SURREY COASTAL FLOOD ADAPTATION STRATEGY and DISASTER MITIGATION ADAPTATION FUND

February 14, 2019 SBOT Presentation

nhc northwest hydraulic consultants

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Coastal Floodplain at a Glance

COMMUNITIES AND PEOPLE

Many residential areas and neighbourhoods
Semiahmoo First Nation
2,500+ residents
Approximately 20% of Surrey's land area

PARKS AND ENVIRONMENT

Destination regional and City parks
Beaches and recreation areas
Critical foreshore, coastal, and riparian areas

LOCAL AND REGIONAL ECONOMY

3,000 jobs
Over $100M in annual farm gate revenue
Over $2B in assessed property value
Almost $25B annual truck and rail freight traffic

INFRASTRUCTURE

Over 10km of Provincial Highways
Over 200,000 vehicle trips a day
Over 30km of railway (freight, passenger)

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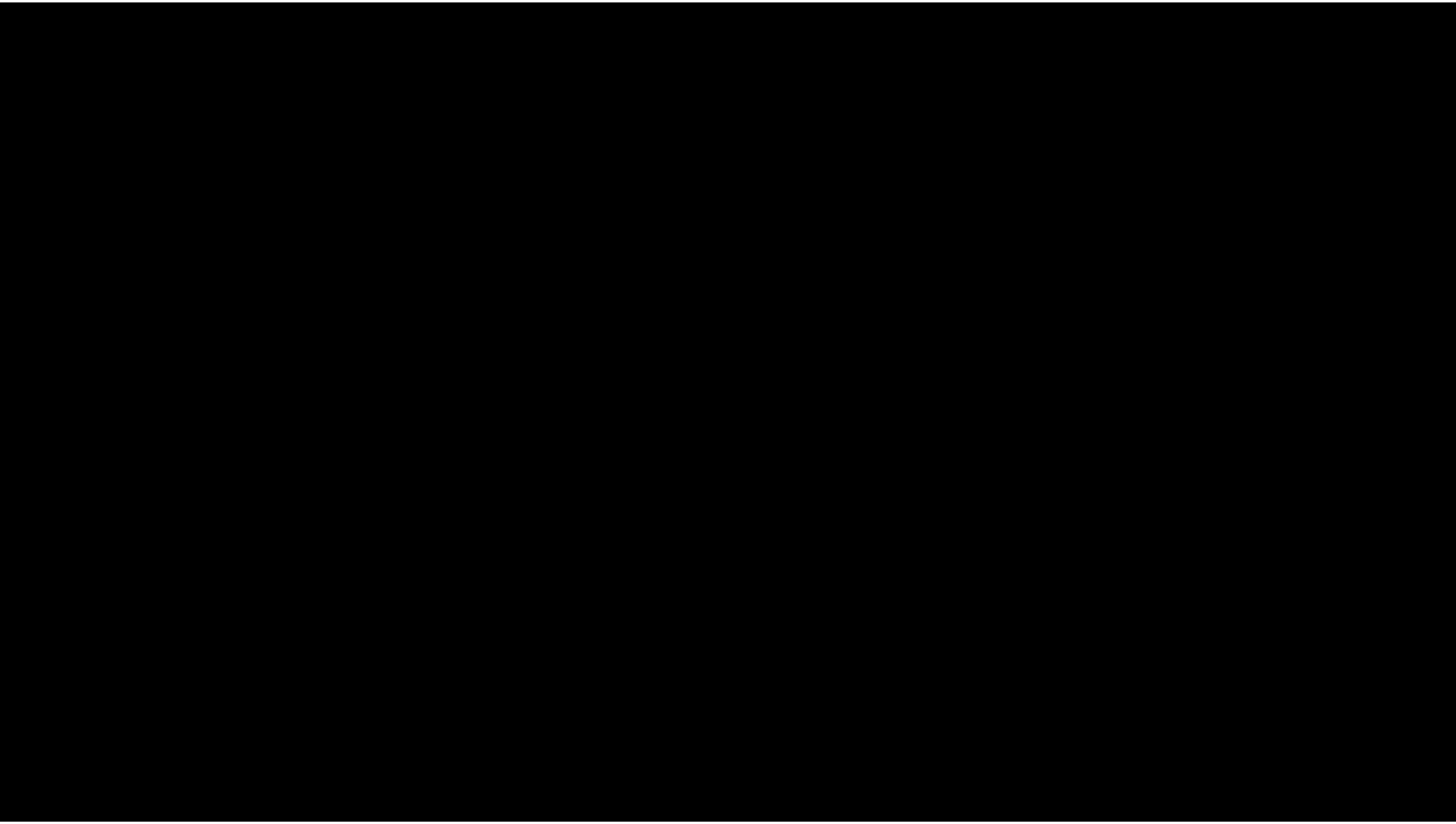
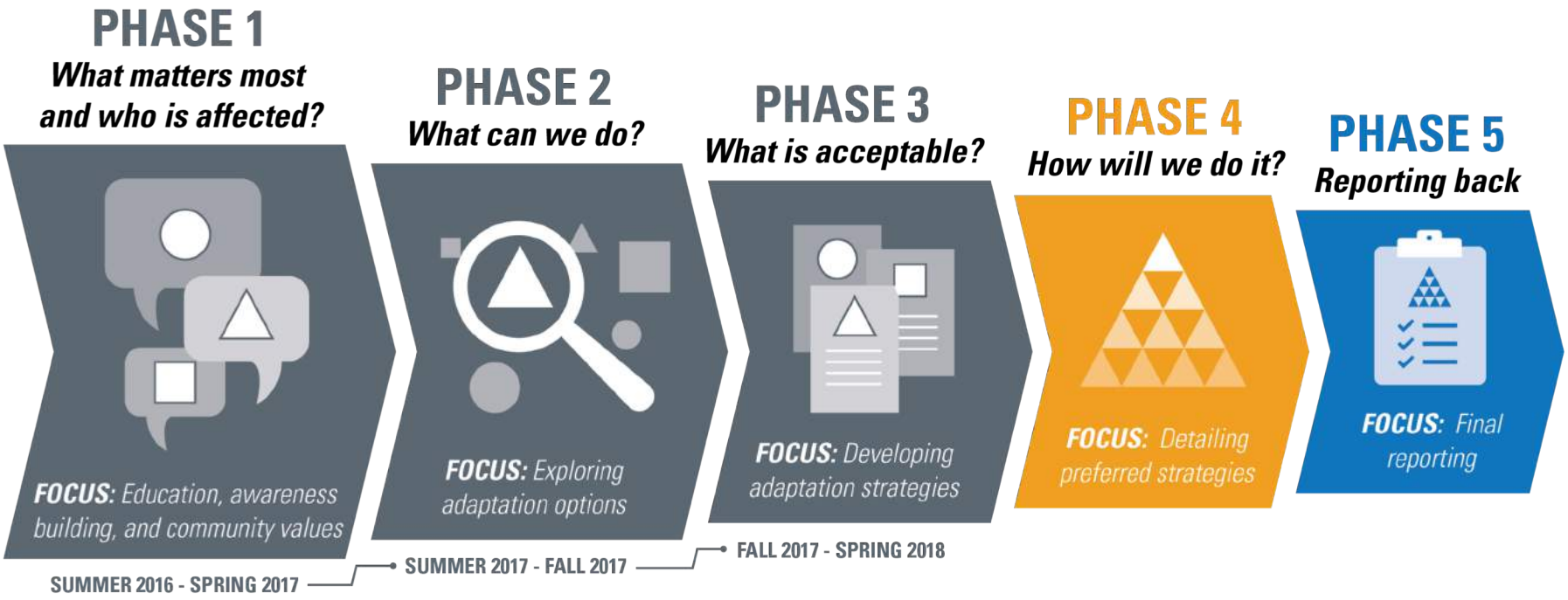
Involving the Community



Coastal Flood Adaptation Strategy (CFAS)

- The Province has directed municipalities to consider 1m of sea level rise by year 2100.
- Coastal cities around the world are facing same challenges



COASTAL AND RIVER FLOODING

1870 1880 1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100 2100

Major Coastal and River Flood Events

1 Metre

100 cm
80 cm
60 cm
40 cm
20 cm
0 cm

Sea Level Rise

TODAY

A Changing Shoreline

In 1890, dyking of Mud Bay begins. Shortly afterwards, dyking and damming of the Serpentine and Nicomekl Rivers begins.
By 1953, a timber sea wall at Crescent Beach is constructed.

Since then, residents of Surrey's Coastal Floodplain have relied on a system of dykes and sea dams to protect themselves from ocean and river flooding.

Photos courtesy Surrey Archives and Museum

An Evolving Future

As our climate continues to change and sea levels continue to rise over the coming years, it is anticipated that the frequency and intensity of major coastal and river floods will also increase.

The Province has directed municipalities to plan for at least 1m sea level rise by 2100. In Surrey, and elsewhere in the Lower Mainland, most drainage systems are not designed for projected changes.

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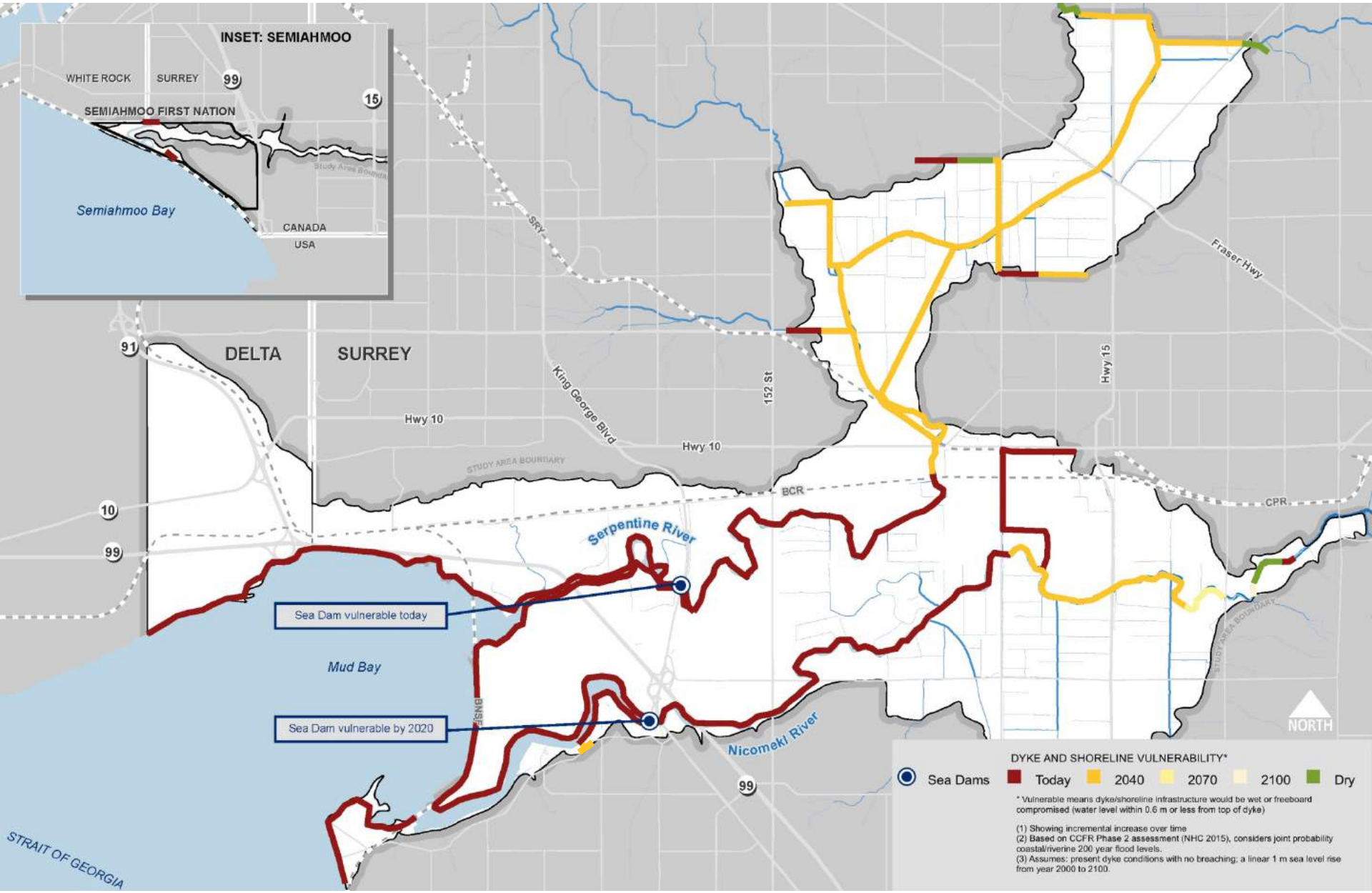
What are we seeing?

Photos from December 20, 2018 high wind event



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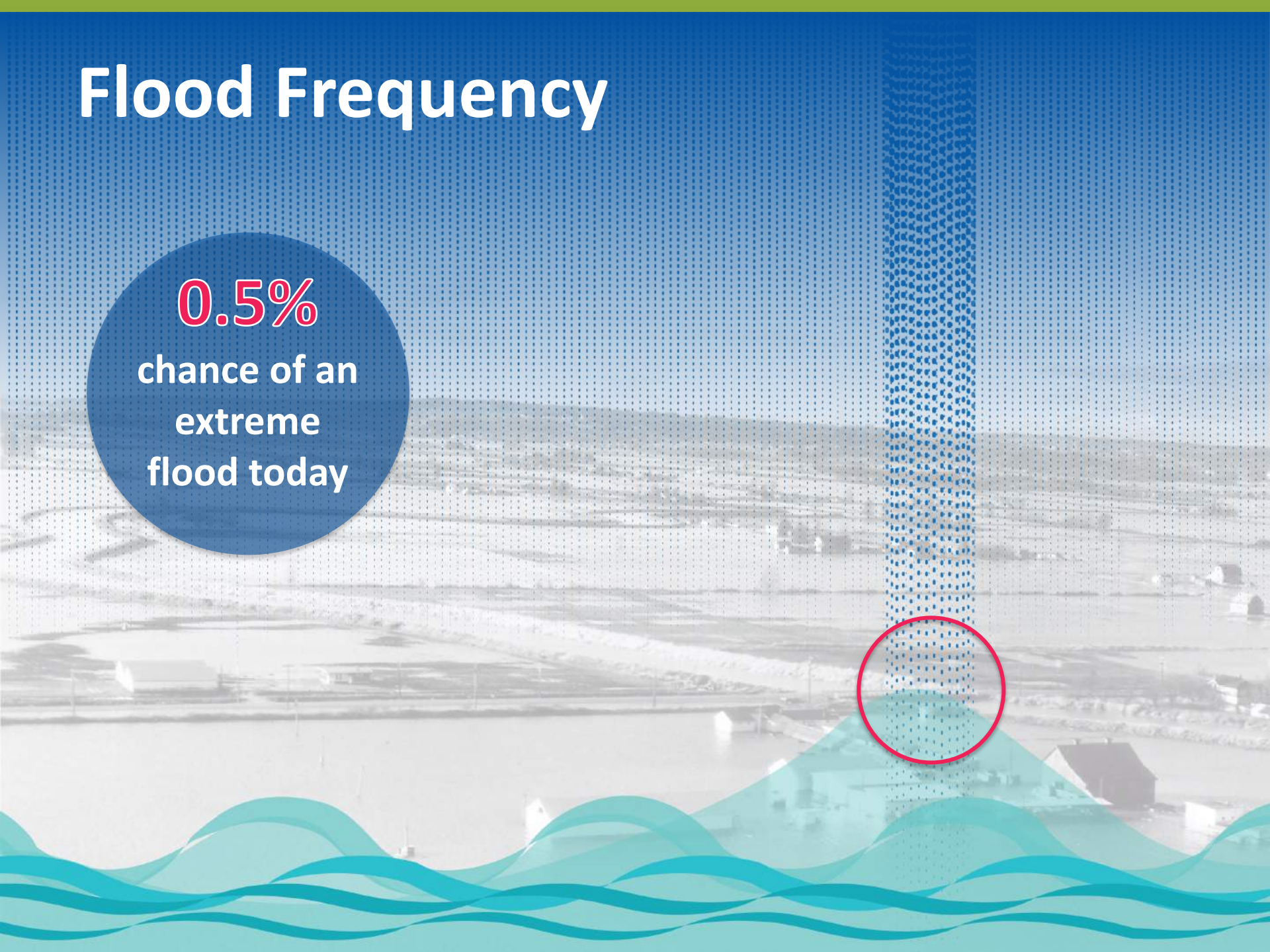
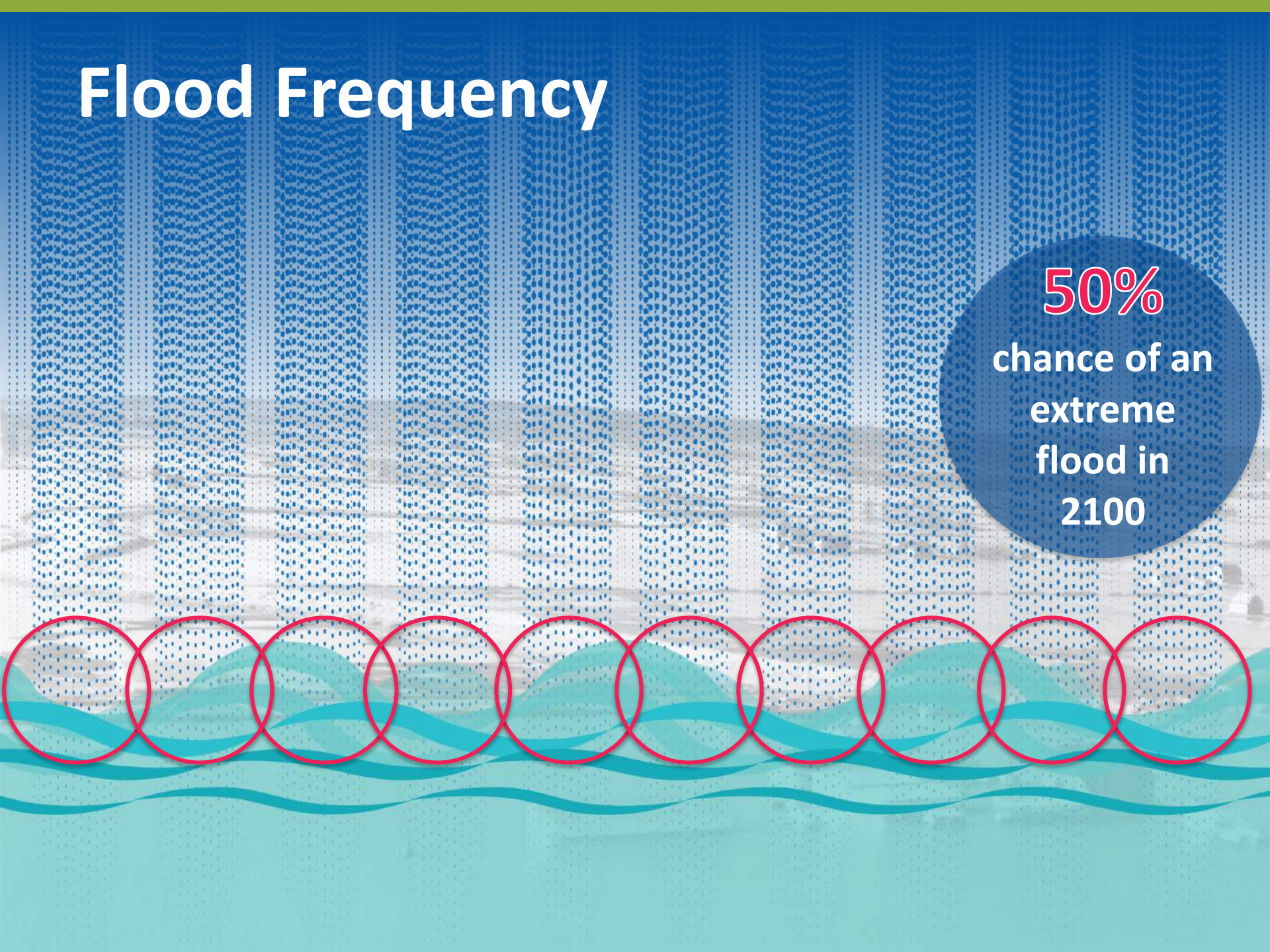
Flood Frequency

0.5%
chance of an extreme flood today



Flood Frequency



4

MEETINGS AND SITE VISITS
with Semiahmoo First Nation

3

FOCUS GROUPS
(Agriculture & Farming, Community & Residential, Environment & Recreation)

60+ participants

7

TECHNICAL WORKSHOPS
2 Greenshores™ Shoreline Design workshops, 2 PIEVC™ infrastructure operators workshops, 2 Design workshops with Dutch engineering design experts and UBC researchers, Coastal regulators, Coastal stewards

3

CFAS ADVISORY GROUP WORKSHOPS
With project stakeholders and partners, including local governments, infrastructure operators, provincial agencies, organizations, residents and farmers

5

CRESCENT BEACH COMMUNITY WORKSHOPS
140+ attendees

BUS TOURS
Site tour and "walk-shops" around the CFAS study area

70+ participants

SURREY YOUTH ENGAGED
5 sessions with high school students, 2 youth events at City Hall, and 80 CFAS postcards completed by elementary school students

COMMUNITY CONVERSATIONS
at Crescent Beach pop-up event hosted with 40+ University of the Fraser Valley Geography and Environment students

POP-UP PROJECT OUTREACH STATIONS
Crescent Beach, Blackie Spit, SFU Surrey, Surrey Centre/Ocean Park/ Semiahmoo Public Libraries, Surrey City Hall, Alexandra House (Crescent Beach)

WORKSHEETS COMPLETED
At various engagement events and workshops

SOCIAL MEDIAL IMPRESSIONS
Instagram & Twitter (200+ #SurreyCoastal mentions), Facebook (100+ CFAS comments), LinkedIn, YouTube (1,000+ hours of CFAS video views), CFAS website and StoryMaps (10,000+ views)

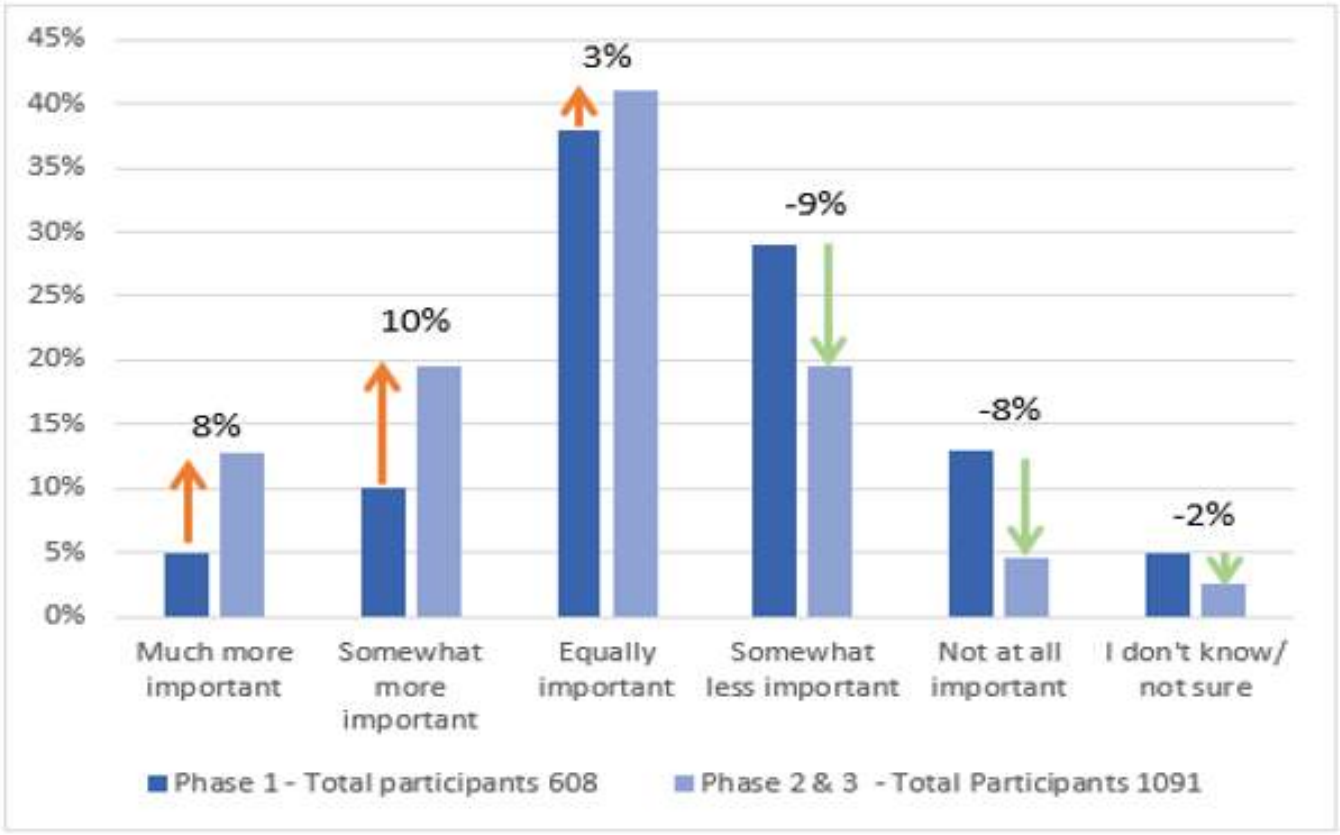
1,000+
COMMUNITY MEMBERS
directly involved to date

#SURREYCOASTAL PHOTO CONTEST
200+ submissions on Facebook, Twitter, and Instagram with winners in three categories

1,000+
SURVEYS
Completed online, at CFAS workshops, at community events, and by CitySpeaks Members

Public Awareness

By comparison to other issues Surrey is facing, how important is the issue of sea level rise and coastal flooding?



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Building Partnerships

University of the Fraser Valley

Fraser Basin Council

SFU

Semiahmoo First Nation

Polytechnique Montréal

engineerscanada
ingénieurscanada

UBC The University of British Columbia

Climate Action Initiative
BC Agriculture & Food

Engineers & Geoscientists British Columbia

Green Shores

White Rock City by the Sea!

Bird Studies Canada
Études d'oiseaux Canada

Delta

Ducks Unlimited Canada

Rescue Our Wetlands

Stewardship Centre for British Columbia

Friends of Semiahmoo Bay Society

Holland.

FCM Federation of Canadian Municipalities

$272,525 received to date
$176,600 eligible upon completion

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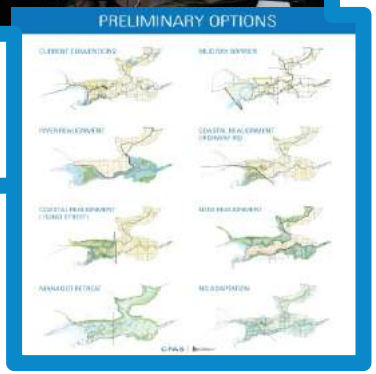
Options Development – What can we do?

Preliminary Options Development with Community and Professionals

HIGH-LEVEL FEASIBILITY ANALYSIS

Community Review of Preliminary Options



REFINEMENT & TECHNICAL ANALYSIS

Shortlisted Options

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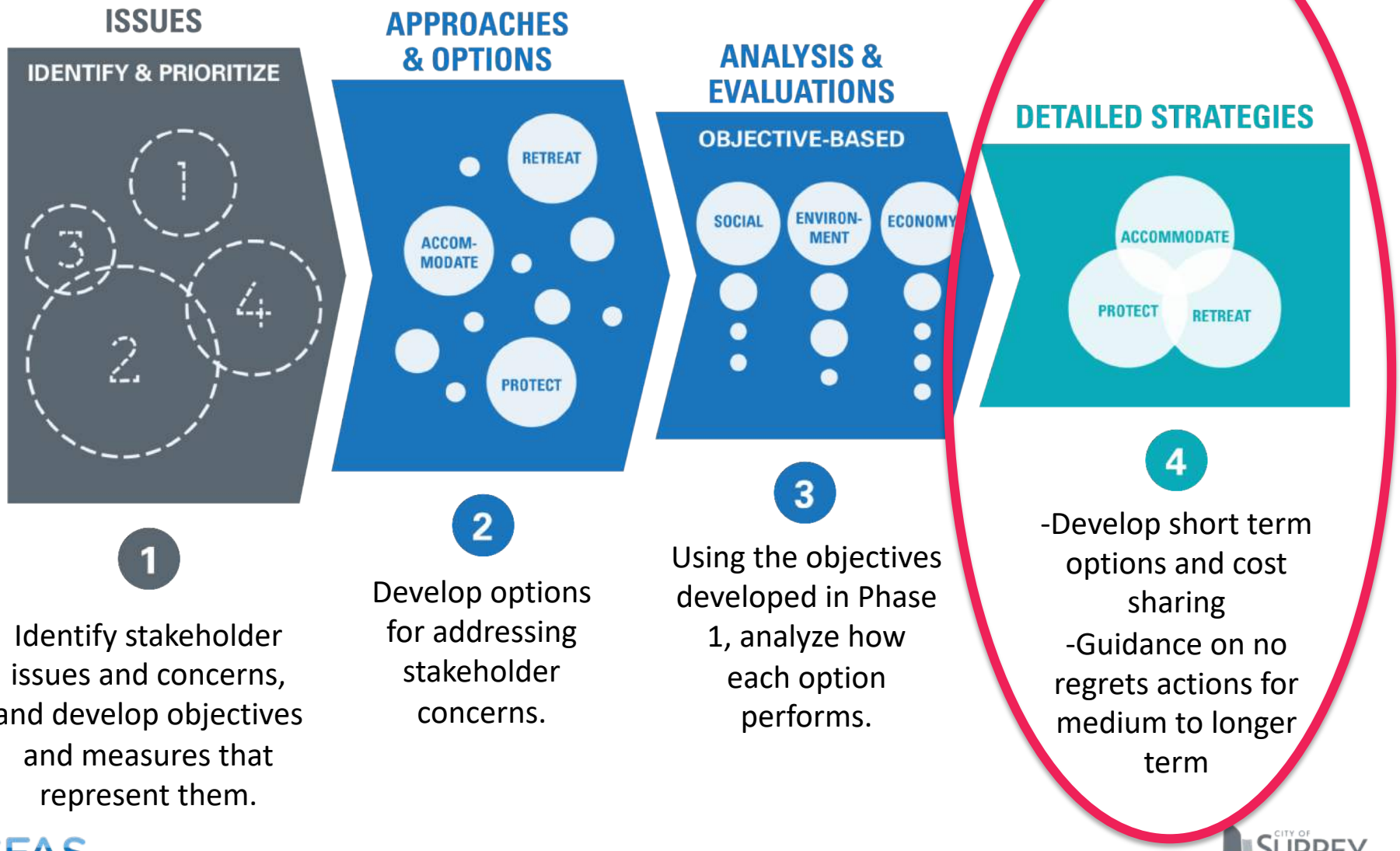
Developing Solutions



1

Identify stakeholder issues and concerns, and develop objectives and measures that represent them.

2

Develop options for addressing stakeholder concerns.

3

Using the objectives developed in Phase 1, analyze how each option performs.

4

-Develop short term options and cost sharing

-Guidance on no regrets actions for medium to longer term

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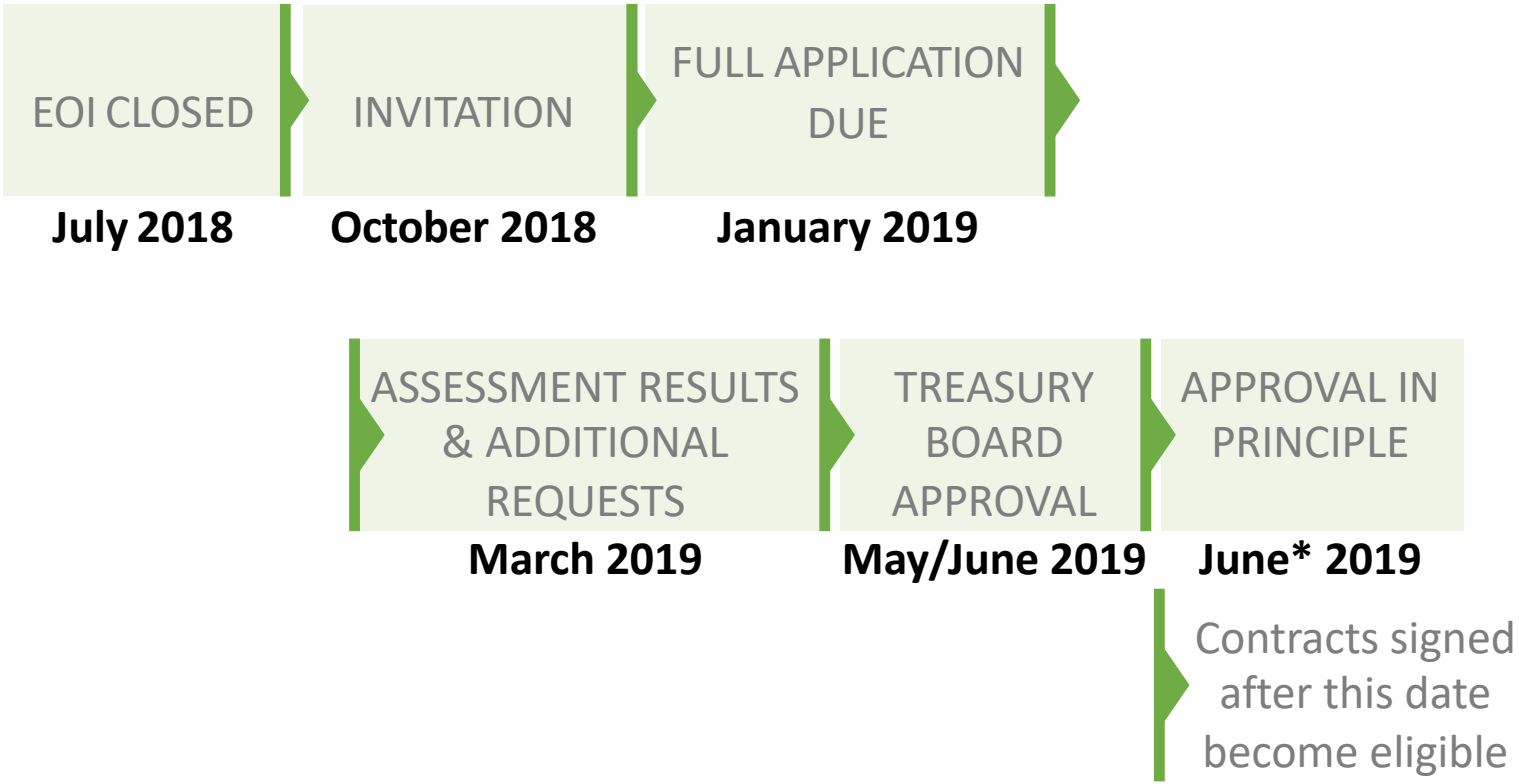
Federal Disaster Mitigation Adaptation Fund (DMAF)

DMAF ASSESSMENT PROCESS



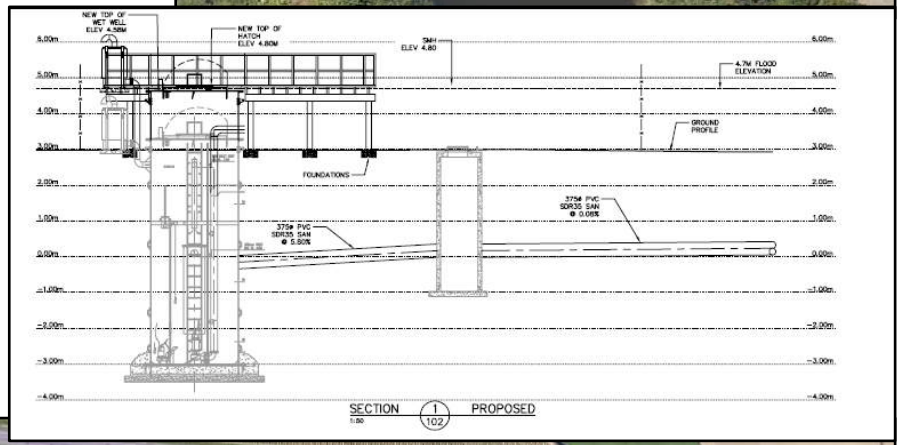
Shovel Ready Projects

City of Surrey

- Colebrook Dyke Upgrades
- Stewart Pump Station
- Burrows Pump Station
- Southern Railway of BC

City of Delta

- Boundary Bay Dyke Upgrades



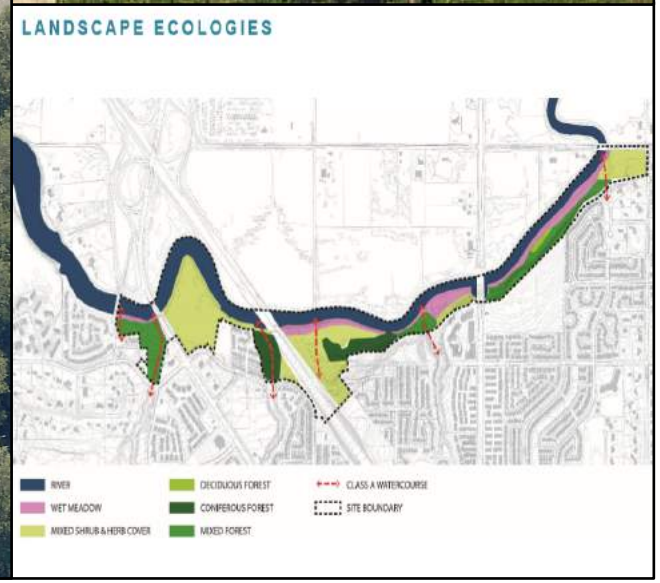
High Priority Projects

Conceptual designs:

- Nicomekl King George Blvd Bridge
- Nicomekl Riverfront Park
- 152 St Raising and Widening

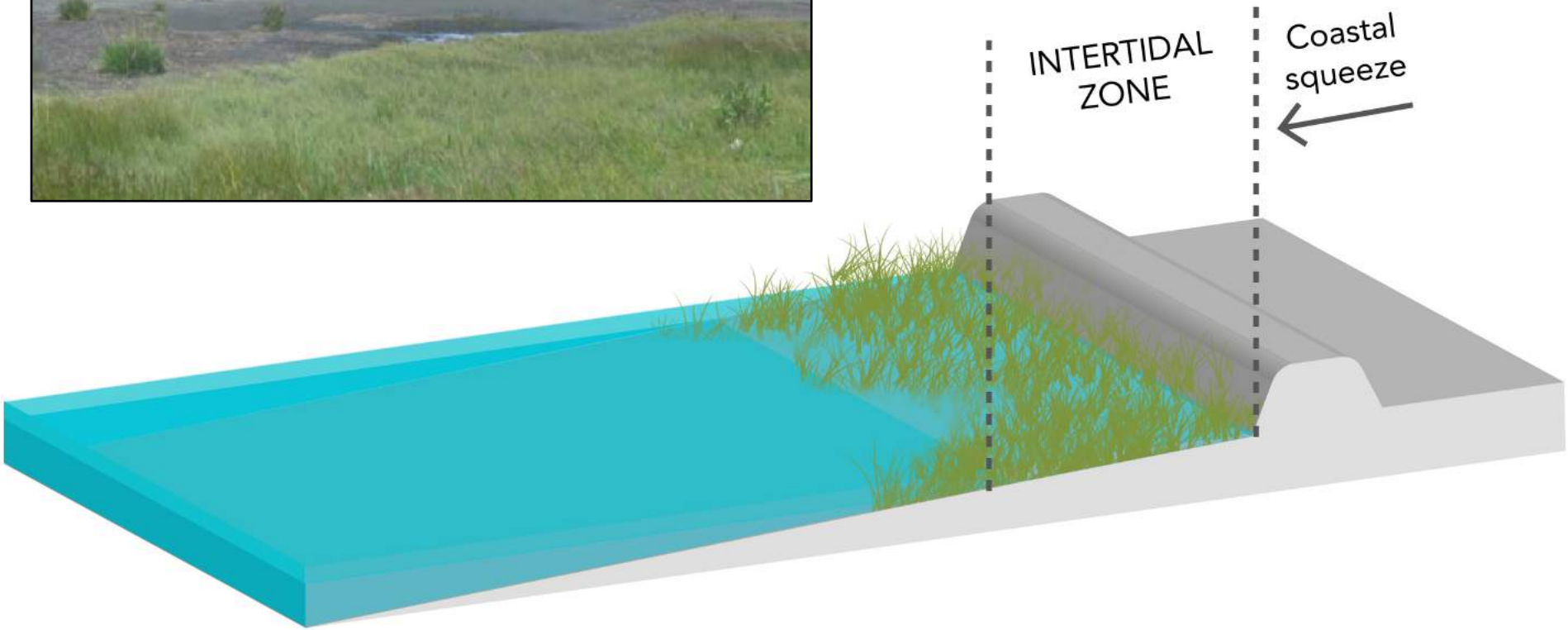
Detailed Design

- Colebrook Pump Station



Innovative Projects

Foreshore Protection
Nature Based Solutions



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DMAF PROJECT OVERVIEW

#	Name	Asset Type	Hazard Mitigation
1	**Colebrook Dyke Upgrades**	Coastal Dyke	flood
2	**Colebrook Drainage Pump Station Replacement**	Drainage Pump Station	flood, seismic
3	**Sea Dam – Serpentine River**	Sea Dam (drainage and irrigation)	flood, seismic, drought
4	**152 St Road Upgrades and Raising**	Integrity of Transportation Network and Asset	flood
5	**Nicomekl Riverfront Park - Phase 1**	Flood storage alternative to riverine dyking	flood, drought
6	**King George Boulevard Bridge and Nicomekl River Sea Dam Replacement**	Arterial Bridge (integrated with one sea dam) Integrity of Transportation Network and Asset	flood, seismic, drought
7	**Crescent Beach Storm Sewer System Upgrades - Perforated Piping**	Flood Protection increases transportation resilience	flood
8	**Dyking - Lower reaches of Nicomekl and Serpentine**	Flood Protection (nuisance and extreme event)	flood
9	**Serpentine SRY Rail Link Bridge Replacement and Dyking**	Flood Protection (nuisance and extreme event)	flood, seismic, drought
10	**Burrows Drainage Pump Station Upgrade**	Drainage Pump Station	flood, seismic, drought
11	**Stewart Farm Sanitary Pump Station Coastal Flood Proofing**	Integrity of Sanitary Sewer Network	flood
12	**Campbell River Pedestrian and Emergency Access Bridge Replacement**	Integrity of Transportation Network	flood, seismic
13	**Foreshore Enhancements**	Structural and nature based flood control and environmental enhancements	flood

Next Steps

- Technical work underway
- Await to hear outcome of DMAF (Spring 2019)
- Develop draft strategy for Council Review (Summer 2019)

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Thank you!

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