

Dykeland System Upgrades Project

Climate Action
NSFM Conference



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Nova Scotia Dykelands



81 marshlands*
240 kilometers of dyke
250 aboiteaux
17,400 ha protected land
12,000 ha actively farmed



Kennetcook Marsh, September 2018

Great Village Aboiteau, February 2018

*Marshlands legislated under the Agricultural Marshland Conservation Act governed by a Marsh Body

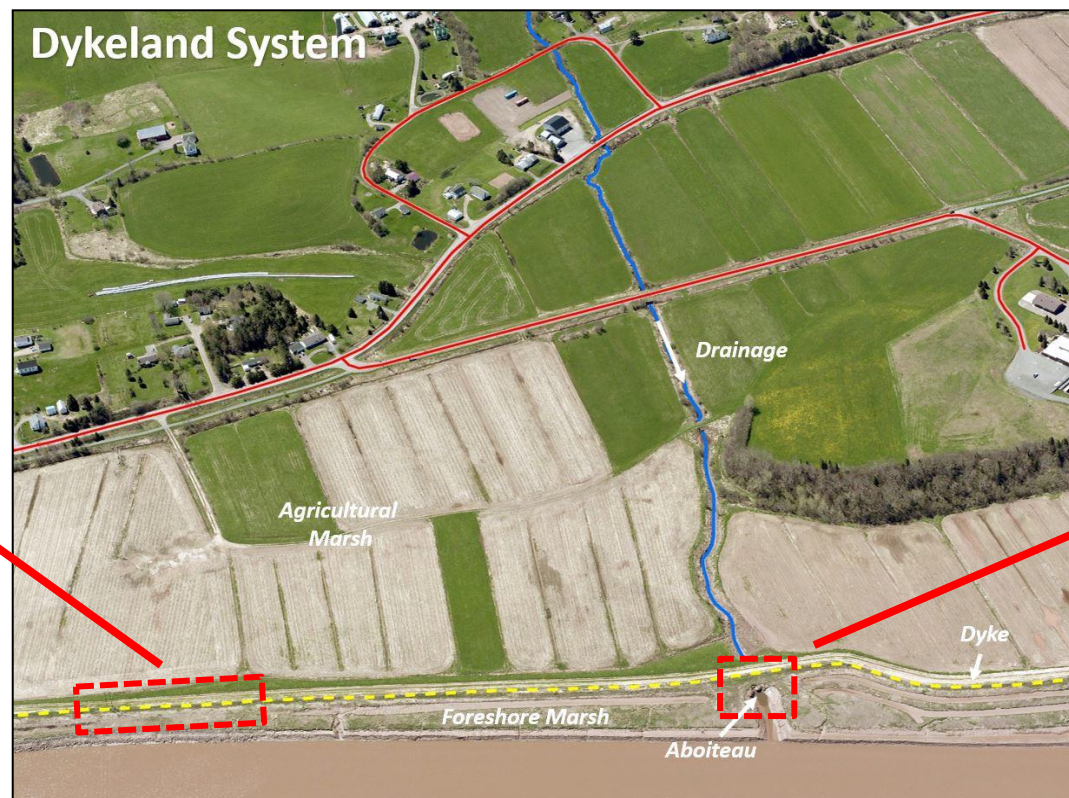
What is a Dykeland System?

- ▶ A **dykeland system** encompasses all components of the marshland and associated assets. This includes the dyke, aboiteau(x), drainage network, foreshore marsh and intertidal zone, and the agricultural marshland.
- ▶ These components interact to ensure the safe operation of agricultural, economic, cultural, and biological activities within the dykeland system.

Dyke

(i.e., dike, levee or embankment)

An embankment constructed of earth whose purpose is coastal flood risk reduction or water conveyance.



Aboiteau

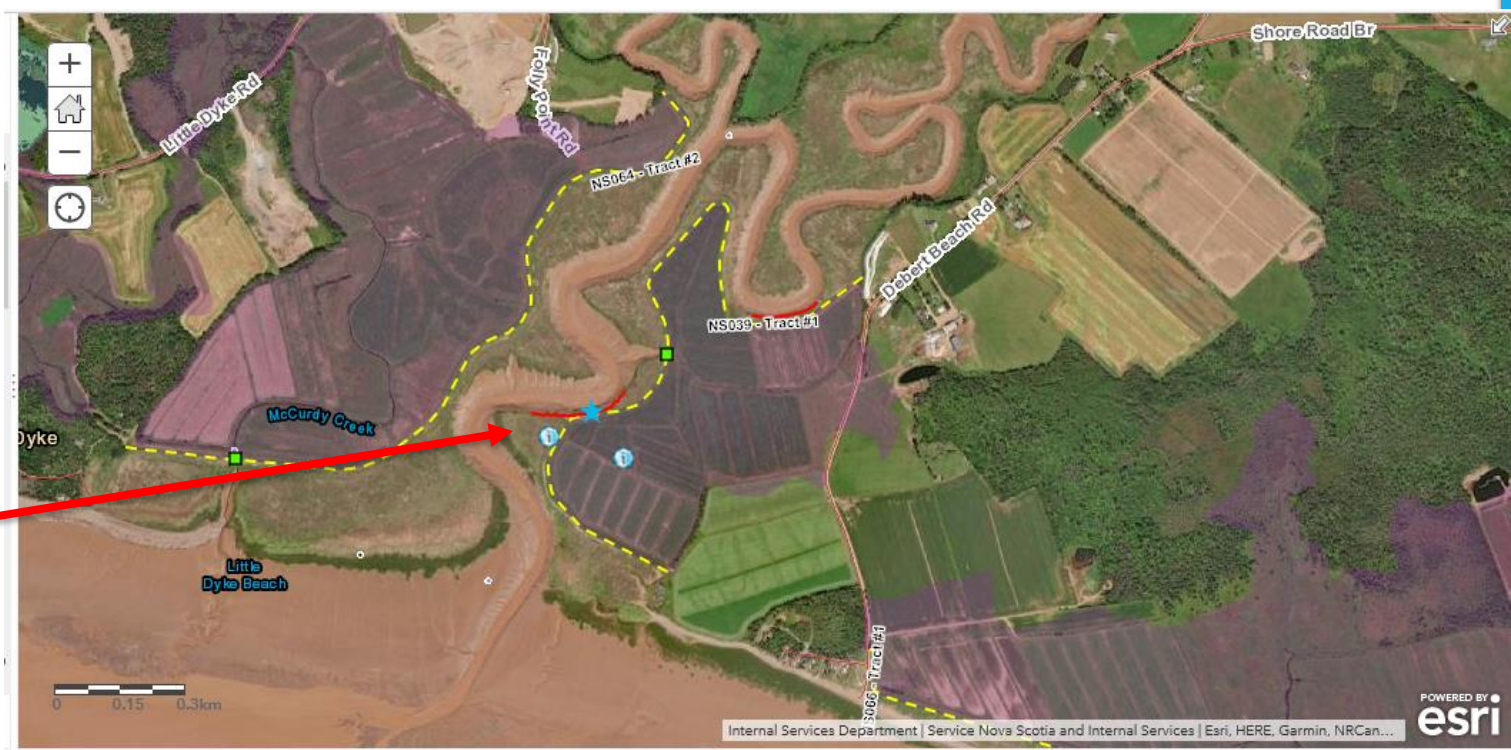
(plural aboiteaux)

A water control structure consisting of a tide gate at the end of a culvert that regulates water flow between a tidewater area and a drained upland area.

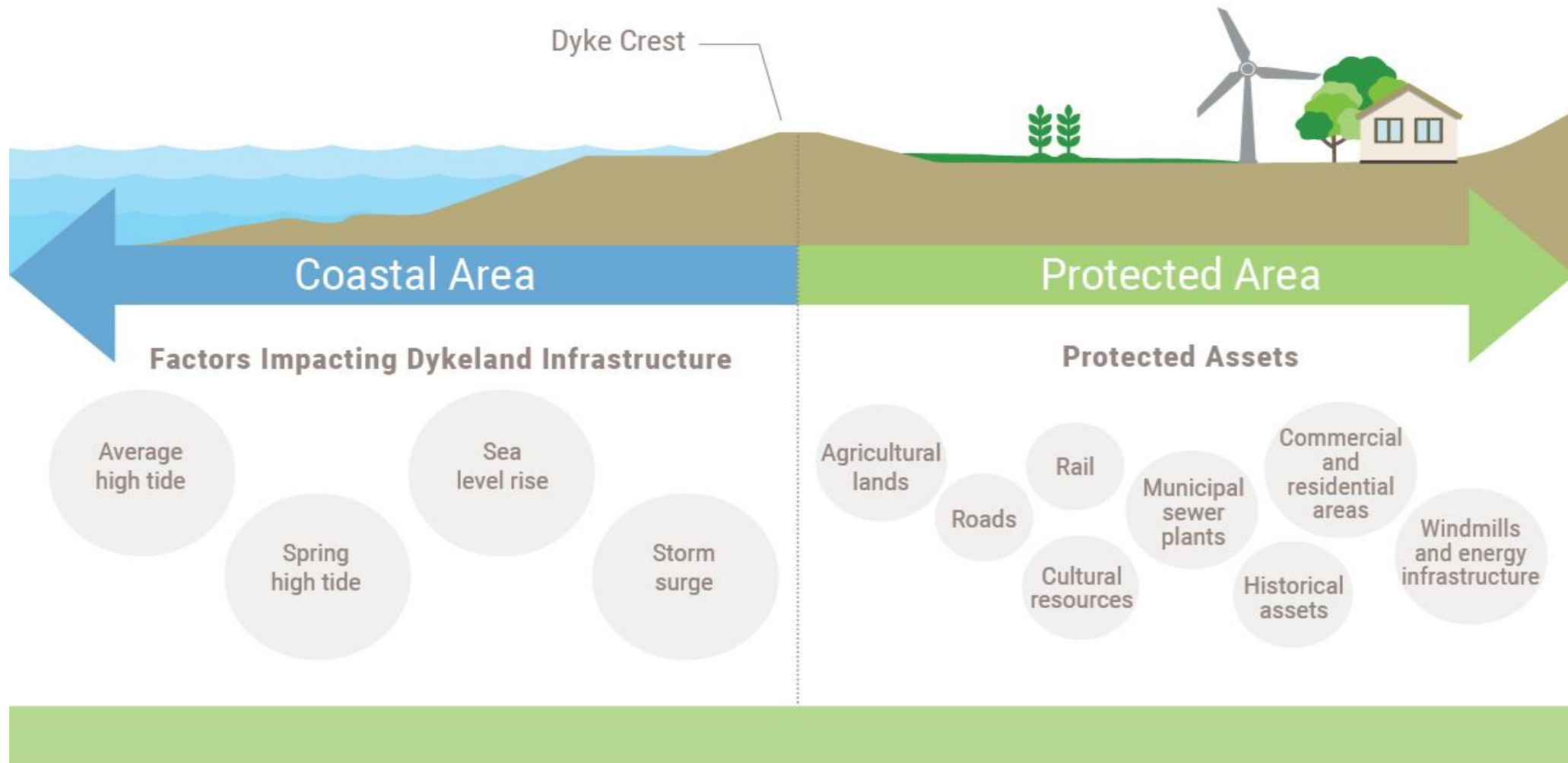


- **Operational Maintenance Program** – assets are managed through an inspection surveillance program, prioritizing maintenance areas and conducting repairs.
- **Capital Program upgrades**

Points of concern can be marked and shared directly with the team.



Working with the Tides



Climate Change – What are we facing today and what is expected tomorrow?

- ▶ Storm Surge
- ▶ Sea Level Rise
- ▶ Erosion
- ▶ Sedimentation
- ▶ Ice
- ▶ Variable Seasonal Conditions
- ▶ Updated predictions

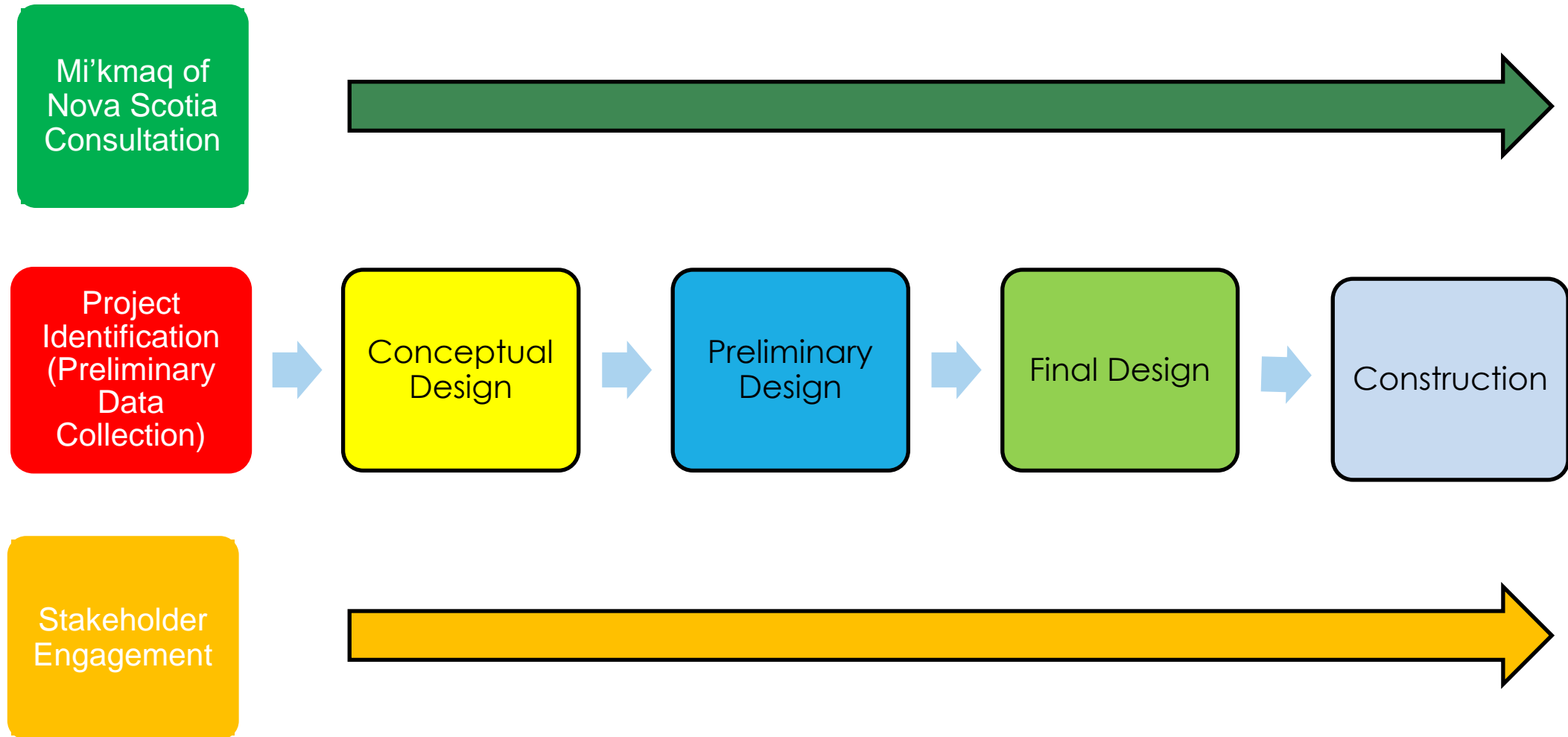
- ▶ Aging Infrastructure (dykes & aboiteaux) require upgrade



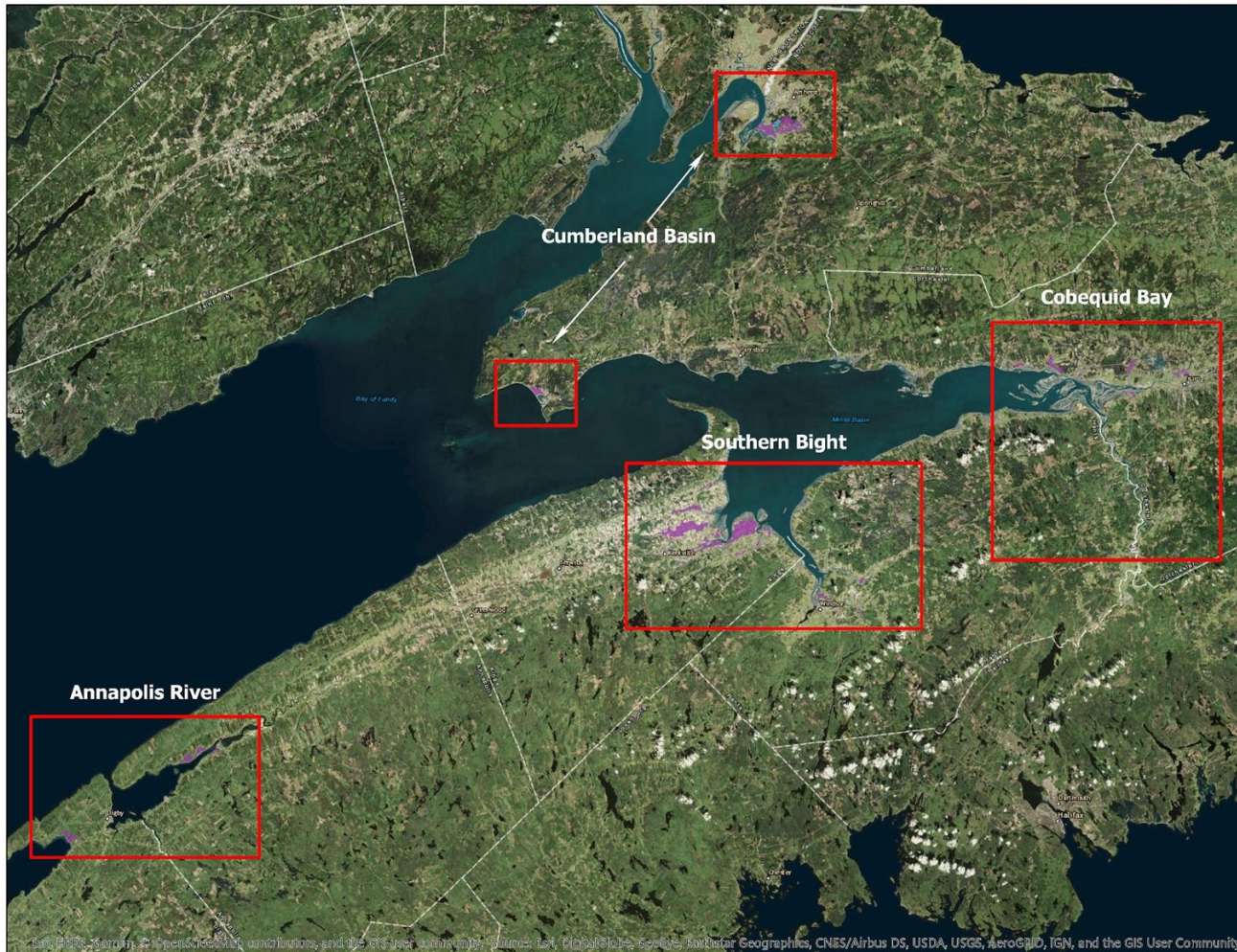
How do you tackle major capital infrastructure projects?

- ▶ Dedicated team, strong lead, and commitment to overcome all challenges
- ▶ Significant preplanning – studies, relationship building, merit based programs, strong competition
- ▶ Building Support – internally and externally for project
- ▶ Funding – capital vs maintenance – leveraging dollars on solutions
- ▶ Regulatory environment – species at risk, Fisheries Act, archaeology
- ▶ Engage and work with the Mi'kmaq – local knowledge, expertise,...
- ▶ Stakeholder engagement – solutions need to be supported
- ▶ Strong application supported with sound methodology and studies....

Stages of a Project

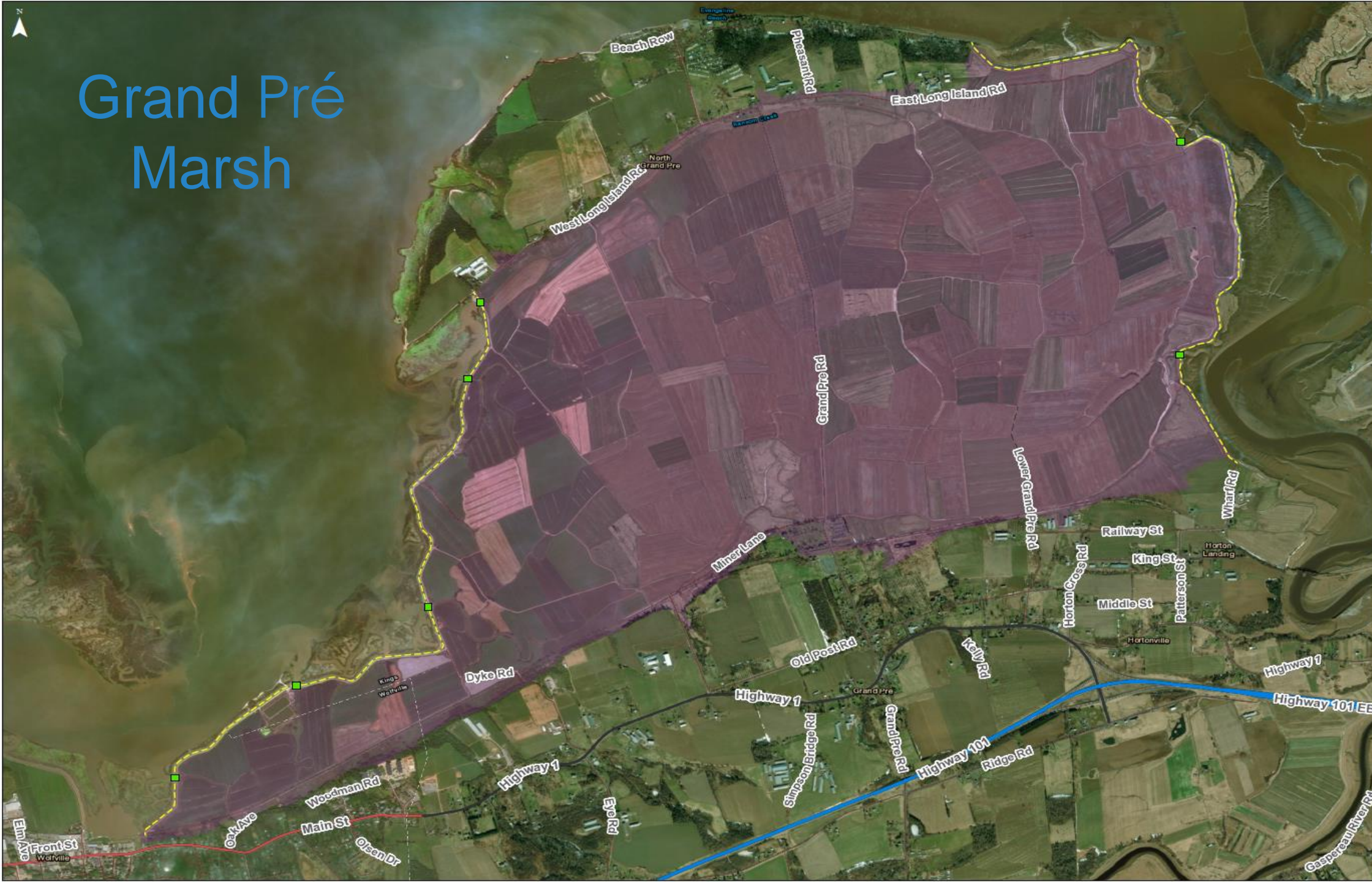


Dykeland System Upgrades Project (DSUP)



- ▶ Project: Construction Upgrades to 60 Kilometers of Dykes and 5 Aboiteaux within the Bay of Fundy Dykeland System to Protect 60 Communities in Nova Scotia from the Impacts of Coastal Flooding
- ▶ \$50 million funding
- ▶ 50% federally funded under
- ▶ Disaster Mitigation Adaptation Fund
- ▶ (DMAF)
- ▶ 8-year program
- ▶ Will address **4** regional systems:
 - Cobequid Bay
 - Cumberland Basin
 - Southern Bight
 - Annapolis River System

Grand Pré Marsh



LEGEND

- ABOITEAU
- DYKE
- MARSHLAND
- SEWAGE TREATMENT

MARSHLAND INFORMATION

MARSH AREA: 3016 ACRES
DYKE LENGTH: 8.7 KM; 2 TRACTS
ABOITEAUX: 7

GENERAL:

ALL DIMENSIONS IN METERS UNLESS NOTED OTHERWISE.

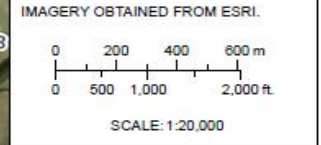
COORDINATES SHOWN ARE UTM ZONE 20 NORTH NAD 1983 CSRS DATUM.

THIS PRODUCT IS FOR GENERAL REFERENCE USE ONLY AND MAY NOT HAVE BEEN PREPARED FOR, OR BE SUITABLE FOR LEGAL ENGINEERING, OR SURVEYING PURPOSES.

DATA SOURCES:

BASE DATA OBTAINED FROM THE 1:10,000 NOVA SCOTIA TOPOGRAPHIC DATABASE (NSTDB).

MARSHLAND DATA OBTAINED FROM THE NOVA SCOTIA DEPARTMENT OF AGRICULTURE.



SITE OVERVIEW

GRAND PRÉ (NS008)
 KINGS COUNTY, NS



1



**Dyke
Reinforcement**

2



**Dyke
Realignment**

3



**Tidal Wetland
Restoration**

Dykeland System Potential Design Upgrade Options



4

**Aboiteau
Upgrades/
Rehabilitation**

5



**Aboiteau
Construction**

6



**Drainage
Improvement**

7



**Management
Plan**

Engineering Condition Assessment



Photo Locations (Tract 1)		
ID	Easting	Northing
1	399190.463	4998098.655
2	399122.298	4996556.436
3	399080.558	4996680.562
4	399059.199	4996711.788
5	398559.128	4999033.087
6	398373.718	4998945.047
7	398955.840	4997083.801

Photo Locations (Tract 2)		
ID	Easting	Northing
1	394844.874	4995607.127
2	395155.923	4997237.921
3	394888.089	4995575.546
4	394888.089	4995575.546
5	394620.214	4995240.445
6	393515.840	4994548.901
7	394844.874	4995607.127
8	394159.227	4995124.831
9	393515.123	4994518.043

Aboiteau Locations		
ID	Easting	Northing
001	395066.033	4996960.283
01E	398899.177	4997113.004
002	398901.688	4998416.875
004	394854.149	4995576.636
005	395130.557	4997424.087
009	394138.776	4995070.015
011	393491.024	4994521.832

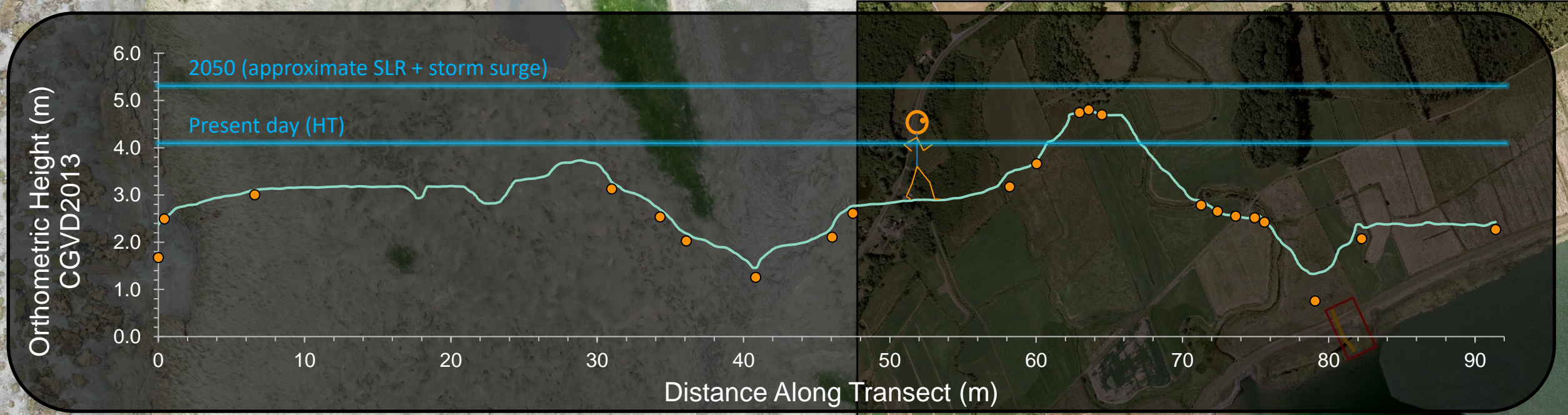
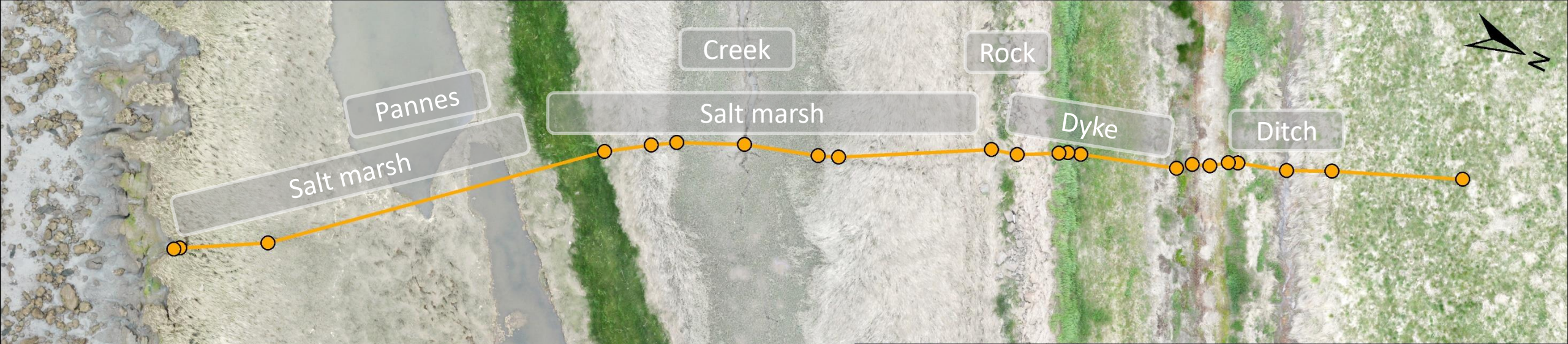
LEGEND

① PHOTO LOCATION (PHOTO NUMBERS AS REFERENCE ON DYKELAND SYSTEM INSPECTION FORMS)

NOTE: 2018 aerial photo from Google Earth

Drawn By	AGSD	Checked By	PM
Calculations By		Checked By	
Date	AUG, 2020		
Project	DYKELAND SYSTEM ENGINEERING CONDITION ASSESSMENT GRAND PRÉ MARSH (NS008) NOVA SCOTIA		
Drawing	GRAND PRÉ MARSH (NS008) SITE PLAN SHOWING PHOTO LOCATIONS		
Scale	1:25000		
File No.	Drawing	Revision No.	
108850201	FIGURE 1	0	





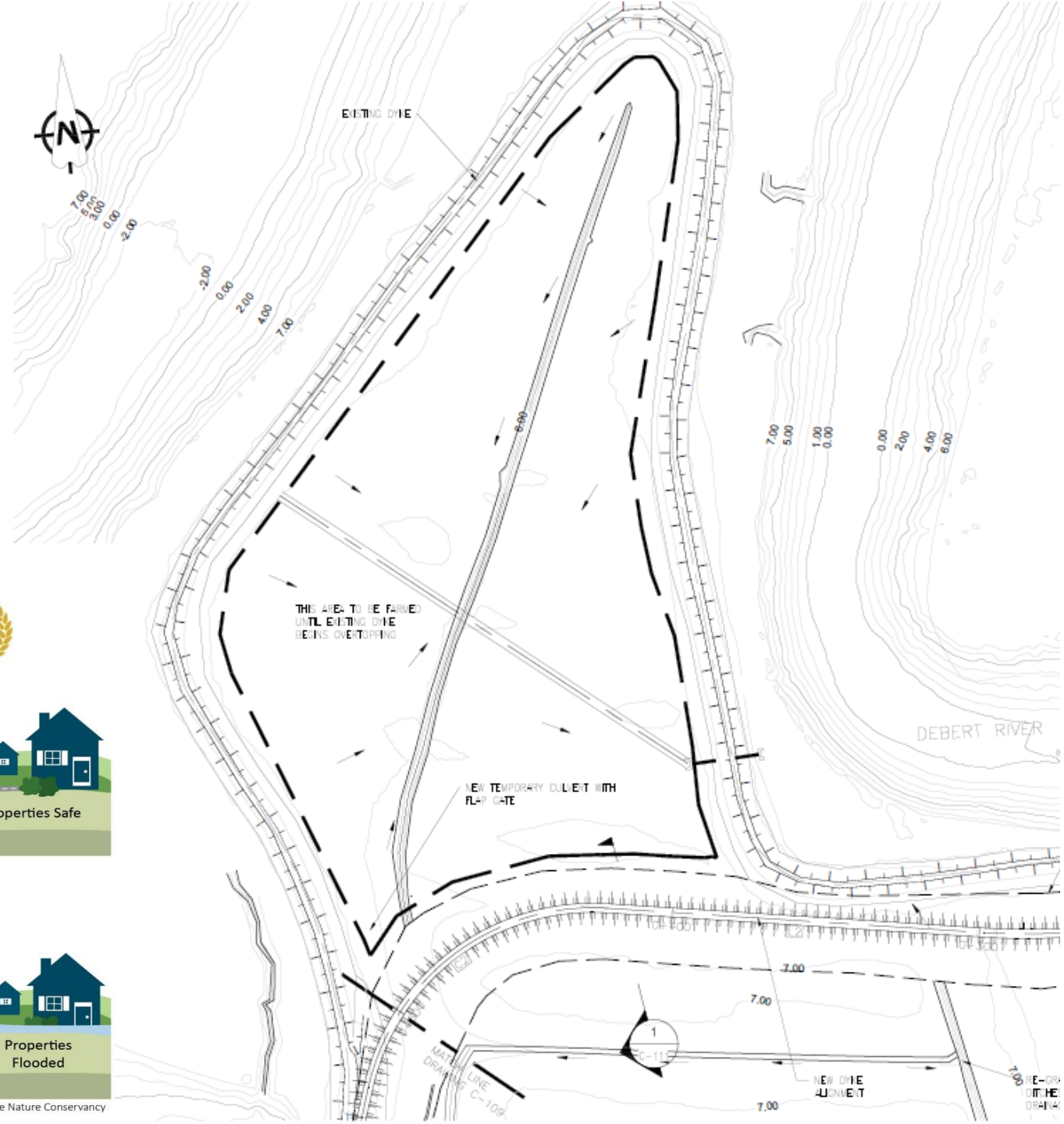
Dyke Reinforcement

- ▶ Topping
- ▶ Armour Rock
- ▶ Green Solutions



Dyke Realignment

- ▶ Shift dykes to reduce impacts along vulnerable sections
- ▶ Increase foreshore

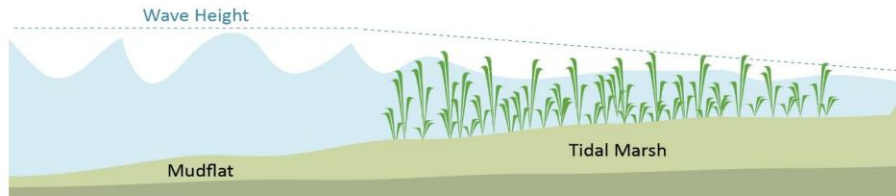


Dike Not Overtopped and/or Damaged

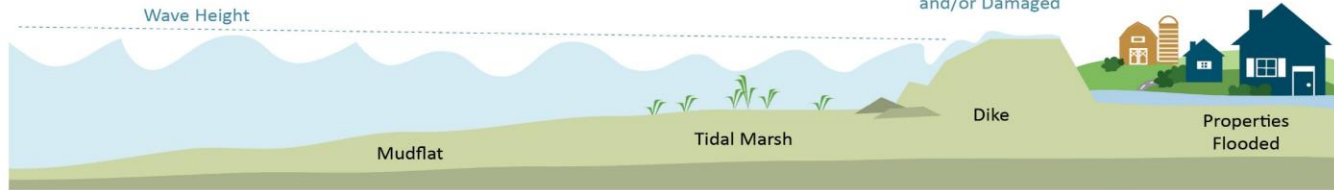


Properties Safe

Wave attenuation with a healthy tidal marsh.



Wave attenuation with a degraded tidal marsh.



Dike Overtopped and/or Damaged



Properties Flooded

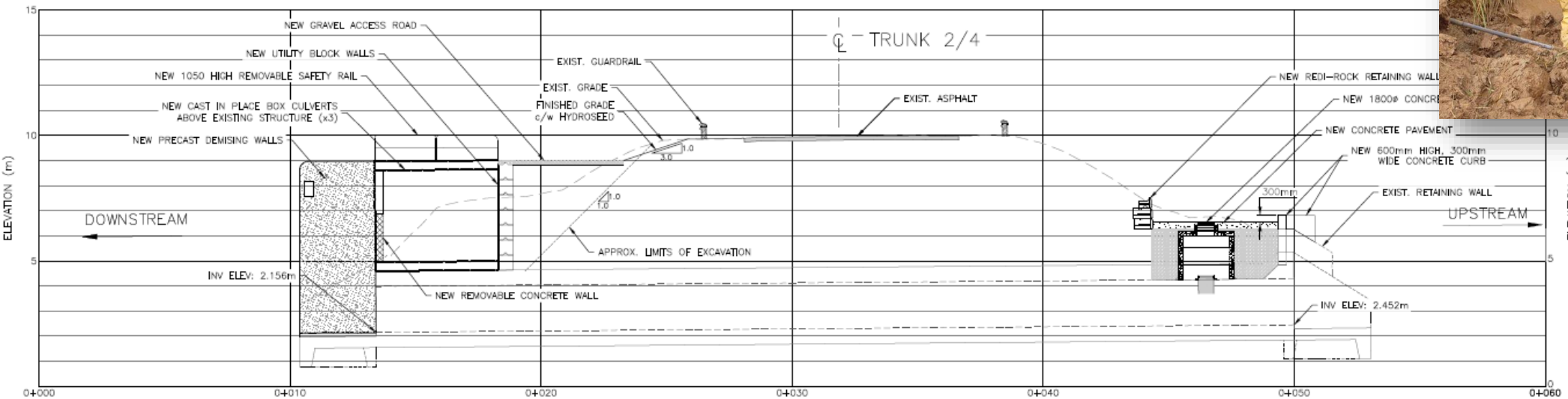
Tidal Wetland Restoration

- ▶ Belcher Street marsh along Cornwallis River, close to the Town of Kentville



Aboiteau Rehabilitation & Construction

- ▶ Sliplining
- ▶ Gate Replacement
- ▶ Headwall Repair
- ▶ Life-cycle extensions

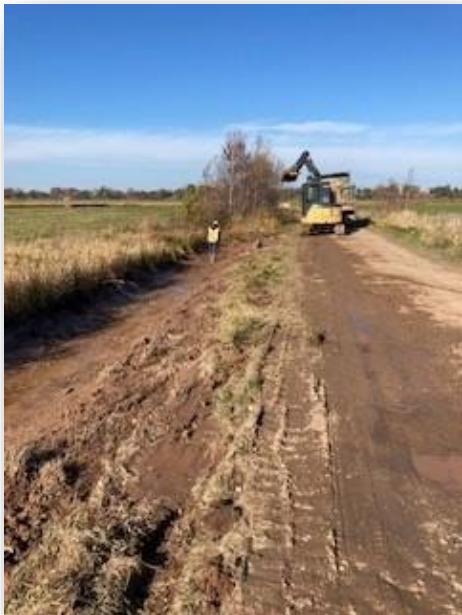






Drainage Improvements

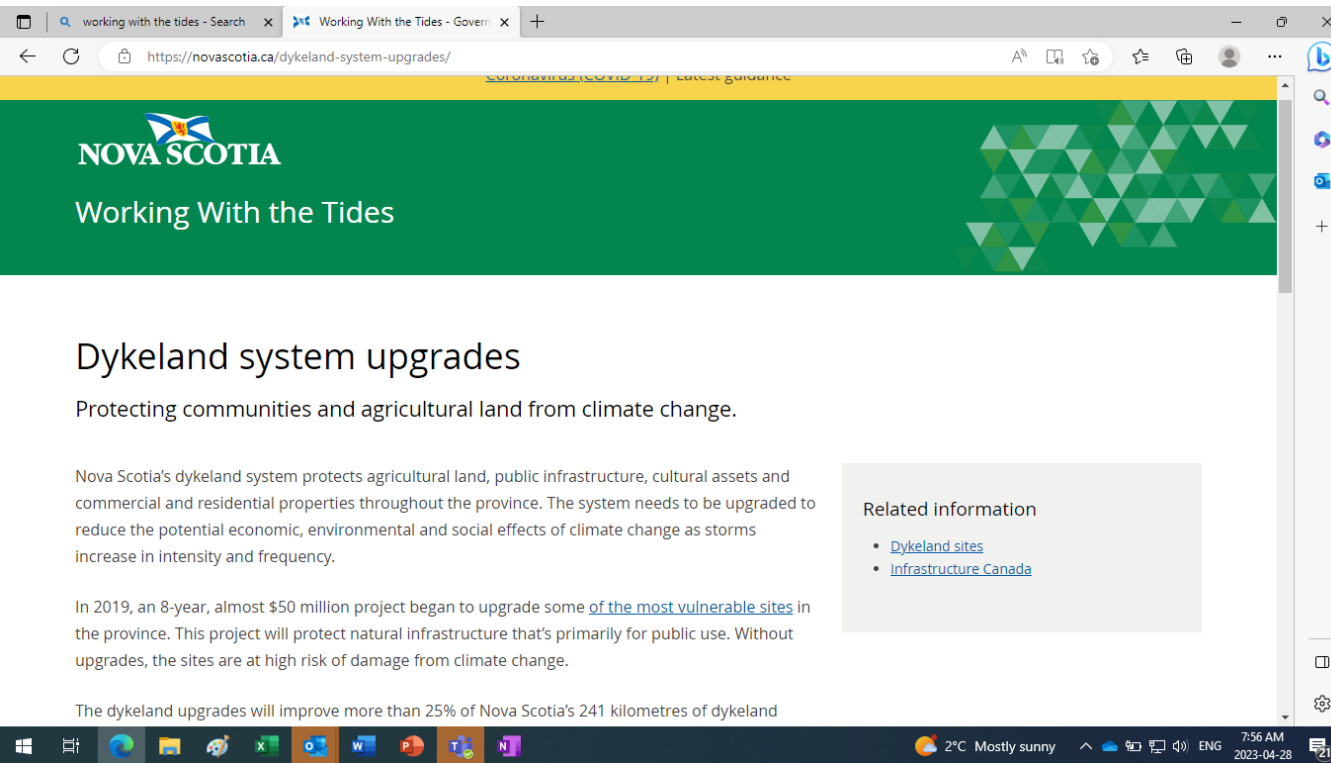
- ▶ Ditching
- ▶ Culvert Installation
- ▶ Dredging



Management Plan

- ▶ Long-term asset management planning for land use and operations
- ▶ Flood control and drainage planning
- ▶ Vulnerability and emergency response preparedness and planning





working with the tides - Search x Working With the Tides - Govern x +

https://novascotia.ca/dykeland-system-upgrades/

NOVA SCOTIA

Working With the Tides

Dykeland system upgrades

Protecting communities and agricultural land from climate change.

Nova Scotia's dykeland system protects agricultural land, public infrastructure, cultural assets and commercial and residential properties throughout the province. The system needs to be upgraded to reduce the potential economic, environmental and social effects of climate change as storms increase in intensity and frequency.

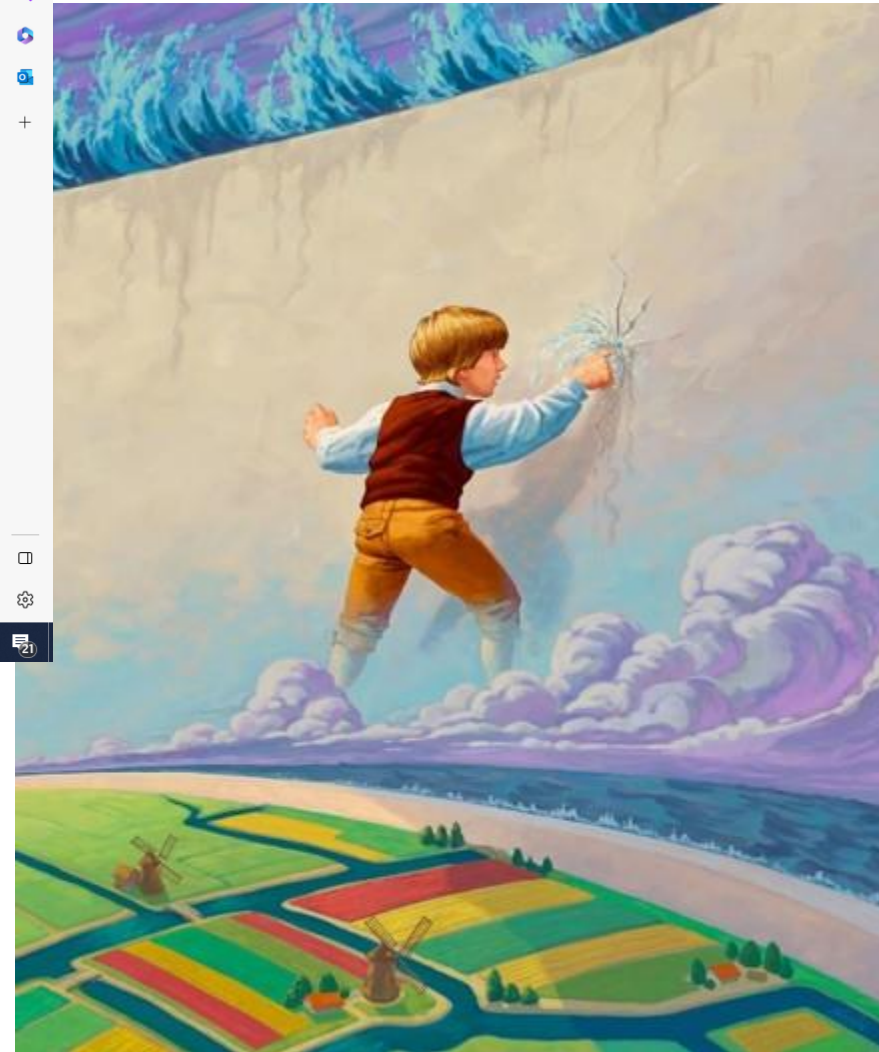
In 2019, an 8-year, almost \$50 million project began to upgrade some [of the most vulnerable sites](#) in the province. This project will protect natural infrastructure that's primarily for public use. Without upgrades, the sites are at high risk of damage from climate change.

The dykeland upgrades will improve more than 25% of Nova Scotia's 241 kilometres of dykeland

Related information

- [Dykeland sites](#)
- [Infrastructure Canada](#)

Windows taskbar: 2°C Mostly sunny 7:56 AM 2023-04-28



Questions