regional Resiliency Assessment Program:
2015 *Maine Climate Adaptation "Table Top Exercise"* pilot
2015 **US Green Building Council** North East Regional Conference
2015 **Comprehensive Plan Updates**
Ongoing **Bayside Flooding Adaptation**:

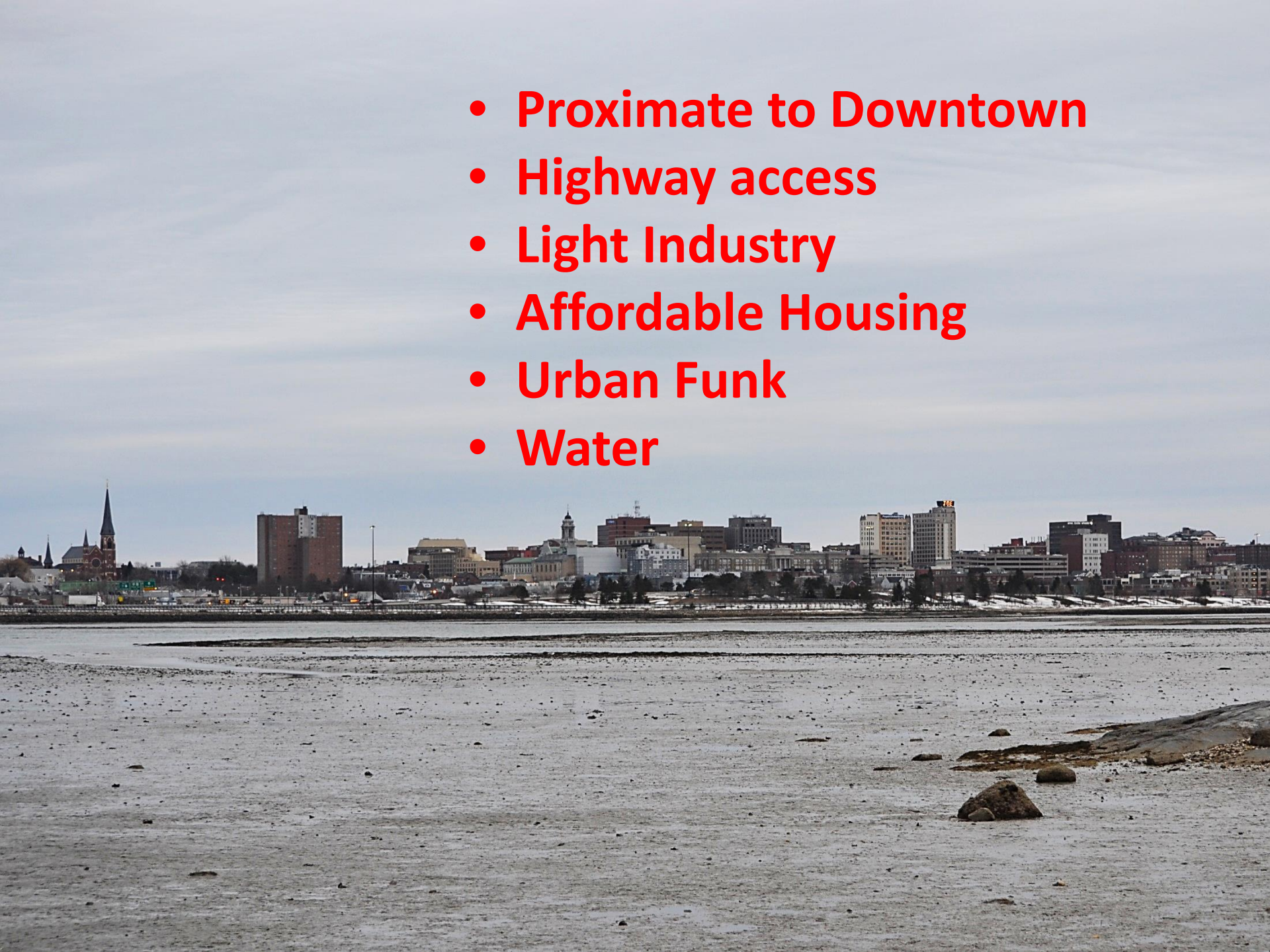
Big list, modest accomplishments


Bayside Neighborhood
N
W

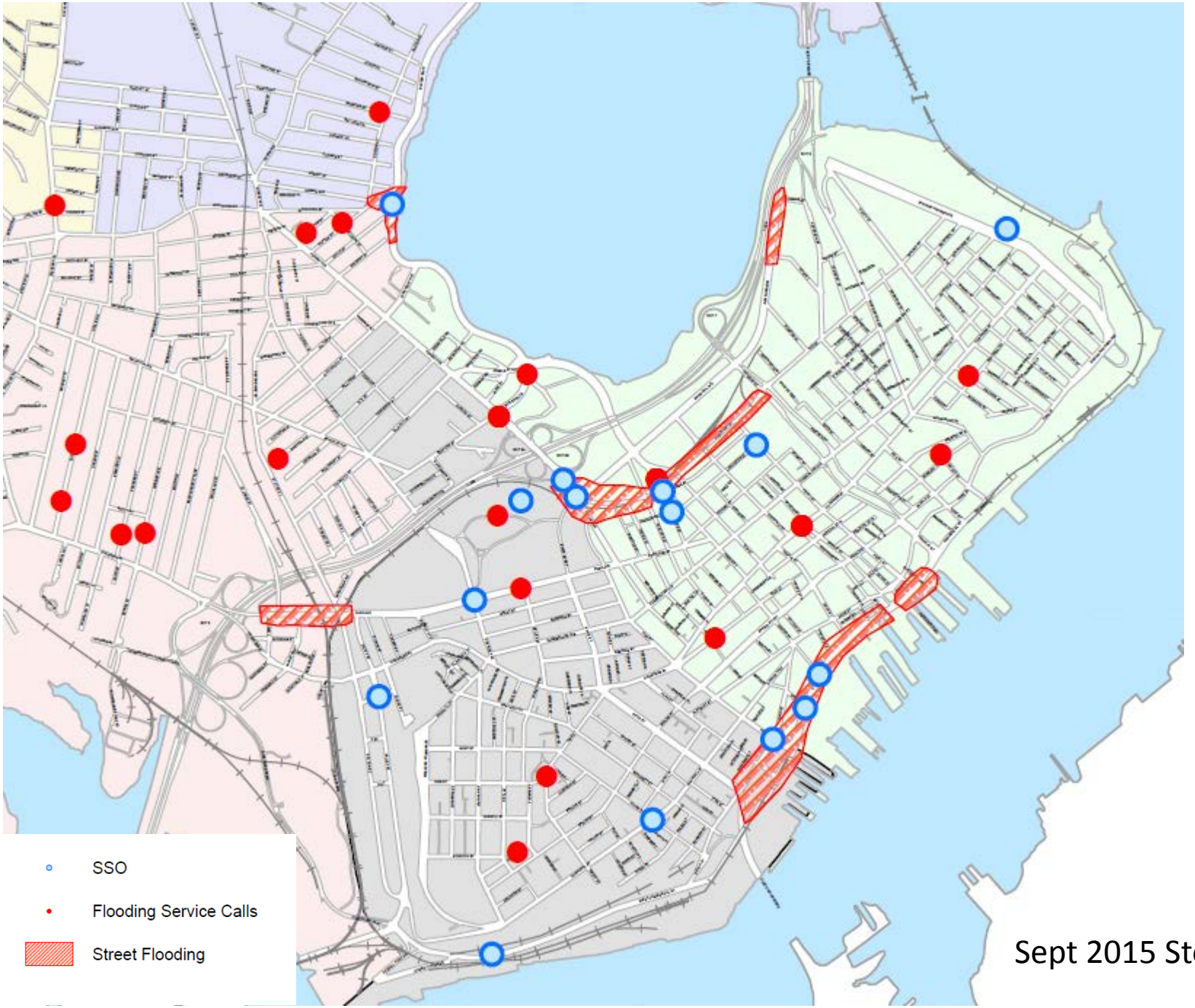
Bayside History



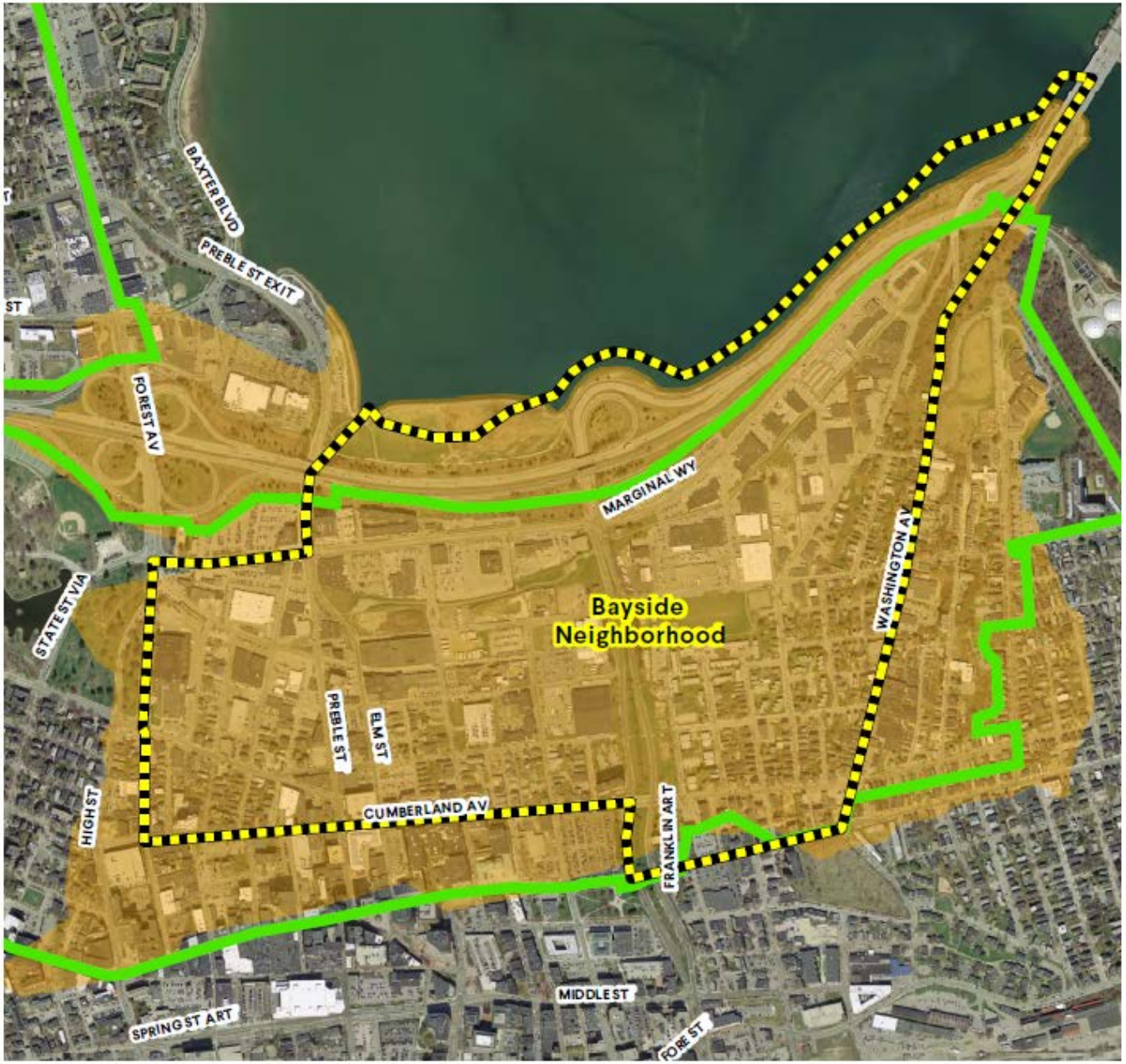
An Urban District with Development Opportunities and Policies for Growth


• Proximate to Downtown
• Highway access
• Light Industry
• Affordable Housing
• Urban Funk
• Water

Bayside is a filled land redevelopment area that is at significant risk of flooding during intense
Rain events at high tide. Rising seas are not going to make these conditions any better.



Sept 2015 Storm



Bayside Neighborhood Drainage

Low lying areas created by 19th and 20th Century filling

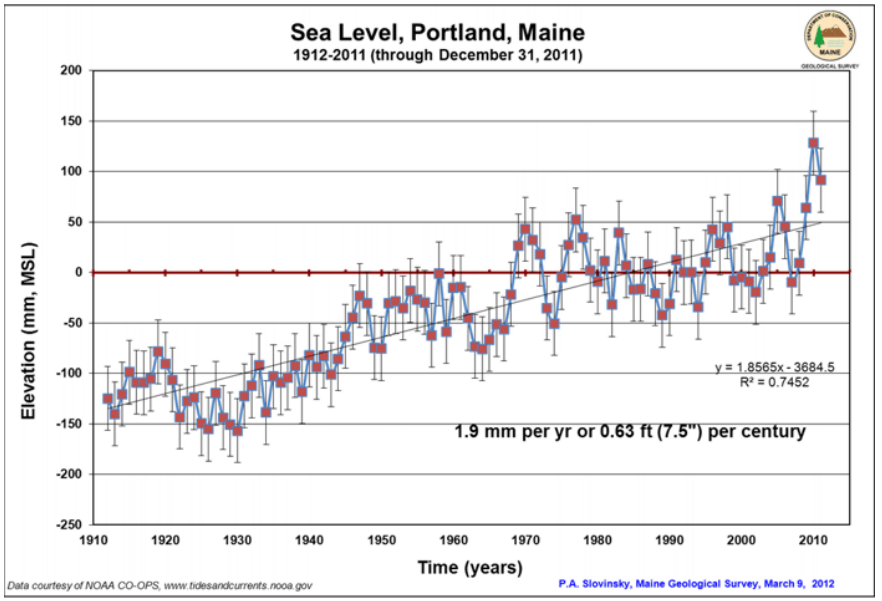
What do we know?

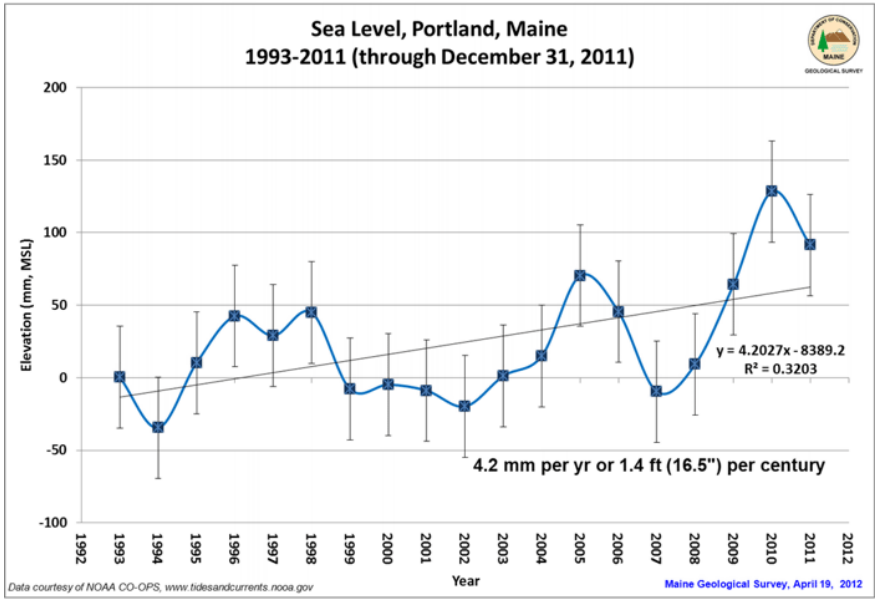
100 years of data from the Portland Tide Gauge

1.9 mm/year
7.5 inches /century

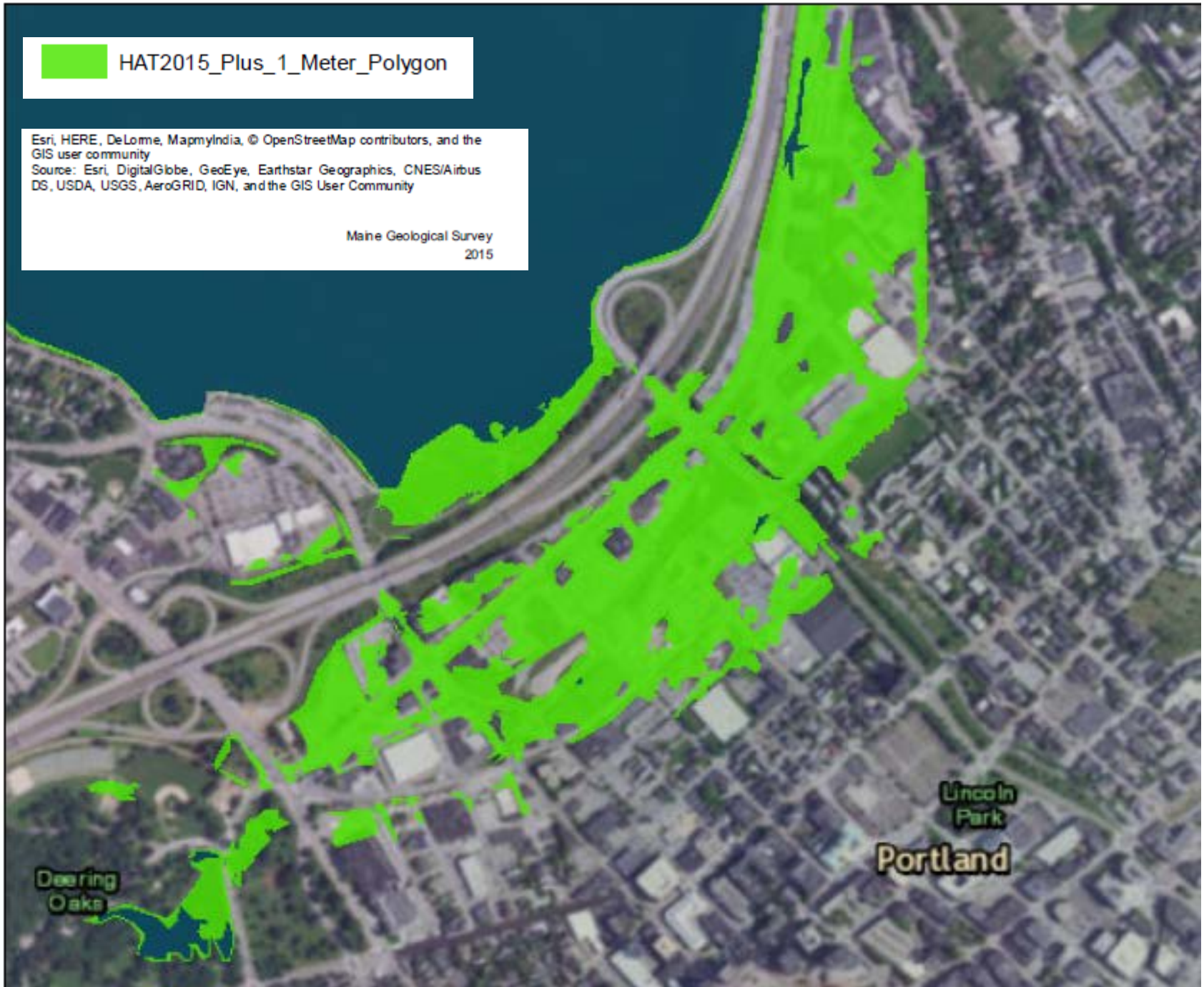
More Recently

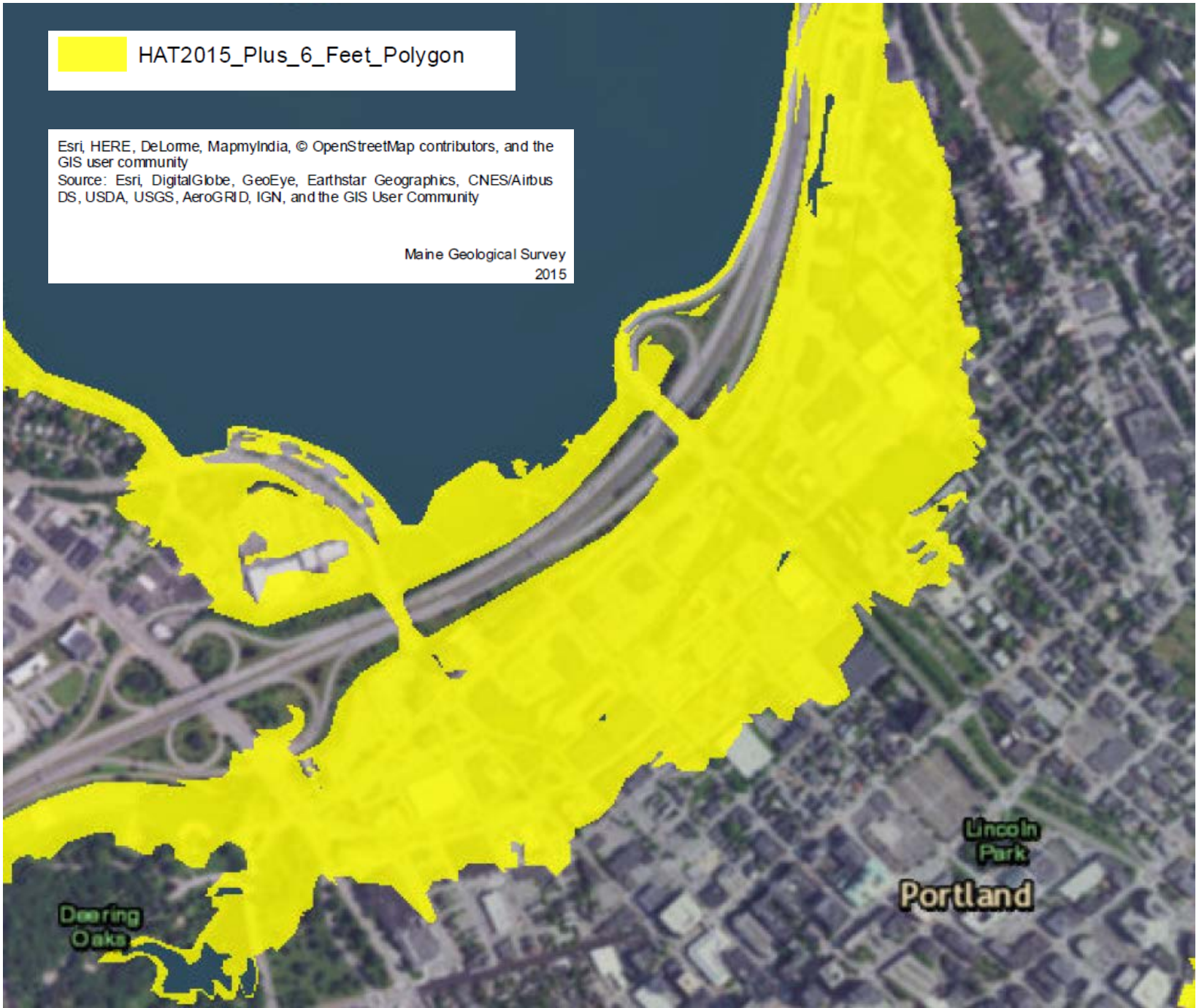
4 mm/year
1.4 feet per century





Source: Peter Slovinsky, Maine Geologic Survey


HAT2015_Plus_1_Meter_Polygon
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Maine Geological Survey
2015
Deering Oaks
Lincoln Park
Portland


HAT2015_Plus_6_Feet_Polygon
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Maine Geological Survey
2015
Lincoln Park
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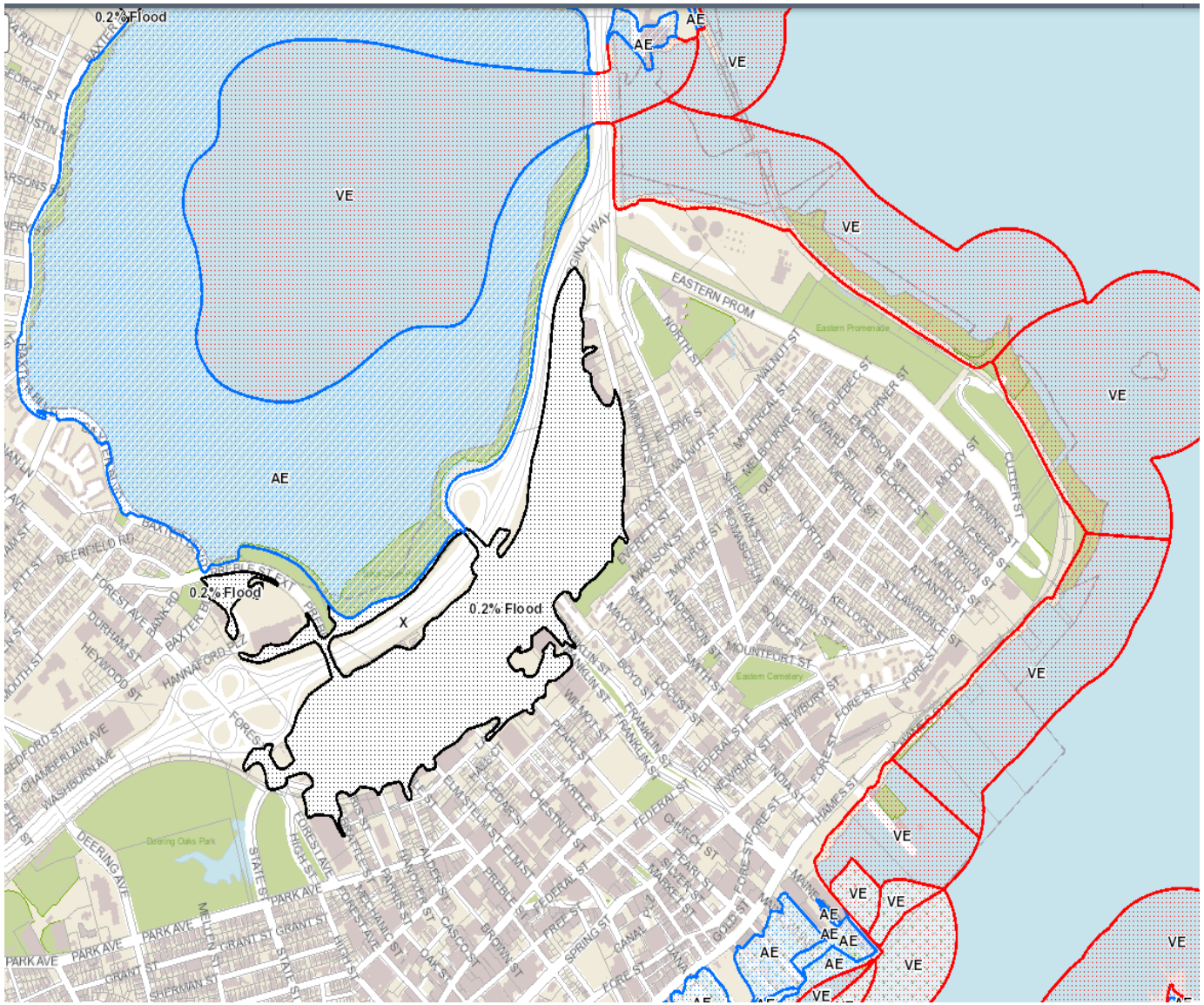
FEMA Flood Maps - Preliminary



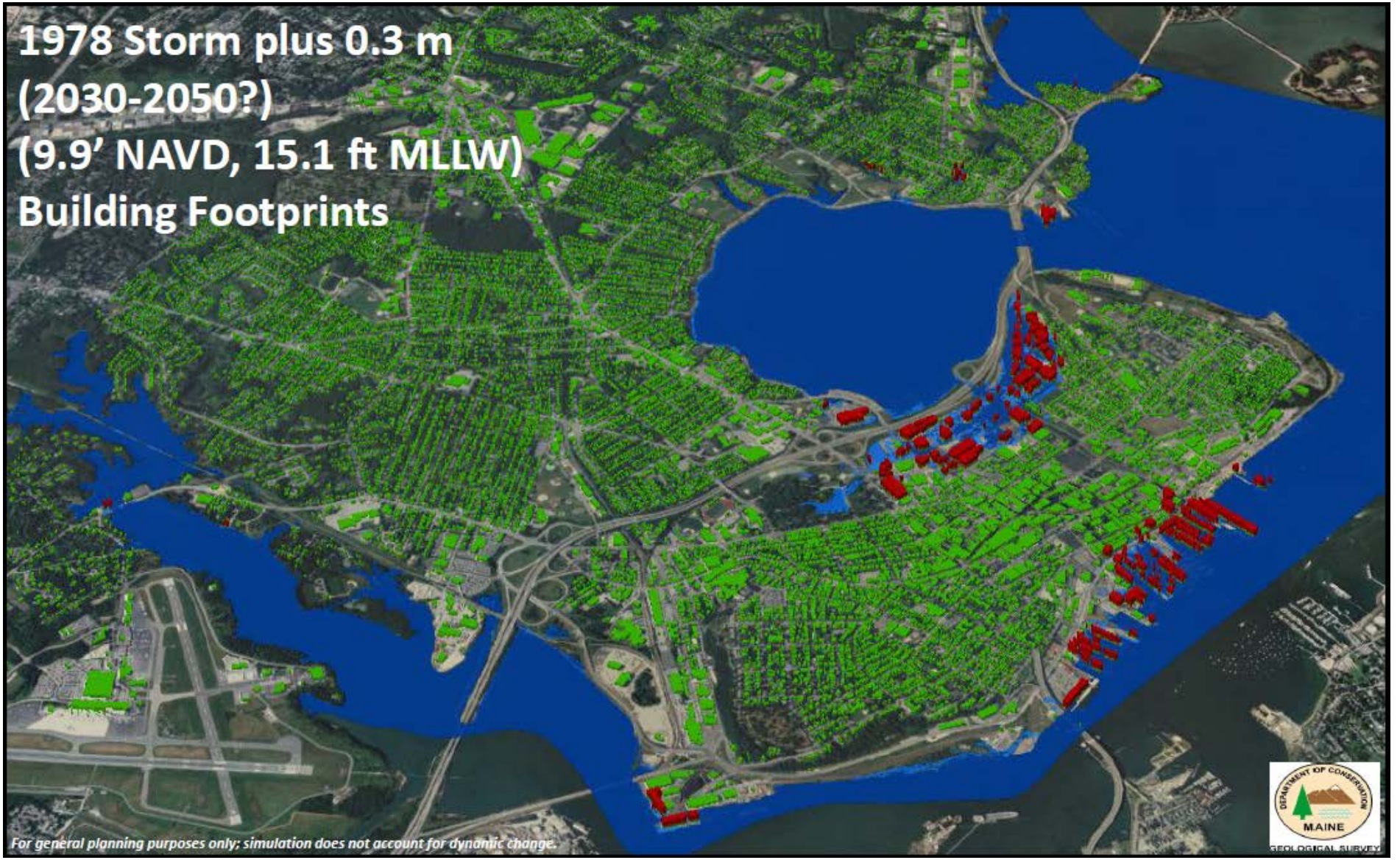
Bayside: Past Efforts

Work with collaborative team

Leverage outside leadership from the

- Design Community (PSA)
- Academic Community (Muskie School, NEEFC)
- State of Maine
- US Dept. Homeland Security

State of Maine Partnerships



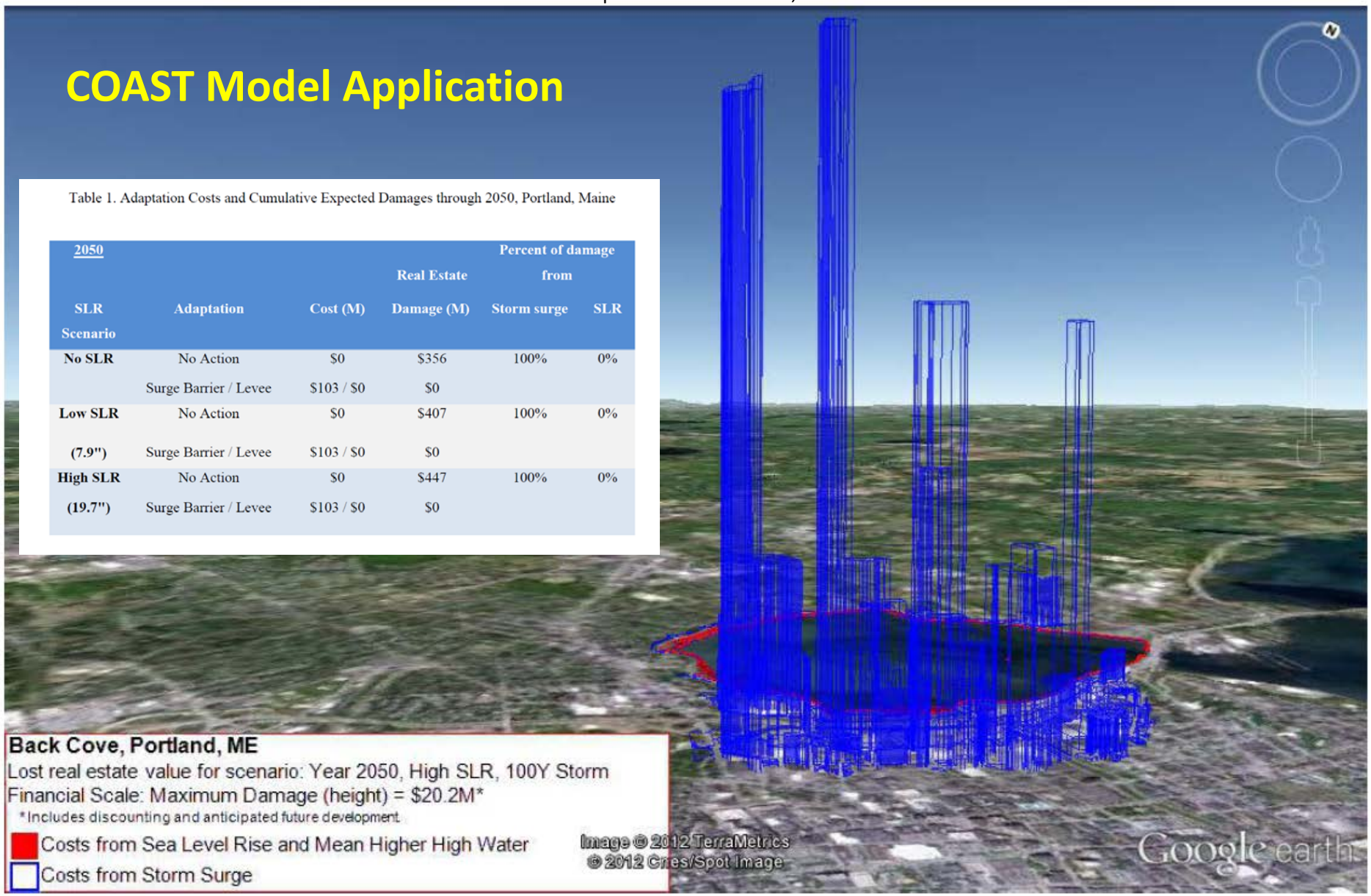
Assistance from the Maine Geological Survey

Source: Merrill, S., P. Kirshen, D. Yakovleff, S. Lloyd, C. Keeley, and B. Hill. 2012. COAST in Action: 2012 Projects from New Hampshire and Maine. New England Environmental Finance Center Series Report #12-05. Portland, Maine.

COAST Model Application

Table 1. Adaptation Costs and Cumulative Expected Damages through 2050, Portland, Maine

2050 SLR Scenario	Adaptation	Cost (M)	Real Estate Damage (M)	Percent of damage from Storm surge	Percent of damage from SLR
No SLR	No Action	$0	$356	100%	0%
	Surge Barrier / Levee	$103 / $0	$0		
Low SLR (7.9")	No Action	$0	$407	100%	0%
	Surge Barrier / Levee	$103 / $0	$0		
High SLR (19.7")	No Action	$0	$447	100%	0%
	Surge Barrier / Levee	$103 / $0	$0		



The Challenge of Adaptation

Steps to Resilience:

Step 1: Identify the Problem
Step 2: Determine Vulnerabilities
Step 3: Investigate Options
Step 4: Evaluate Risks & Costs
Step 5: Take Action

Transitioning
from
Vulnerability awareness (Step 2)
to
Options (Step 3)

Local dollars compete
with schools, cops, parks,
……..

What is the City doing about current and future flooding in Bayside?

Bayside Adapts builds on past efforts

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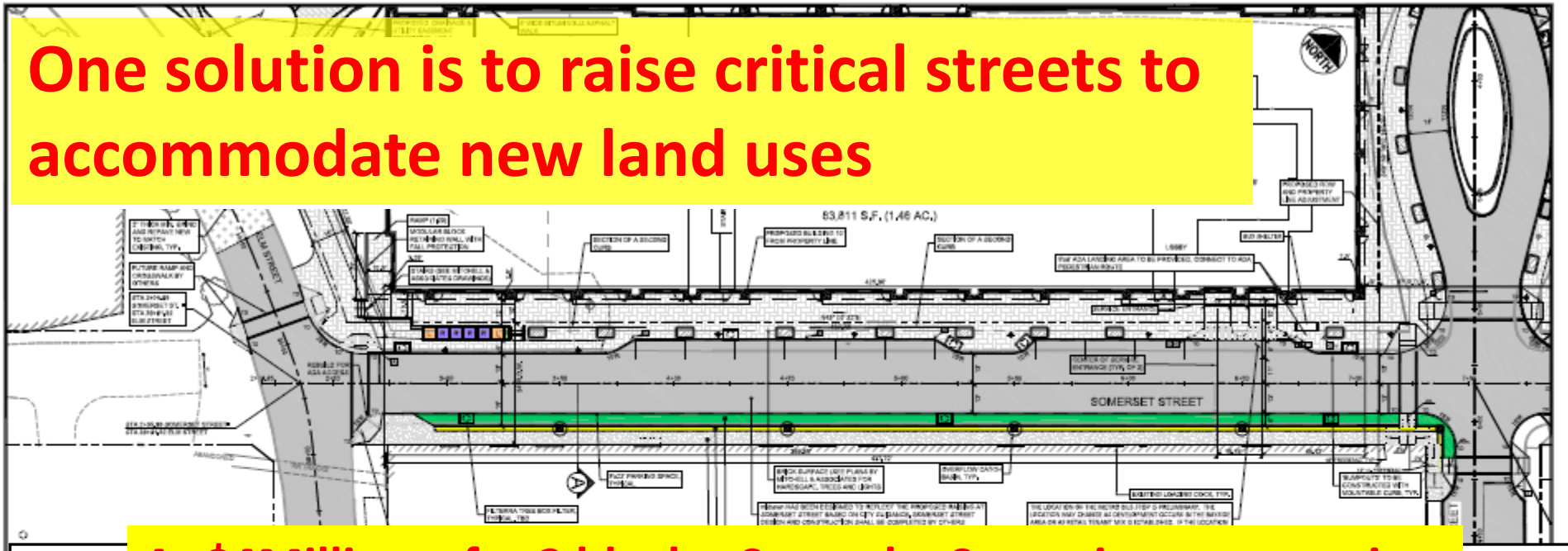
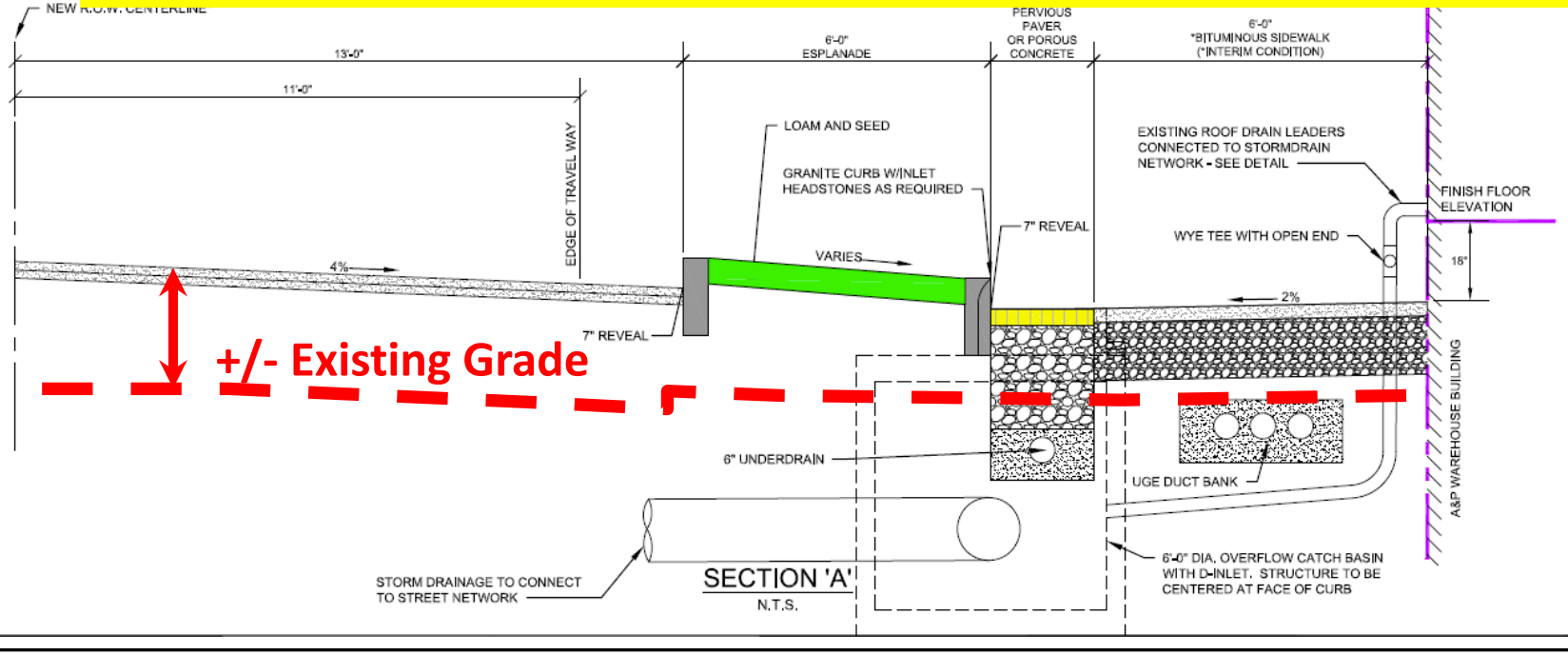
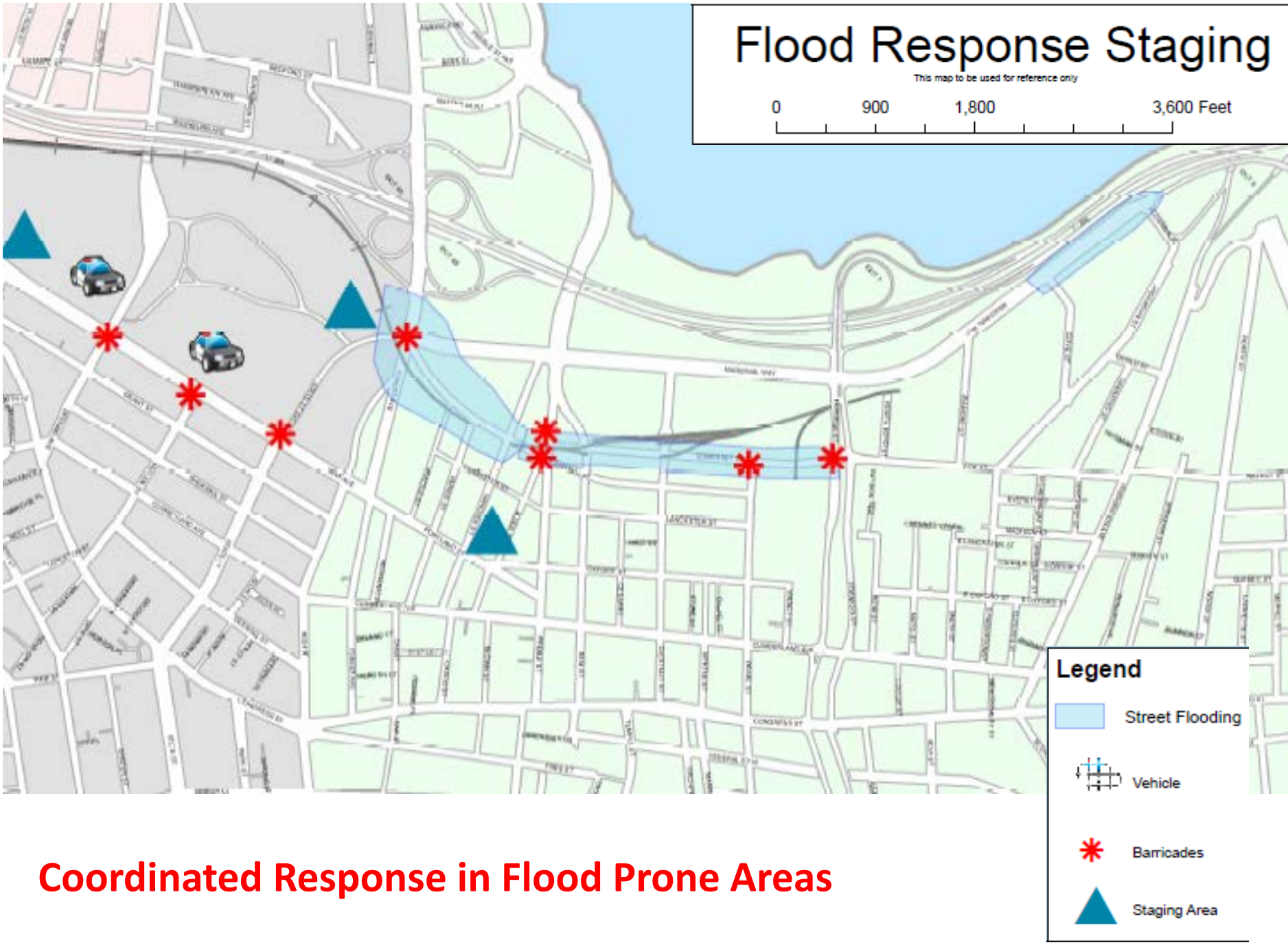
- Leverage outside leadership from the
  - Design Community (PSA)
  - Academic Community (Muskie School, NEEFC)
- Development Review Process
- Create Flood Response Protocols and Procedures
- Maintenance and House Keeping

One solution is to raise critical streets to accommodate new land uses



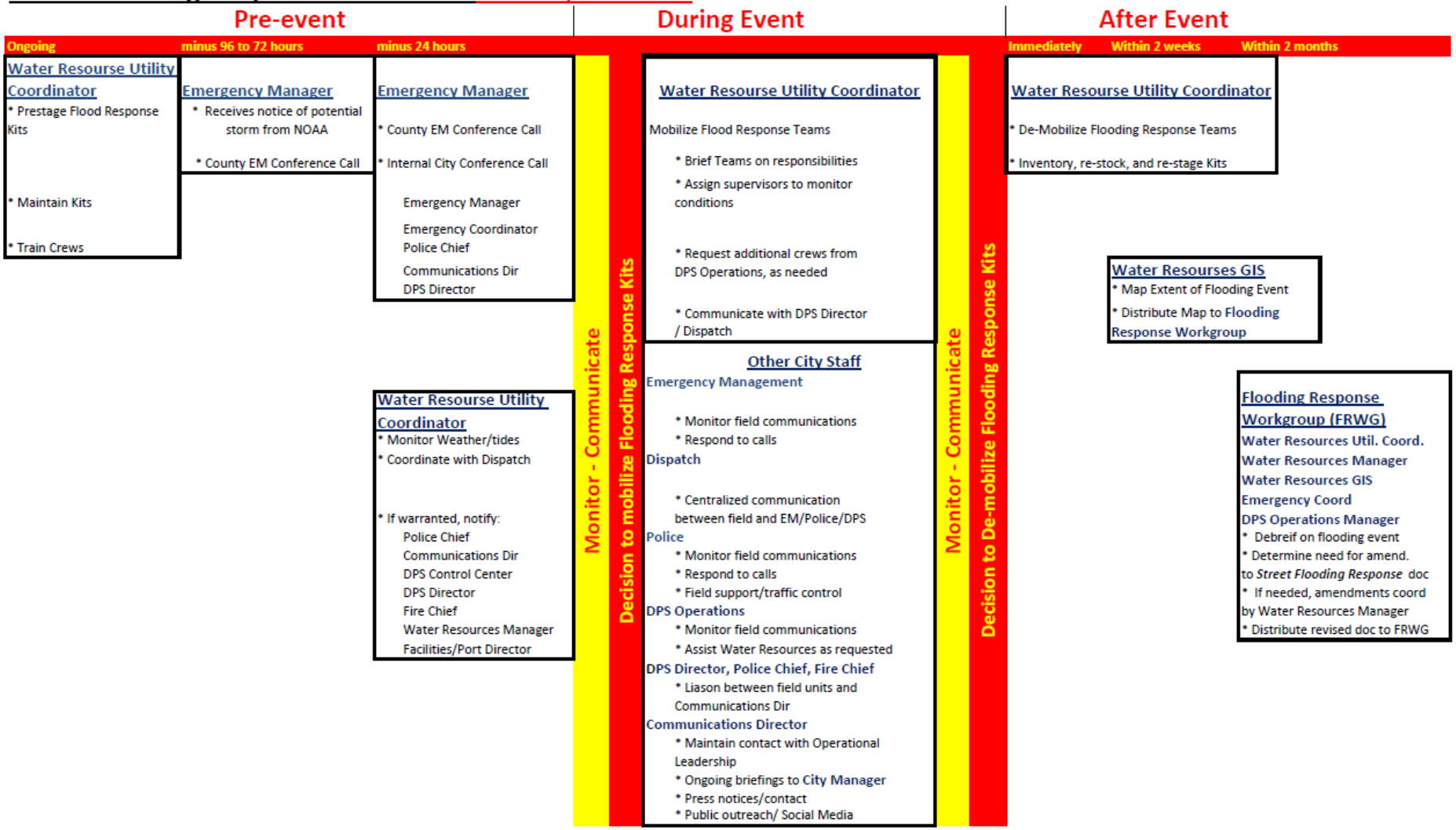
At $4Million + for 2 blocks, Street by Street is not an option





Coordinated Response in Flood Prone Areas

Street Flooding Response Flow Chart DRAFT, 12-30-15



Maintenance and Housekeeping:

Somerset Street and
Franklin Street

Sept
2015

Oct
2015

Bayside Adapts

NATIONAL LEAGUE of CITIES

WOODARD &CURRAN

usm UNIVERSITY OF SOUTHERN MAINE Edmund S. Muskie School of Public Service

New England Environmental Finance Center

RESURGAM :: MUTTLUM SIGILLUM :: CIVITATIS PORTLANDIÆ

THE STUDY AREA

Bayside Study Area

See BaysideAdaptsMaps.pdf for full size maps.

How can Bayside continue to grow and succeed in a future with higher sea levels?

What might the neighborhood look like in the future?

What actions can property owners, residents, and City government take to intentionally design the neighborhood for more water?

Bayside Adapts

Three Pronged Approach:

- **Stakeholder Outreach and Engagement**
- **Technical *Data Gap* Analysis**
- **Design Competition**

Stakeholder Outreach:
Bayside Adapts Work Group

- **Property Owners**
- **Neighbors**
- **Design Community**
- **Business Owners**
- **Activists**

Outcomes: **Shared understanding of the problems**
Shared language for discussing the issues
"Goals for Adaptation"

Principles/Goals for Adaptation: DRAFT, Summarized

1. **Adaptation in Bayside is a citywide concern:**
   The burdens of adaptation should be shared

2. **Engagement of diverse stakeholders critical**

3. **City regulations should not create barriers to adaptation**

4. **Incentives to promote adaptation solutions**

5. **Coordinated Action**

6. **Avoid Ad hoc, site-by-site solutions**

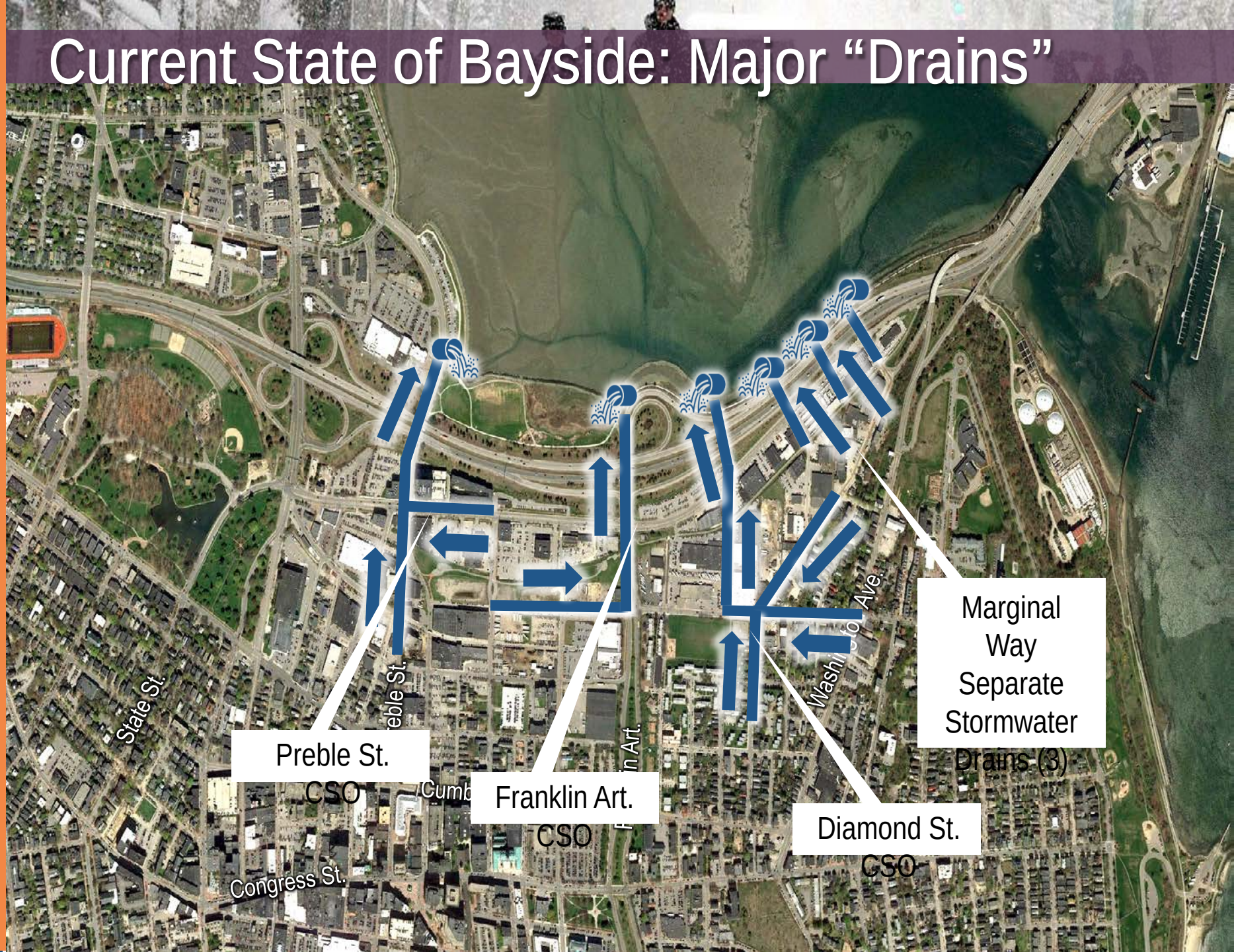
7. **Adaptation needs to be connected to a vision for Bayside**

Data Gap Analysis:

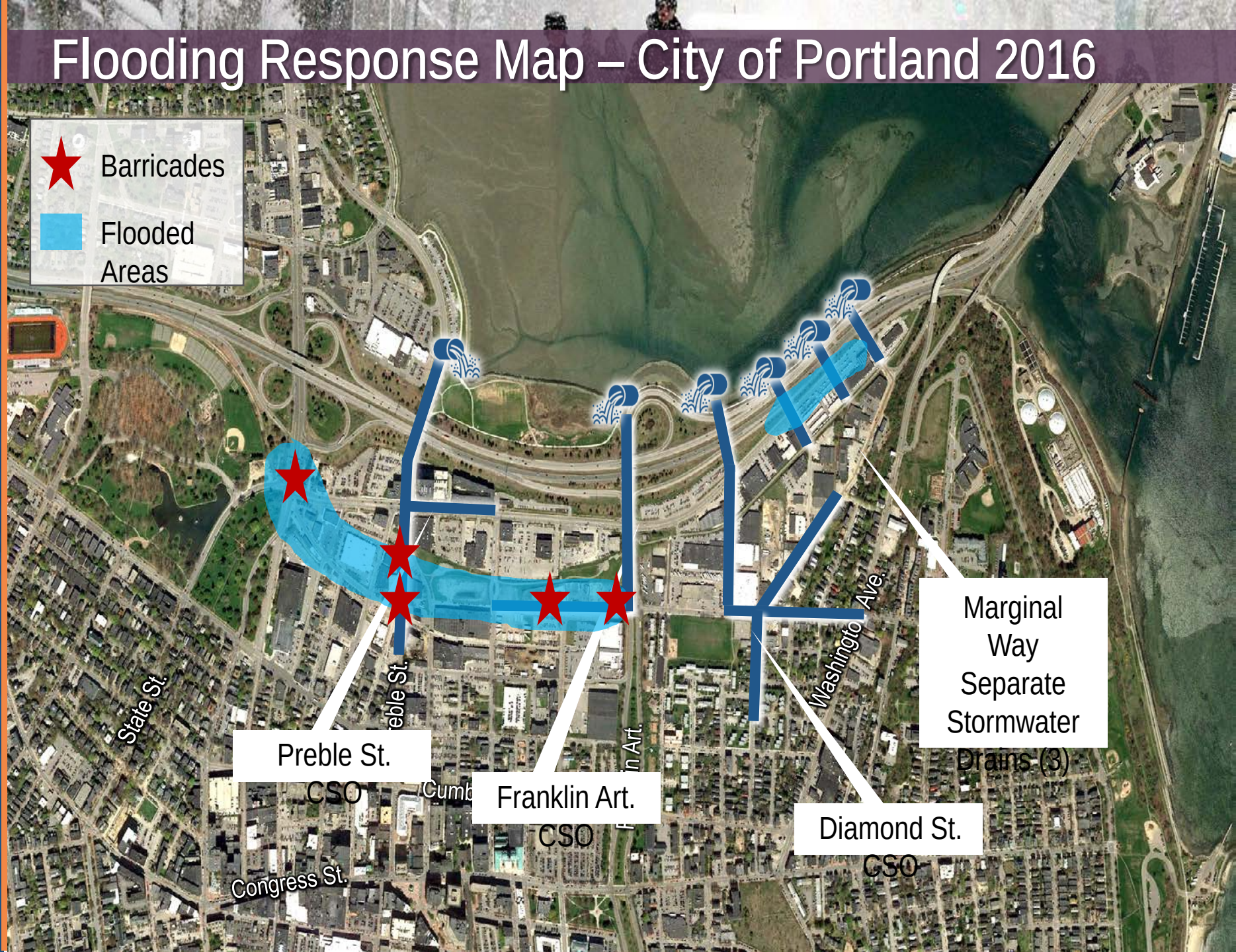
Identify the data gaps and the means of closing those data gaps to allow the City to analyze flooding caused by rainfall, tides, surge, and sea level rise

- Review the City's sewer and stormwater system to ID gaps
- Define planning scenarios for
  sea level rise / storm surge / storm events
- Contribute to / learn from public engagement
  (property owners, businesses, public)
- Provide recommendations / budgets
  for closing the data gaps

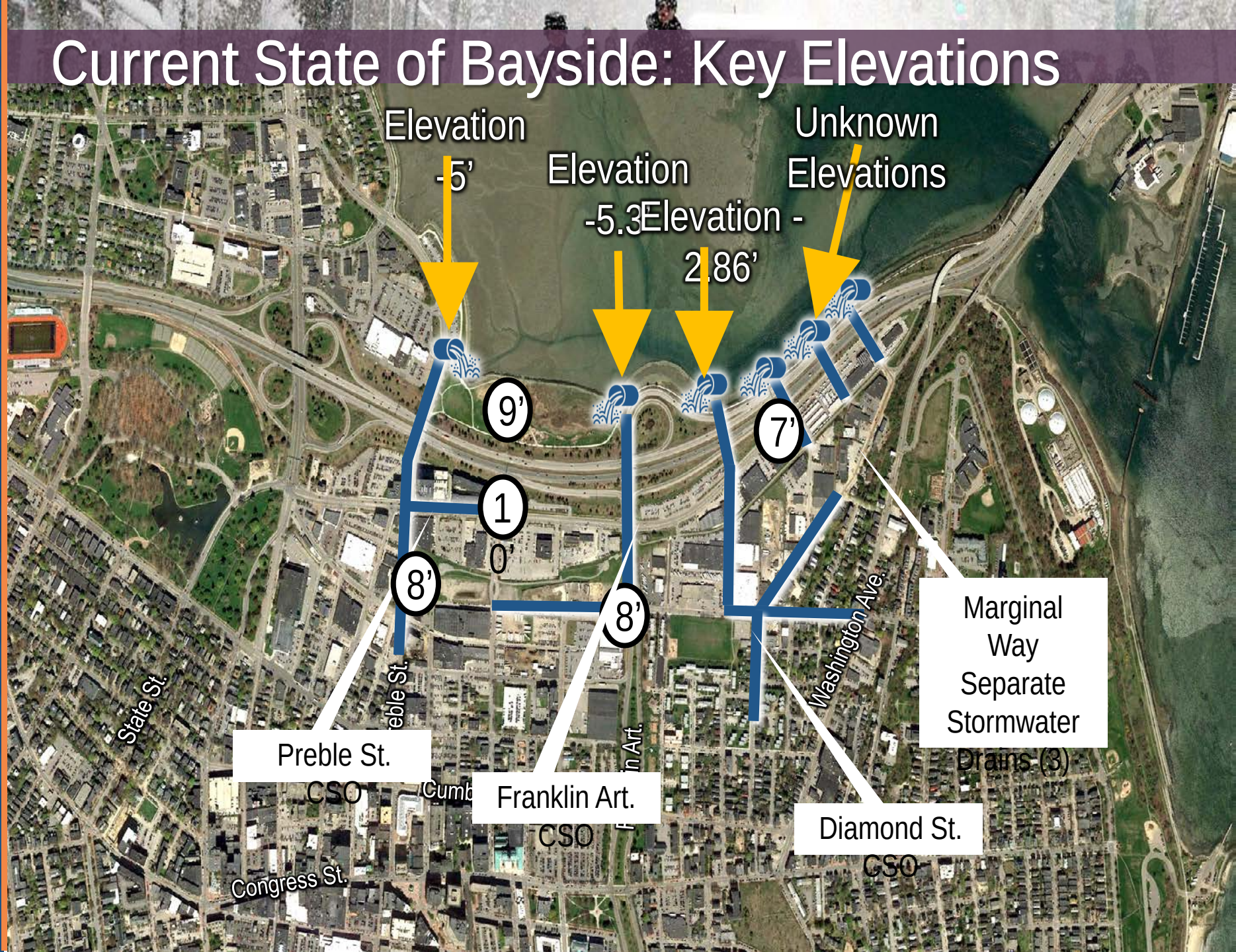
Current State of Bayside: Major “Drains”



Flooding Response Map – City of Portland 2016

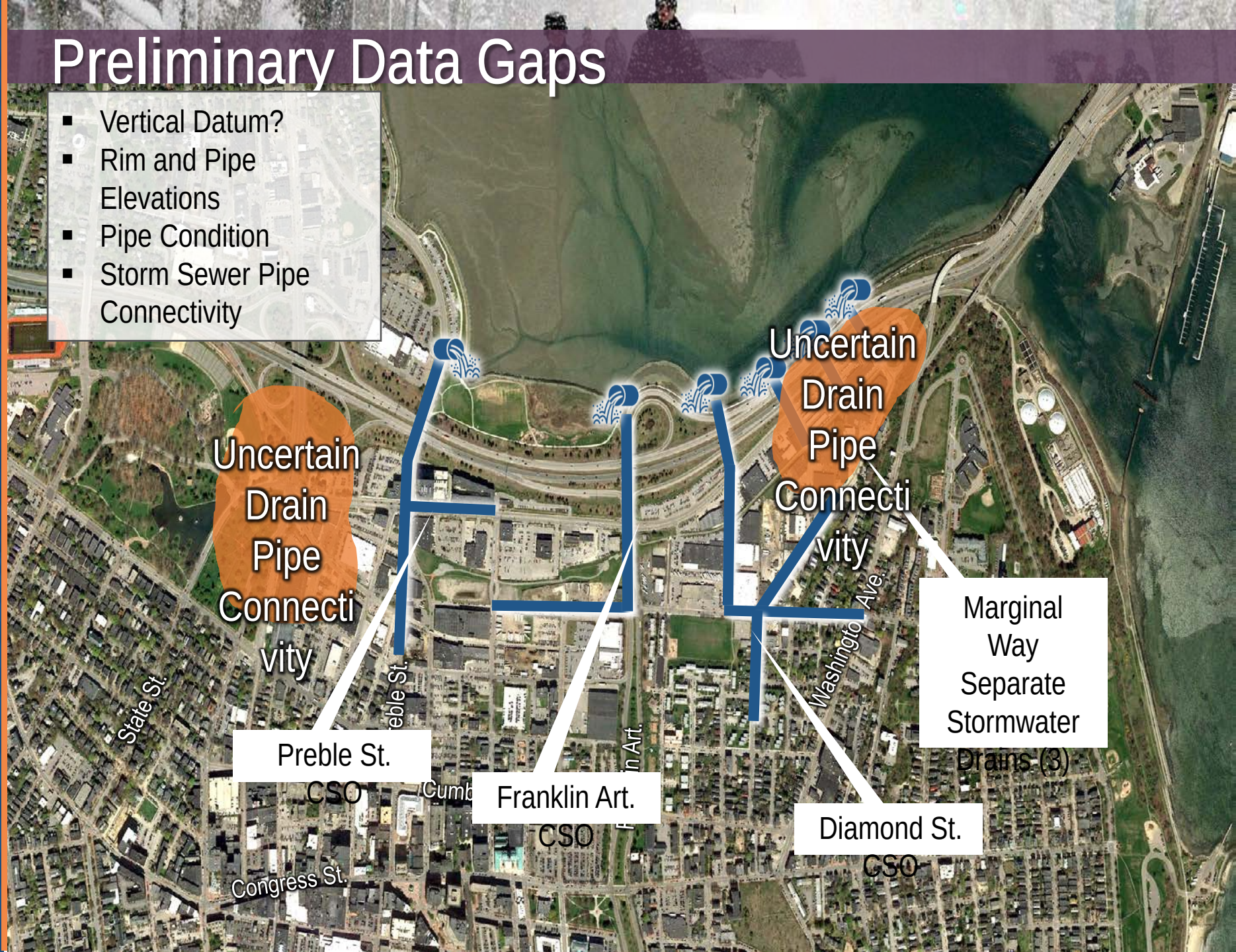


Current State of Bayside: Key Elevations



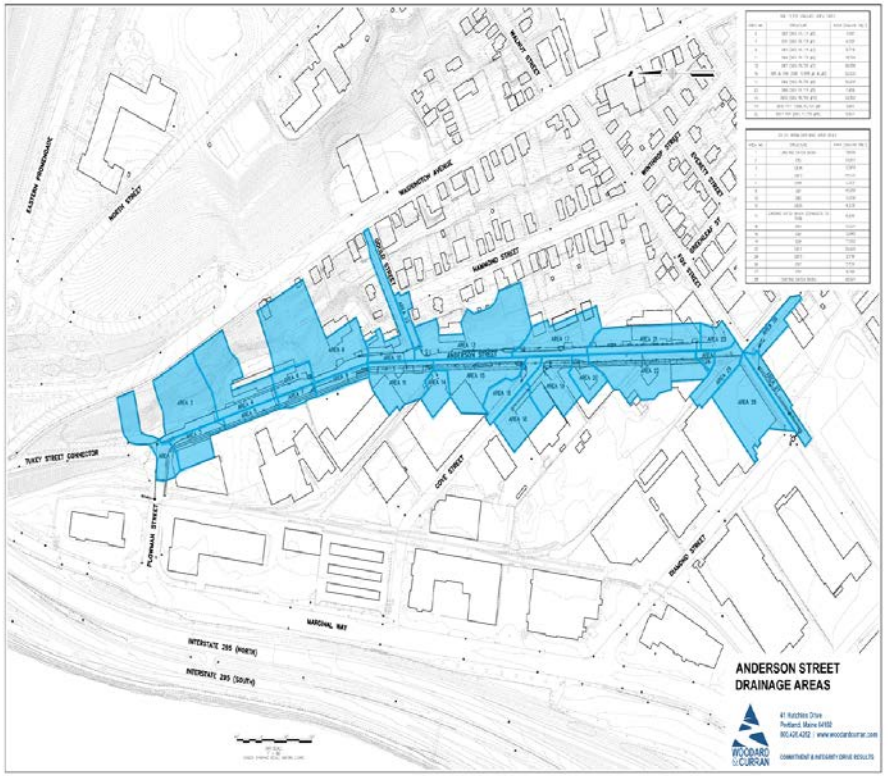
Preliminary Data Gaps

- Vertical Datum?
- Rim and Pipe Elevations
- Pipe Condition
- Storm Sewer Pipe Connectivity



Filling Infrastructure Gaps

- Identify Key Data Needs
- Identify Best Sources of Data for Bayside Drainage Infrastructure:
  - City and DOT GIS
  - SWMM Models
  - Archives - Local Project HydroCAD - As-Builts
  - Ongoing CCTV and Condition Data
- Flow Monitoring



Environmental Conditions: Gaps & Uncertainties

- **Sea Level Rise Rate**
  - Many sources of information from regional, global, and national sources
  - Potential for acceleration of rate over time

- **Storm Surge**
  - Many sources of information at local & regional scales
  - Potential for large local spatial variation
  - Dependence on sea level rise rate
  - Uncertainty about future storm

- **Precipitation**
  - Design storms vary among studies
  - Design storms should change as precipitation patterns change
  - Several sources of predicted changes

WOODARD &CURRAN

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DESIGN BRIEF

Generate visionary images and ideas for the Bayside neighborhood illustrating a vital future with more water.

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Submissions Requirements:

Climate Change Scenario

- # feet of sea level rise
- Time frame
- Infrastructure lifecycle

250 Words or Less

Concept Summary Board

- Stand alone document
- Overall Approach
- Citations

11x17 format,
suitable for larger printing

Supporting Boards

- Renderings
- Details
- Narratives

No more than 3

Judging Criteria:

Coherency

Are the Adaptive Approaches clearly

- **Conceived**
- **Communicated**

Judging Criteria:

Credibility

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- **Does the Climate Change Scenario Articulate the risk(s)?**
- **Do the adaptive approaches address the risks?**

Judging Criteria:

Scope

Does the submission address the scope of the problem (in the Problem Statement?

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Judging Criteria:

Practicality

Is there a reasonable expectation for implementation?

For the entire Neighborhood?

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Judging Criteria:

Inspiration

- Is the vision compelling?
- Does the vision inspire action?

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Additional Resources

Portland, ME GIS maps
http://click.portlandmaine.gov/gisportal/

Maine's Climate Future
http://cci.siteturbine.com/uploaded_files/climatechange.umaine.edu/files/Maines_Climate_Future_2015_UpdateFinal-1.pdf

Maine Geological Survey tide information
http://www.maine.gov/dacf/mgs/hazards/hat/index.shtml
http://www.maine.gov/dacf/mgs/explore/marine/sites/dec14.pdf

People Nature Adapting to a Changing Climate
http://www.maine.gov/dacf/municipalplanning/docs/People%20and%20Nature%20Adapting%20to%20Climate%20Change.pdf

Resiliency Planning in Portland, Maine
https://conference.ifas.ufl.edu/NWWWS/documents/Presentations/D2%20Needelman.pdf

Portland Press Herald
http://www.pressherald.com/2015/09/30/heavy-rains-slowing-morning-commute-across-southern-maine/

National Resource Council of Maine
http://www.nrcm.org/wp-content/uploads/2013/10/portland1.jpg

The Objectives/Outcomes:

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- Accommodate water
- Elevate infrastructure
- Armor against water
- Retreat
- ??????

Submissions due April 10, 2017

Awards ceremony on May 3, 2017 in the Portland Public Library

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What do we expect from Bayside Adapts?

- Common understanding of vulnerability
- A first formal City community conversation on Sea Level Rise estimates
- Better tools to address the issues
  - Goals/Principles
  - Common Language
- Technical Base line for future work
- Inspiration, Images, and Activism

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Incremental Resiliency Planning Portland, Maine

Maine Waters Conference, Rain and Tides, March 30, 2017

Bill Needelman, Waterfront Coordinator
wbn@portlandmaine.gov 207-874-8722