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SURREY COASTAL FLOOD ADAPTATION STRATEGY (CFAS)

South Nicomekl Irrigation Meeting
November 2nd, 2016

nhc
northwest hydraulic consultants

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Project overview

- A 3-year project to help prepare Surrey for a changing climate and improve the resilience of coastal communities
- Led by broadly skilled consultant team
- Large study area with many communities, stakeholders and partners

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We're in Phase 1

What matters most and who is affected?

FOCUS: *Education, awareness building, and community values*

SUMMER 2016 - SPRING 2017

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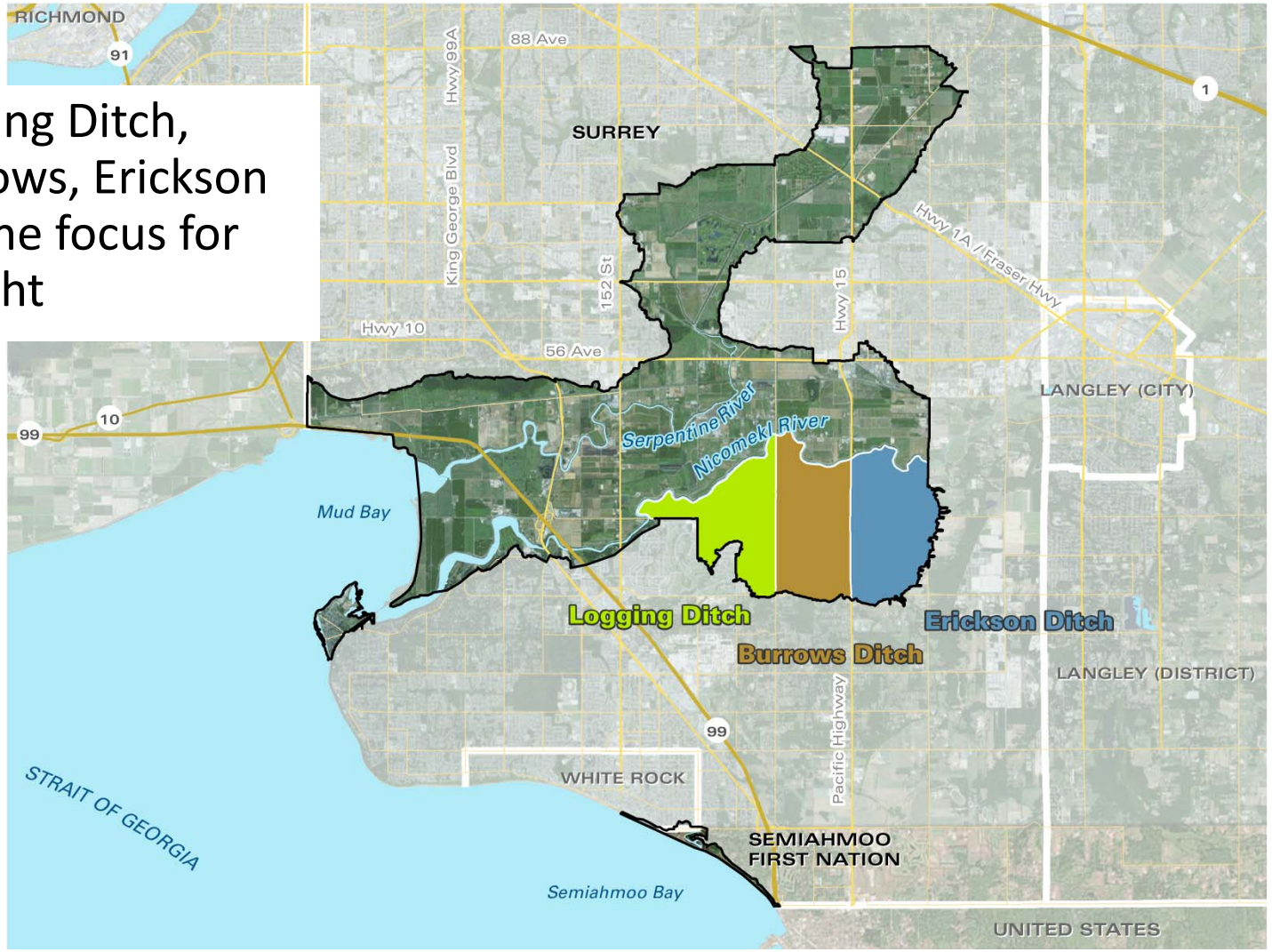
South Nicomekl and Flooding

Logging Ditch, Burrows, Erickson are the focus for tonight



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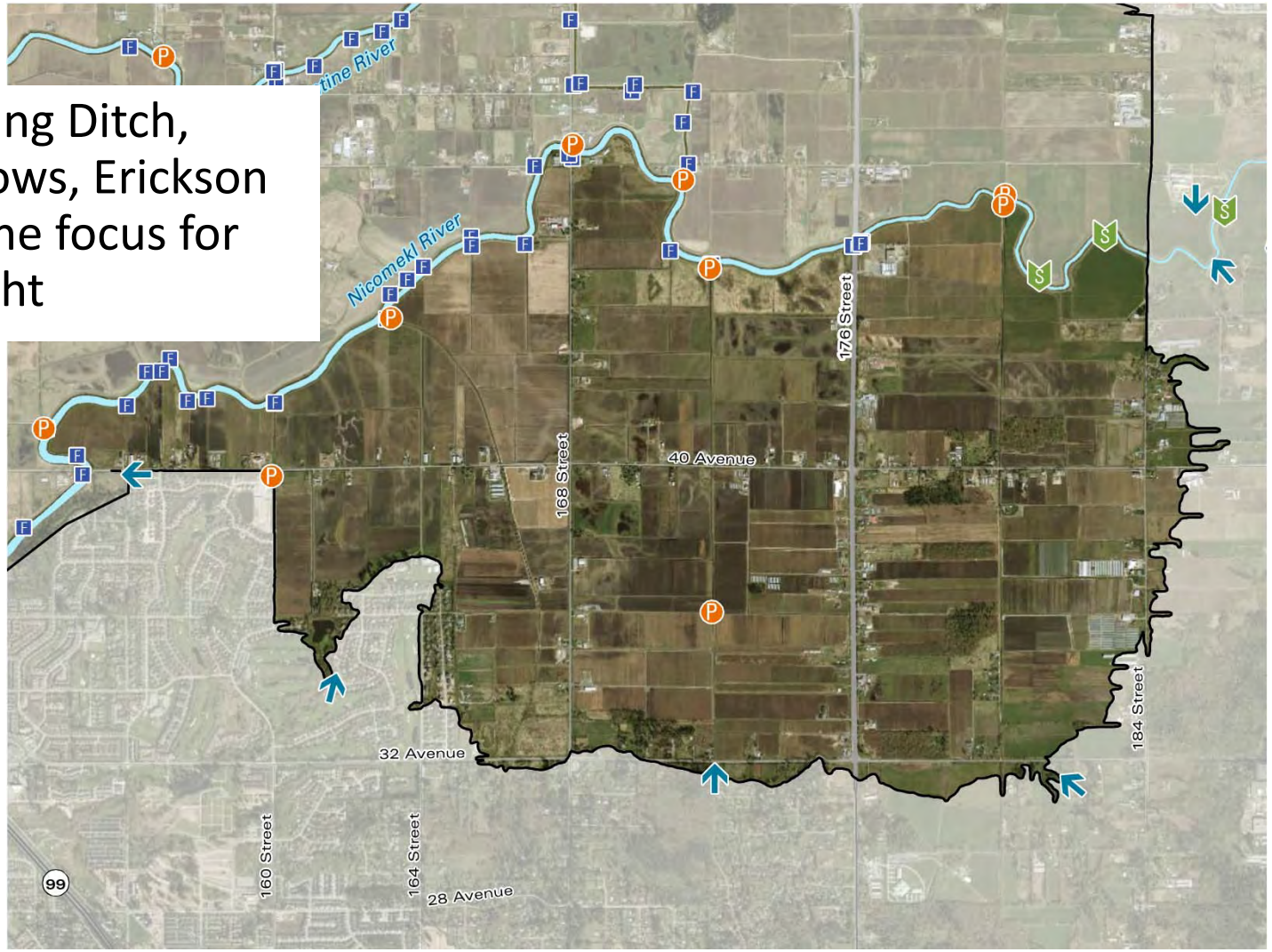

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Past Flooding

- May 2014
    - Intense short duration rainfall over south Nicomekl
- January 2013
    - Several days of higher than mean tide levels combined with moderate rainfall
- Other significant events on record (1965 – 2011)
    - January 2009 largest 5 day runoff
    - October 2003 2nd largest 5 day runoff
    - January 1968 4th highest 5 day runoff

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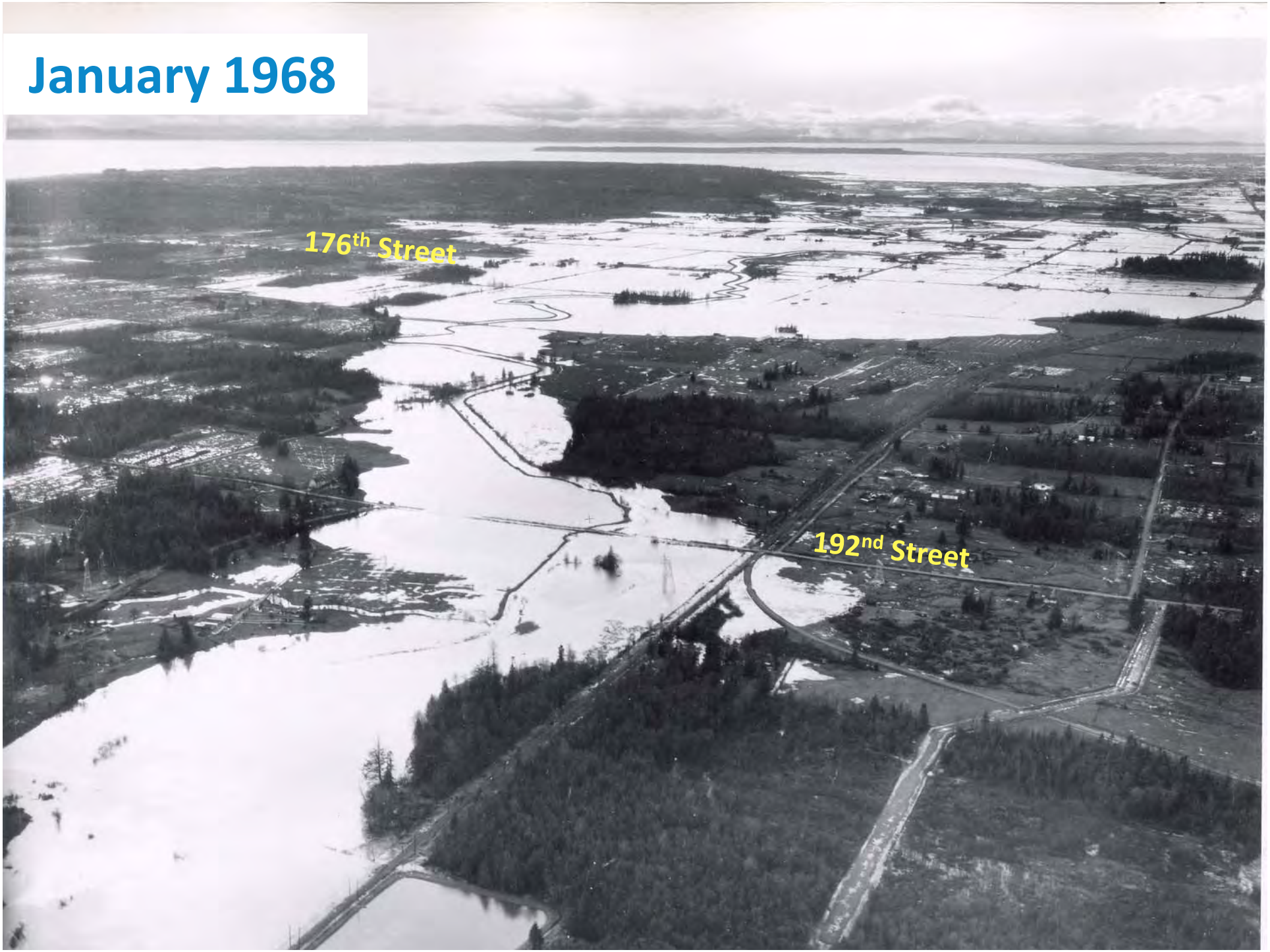
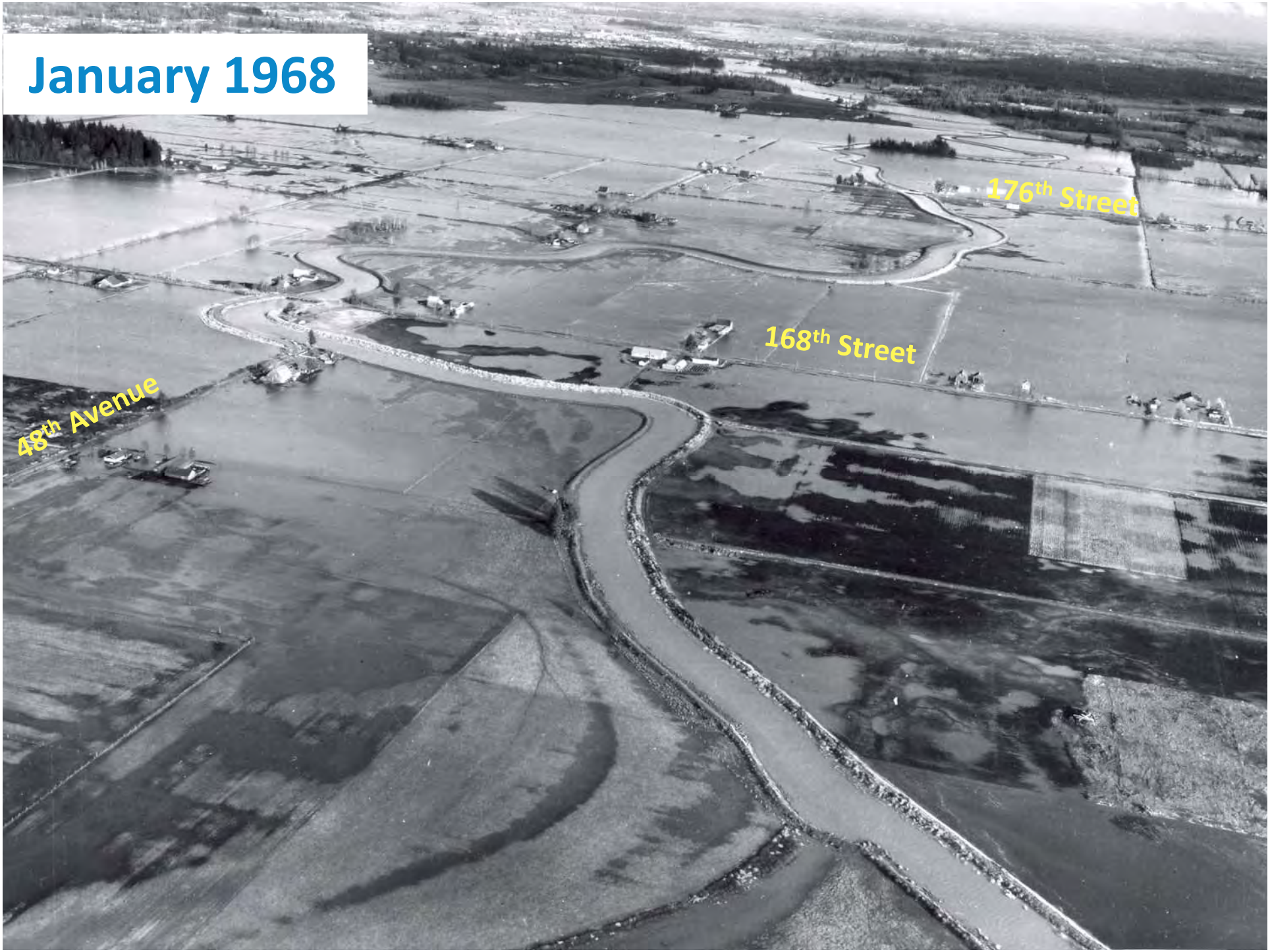
January 1968



January 1968


January 1968
176th Street
168th Street
48th Avenue


January 1968

October 2003

October 2003

October 2003

October 2003

October 2003

October 2003

October 2003

October 2003

2009 Flooding

- Starting in 1999, $40 million in construction value has been invested in dyke and pump station upgrades along Nicomekl and Serpentine Rivers

- While flooding is controlled in both depth and duration, the Nicomekl - Serpentine Valley remains an active floodplain, subject to standing water for multiple days

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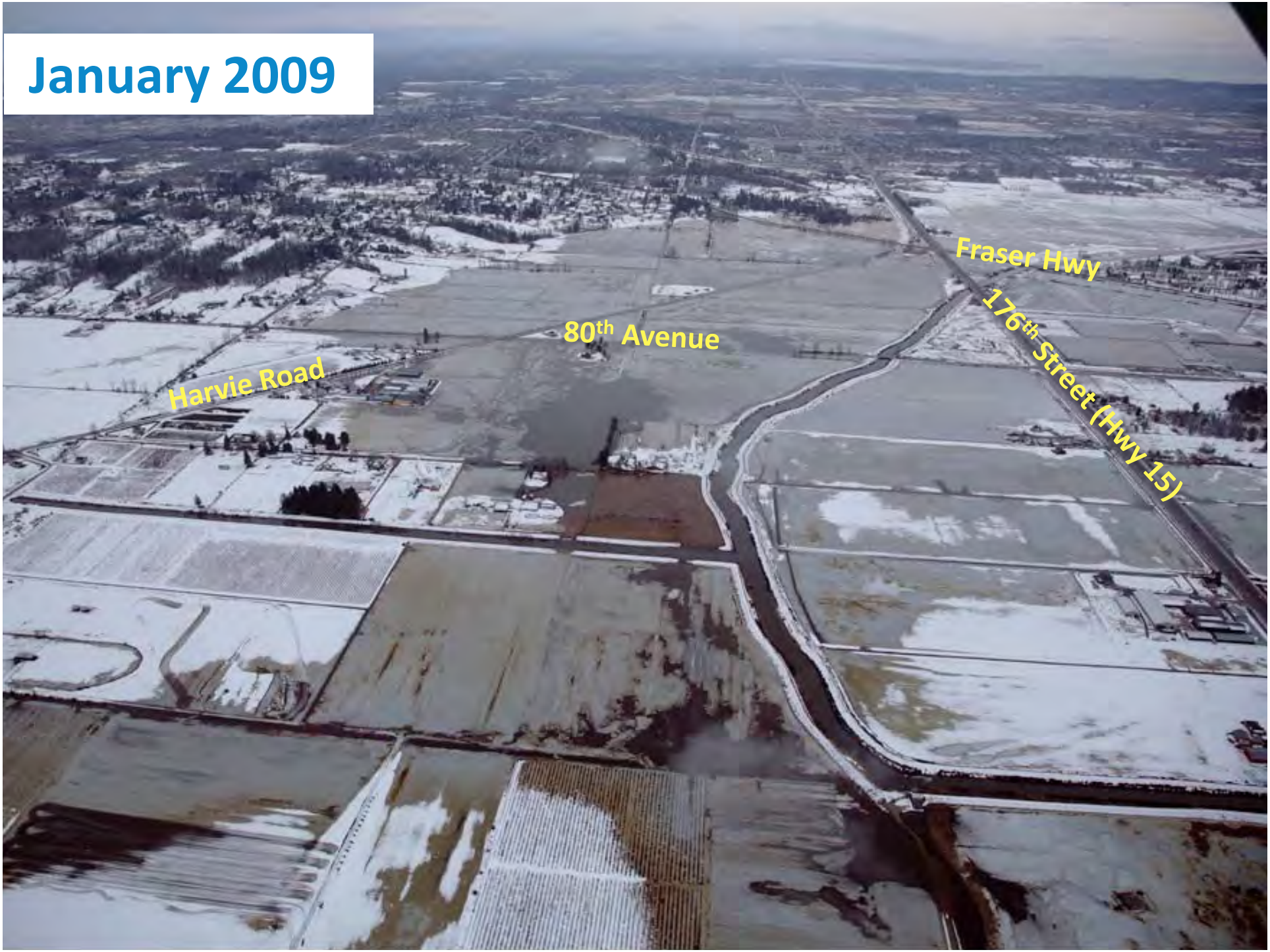
January 2009



January 2009

January 2009


January 2013

Nuisance Flooding

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Drainage and Dyke Network Overview

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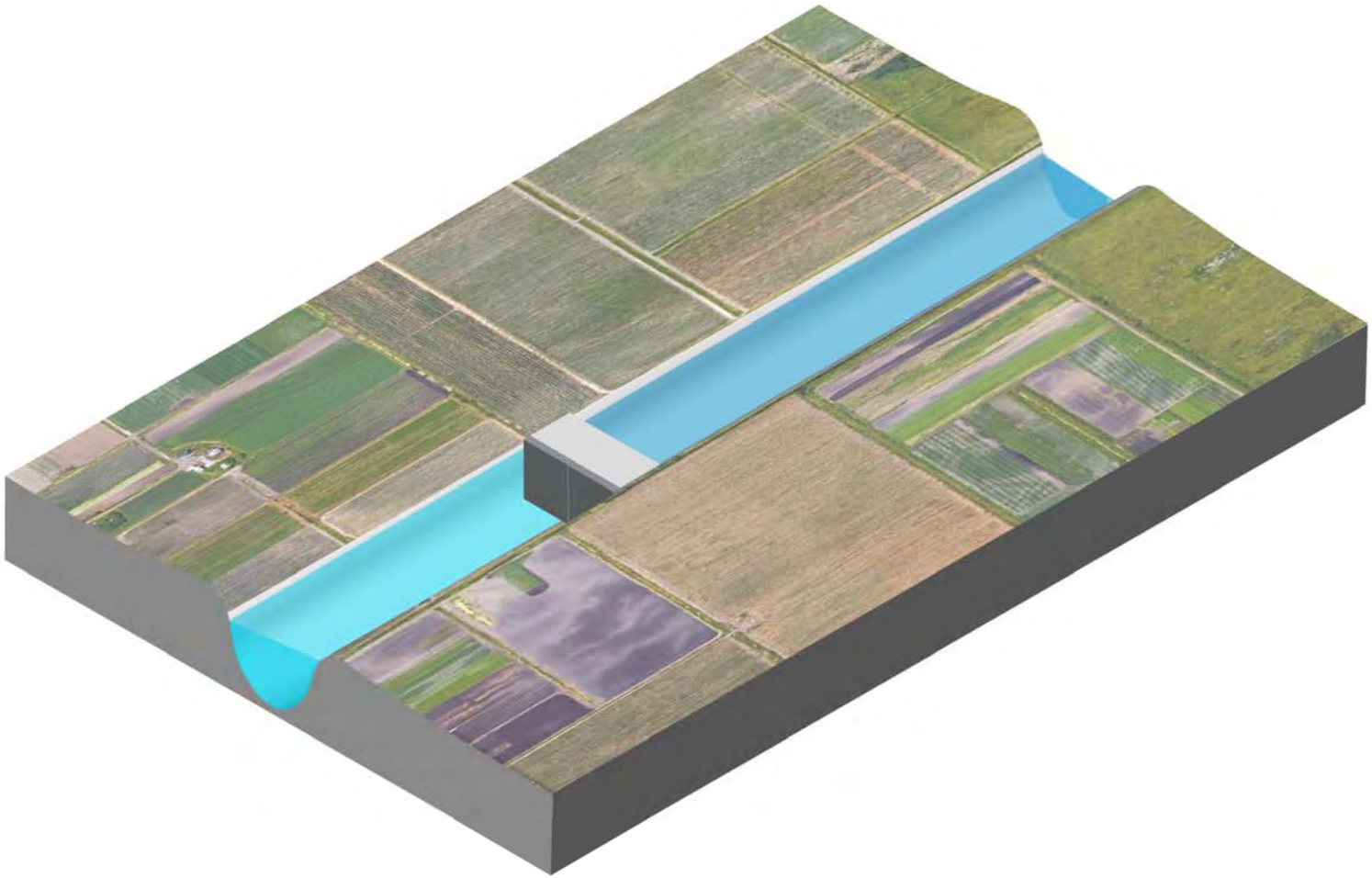
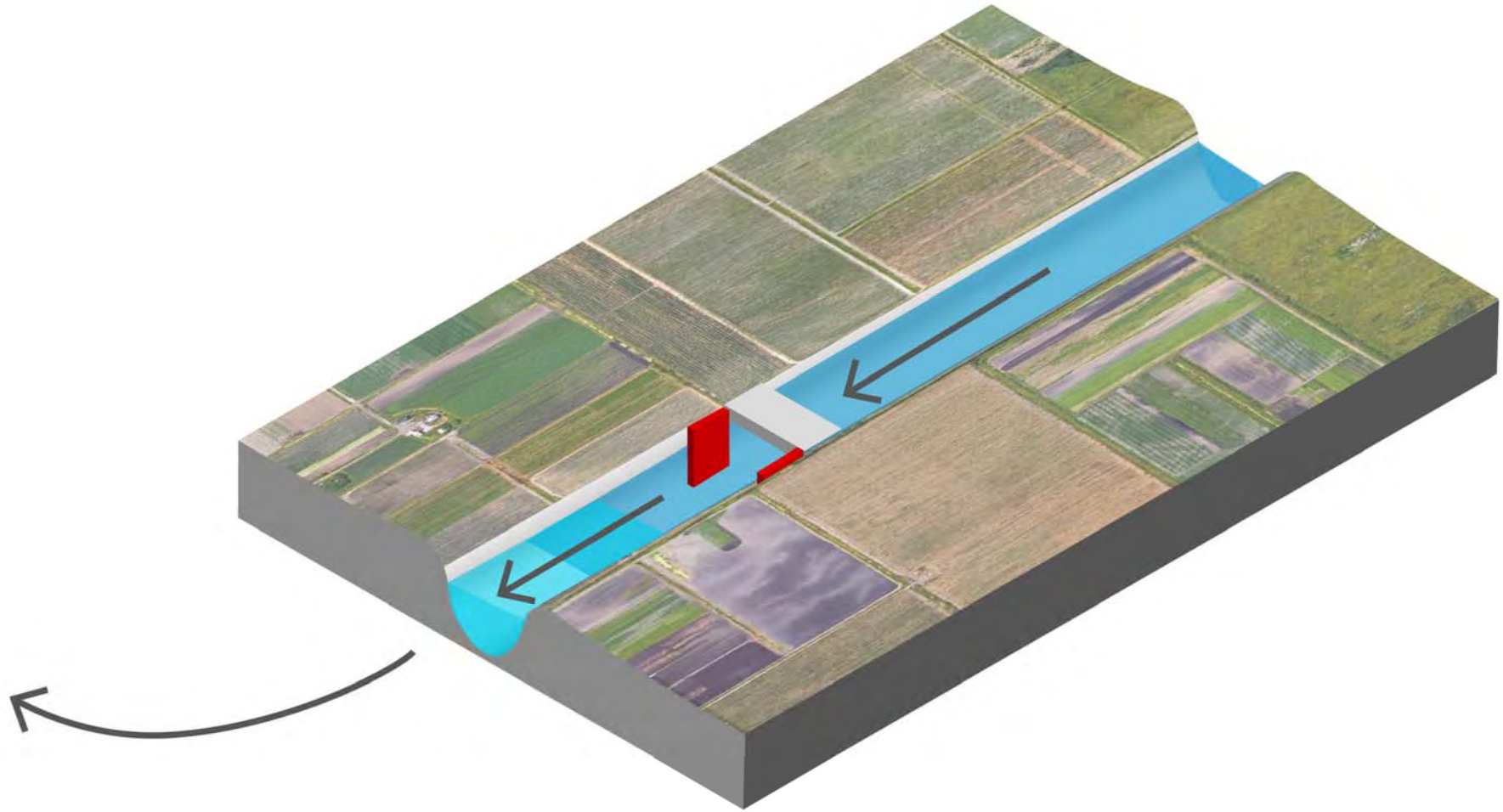
Nicomekl Sea Dam

Nicomekl Sea Dam



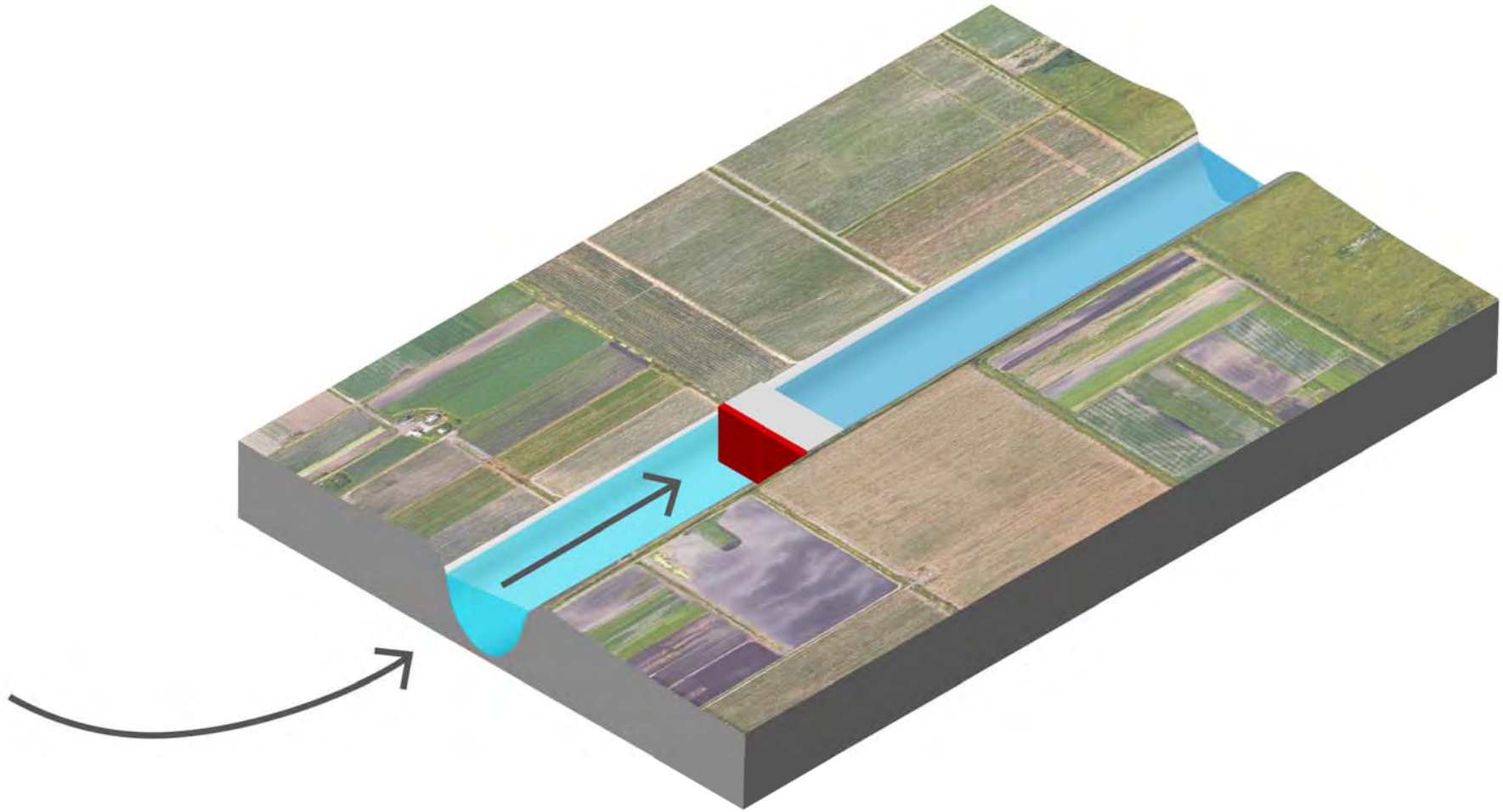
Nicomekl Sea Dam

Tide out: open

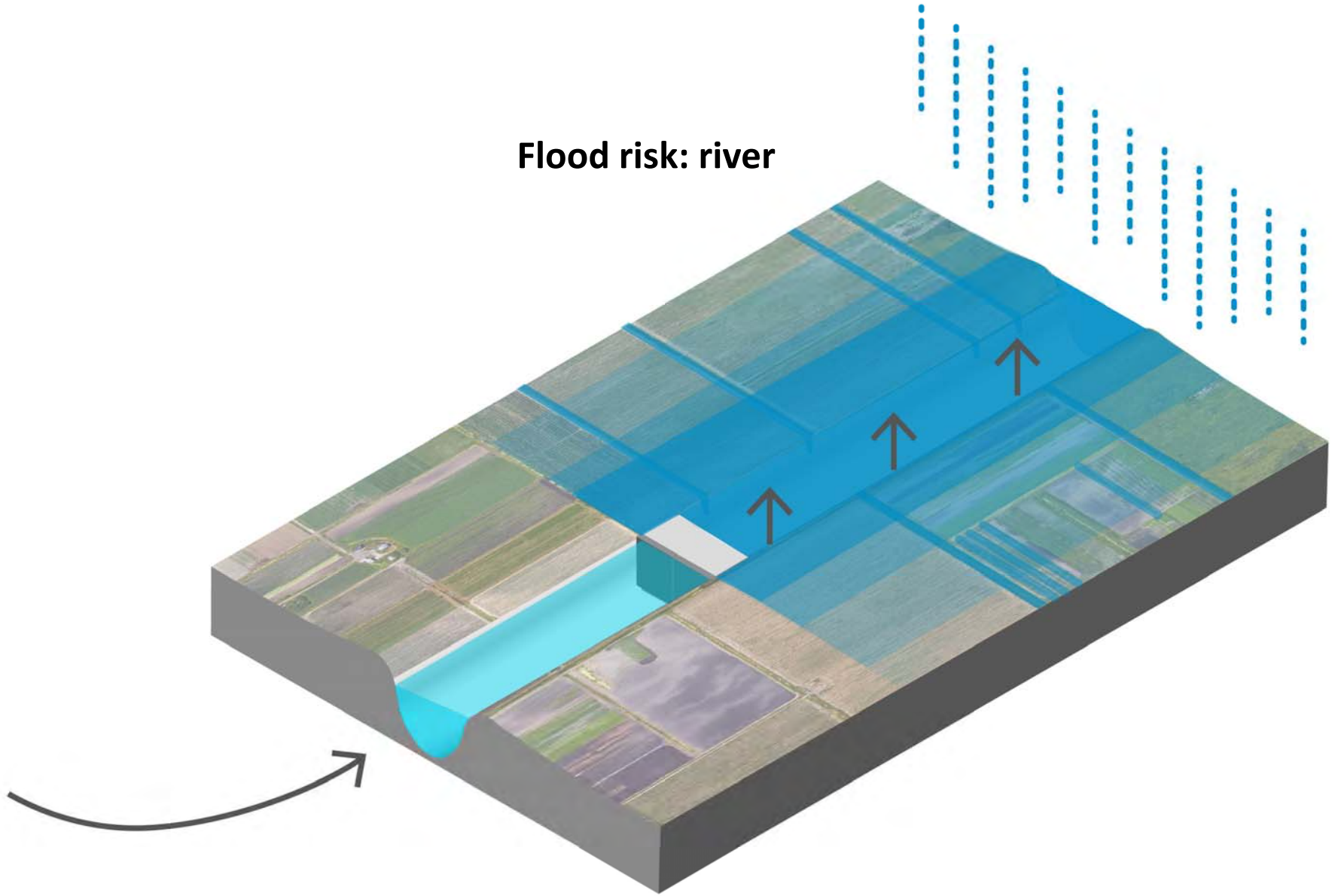


Nicomekl Sea Dam

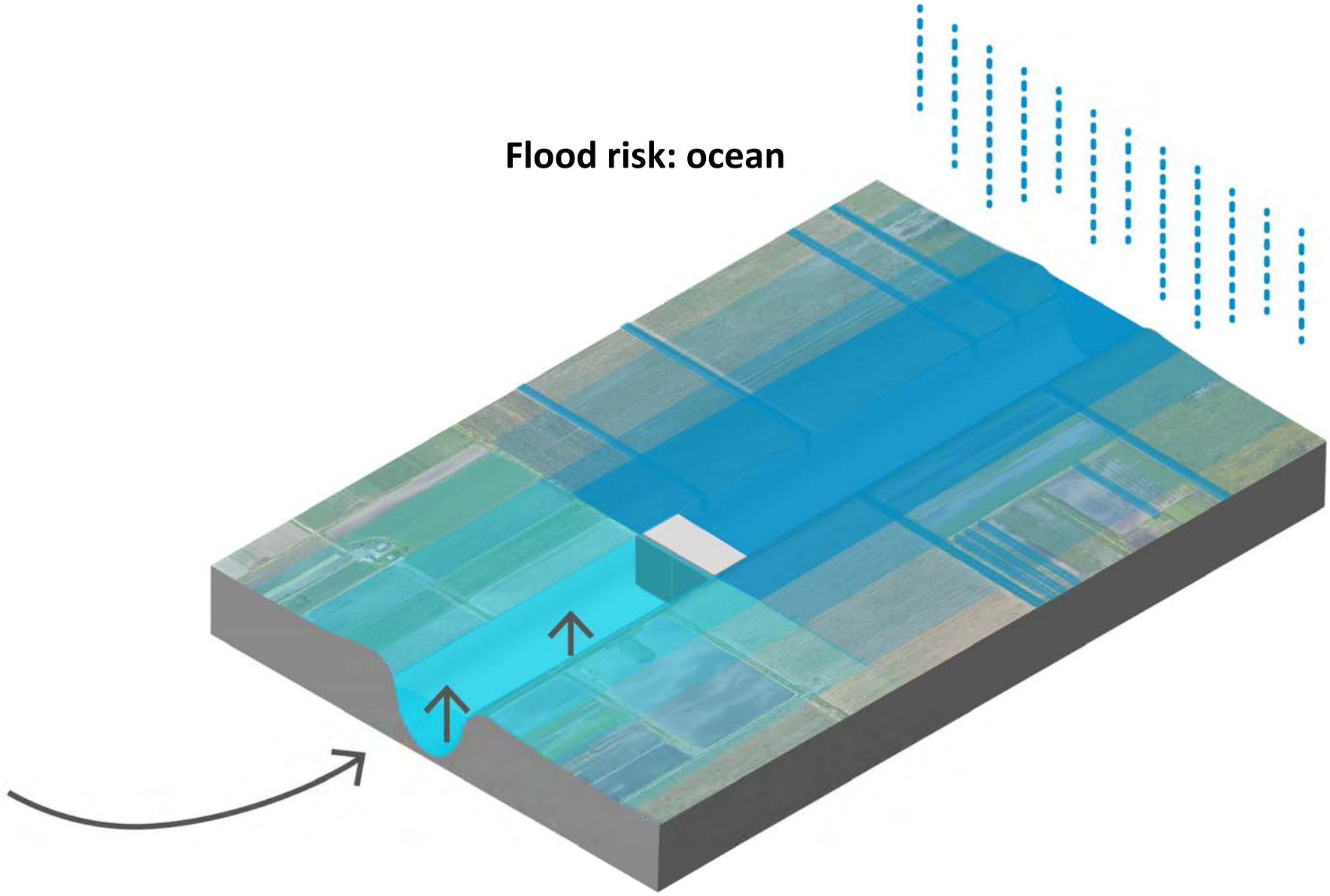
Tide in: closed



Nicomekl Sea Dam



Nicomekl Sea Dam



Climate Change and Flood Hazards

- Coastal cities like Surrey are facing big challenges as a result of climate change and, more specifically, sea level rise
- BC has advised municipalities to plan for at least 1 metre of sea level rise by year 2100
- Coastal areas can expect more frequent and severe flooding from sea level rise and storm surges
- Other challenges will include more erosion of coastlines, impacts to infrastructure and ecosystems, changes to beaches, higher groundwater levels and potential salinization

Climate Change and Flood Hazards

- Sea level rise
- Sea level rise combined with more frequent and more intense storm surges increases the risk of dyke breaches – overtopping, failures, and piping

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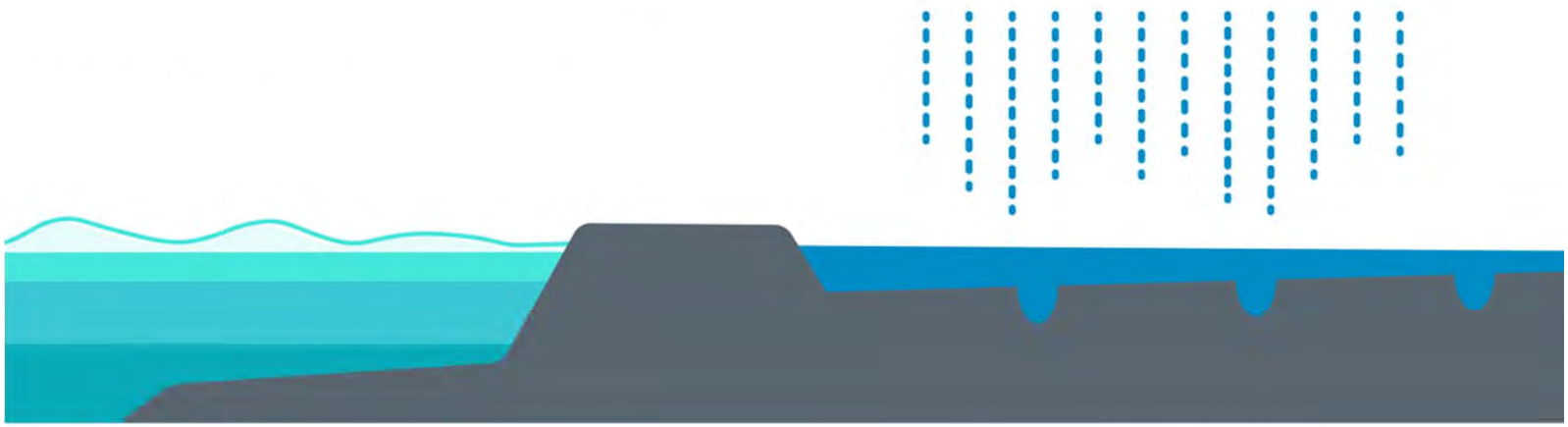
Climate Change and Flood Hazards

- Climate change will increase intensity storms and precipitation



Increased rainfall and storm intensity puts pressure on pumps, ditches and spillways.

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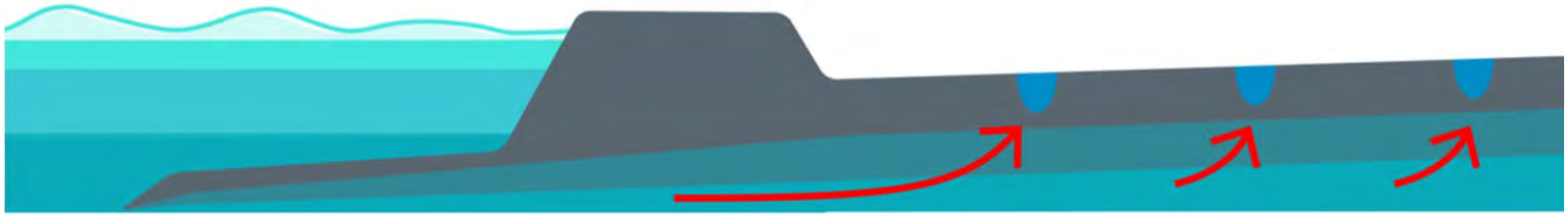
Climate Change and Flood Hazards

- Higher sea levels will increase risk of water intrusion under existing dykes



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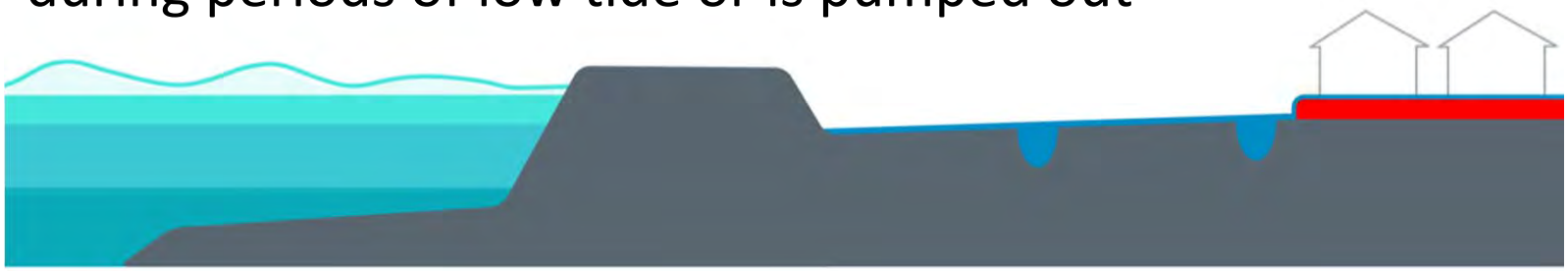
Future Flooding

- Climate change will increase intensity of storms and precipitation, which leads to more stormwater run-off
- Land use changes can displace stormwater to low areas
  - Existing drainage system and policies account for this
- Water becomes trapped behind dykes until it drains out during periods of low tide or is pumped out



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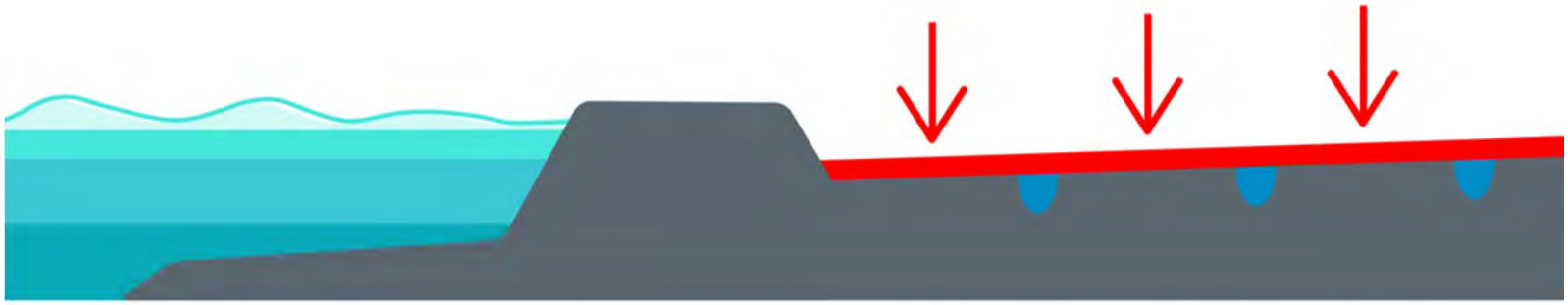
Future Flooding

- Other non-climate change related factors
- Over time the agricultural land is subsiding



In the Surrey Floodplain, the ground naturally recedes approx 2mm per year. In 100 years, the ground is expected to recede approximately 0.1 to 0.25 meters.

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Dyke Breach Risk

Likelihood of Breach

Likely
Unlikely
Very Unlikely

Infrastructure Impact from 200 yr. return Water Level

Sea Dams:	Dry	◆	Compromised	◆	Wet ◆
Bridges:	Dry	●	Compromised	●	Wet ●

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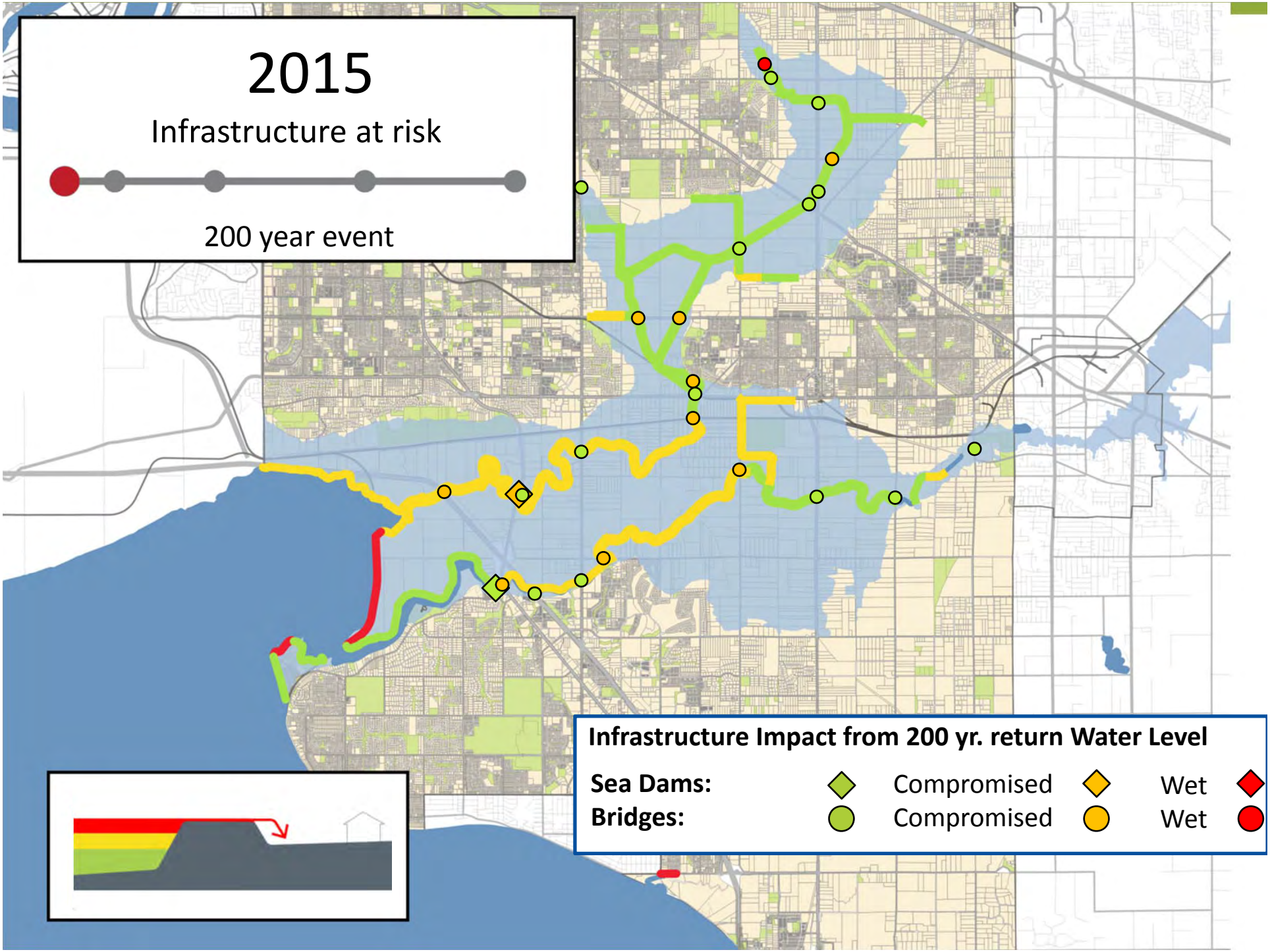
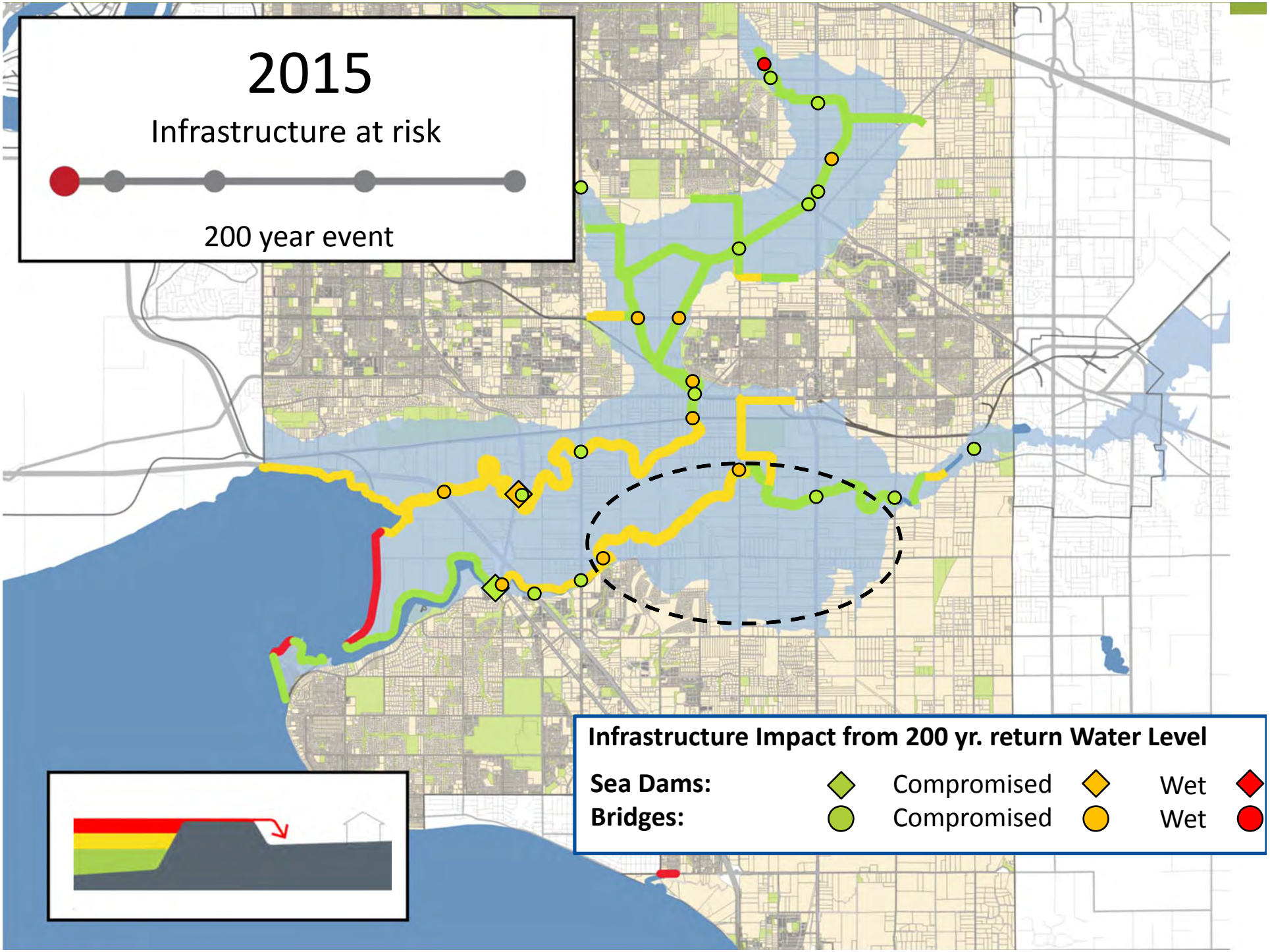

2015
Infrastructure at risk
200 year event
Infrastructure Impact from 200 yr. return Water Level
Sea Dams:
Compromised
Wet
Bridges:
Compromised
Wet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Infrastructure at risk
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Sea Dams:
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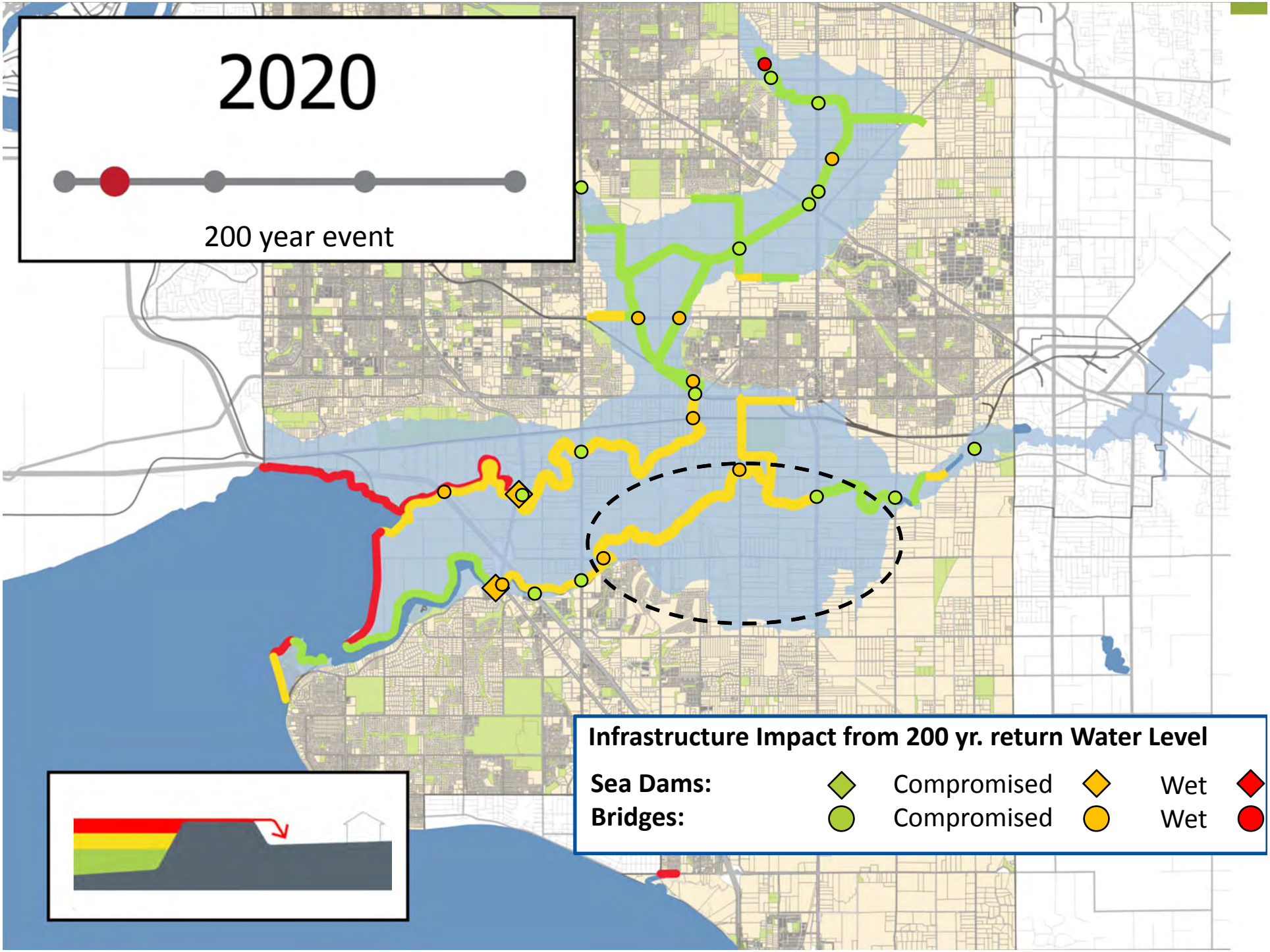
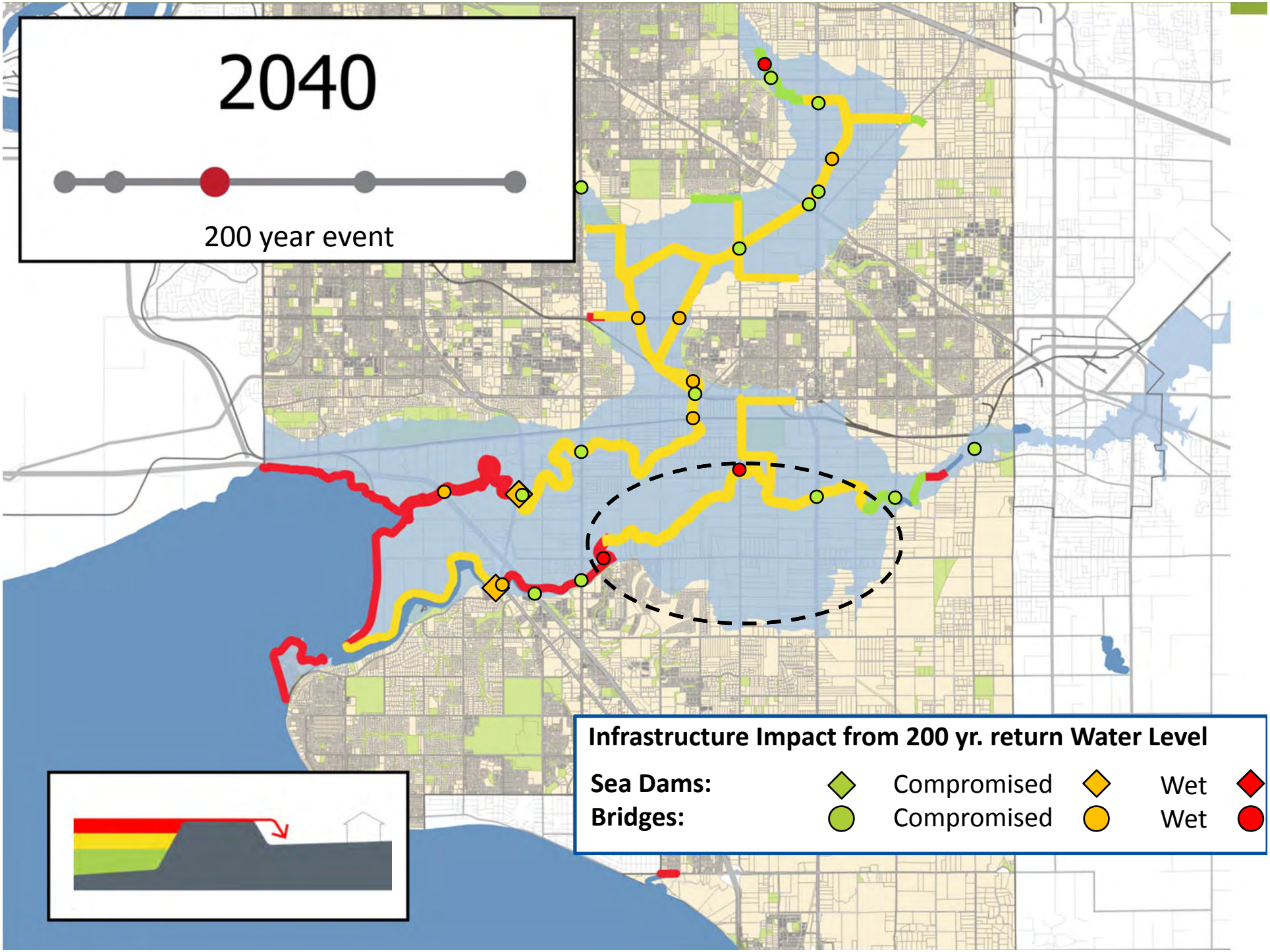
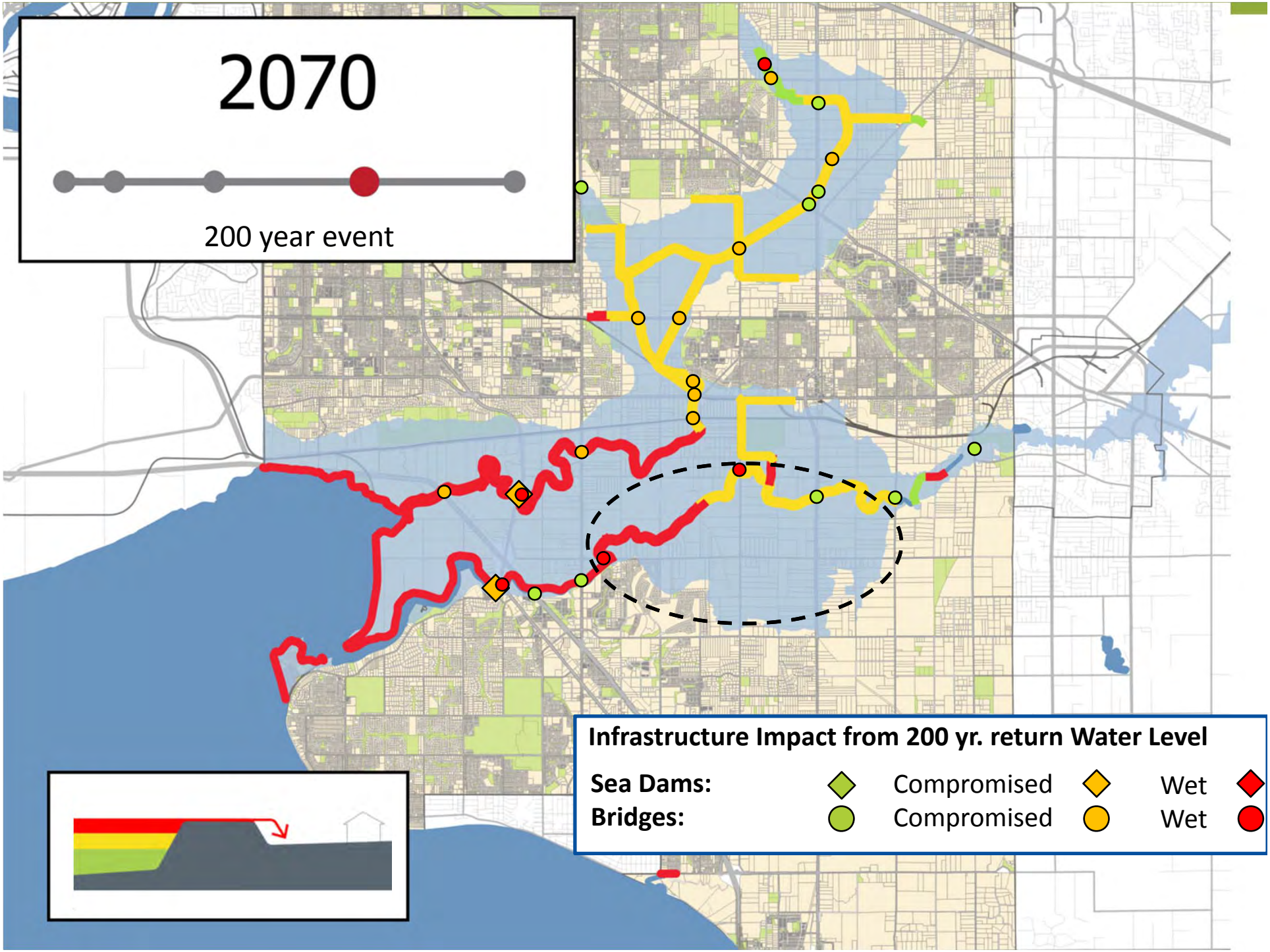
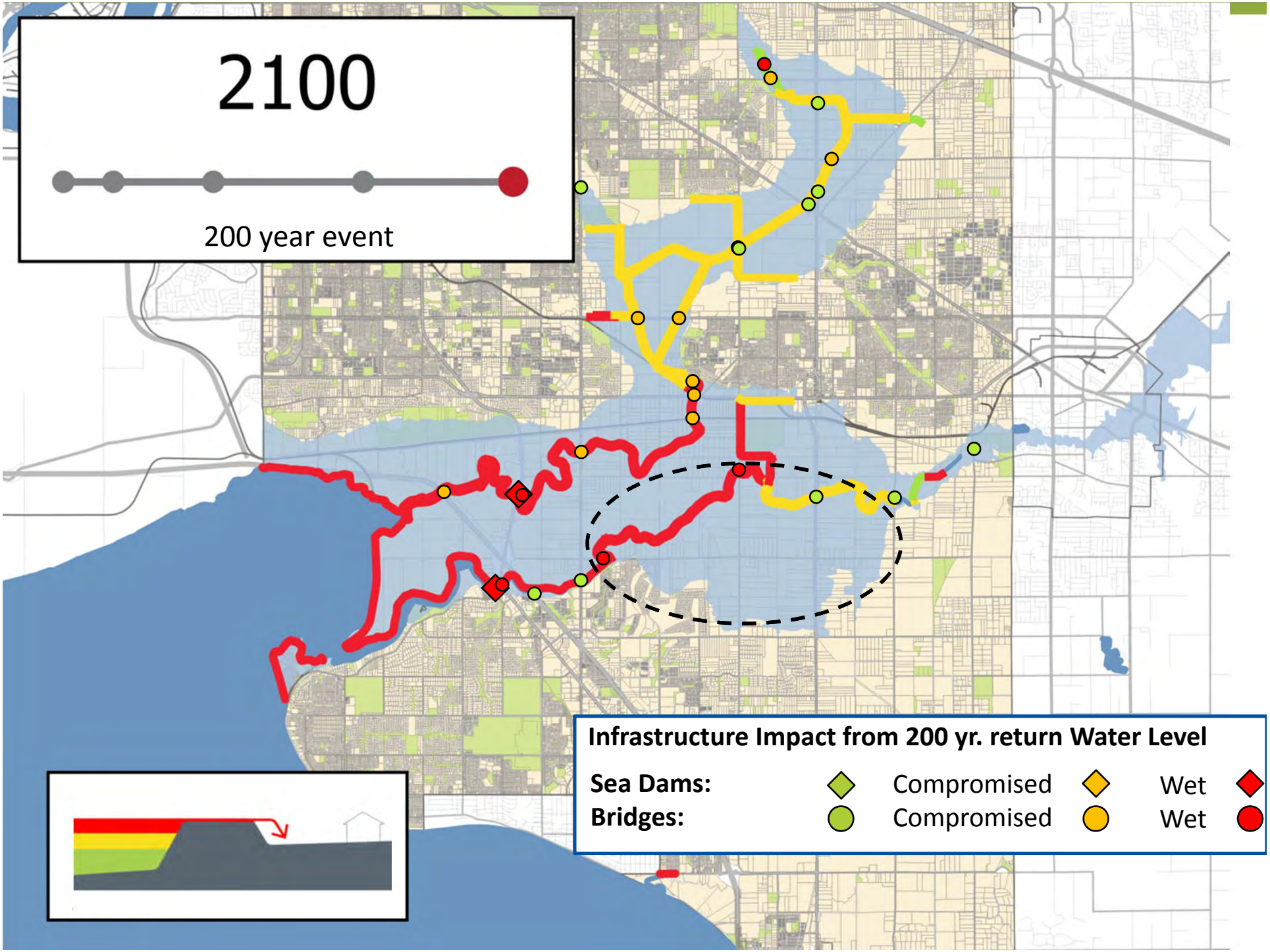
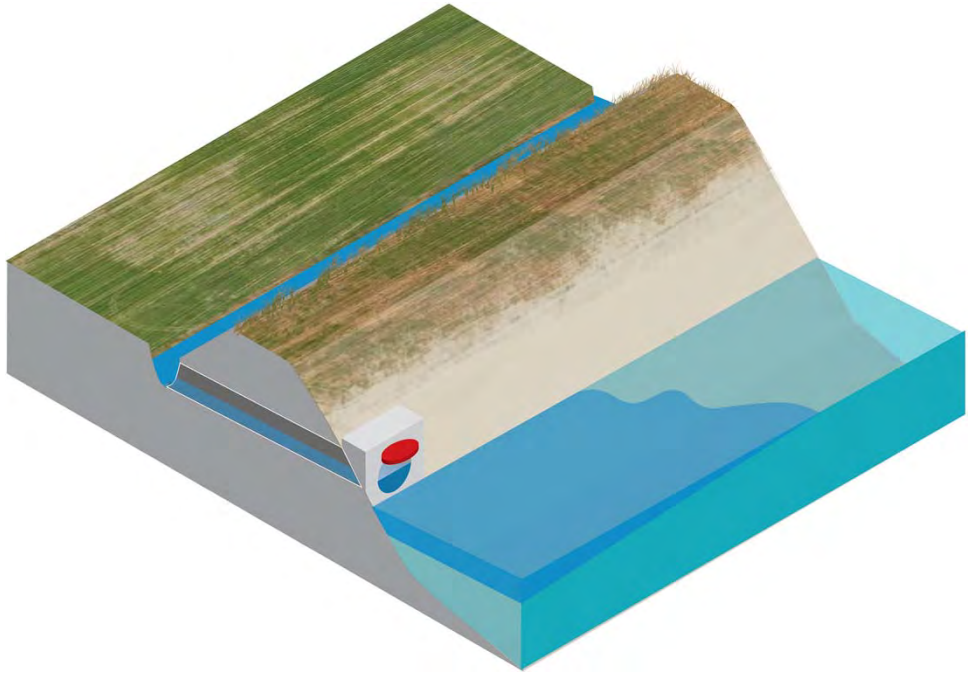

2020
200 year event
Infrastructure Impact from 200 yr. return Water Level
Sea Dams:
Compromised
Wet
Bridges:
Compromised
Wet


2040
200 year event
Infrastructure Impact from 200 yr. return Water Level
Sea Dams:
Compromised
Wet
Bridges:
Compromised
Wet


2070
200 year event
Infrastructure Impact from 200 yr. return Water Level
Sea Dams:
Compromised
Wet
Bridges:
Compromised
Wet


2100
200 year event
Infrastructure Impact from 200 yr. return Water Level
Sea Dams:
Compromised
Wet
Bridges:
Compromised
Wet

Nuisance Flooding



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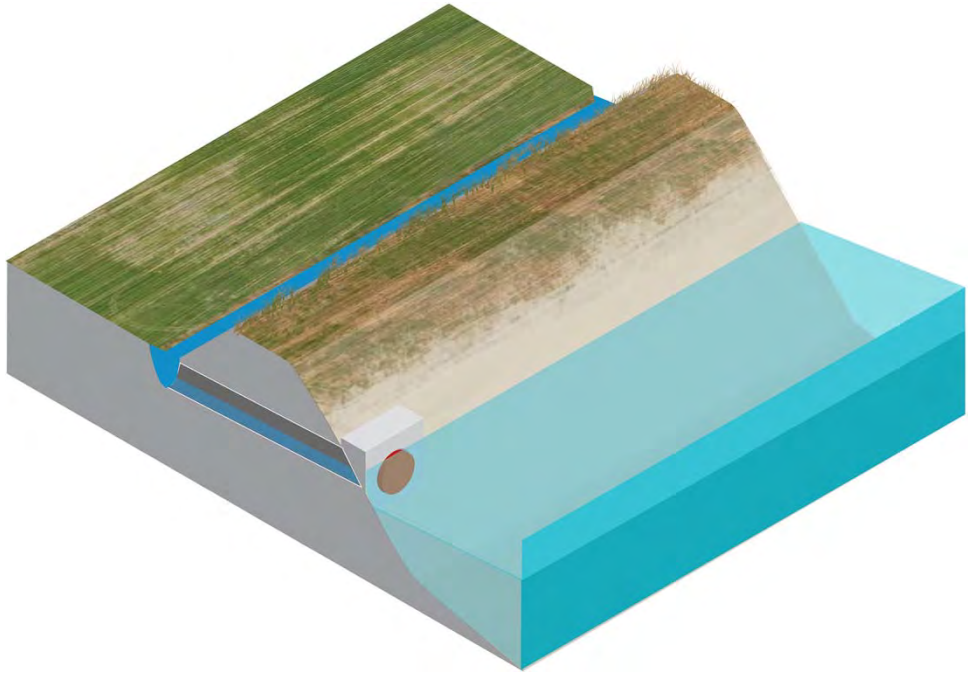
Nuisance Flooding



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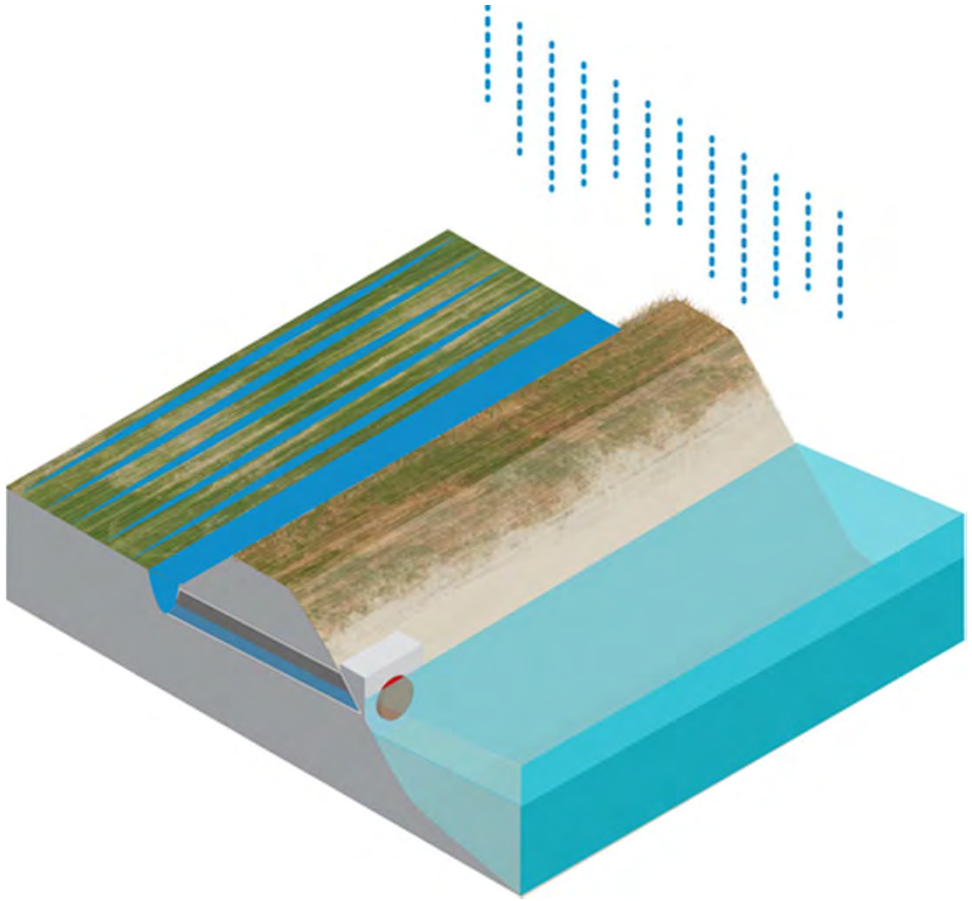

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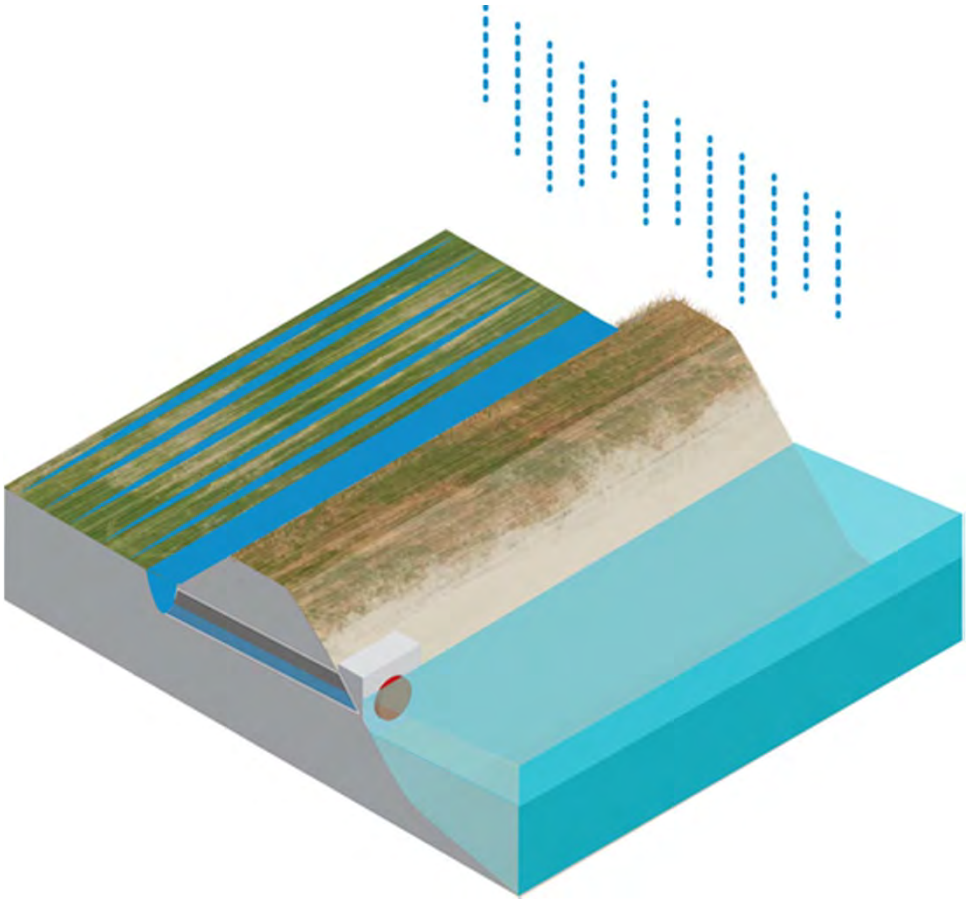
Nuisance Flooding



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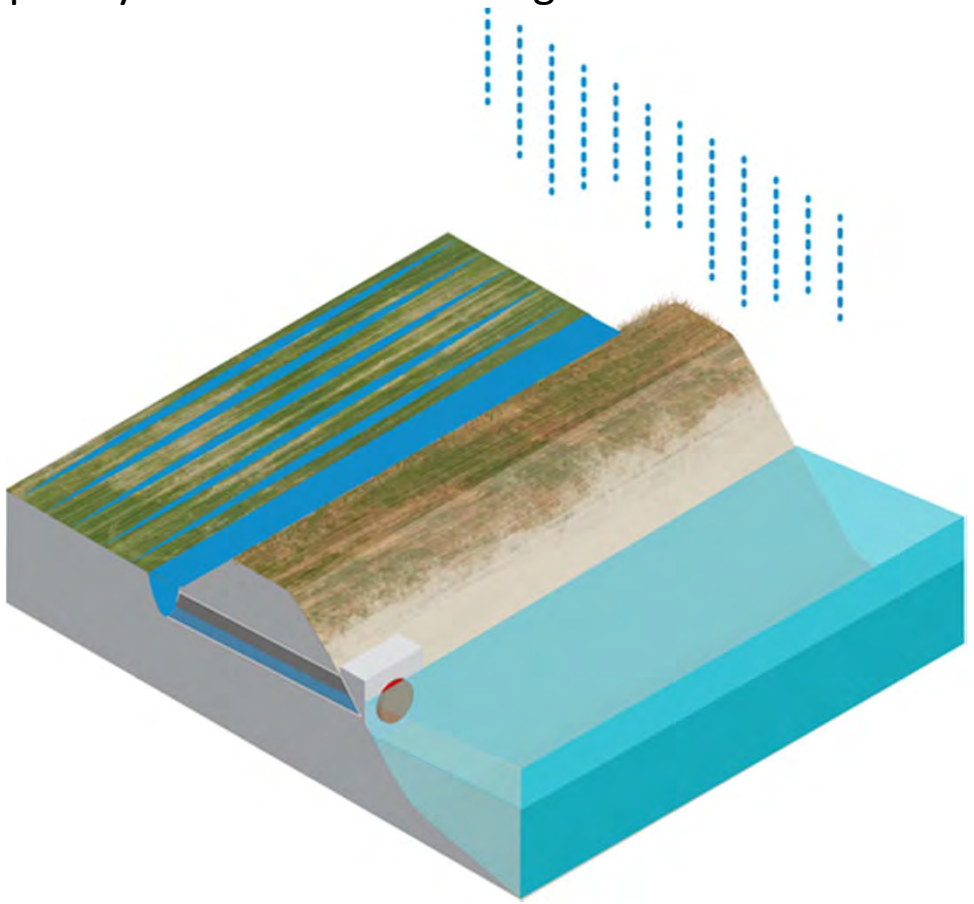
Nuisance Flooding

2010	2040	2070	2100
50%	70% to 83%	74% to 83%	78% to 85%

→ Frequency of Nuisance Flooding will increase with Sea Level Rise



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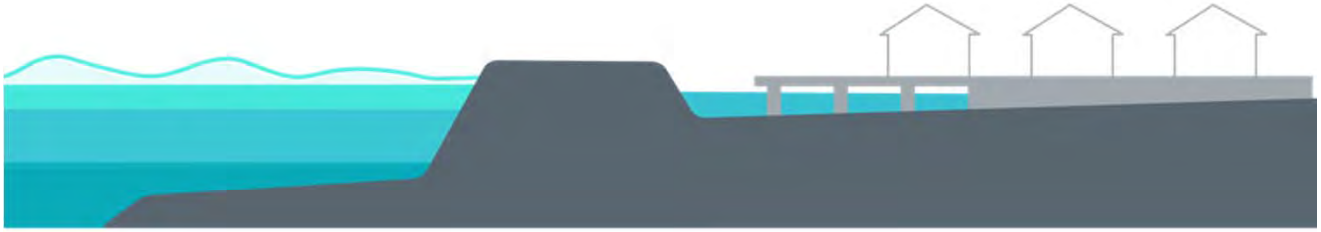
What Approaches are Being Considered?

Protect

Accommodate



Retreat

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What Approaches are Being Considered?

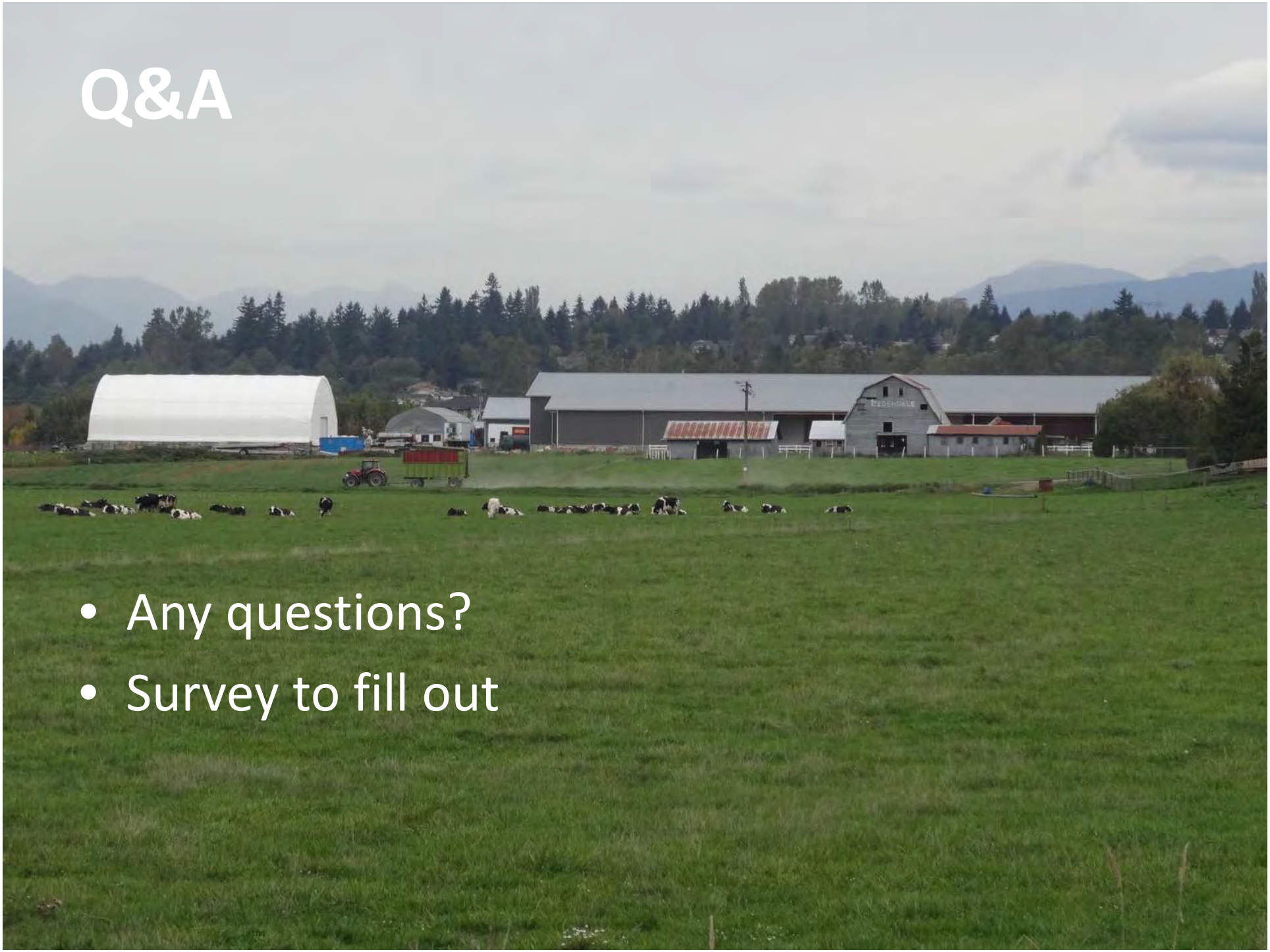
Combination

Next Steps

Upcoming Events

- Agriculture focus group on CFAS project
- To include farmers, organizations, commodity groups
- Focus groups to run two to three hours
- January 2017 with exact date TBD
- Public Open House in Spring 2017

Q&A



- Any questions?
- Survey to fill out

More information?

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Thank you!

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