Padilla & Samish Bays Coastal Protection and Conservation Project

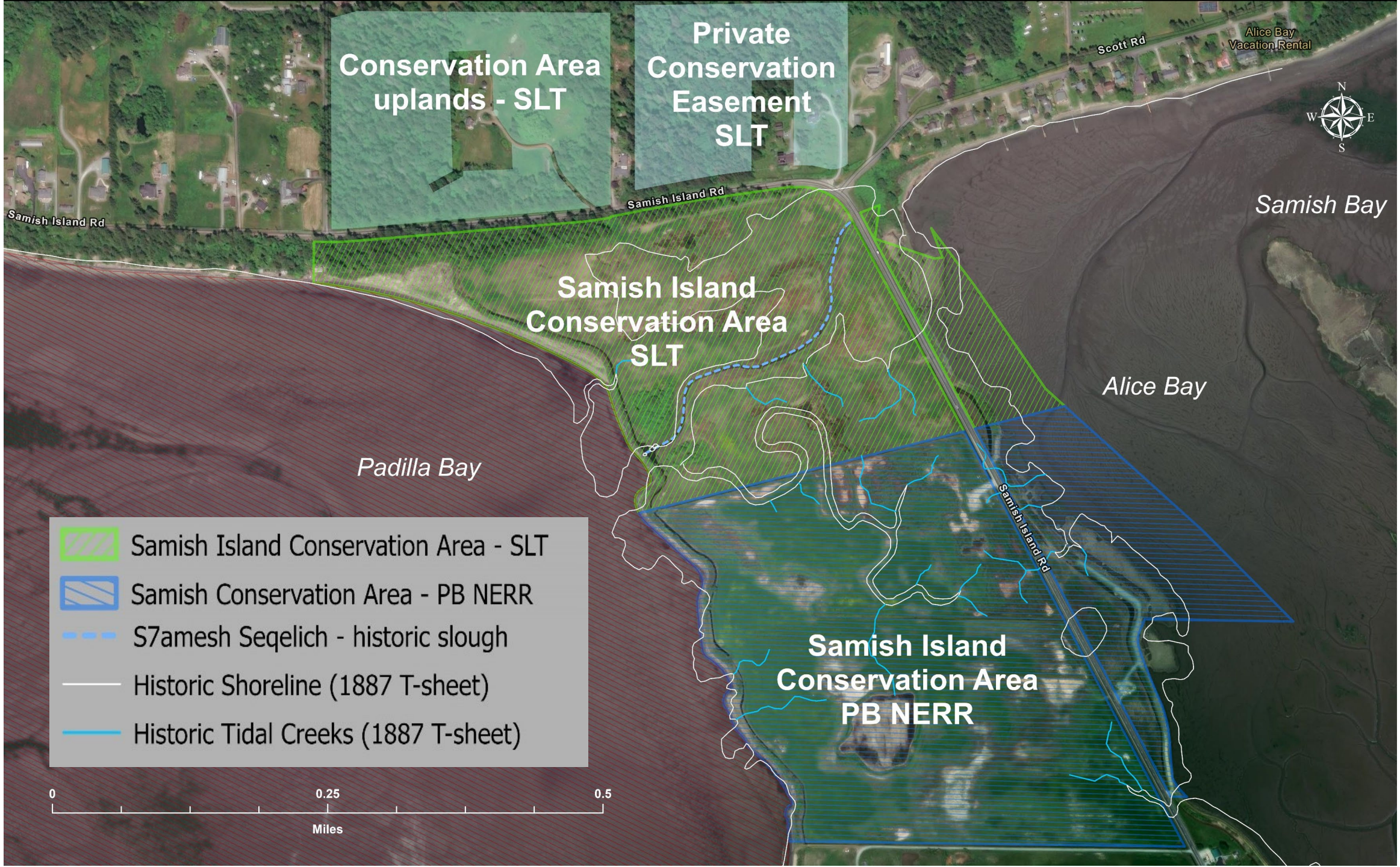
Phase 1 Public Meeting

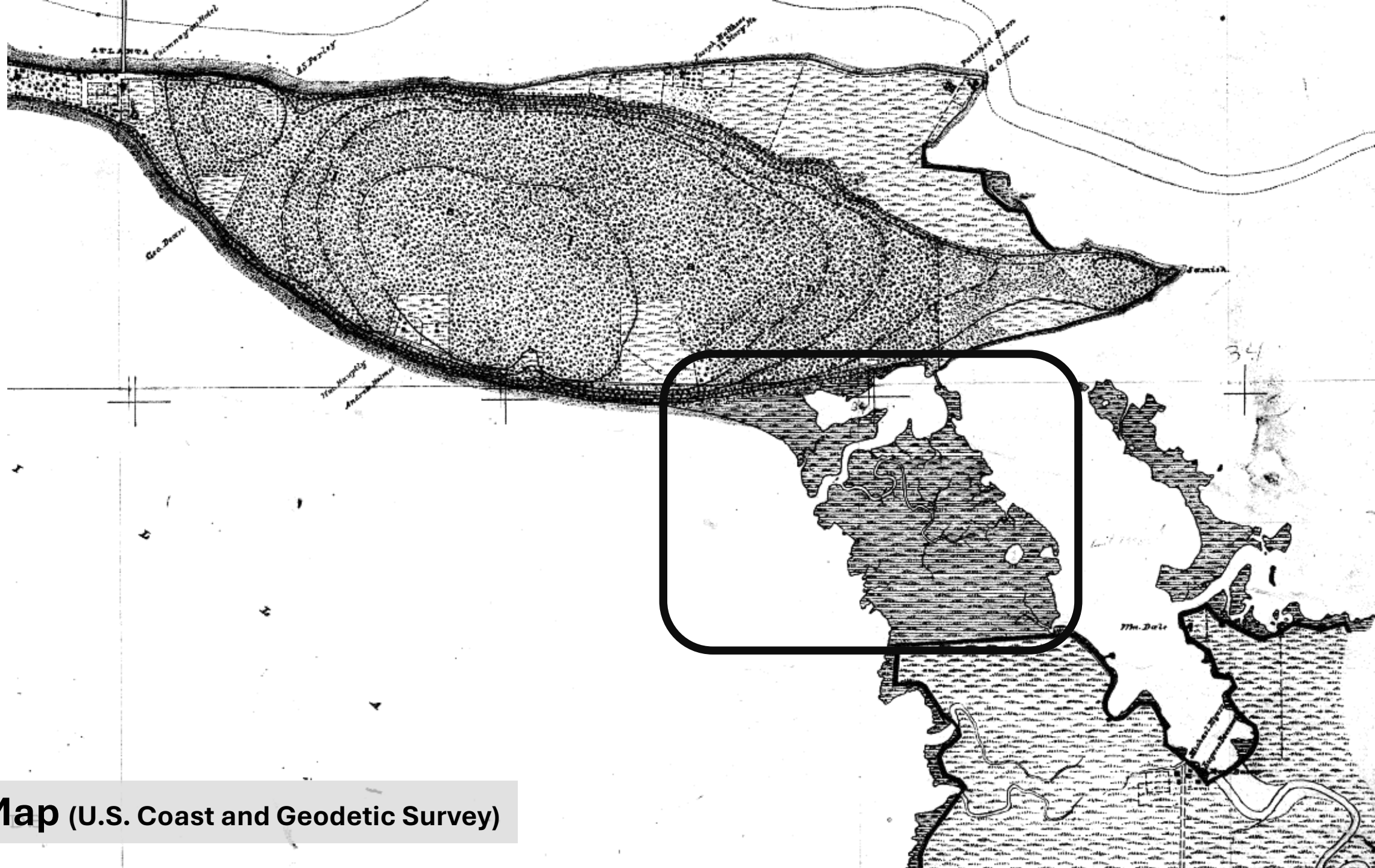
October 10, 2024

SKAGIT LAND TRUST
Saving Land for Tomorrow

Padilla Bay
National Estuarine Research Reserve

Project Site


Conservation Area uplands - SLT
Private Conservation Easement SLT
Scott Rd
Alice Bay Vacation Rental
N
W
E
S
Samish Island Rd
Samish Island Rd
Samish Bay
Samish Island Conservation Area SLT
Alice Bay
Padilla Bay
Samish Island Rd
Samish Island Conservation Area PB NERR
Samish Island Conservation Area - SLT
Samish Conservation Area - PB NERR
S7amesh Seqelich - historic slough
Historic Shoreline (1887 T-sheet)
Historic Tidal Creeks (1887 T-sheet)
0
0.25
0.5
Miles

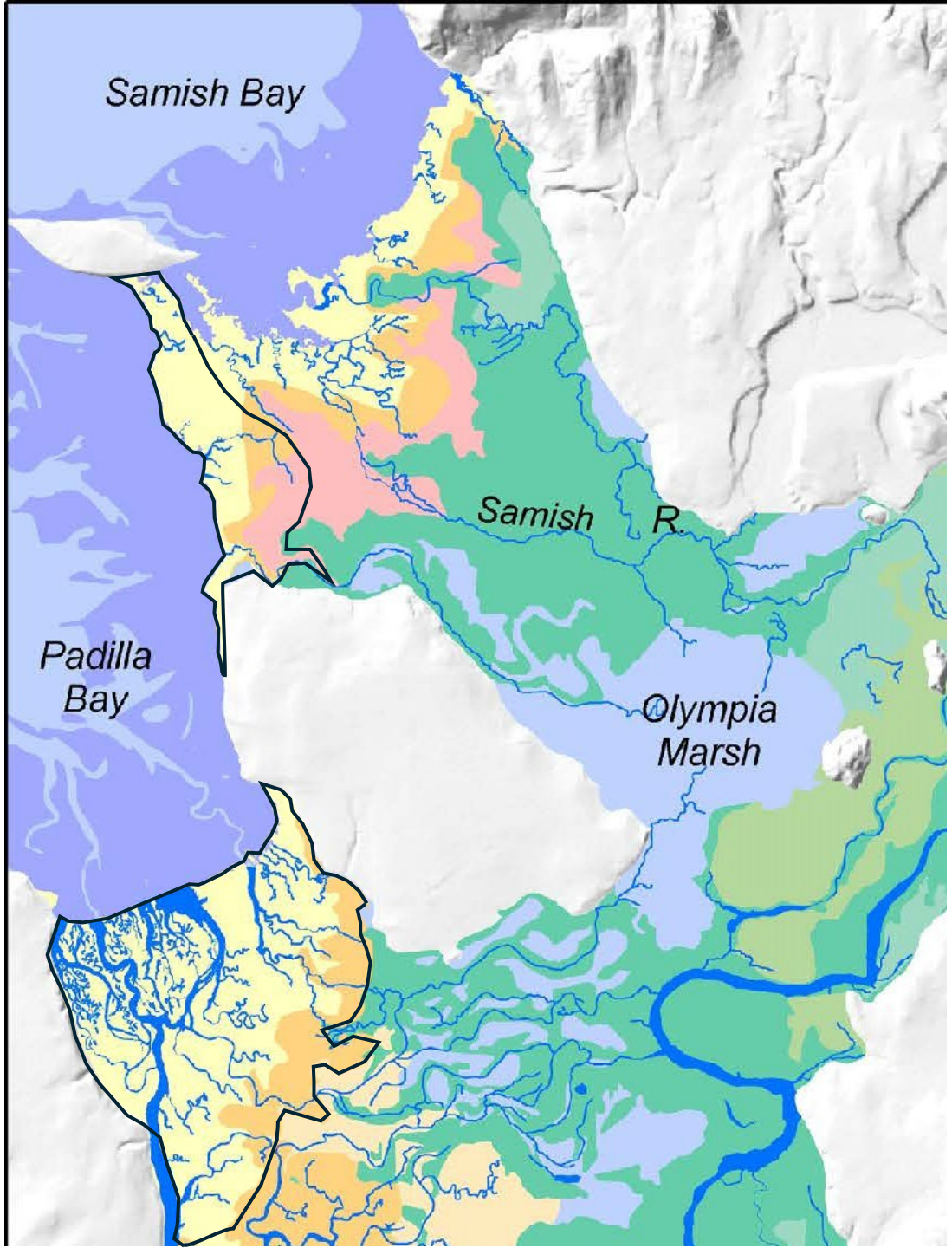


1887 Map (U.S. Coast and Geodetic Survey)

Why Saltmarsh?

Padilla Bay's Historic Tidal Wetlands

~7,000 acres

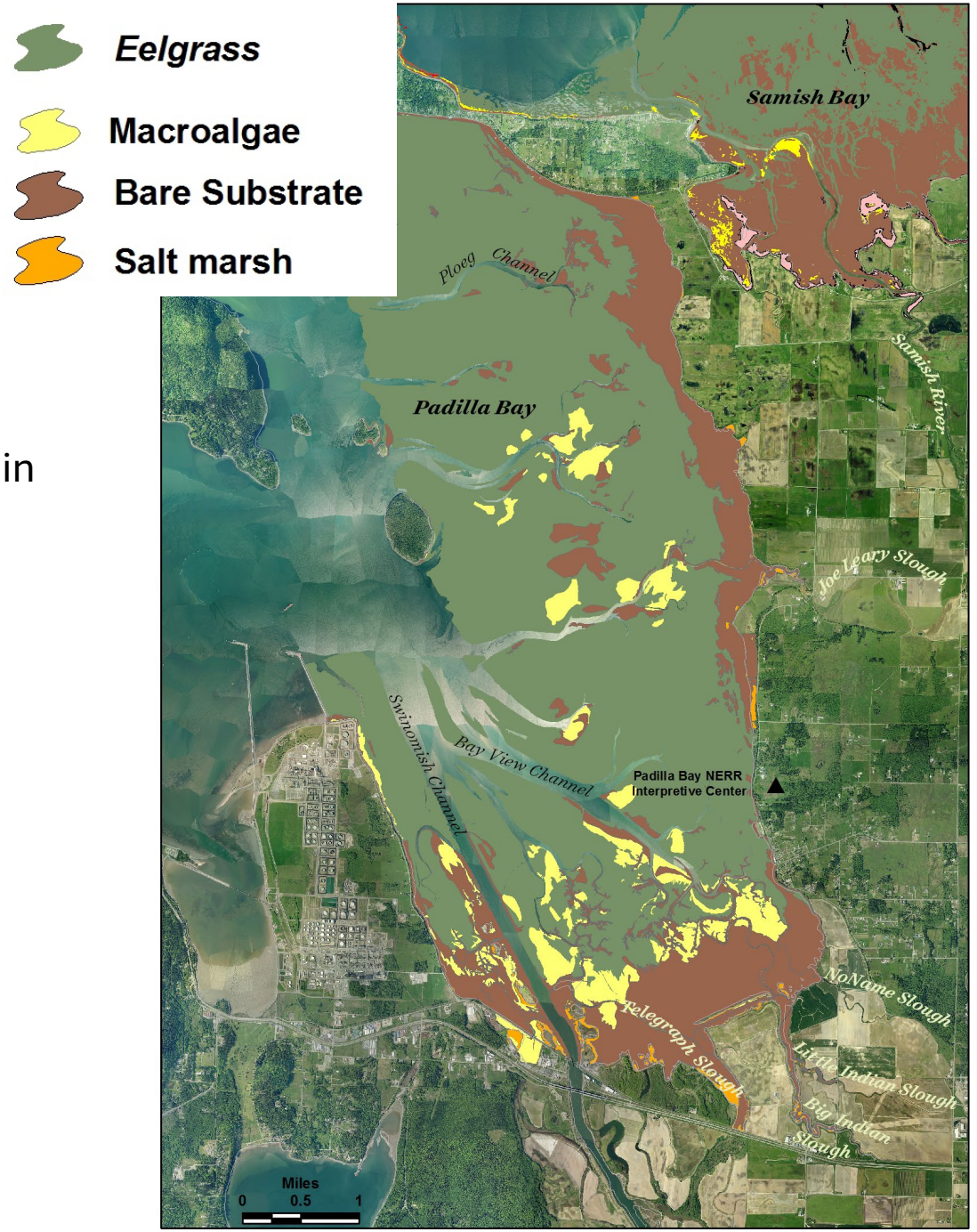


Brian Collins, 2002

Padilla Bay's Current Tidal Wetlands

< 320 acres (4.5%)

(includes partially-functioning wetlands in Swinomish Slough)



Suzanne Shull, PBNERR

Why Saltmarsh?

Spear orache

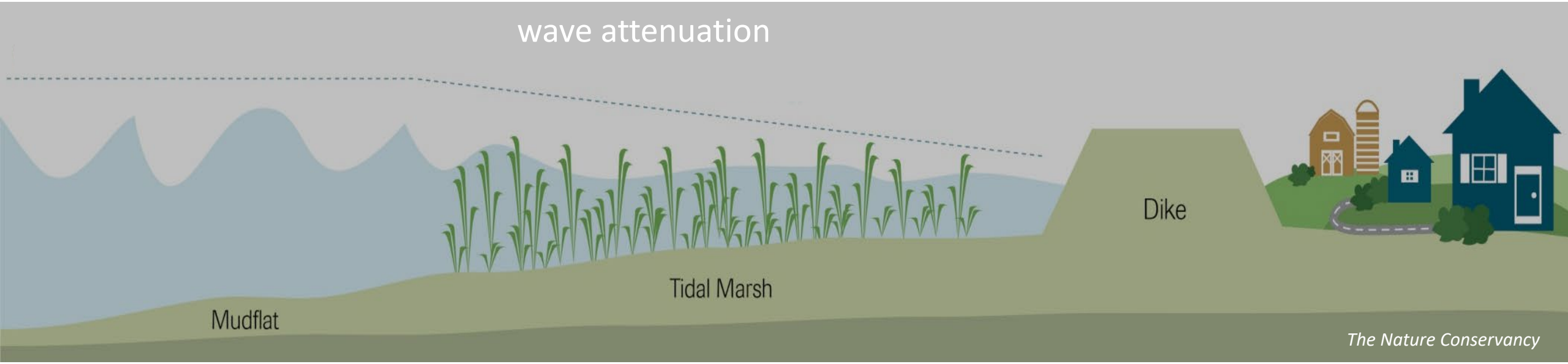
Pickleweed

Photos from camera trap in Bayview Saltmarsh shows that the area is great habitat for migrating waterfowl

hairy shore crab habitat

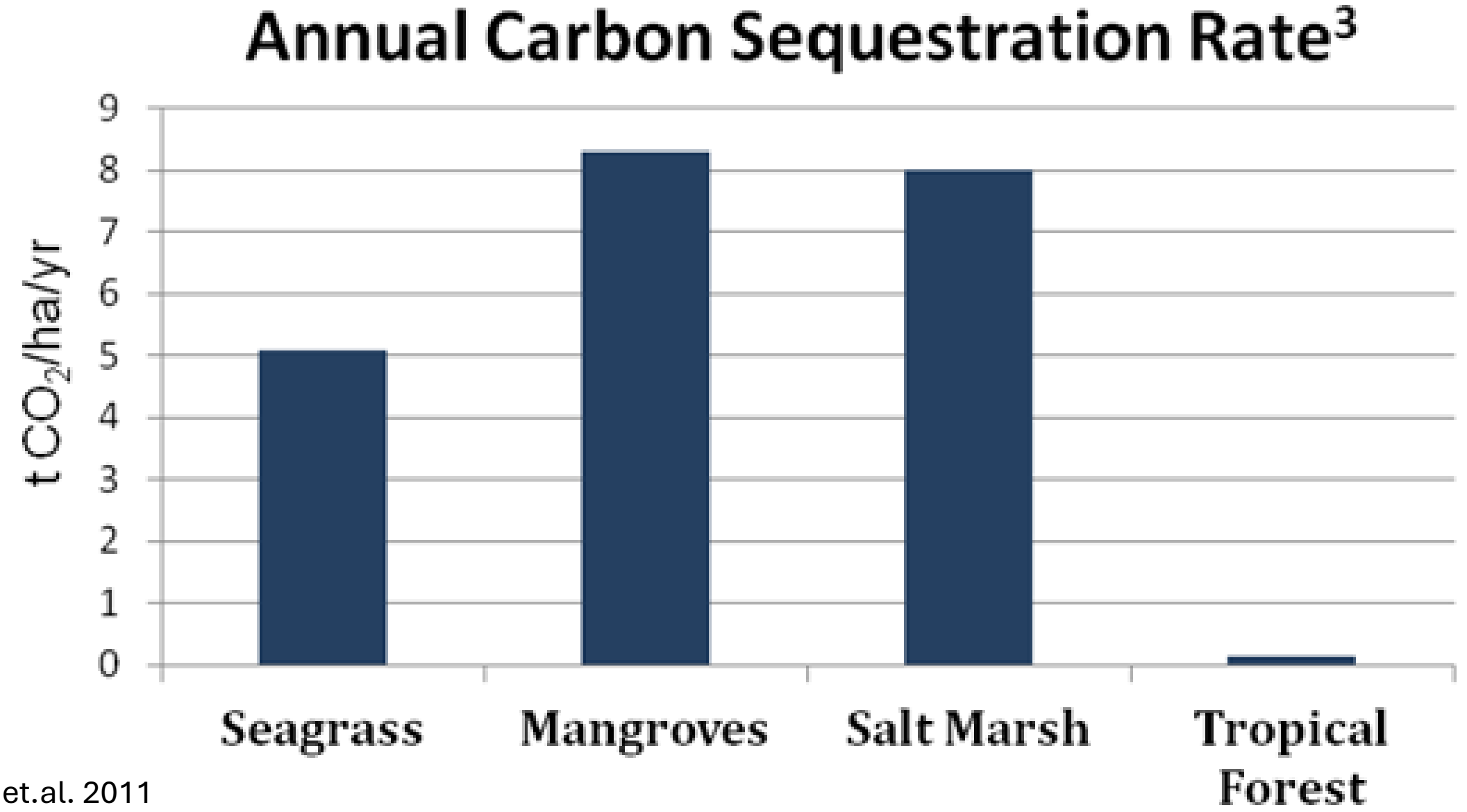
Juvenile Dungeness habitat

Tidal marsh reduces infrastructure vulnerability



Tidal marsh habitats are more elevated than the adjoining mudflats and the aboveground vegetation creates “roughness” in the pathway of waves as they runup onto the shore. The added roughness saps energy from the waves and reduces their height as they pass over the marsh, so they are less likely to erode or overtop the dike.

Saltmarsh fights climate change



McLeod et.al. 2011

Project Goals

- Restore resilient tidal wetlands and channels
- Improve community resilience to storms and flooding
- Build the needed partnerships

Project Phases

- Phase 1 (2022-2024) Acquisition and Assessment
- Phase 2 (Late 2024-2027?) Modeling and Preliminary Design
- Phase 3 (tbd) Final Design and Permitting
- Phase 4 (tbd) Construction

Next Steps

- This presentation and the full Draft Site Assessment and Feasibility Report to be on Skagit Land Trust website by October 20

- Feedback wanted! Skagit Land Trust website will host a link for submitted comments and questions

- Look for periodic updates as we move forward

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BLUE COAST
ENGINEERING

Consulting Team

BLUE COAST ENGINEERING

- Prime & Engineering Design Lead
- Coastal Engineering & Geomorphology
- Surface Water, Waves, and Tidal Measurements
- Nearshore Habitat & Fish Usage
- Hydrodynamic & Hydraulic Modeling (Future)

SHANNON & WILSON

- Geology, Subsidence, Compaction
- Geotechnical Engineering
- Vegetation and Marsh Habitat

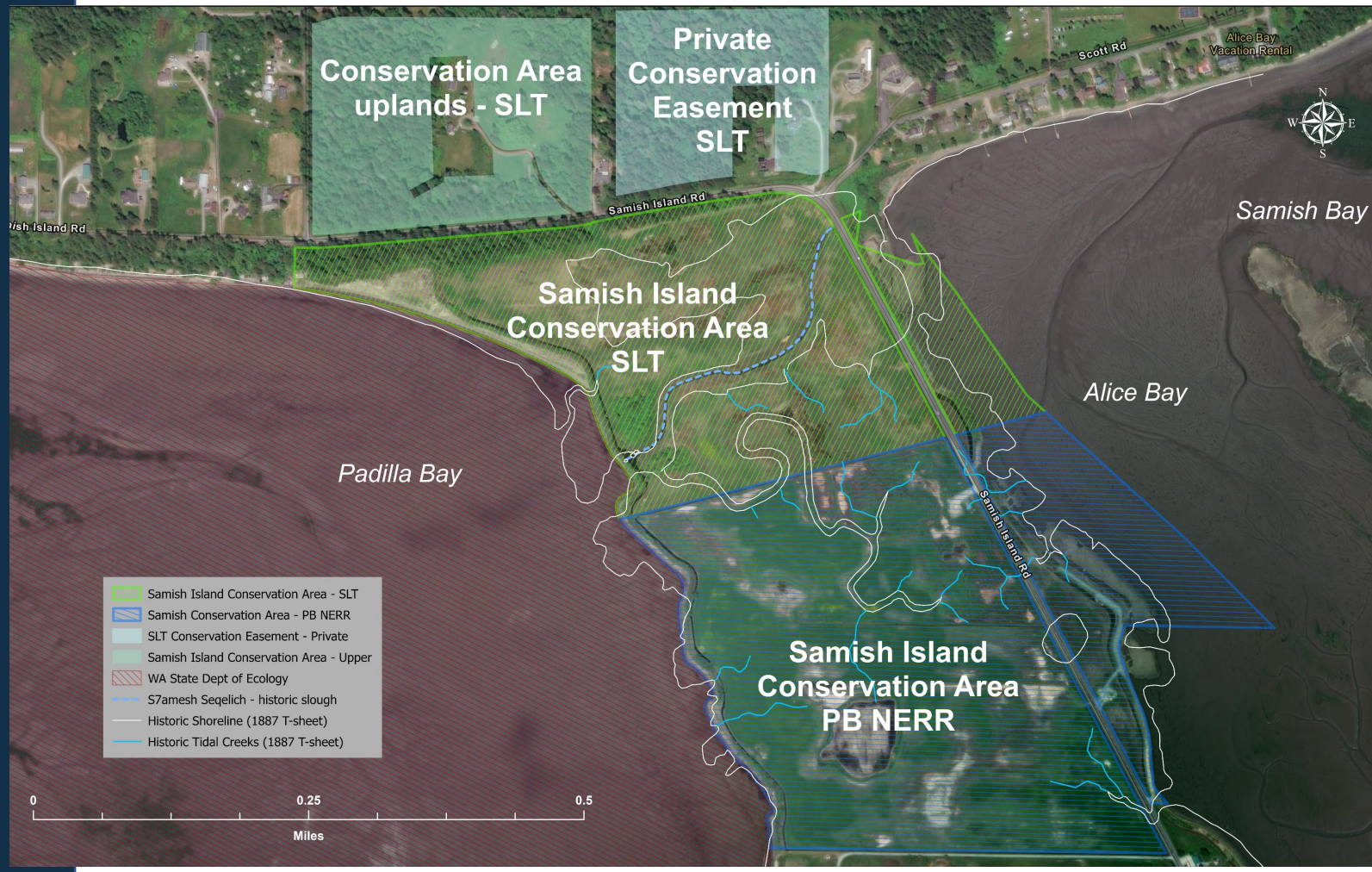
PgG A Mott MacDonald Company

MOTT MACDONALD

- Hydrogeology

Outline

- Site Assessment
  - Coastal Processes
  - Habitat & Species
  - Infrastructure
  - Soil and Geotechnical
  - Hydrogeology
- Benefits
- Conceptual Restoration Ideas



BLUE COAST ENGINEERING

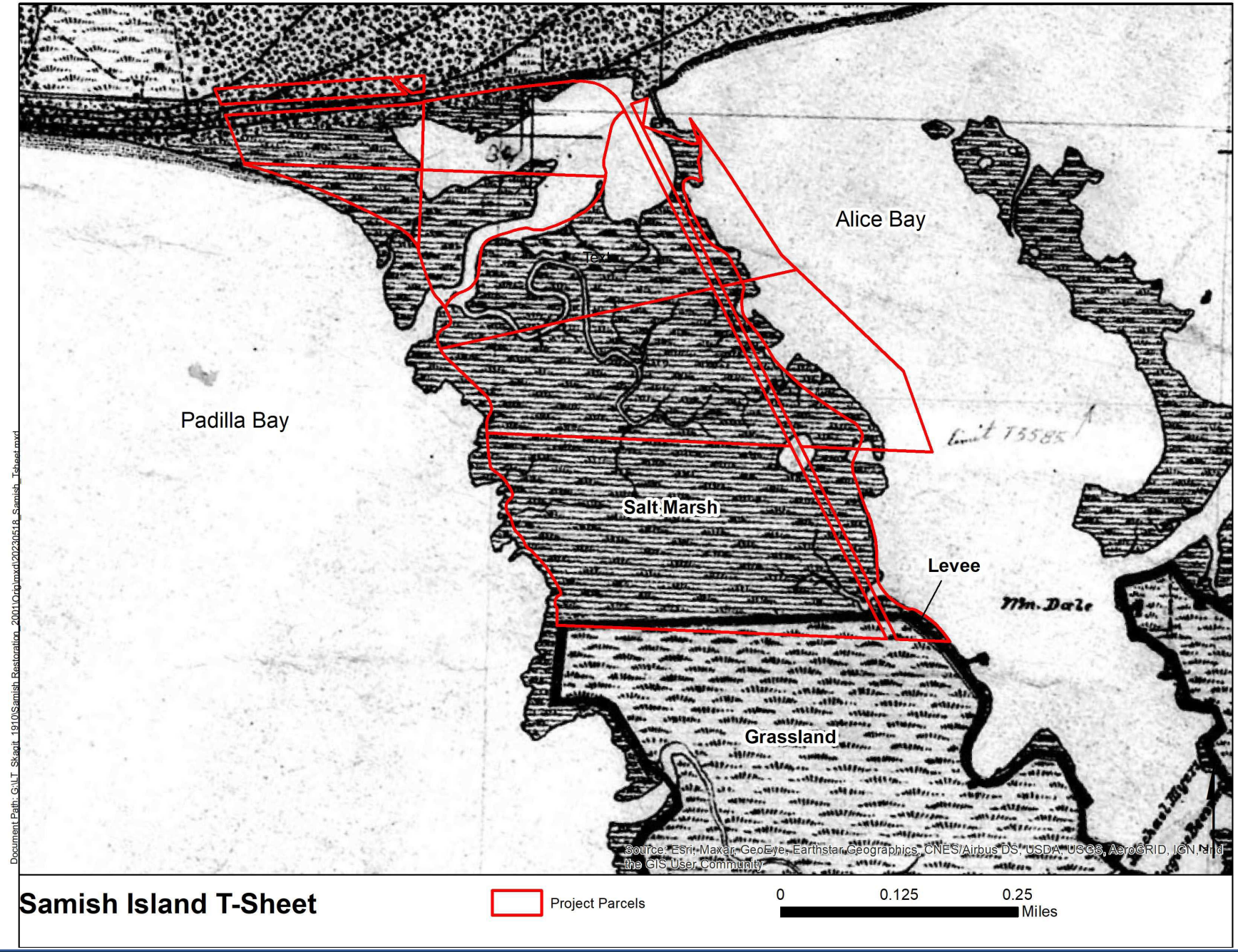
1887

overlain with current parcel boundaries

The channel was widest at the northeast outlet and drained several connecting channels within the salt marsh. Historical reports indicate the channel was deep enough for tugboats to use and it was crossed with a wooden bridge.

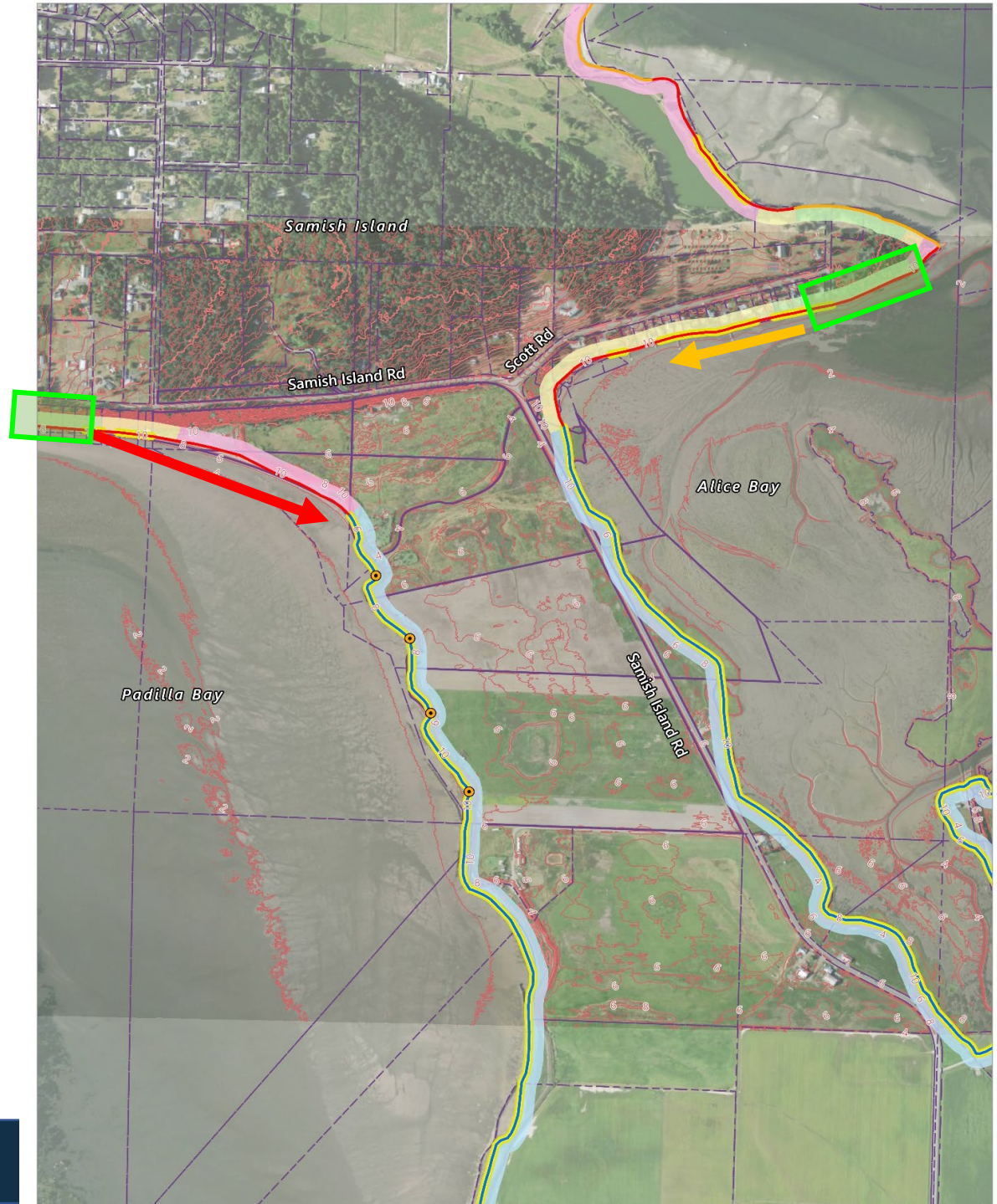
-extensive diking for the river and shoreline had already occurred fixing the land in place.

-The present-day Siwash Slough is located approximately in the location of the former channel (blue line), however its connection to saltwater is currently blocked on both ends by dikes.



Coastal Processes

Geomorphology



LEGEND:

- Parcel Boundary
- Project Parcel Boundary
- Armor Present
- Wider Beach

Shoretype

- Accretion shoreform
- Feeder bluff
- Delta - No appreciable drift
- Transport zone

Topographic Contour

- Major (10' Interval)
- Minor (2' Interval)

Drift Cell Direction

- Left to Right
- No Appreciable Drift
- Right to Left

Coastal Geology

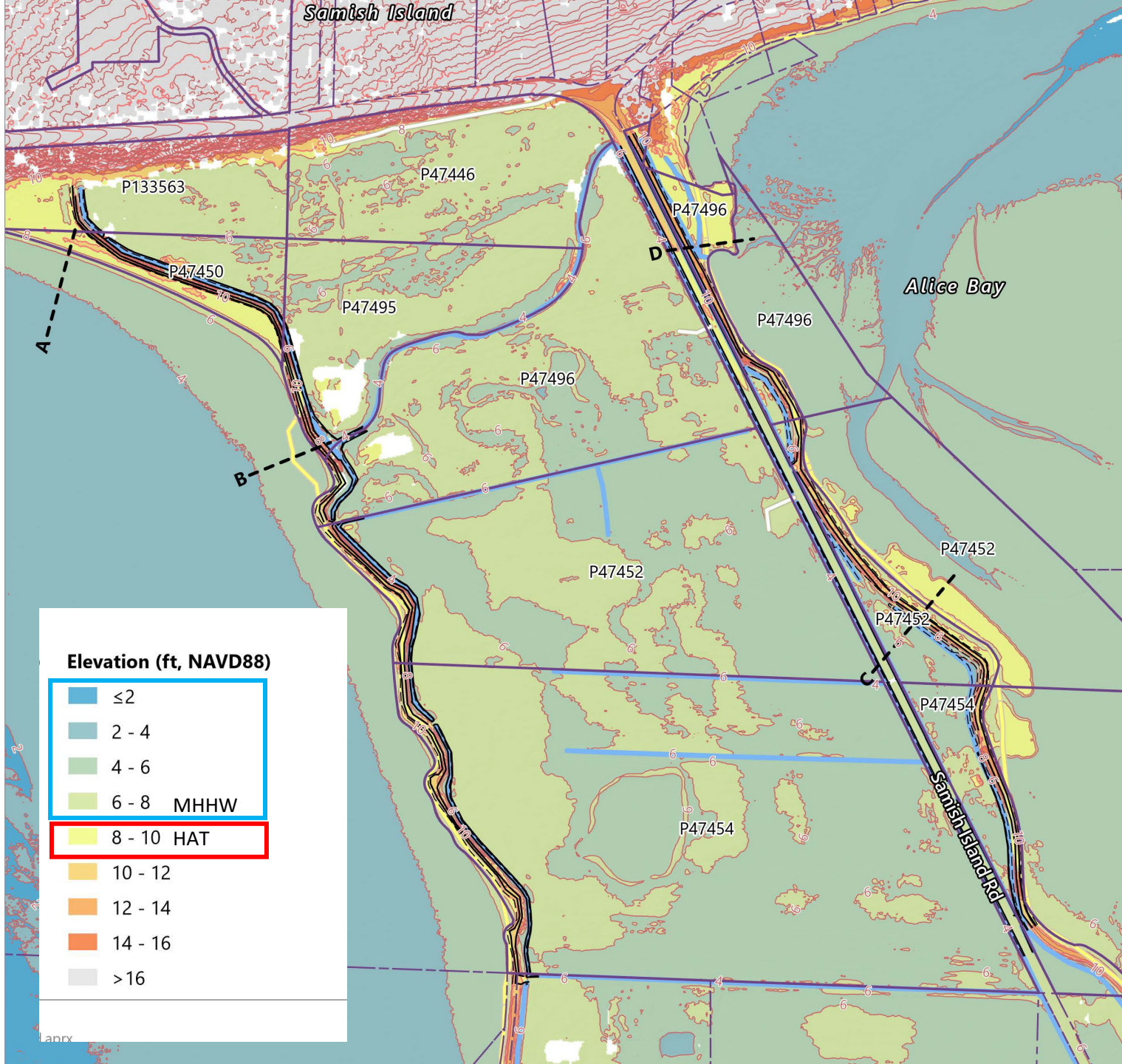
- Samish Island Geology extends downslope into project area
- Gravel bars offshore evidence of eroding bluffs supplying sediment
- Padilla Bay – mud flats and losing elevation
- Alice Bay – potentially gaining elevation
- Both shorelines are receding

Land Elevation relative to water levels

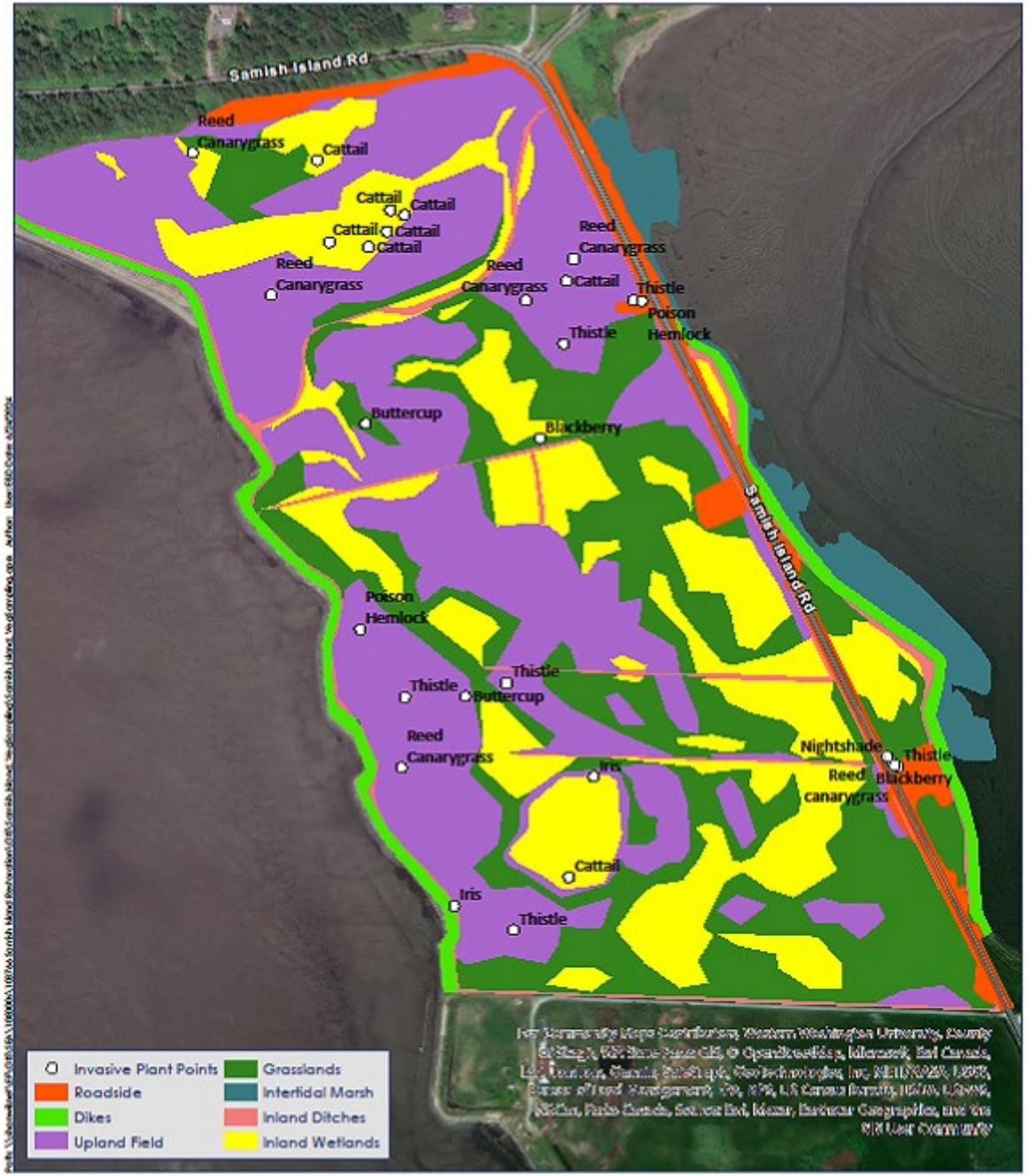
- Tidal Elevation
  - Mean higher high water (MHHW)
  - Highest Astronomical Tide (HAT)
- Wind Wave Runup
- Atmospheric Effects
- Sea Level Rise

Total Extreme Water Levels

- 11 to 13 feet Padilla Bay
- 9.5 to 12 feet Alice Bay
- 13 ft FEMA Base Flood Elevation



Species & Habitat

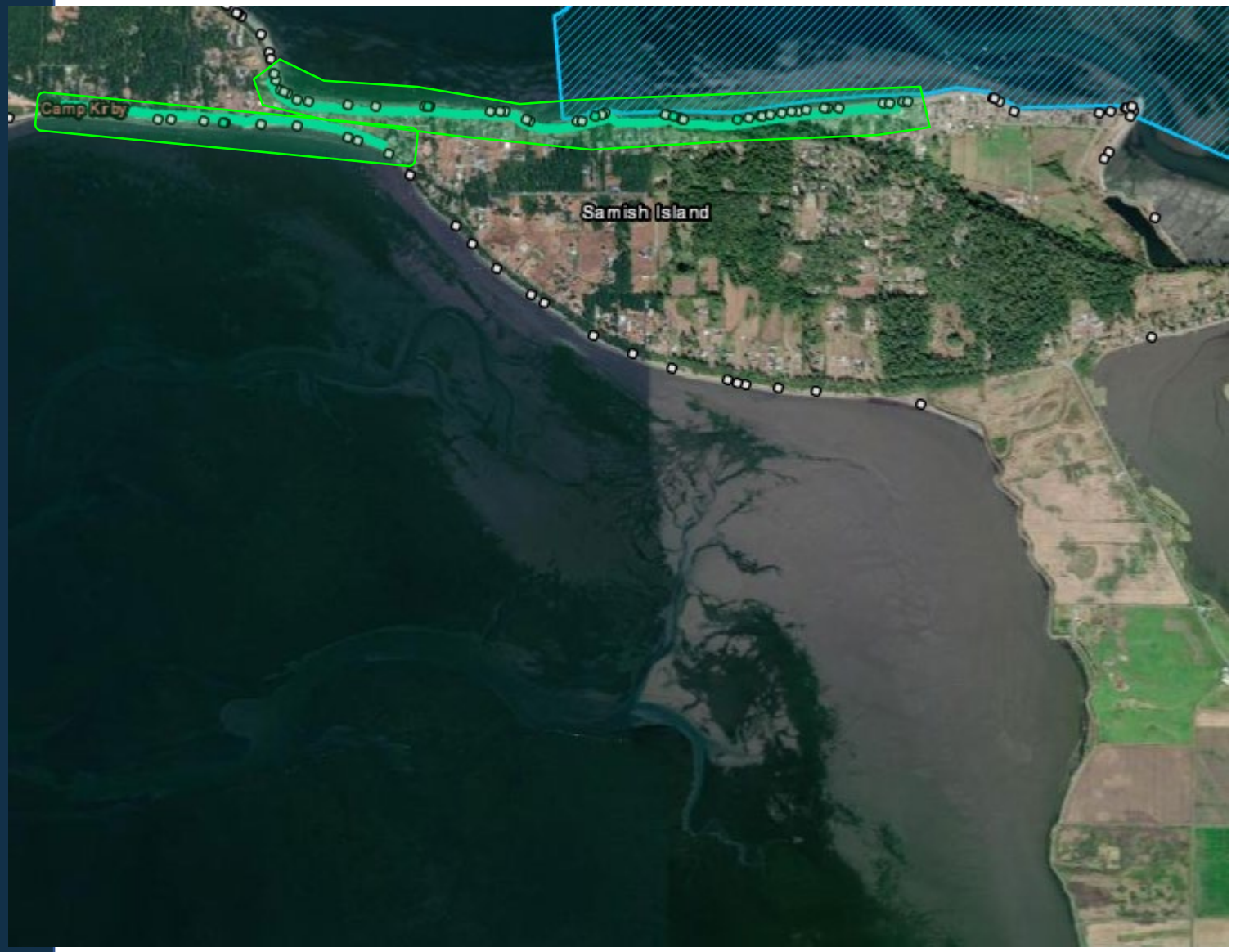


Vegetation Survey

- Nearshore / Intertidal Marsh
- Inland Wetland / Brackish
- Upland Field
- Grasslands
- Roadside
- Dikes
- Inland Ditches
- Invasive Species

Fish Sampling

- Forage Fish spawning south side of Samish is summer smelt, north side winter
- PBNERR sampling at site
- PNW Salmonid found along Samish and Padilla Bay shorelines



BLUE COAST
ENGINEERING

Birds & Other

- Deer and other mammals are using the site
- Bird monitoring
  - Audubon Society
  - Salish Sea Estuaries Avian Monitoring Framework
  - 72 species (none endangered)
- Green crab, bamboo worm, and other invasives present

BLUE COAST
ENGINEERING

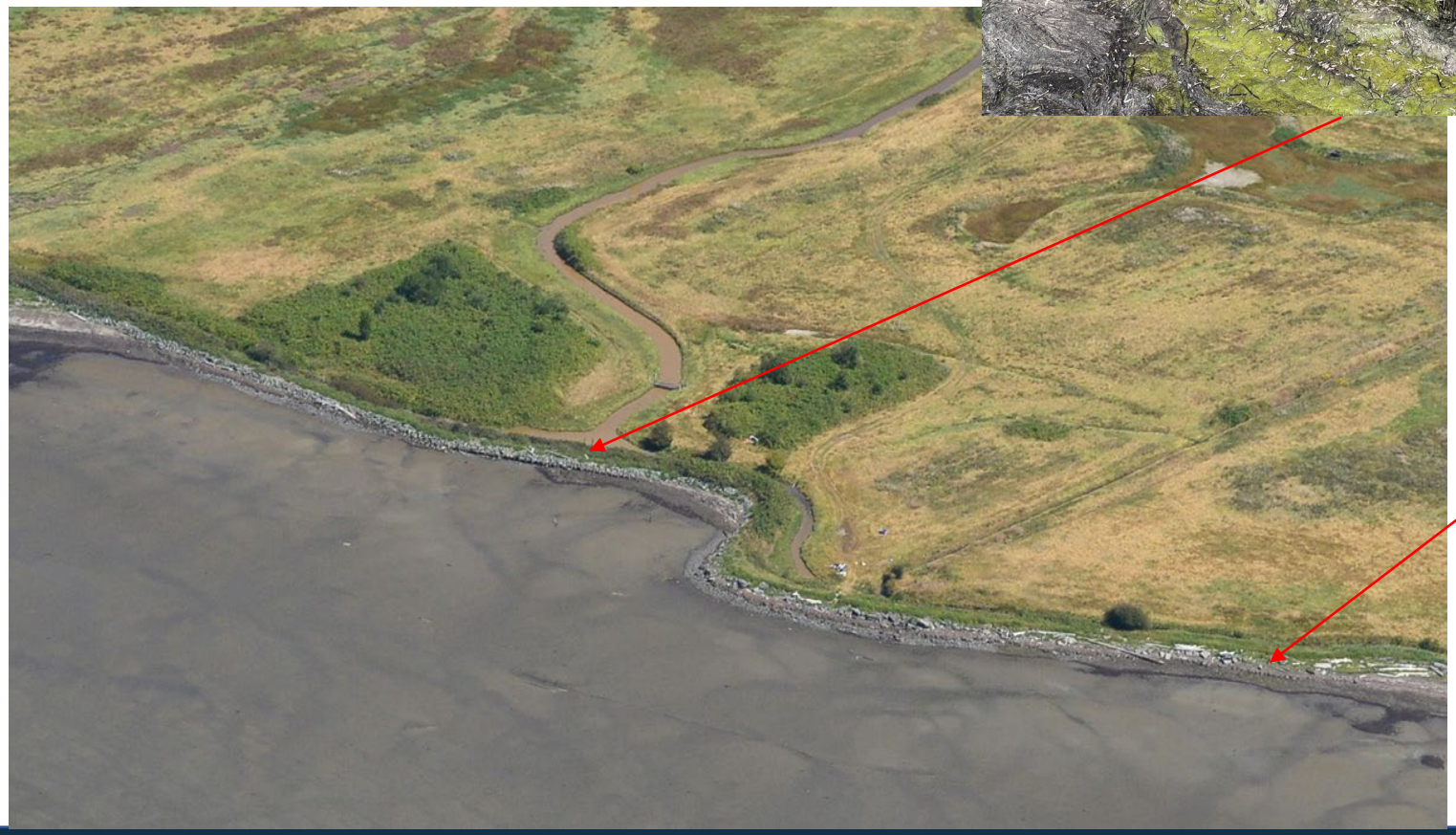
Infrastructure

Road & Utility Conditions

- Samish Island Road
  - Longitudinal and transverse cracking on north end
  - Slight rutting the full length
- Leaning utility poles (power and communication)
- Water main parallels and crosses under road – condition unknown

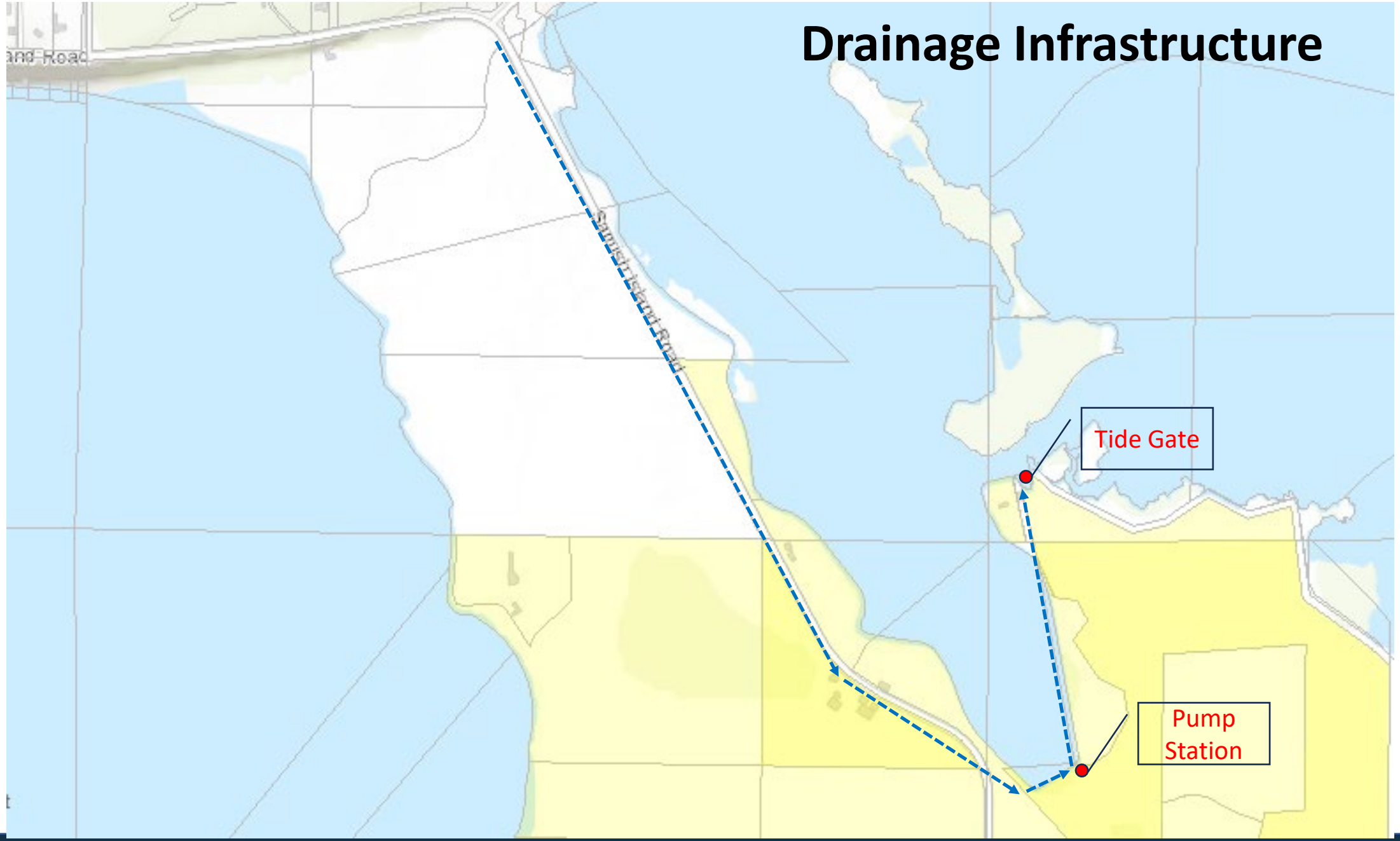
- Padilla Bay Dike North
  - No armor along portions of the dike
  - Earthen dike is lower than other areas
  - Known overtopping during extreme water levels

- Padilla Bay Dike South
  - Degrading Rock and Pilings
  - Dike erosion/slumping
  - Pockets of shoreline erosion



- Alice Bay Dike
  - Varies in age and construction
  - Various repairs with low grade materials
  - 2022 Rebuilt Dike to DD5 standards

Drainage Infrastructure



Site Soils

Site Explorations

- 2022 – Shallow samples at 4 sites
- May 2024 – Sampled 10 sites

LEGEND

B-01p-24 / SP-1-24 / P-1 — Designation and Approximate Location for Boring *(Shannon & Wilson, 2024)*, Standpipe Piezometer *(Shannon & Wilson, 2024)*, and Standpipe Piezometer *(Mott MacDonald, 2024)*

TP-1 — Test Pit Designation and Approximate Location *(Shannon & Wilson, 2024)*

SB-01 — Hand Auger Boring Designation and Approximate Location *(Shannon & Wilson, 2022)*

Soil Analysis

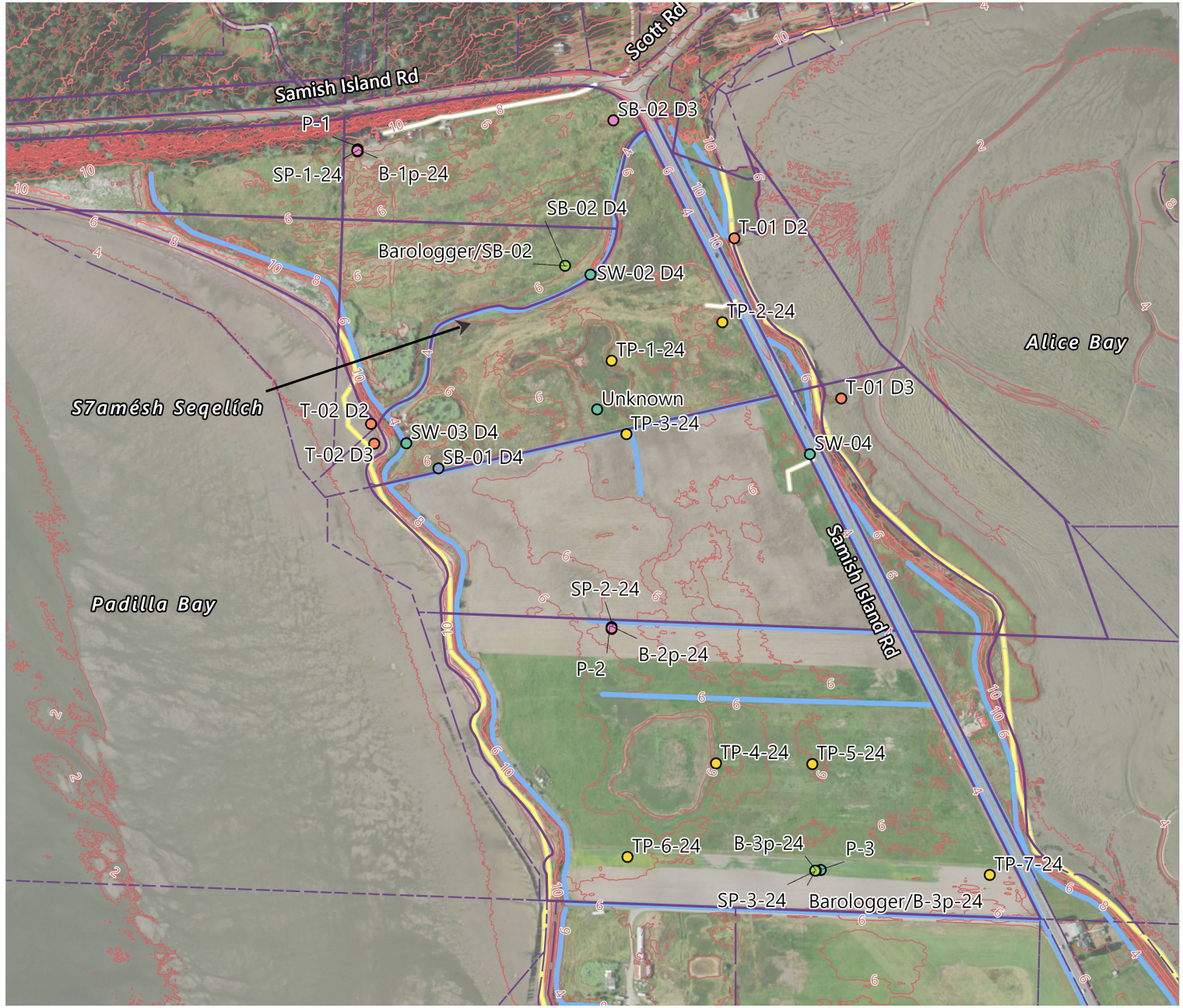
- Historic Marsh sediments
- Some beach deposits
- Plow pan from agriculture
  - Dense/ not porous
  - Restricts vegetation growth

Exhibit 5-1: Plow Pan Observed in TP-1

Hydrogeology

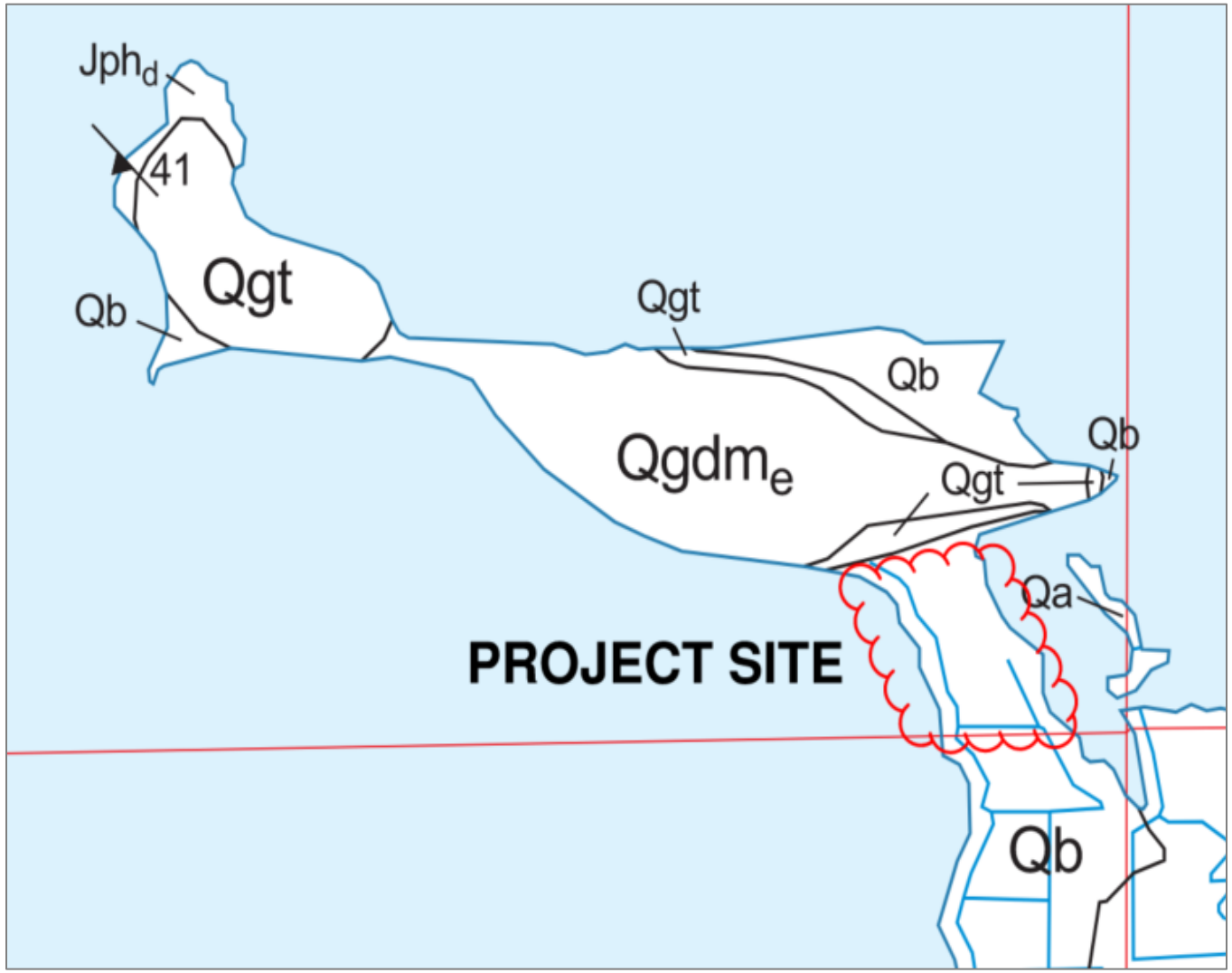
Monitoring Wells & Stations

- 2022 Preliminary shallow wells
- 2024-2025 Comprehensive
  - Deep wells (3)
  - Shallow wells (7)
  - Bimonthly manual measurements



Hydrogeologic Summary

- Compact soils on north end (not porous)
- Beach and tidal flat across most of site are porous
- Well pairs show upward hydraulic gradient (flow of water) in the groundwater table.
- Specific conductance/salinity measurements lower at north than surface and other locations. Suggests freshwater upwelling in parts of the northern parcel.
- Upwelling of groundwater will be a significant consideration for restoration planning



Qa is alluvium – deposited by flowing waters
Qb is beach deposits
Qgdm – is glaciomarine drift

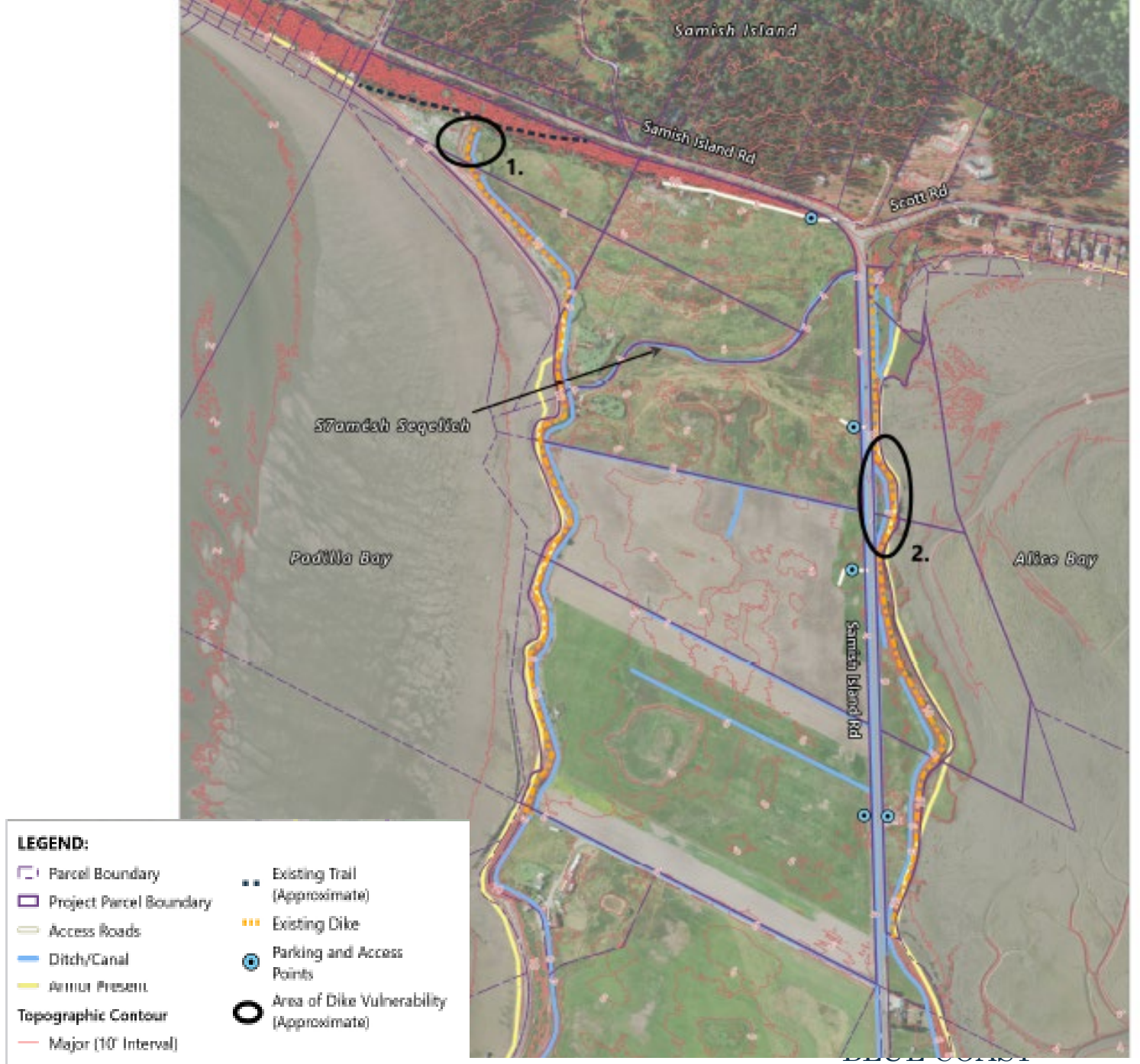
Conceptual Restoration Ideas

Benefits

- Salt marsh for ecosystem connectivity
- Tidal wetlands for nearshore habitat
- Coastal processes to sustain habitat
- Improved infrastructure and access
- Recognition of Coast Salish people
- Low impact public access
- Jobs and local economic development

Concept 1: No Restoration or other Solutions Developed

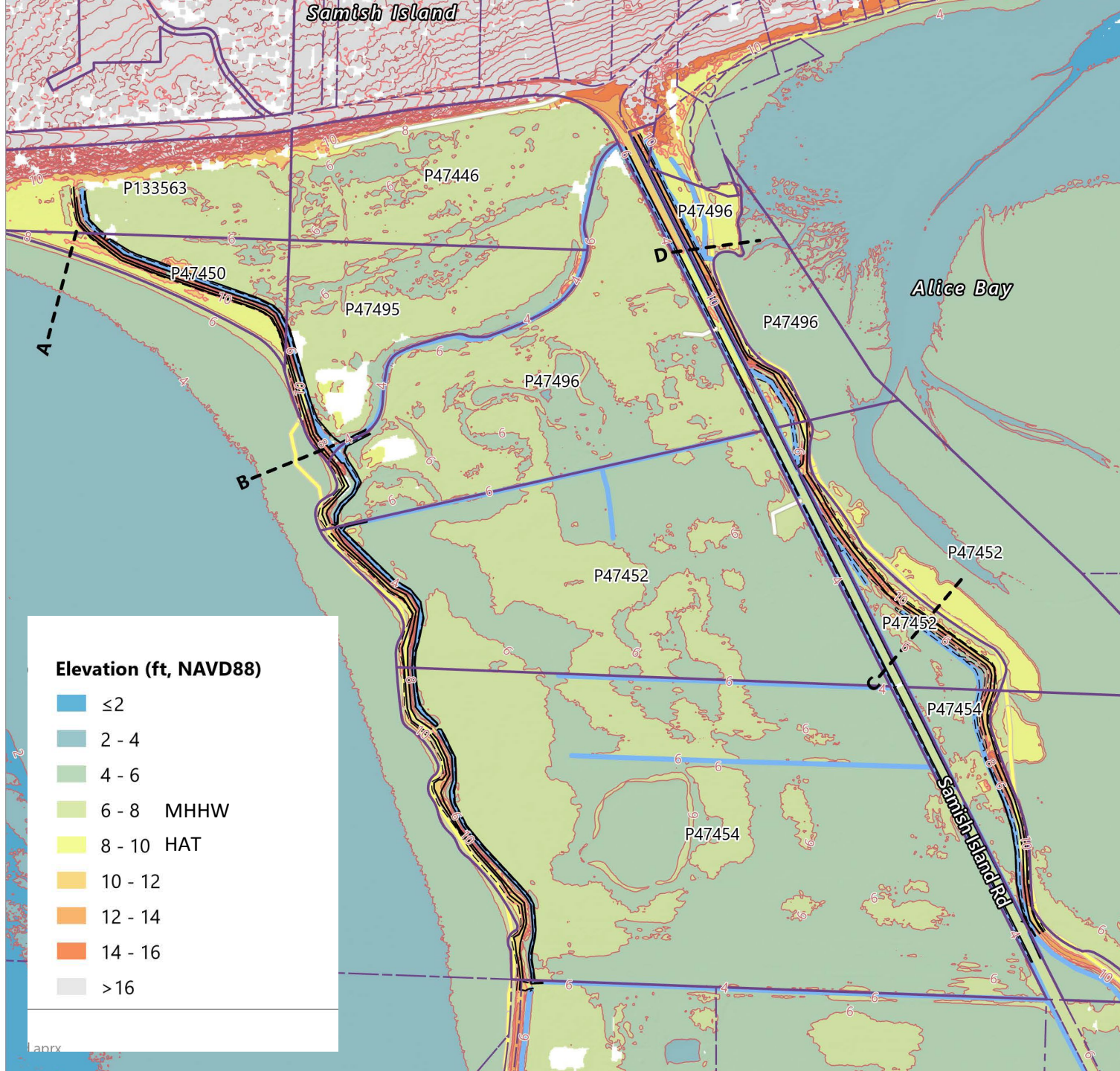
1. No proactive changes to dikes identified
2. No changes to ditches & drainage identified
3. No changes to road identified
4. Invasive species managed
5. Current access managed
6. Temporary & emergency actions on dikes only



BLUE COAST ENGINEERING

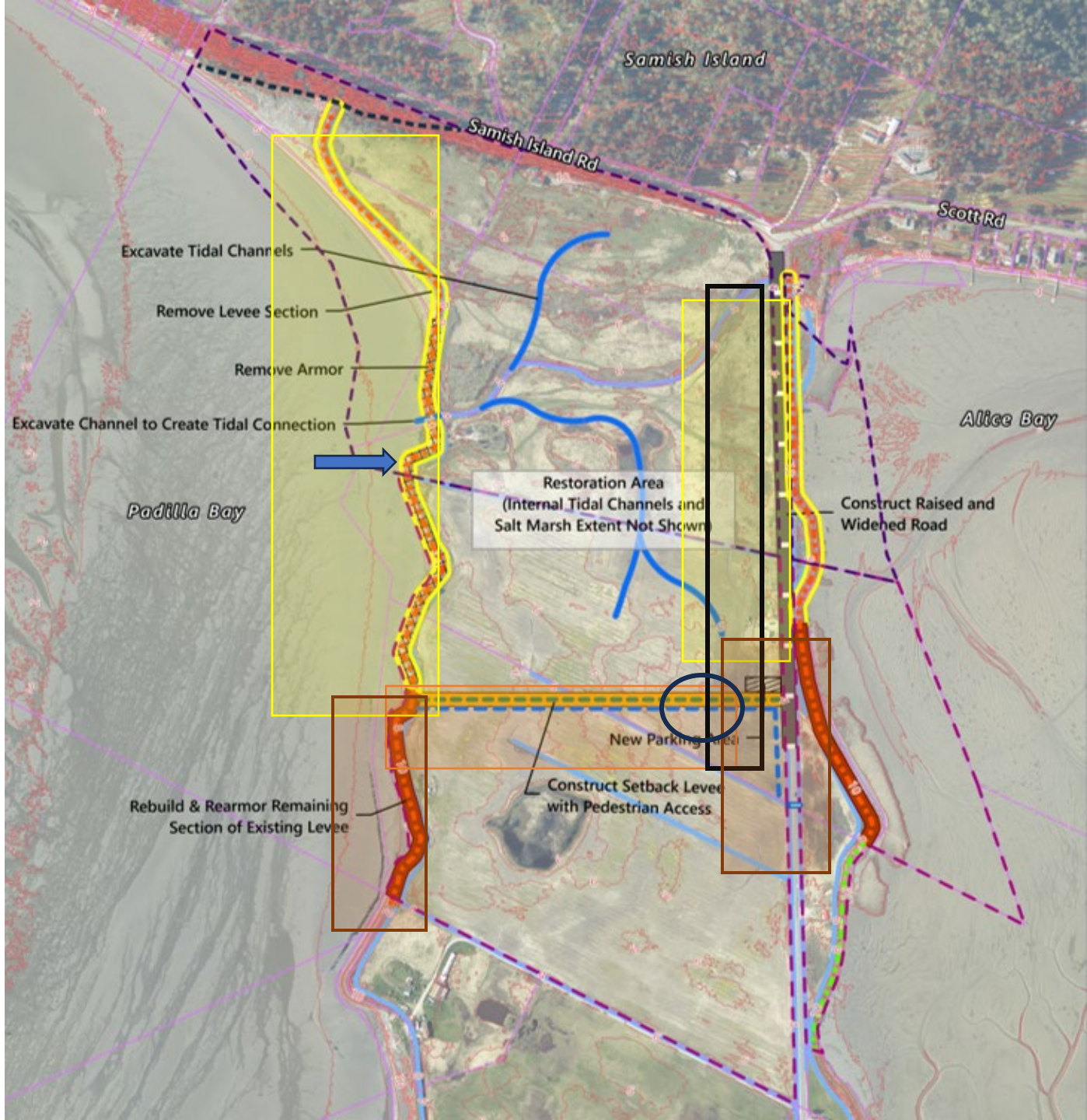
No Restoration Risks

1. Padilla Bay dike coastal overtopping at water levels above MHHW
2. Alice Bay dike coastal overtopping at HAT
3. Road will experience coastal flooding from Alice Bay side
   a) Once per year now
   b) 10% of time by 2070
4. Coastal overtopping increases drainage requirements
5. Access and parking areas will degrade as result of flooding



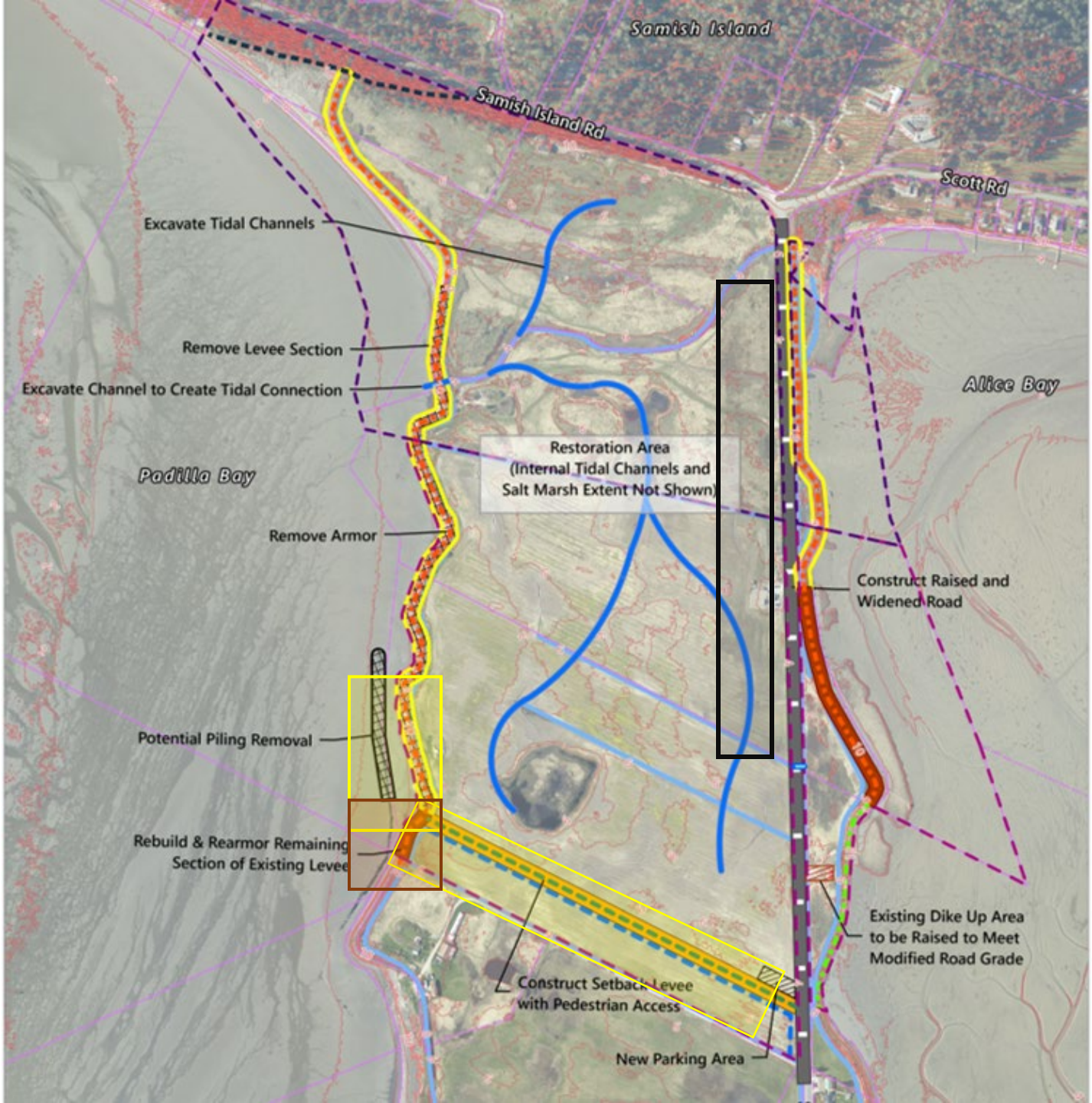
Concept 2a Elements

- Remove all Dikes outlined in yellow
- Main tidal channel into Padilla Bay & interior network of tidal channels for fish habitat
- Construct east to west setback levee
- Create varying elevations of marsh habitat and channels (75 acres)
- Improve about 2,000 feet of Samish Island Road
- Relocate or modify utilities adjacent to road as needed (Power, Communication, and Water),
- Improve parking area & access
- Improve or rebuild remaining dikes in red/orange



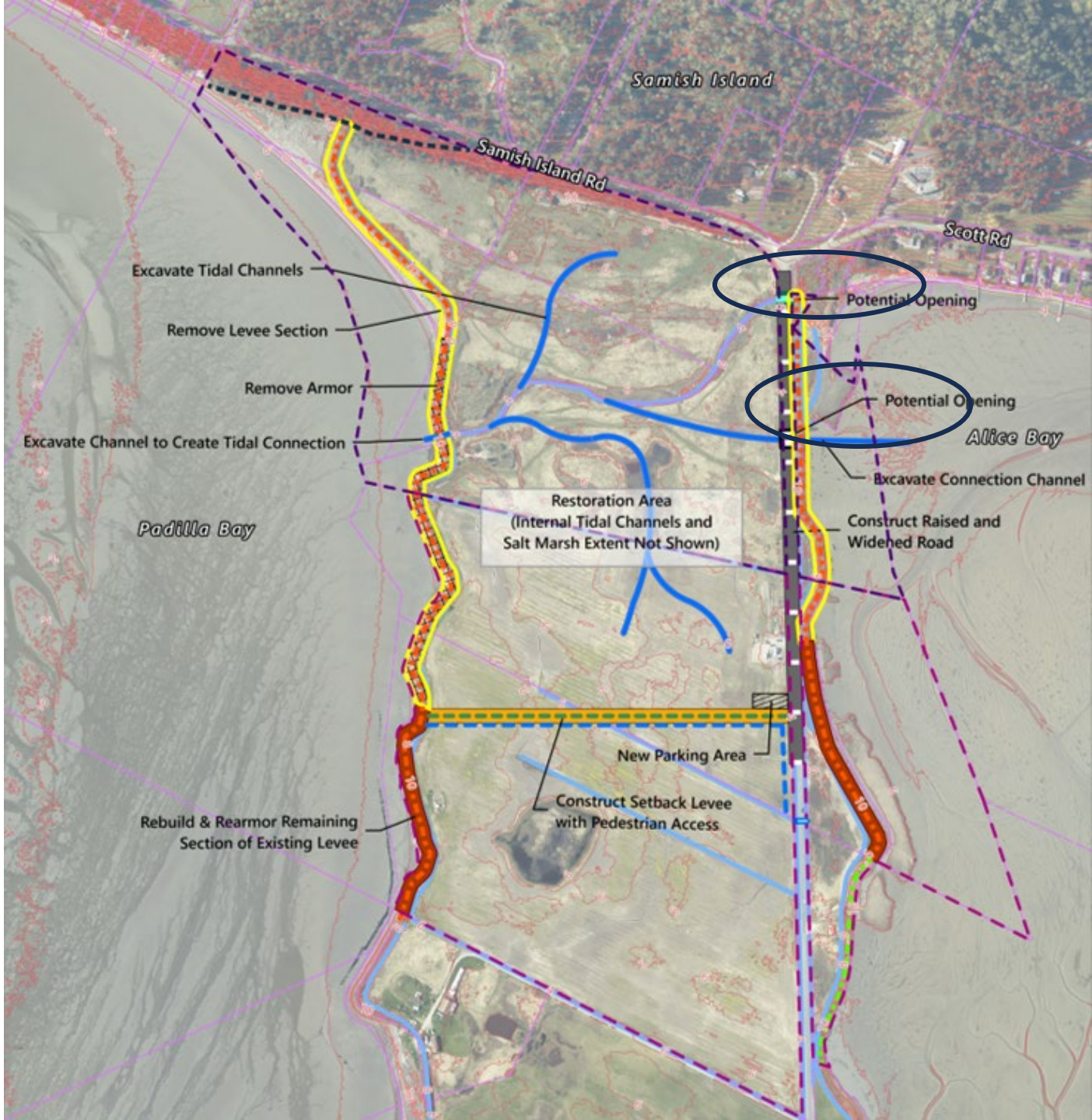
Concept 2b Expansion

- Remove more Padilla Bay dike armor
- East to west setback levee further south
- Shorter section of dikes to rebuild
- Increase marsh and channel habitat to 108 acres
- Improve about 3,500 feet of Samish Island Road



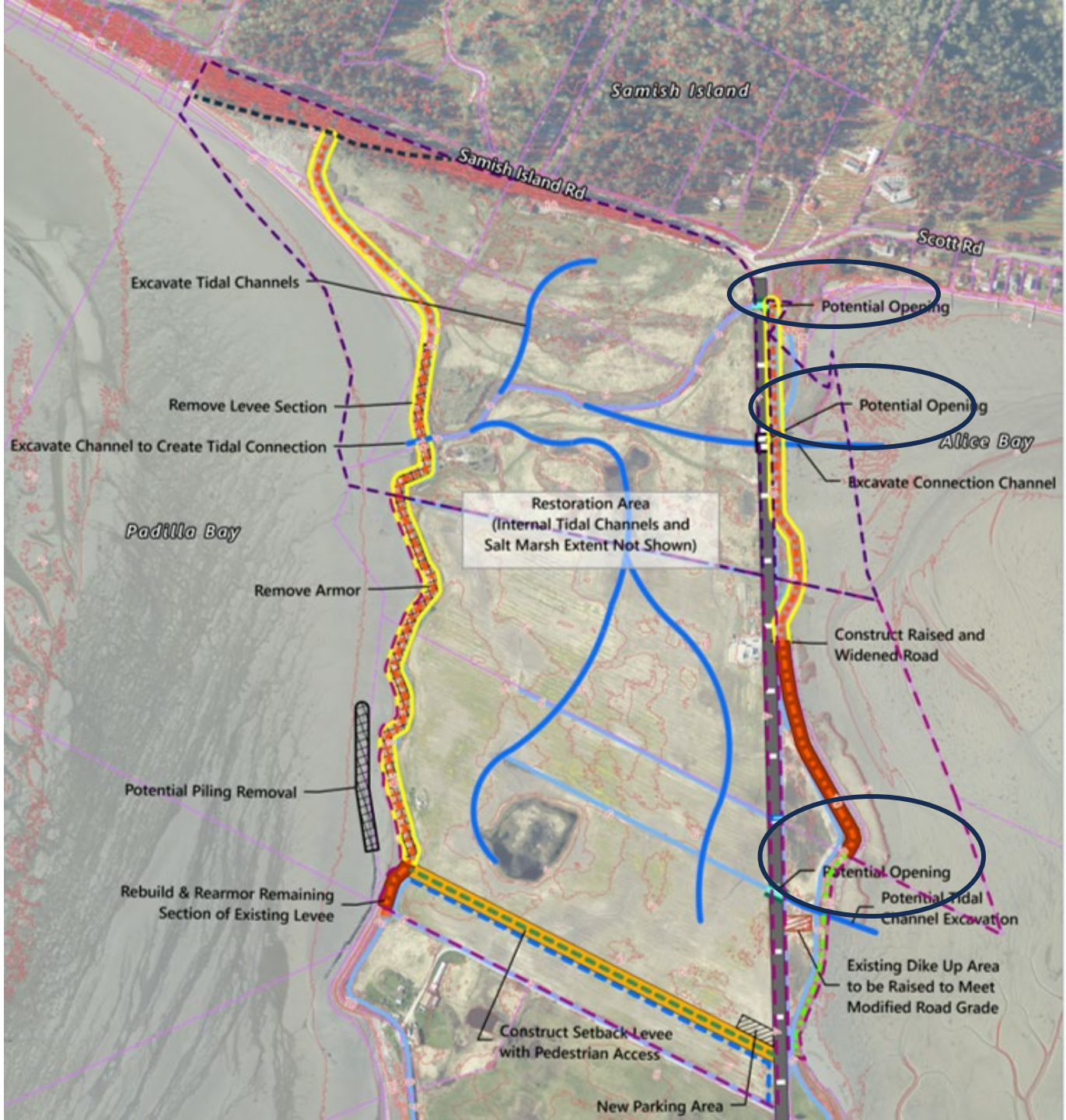
Concept 3a Additions

- Elevate entire or parts of road and provide open channel(s) to Alice Bay
- Remove or breach Alice Bay coastal dikes to allow tidal exchange



Concept 3b Expansion

- Elevate more of road and provide more open channels to Alice Bay



Alternatives Evaluation Categories

Category 1: Ecological Benefits

Category 2: Restoration of shoreline & estuarine processes

Category 3: Changes to Dikes and Drainage

Category 4: Community & Infrastructure Resilience

Category 5: Implementation Feasibility

Next Steps

Technical Project Work

1. Receive comments and feedback from key partners and affected parties
2. Revise & Finalize Phase 1 Feasibility Report
3. Funded Phase 1 scope of work completed by 12/31/2024
4. PBNERR Phase 2 Work
    a) Groundwater Sampling
    b) Coastal Data Collection
    c) Hydraulic & Hydrodynamic Modeling
5. Phase 2 Annual Public Meetings in 2024-2025