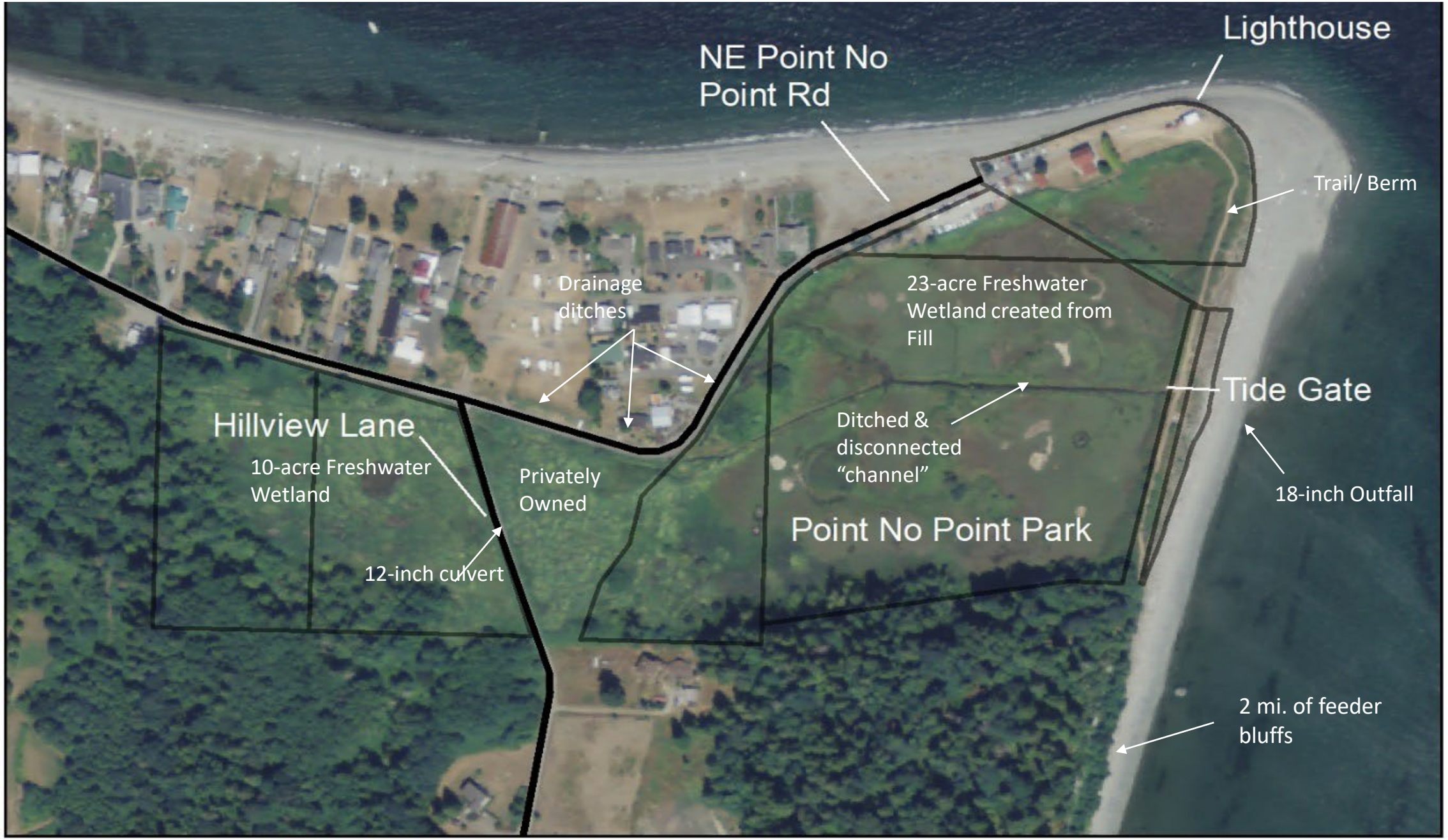
Point No Point Estuary Restoration Groundwater & Surface Water

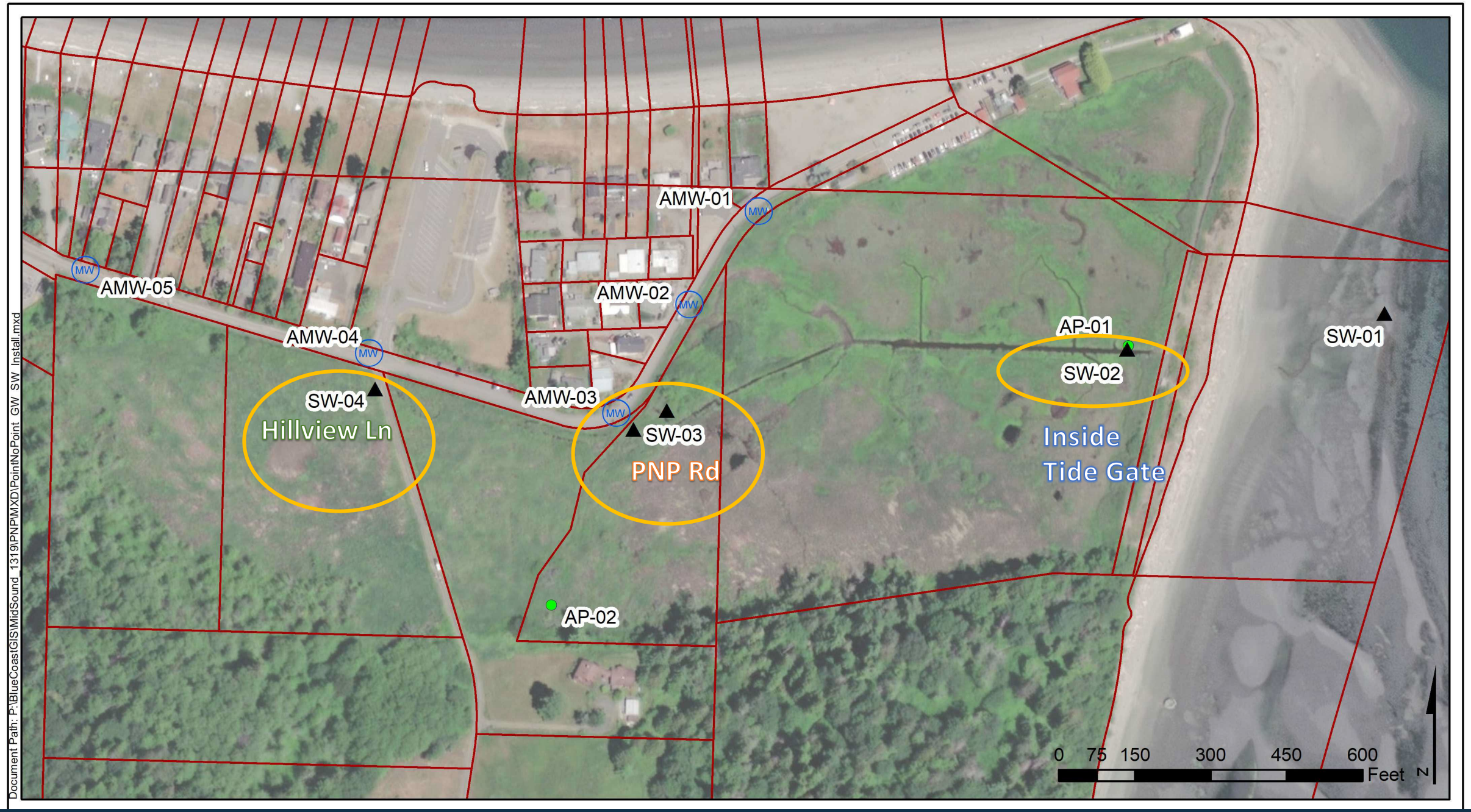
August 25, 2022

Overview

- Existing Conditions
  - Measurements of surface water
  - Model simulations of surface water conditions
  - Groundwater measurements
  - Conceptual plan view model of groundwater
  - Cross-section diagram of existing surface water and groundwater connections
- Possible Future Conditions
  - Model simulation of surface water
  - Conceptual plan view model of groundwater
  - Cross-section diagram of future surface water and groundwater

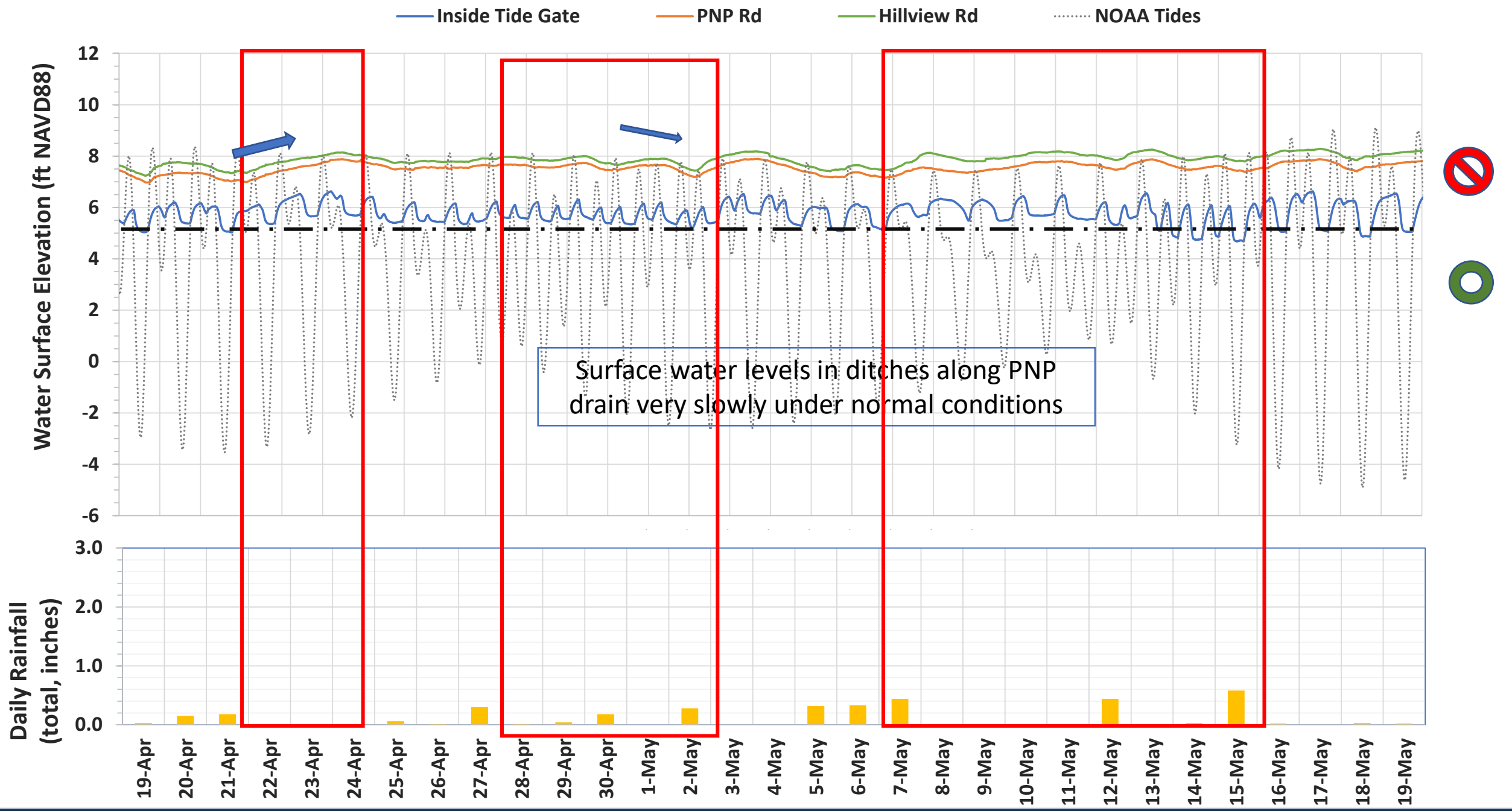


Existing Conditions



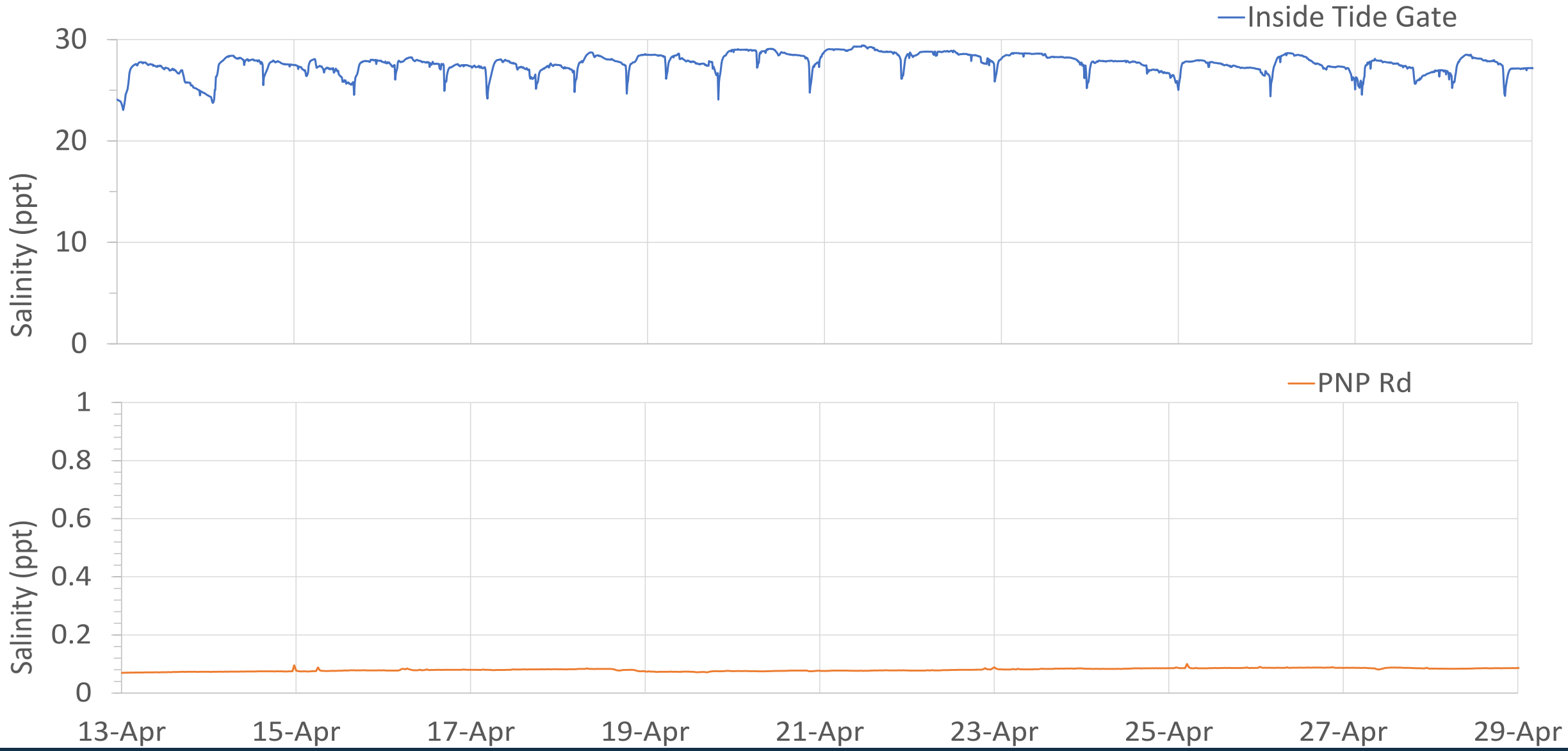
Surface Water Measurement Locations

BLUE COAST ENGINEERING

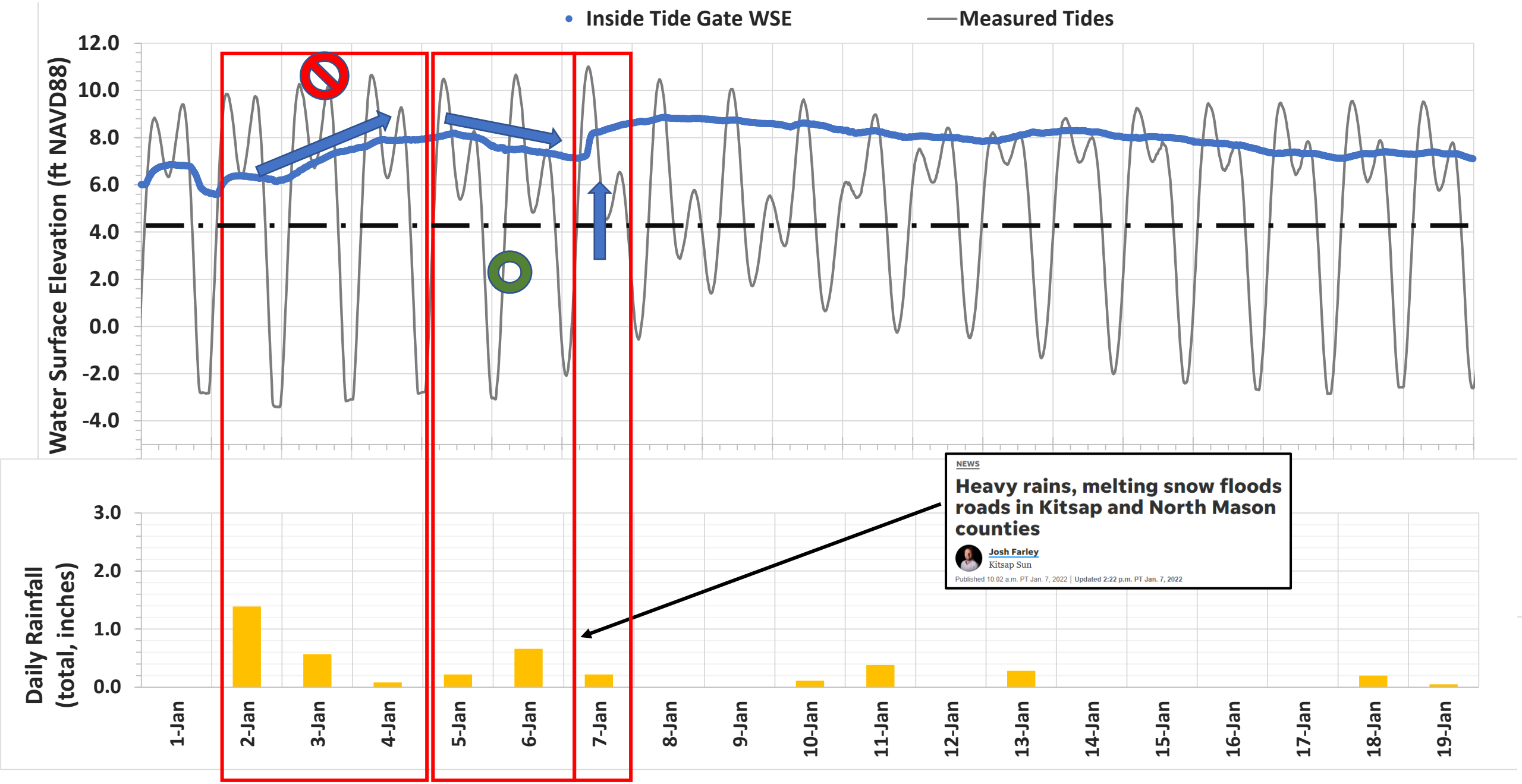


Average Surface Water & Precipitation

Salinity along PNP Road

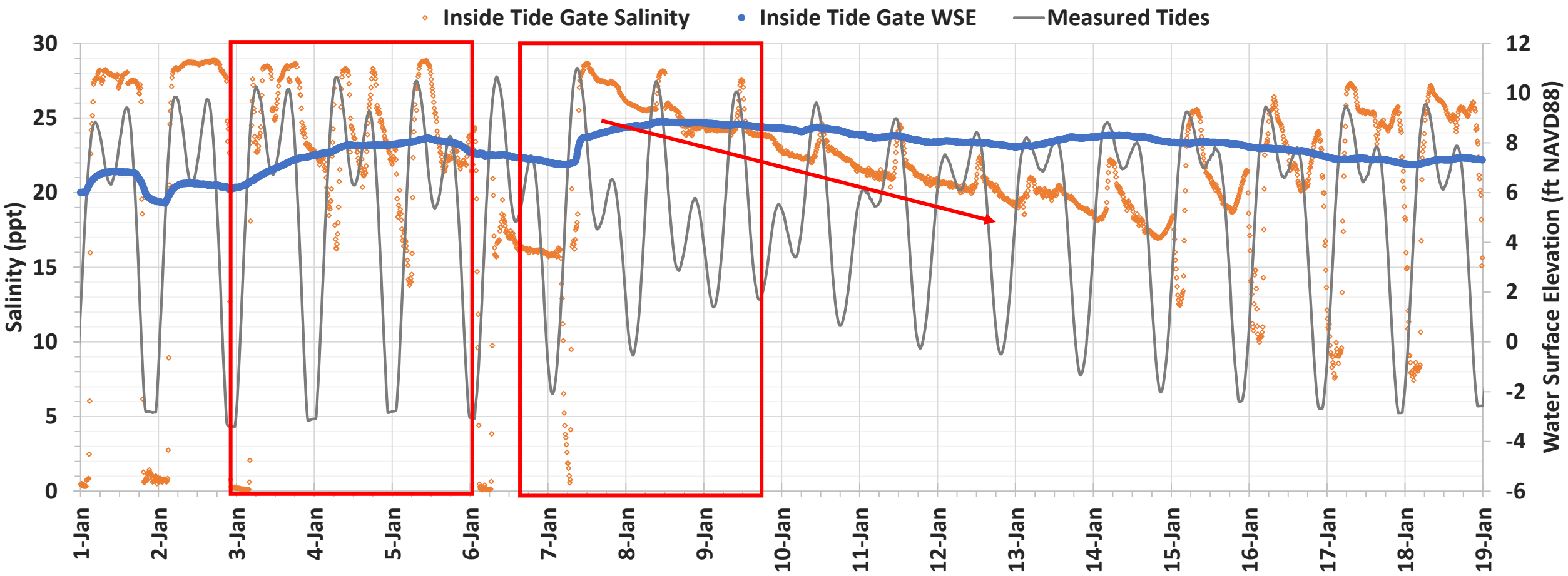


BLUE COAST ENGINEERING



Water Elevation & Precipitation during King Tide

Salinity at Tide Gate during King Tide



BLUE COAST ENGINEERING

Existing Surface Water Conditions
January 2, 2022
Before Heavy Rain

Inputs as yellow arrows

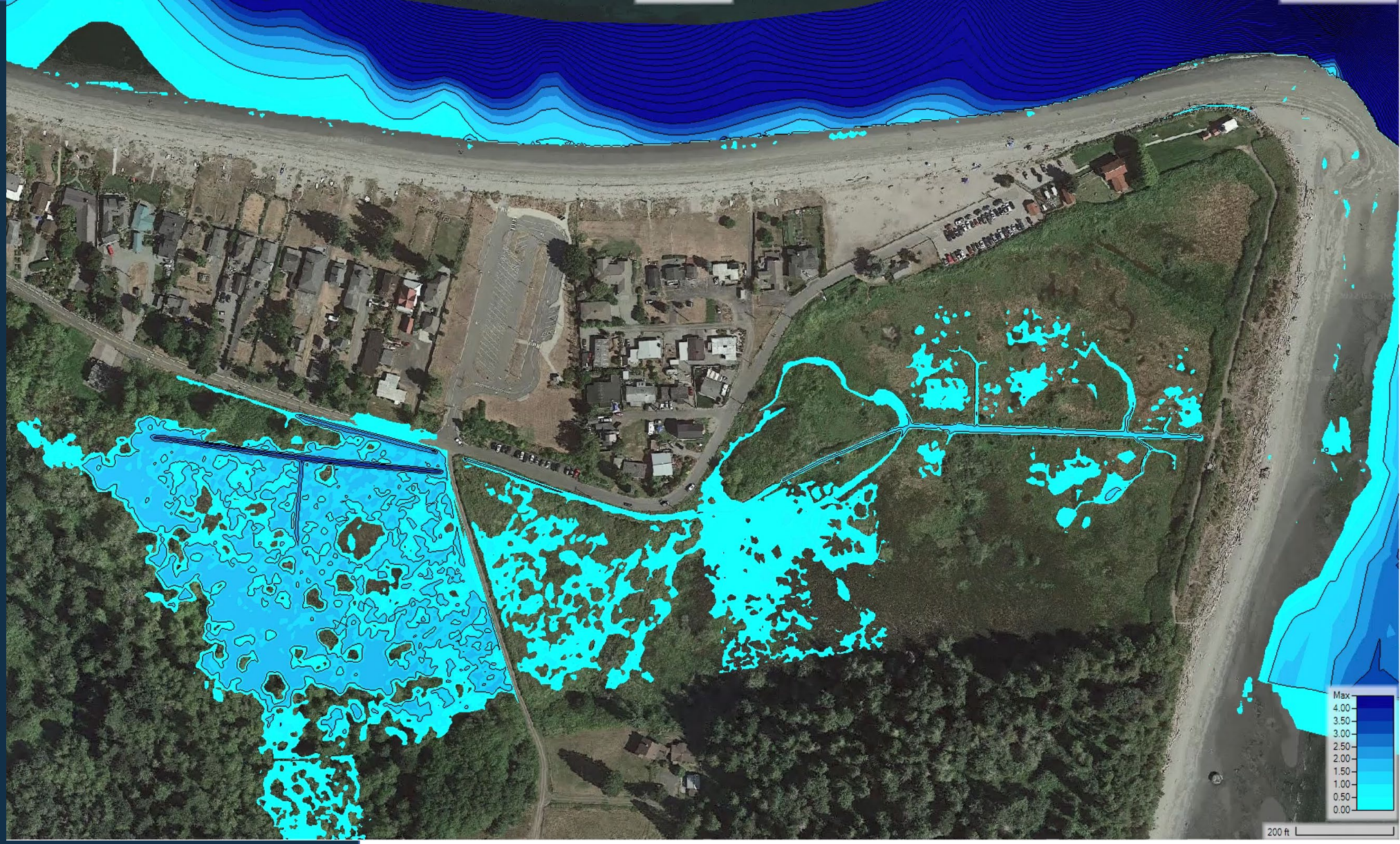
- Point No Point Creek and west drainage ditch flow inputs
- Tides through tide gate
- Internal culverts through Hillview Lane

Blue color represents water depth in feet

BLUE COAST ENGINEERING

Existing Surface Water Conditions January 3, 2022

Heavy rain generates surface flow from upland and begins to fill upper marsh as it tries to drain into Puget Sound

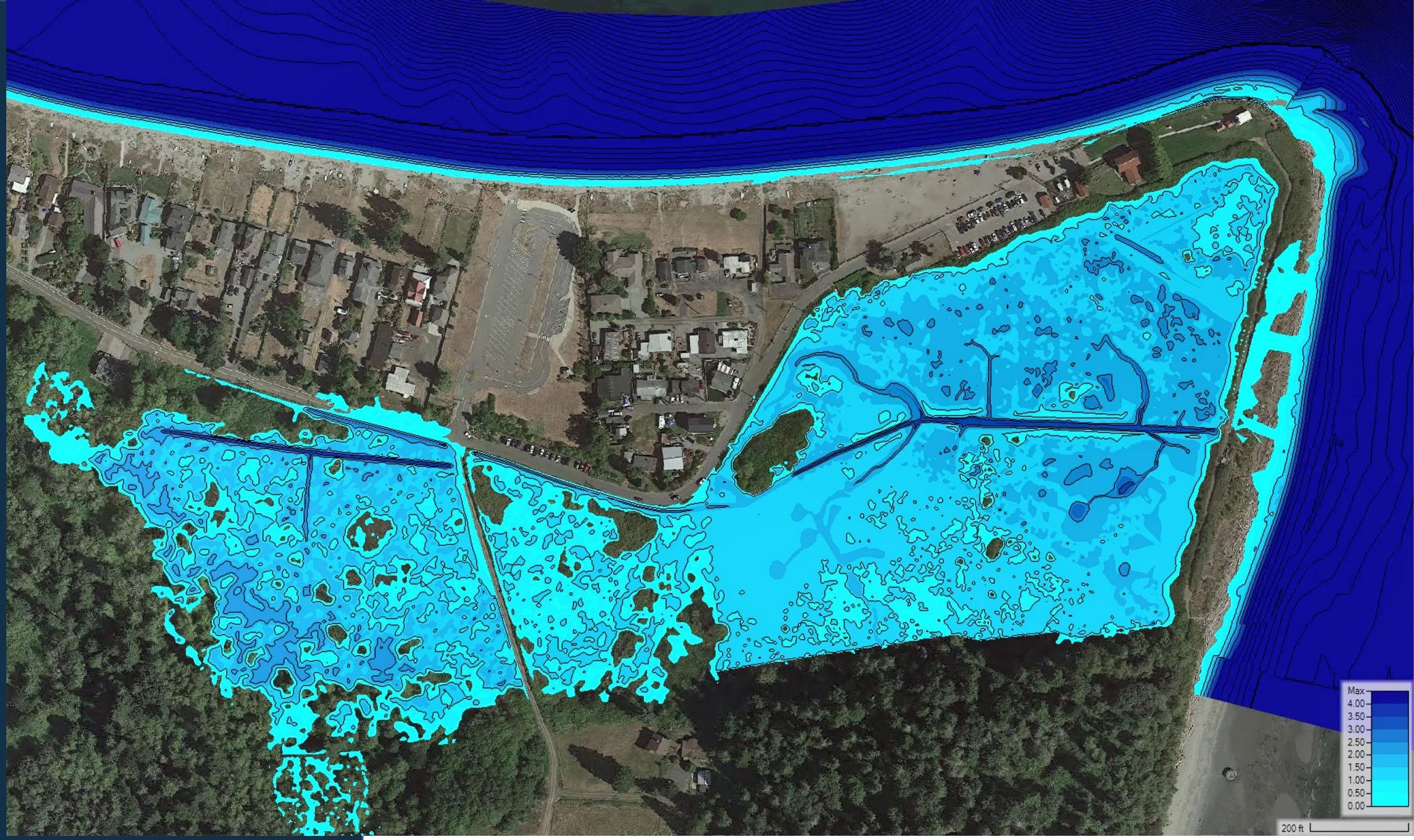


Blue color represents water depth in feet

BLUE COAST ENGINEERING

Existing Surface Water Conditions January 3, 2022

Heavy rains continue and fill lower marsh because tide has risen and tide gate is closed more of the time then it is open and rainfall has no limited channels to Puget Sound

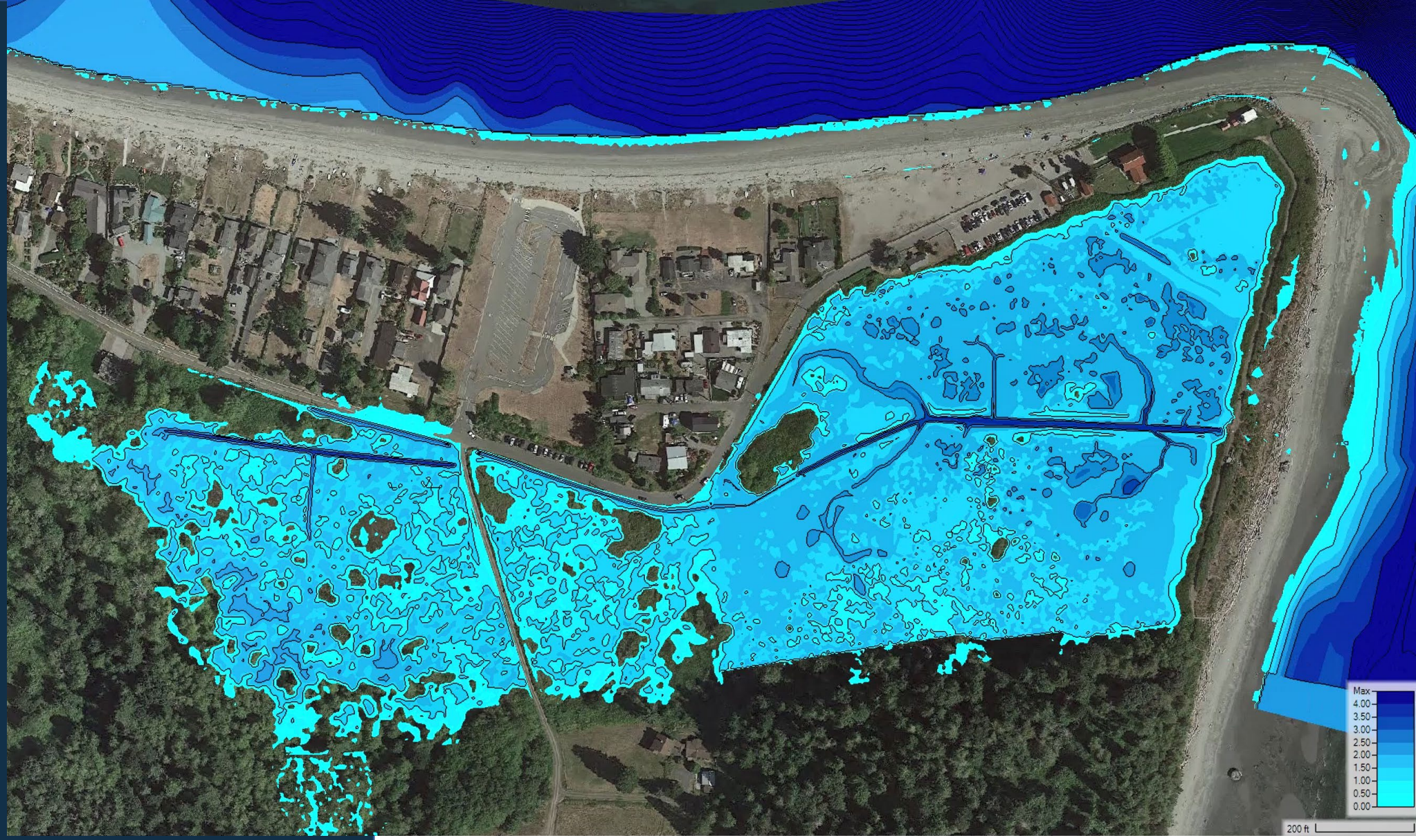


Blue color represents water depth in feet

BLUE COAST ENGINEERING

Existing Surface Water Conditions January 4, 2022

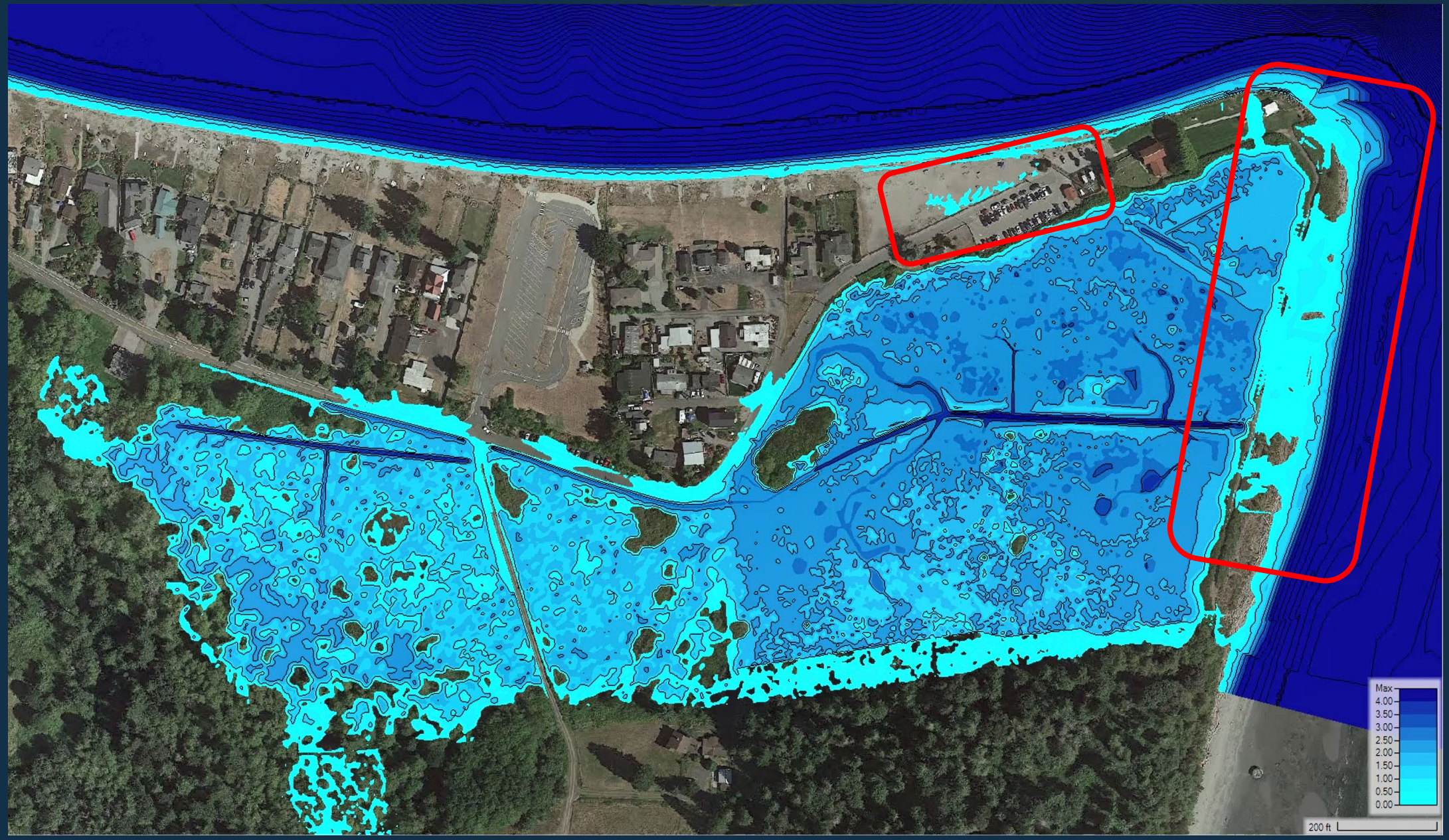
Heavy rains have stopped and tides are lower, but the lack of channels in marsh and small opening through tide gate slows flow into Puget Sound taking 5 more days to see water levels drop



Blue color represents water depth in feet

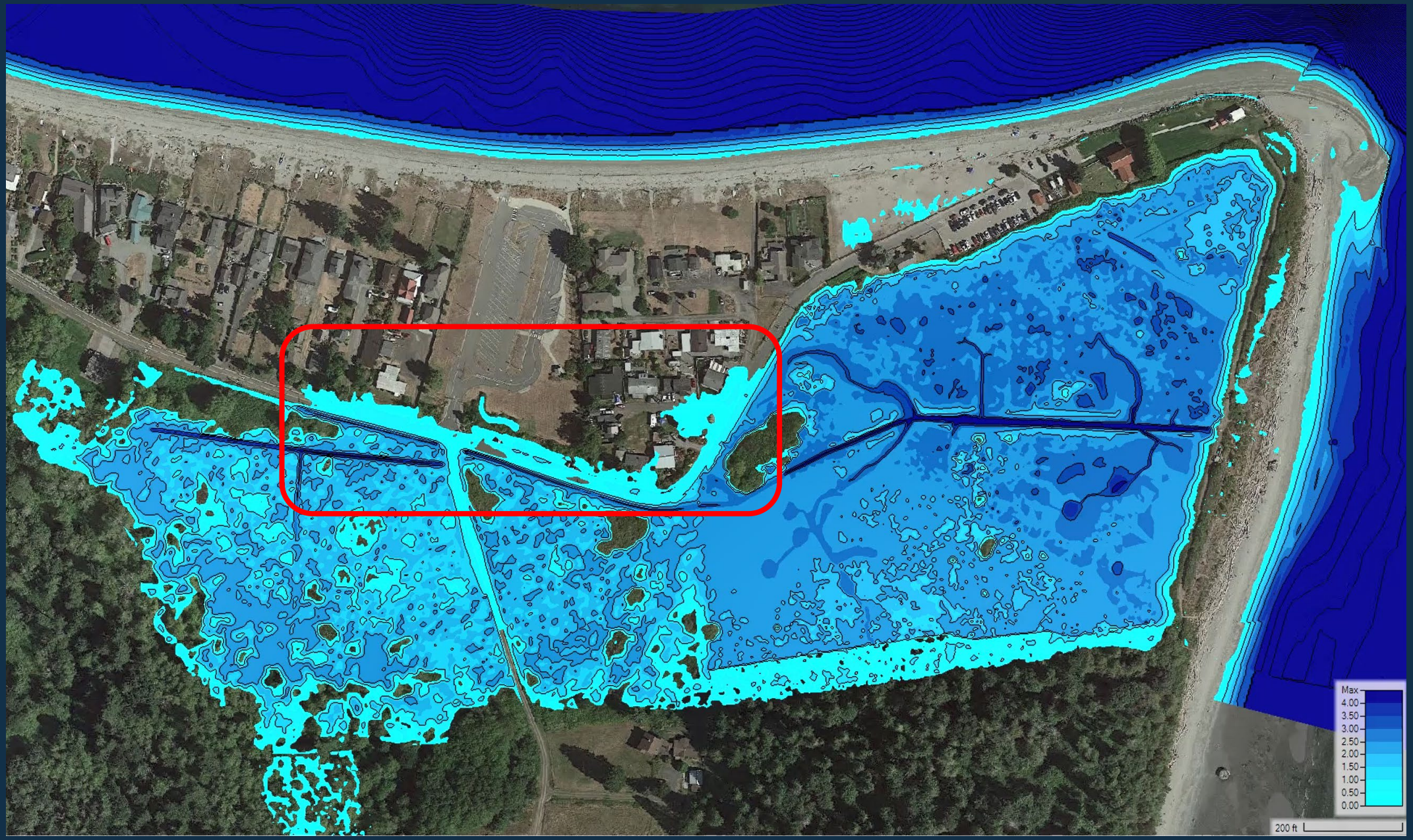
BLUE COAST ENGINEERING

Existing Surface Water Conditions – January 7, King Tide



King Tide event creates overtopping of north beach and east beach

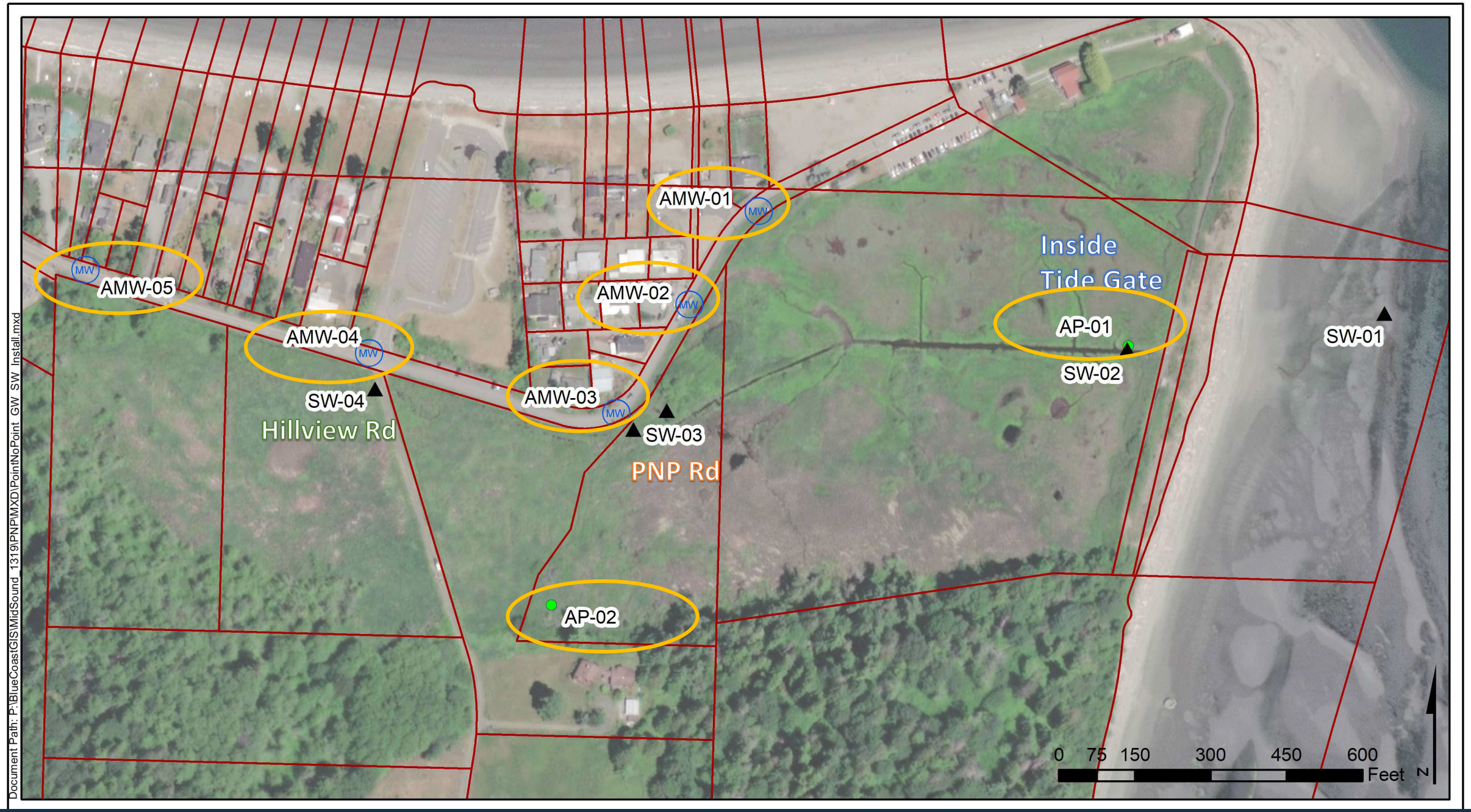
Existing Surface Water Conditions – January 7, King Tide



Slide 10b

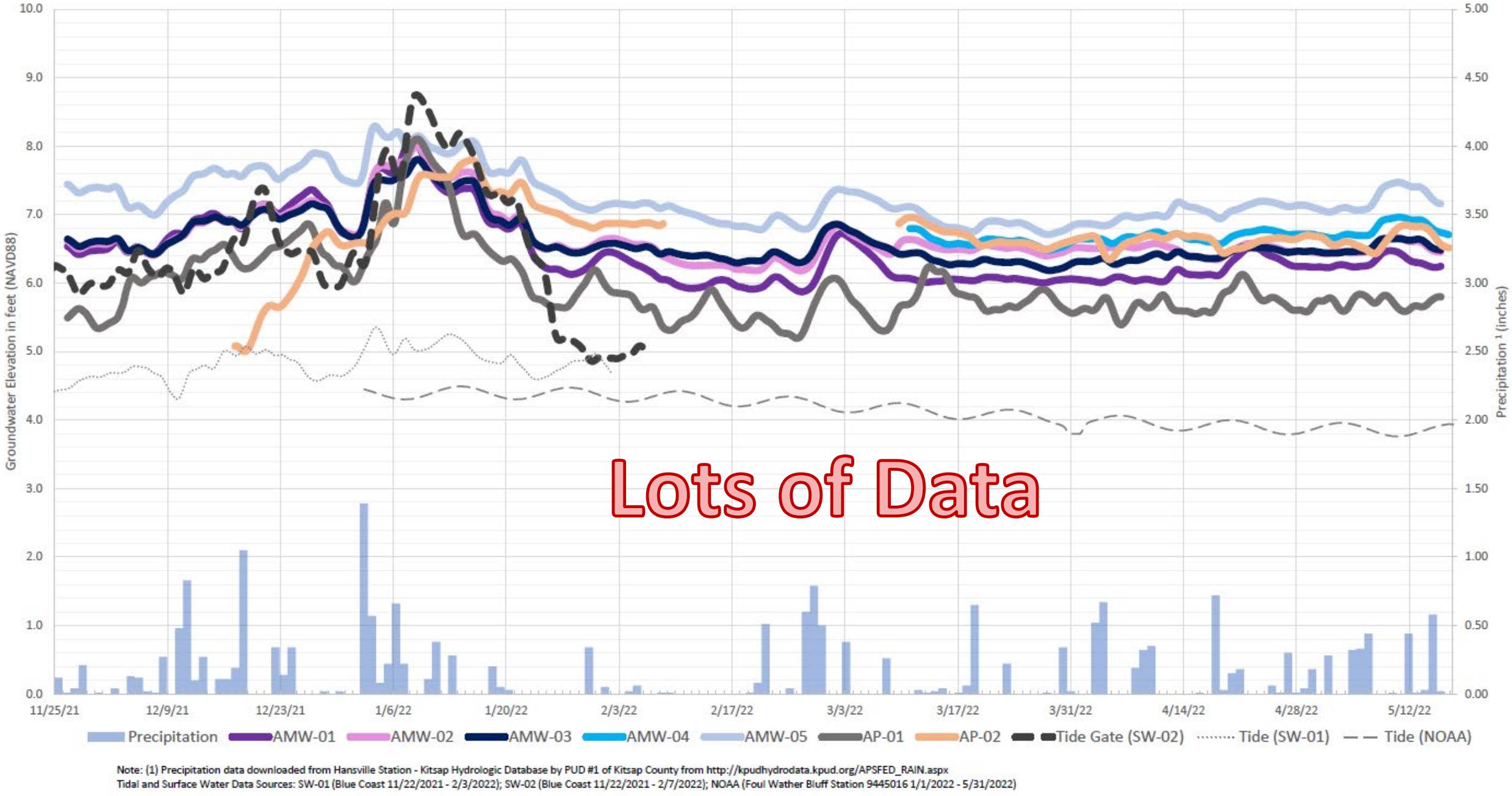
King Tide event adds more water into the marsh after overtopping of beaches, can not drain and floods road.

Groundwater Measurements– Existing Conditions



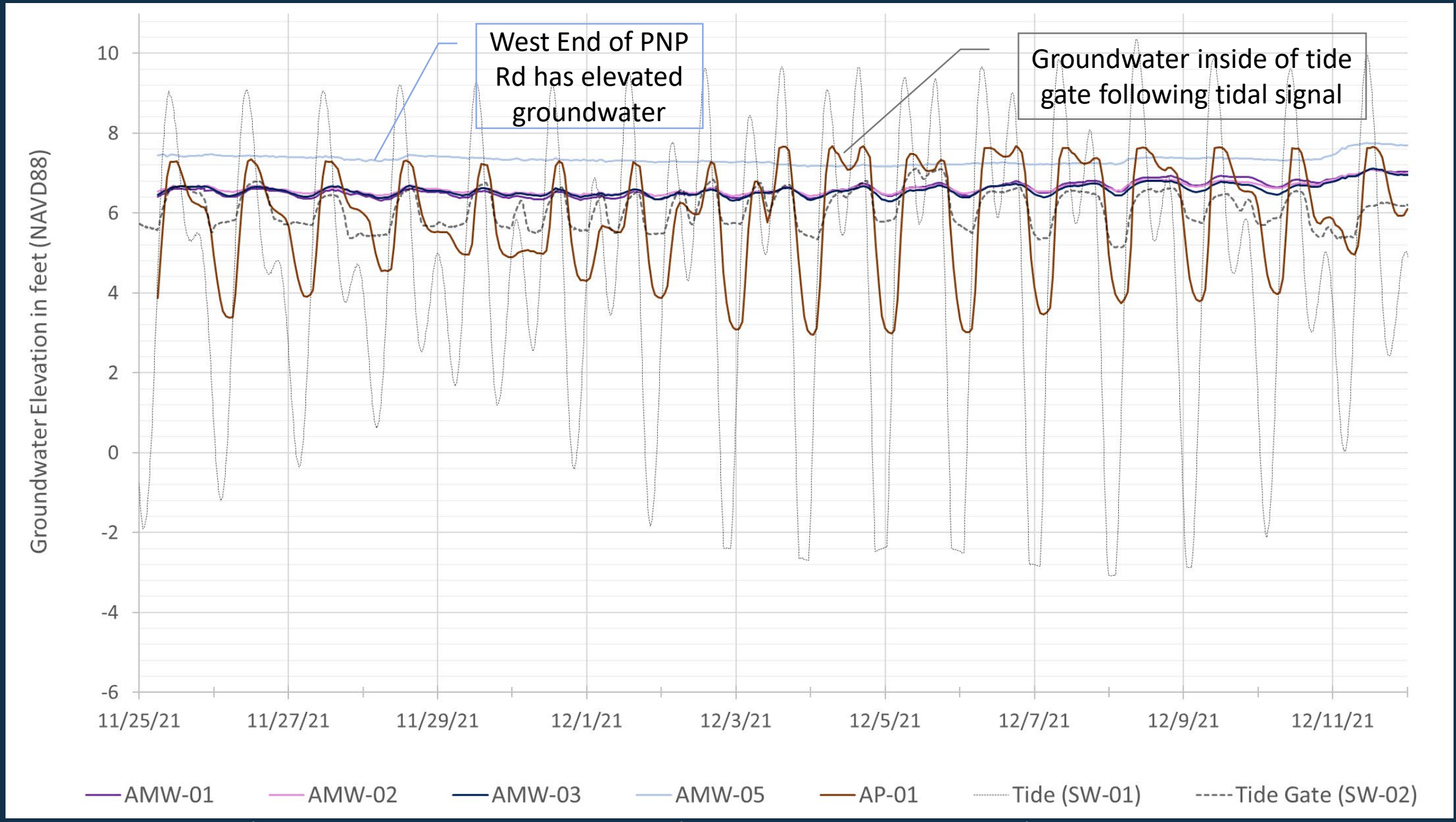
Slide 12 Groundwater Water Measurement Locations

BLUE COAST ENGINEERING

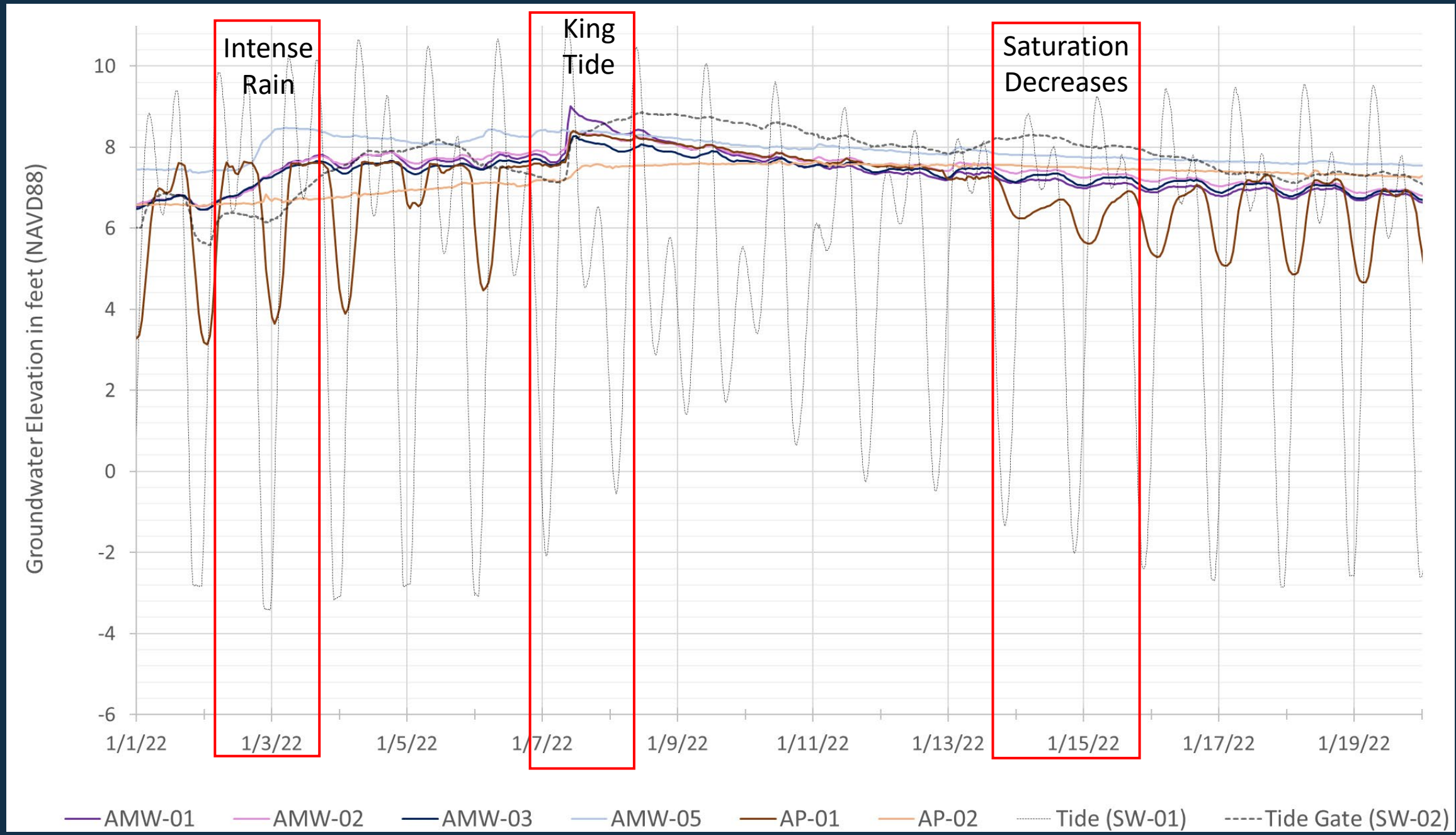


Note: (1) Precipitation data downloaded from Hansville Station - Kitsap Hydrologic Database by PUD #1 of Kitsap County from http://kpudhydrodata.kpud.org/APSFED_RAIN.aspx
Tidal and Surface Water Data Sources: SW-01 (Blue Coast 11/22/2021 - 2/3/2022); SW-02 (Blue Coast 11/22/2021 - 2/7/2022); NOAA (Foul Wather Bluff Station 9445016 1/1/2022 - 5/31/2022)

Ground Water & Surface Water Measurements



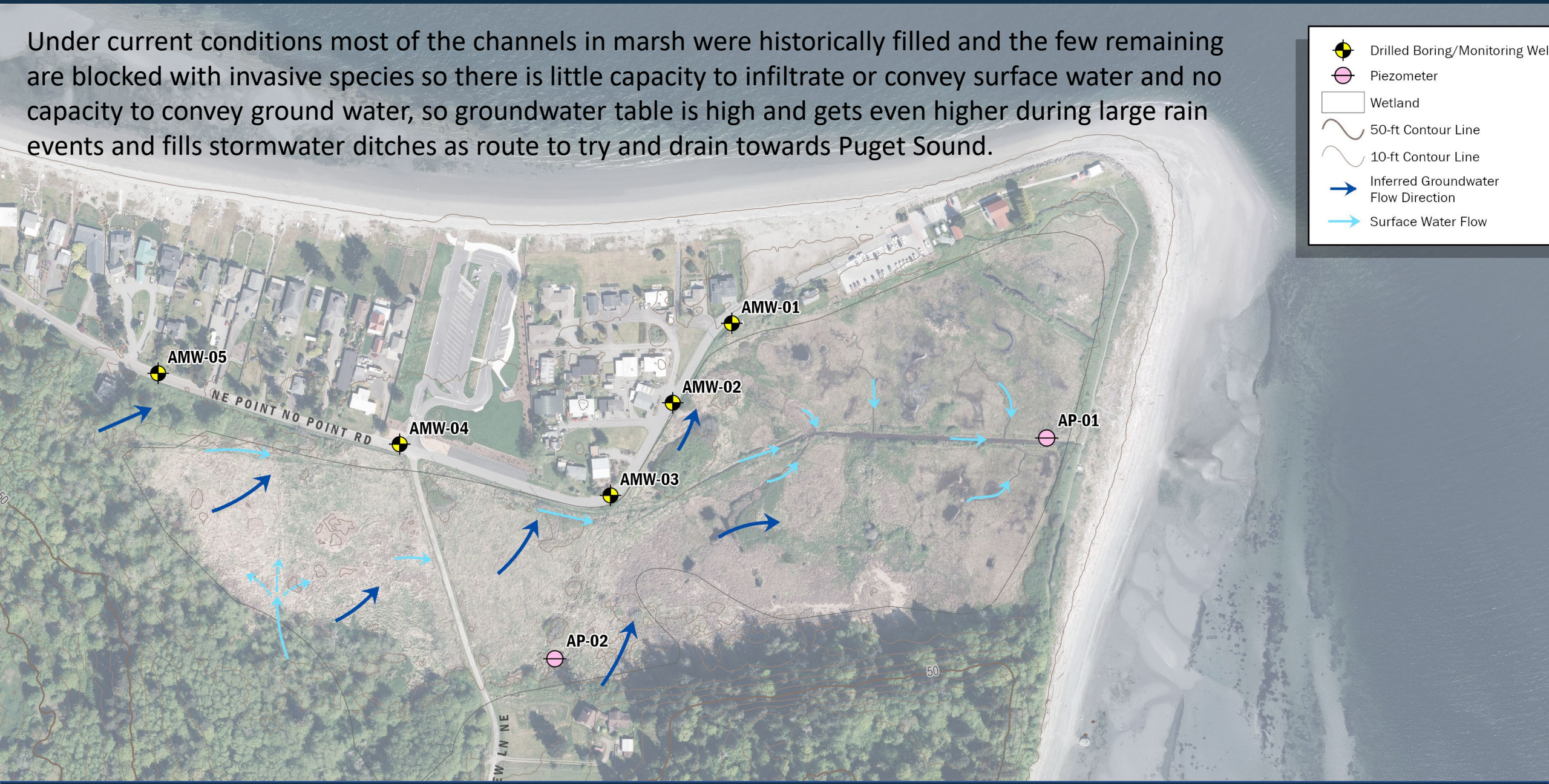
Ground Water Measurements during Average Condition



Slide 15

Ground Water Measurements during Extreme Conditions

Under current conditions most of the channels in marsh were historically filled and the few remaining are blocked with invasive species so there is little capacity to infiltrate or convey surface water and no capacity to convey ground water, so groundwater table is high and gets even higher during large rain events and fills stormwater ditches as route to try and drain towards Puget Sound.

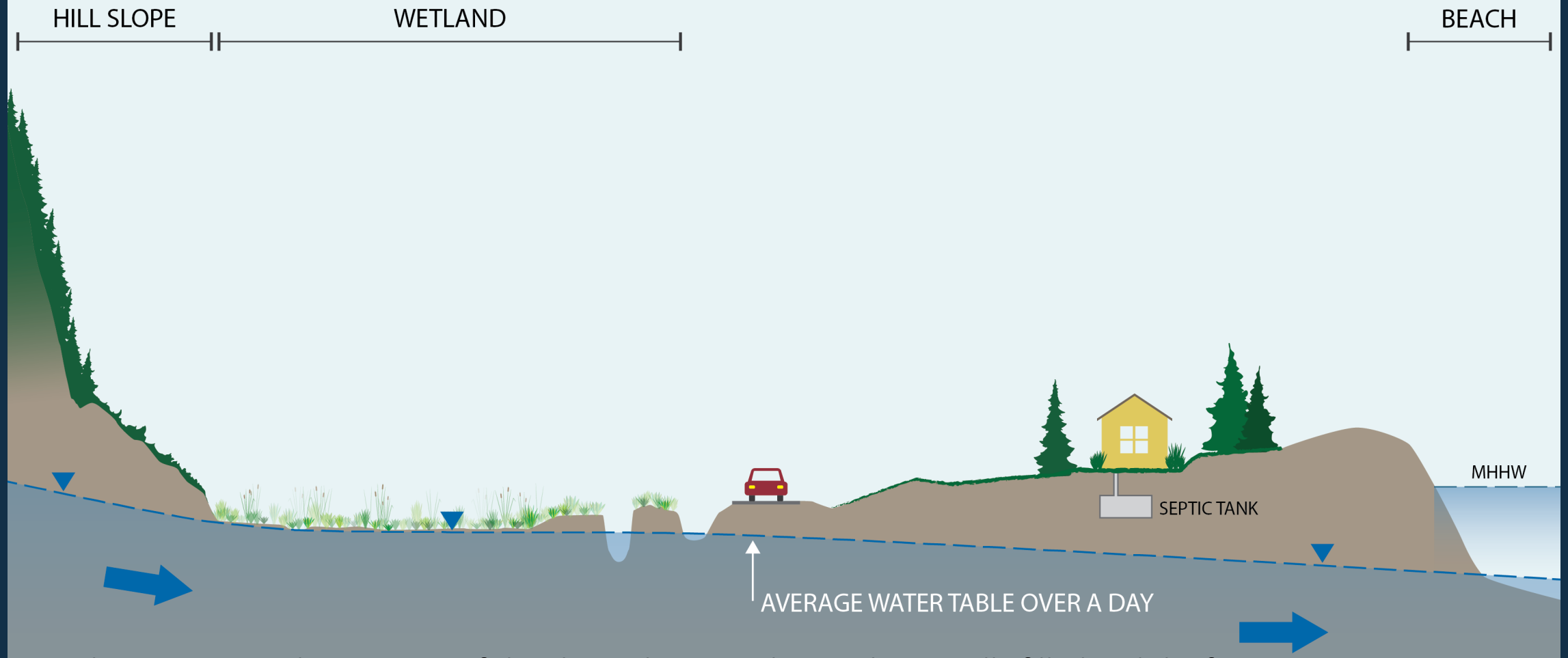


Plan View Conceptual Model of Ground Water

BLUE COAST ENGINEERING

CURRENT CONDITIONS

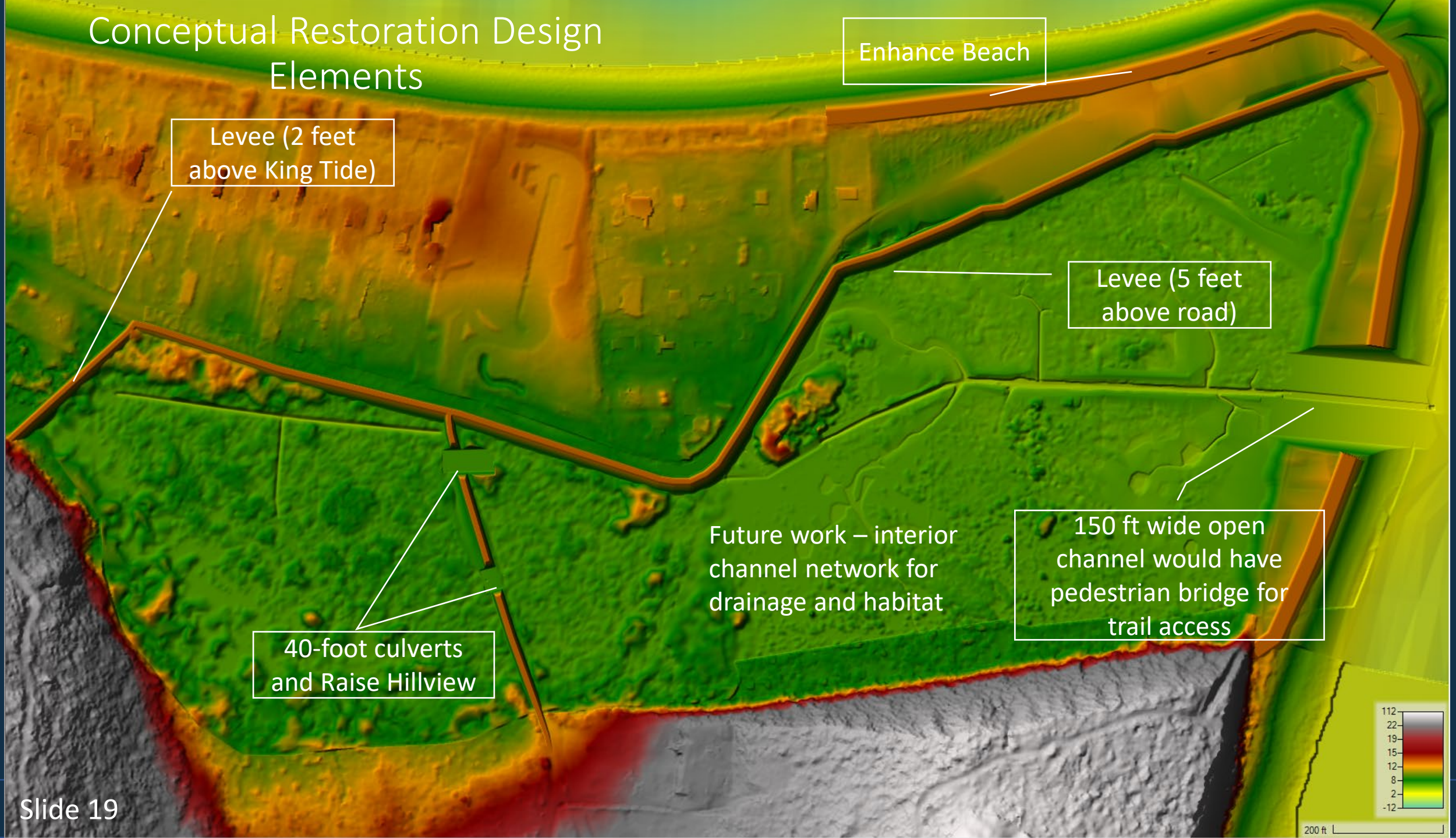
Section View Conceptual Model of Ground Water



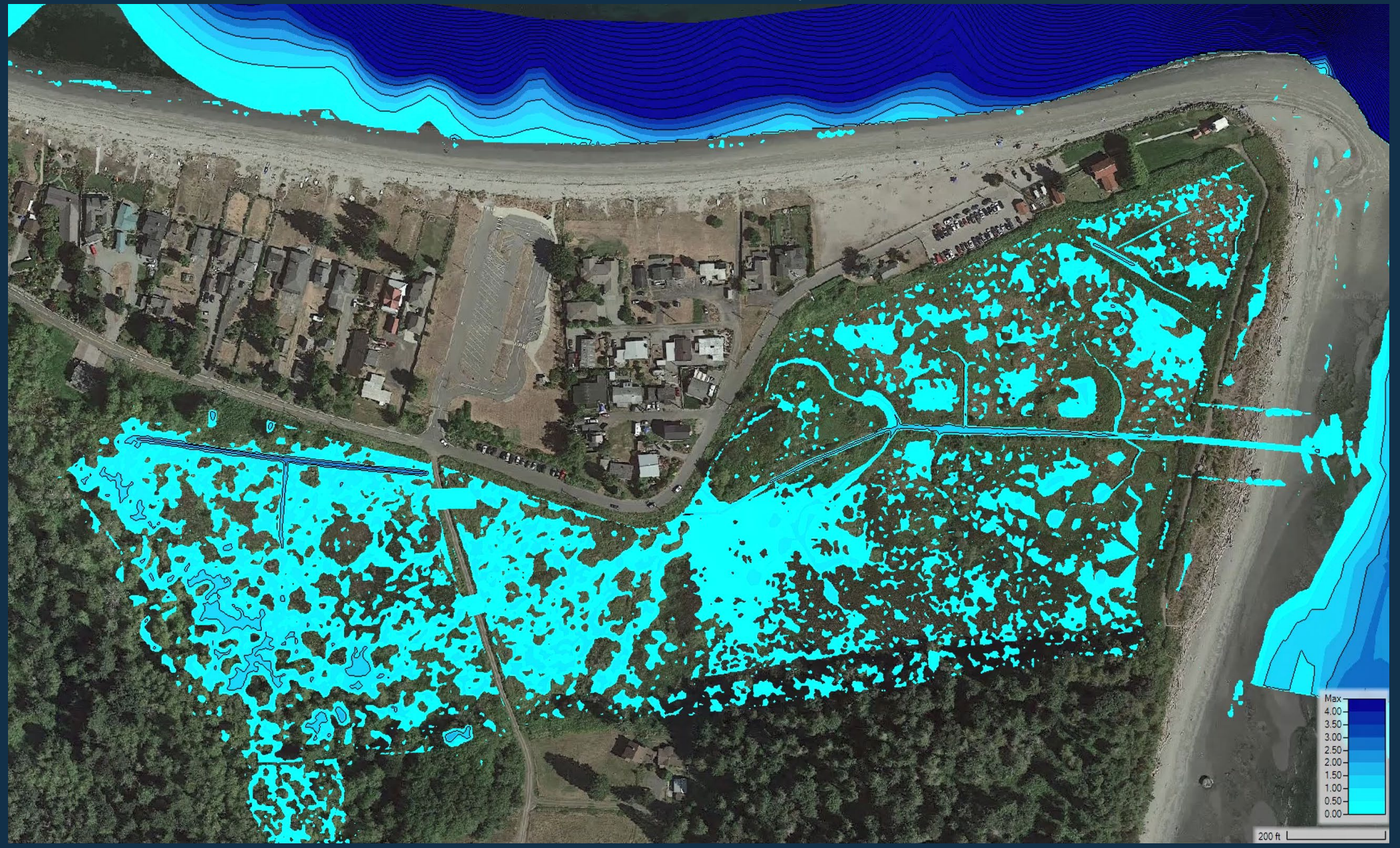
Under current conditions most of the channels in marsh were historically filled and the few remaining are blocked with invasive species so there is no capacity to infiltrate or convey ground water, so groundwater table is high and gets even higher during large rain events and fills stormwater ditches as route to try and drain towards Puget Sound.

Possible Future Conditions

Conceptual Restoration Design Elements



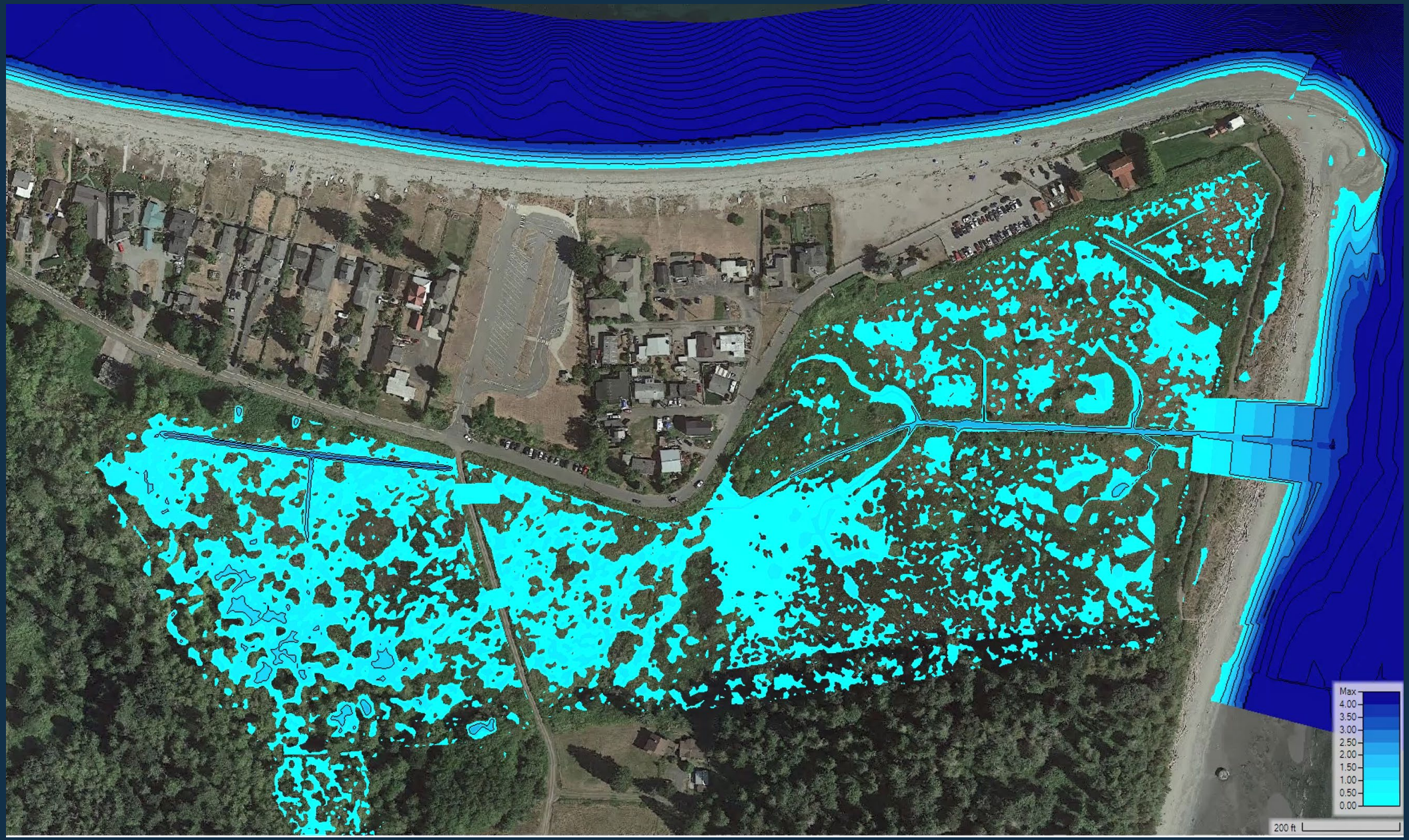
Possible Surface Water Conditions – January 2, 2022 Prior to Intense Rain



Slide 20a

Initial conditions at low tide prior to intense rain marsh is wet from tidal flow would happens daily.

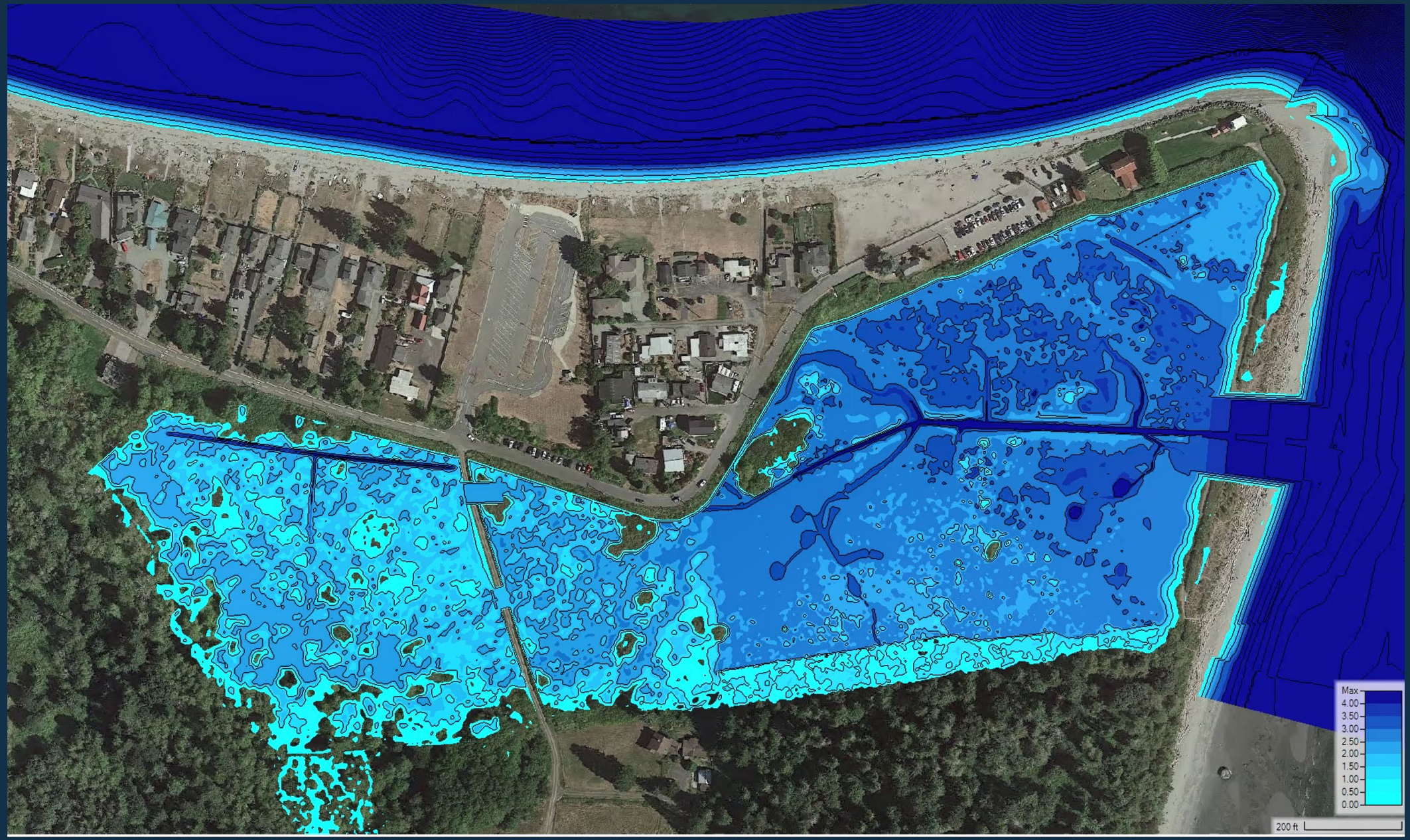
Possible Surface Water Conditions – January 3, 2022 Intense Rain



Slide 20b

With restoration tidal flow will be able to enter and exit the marsh through the large tidal channel.

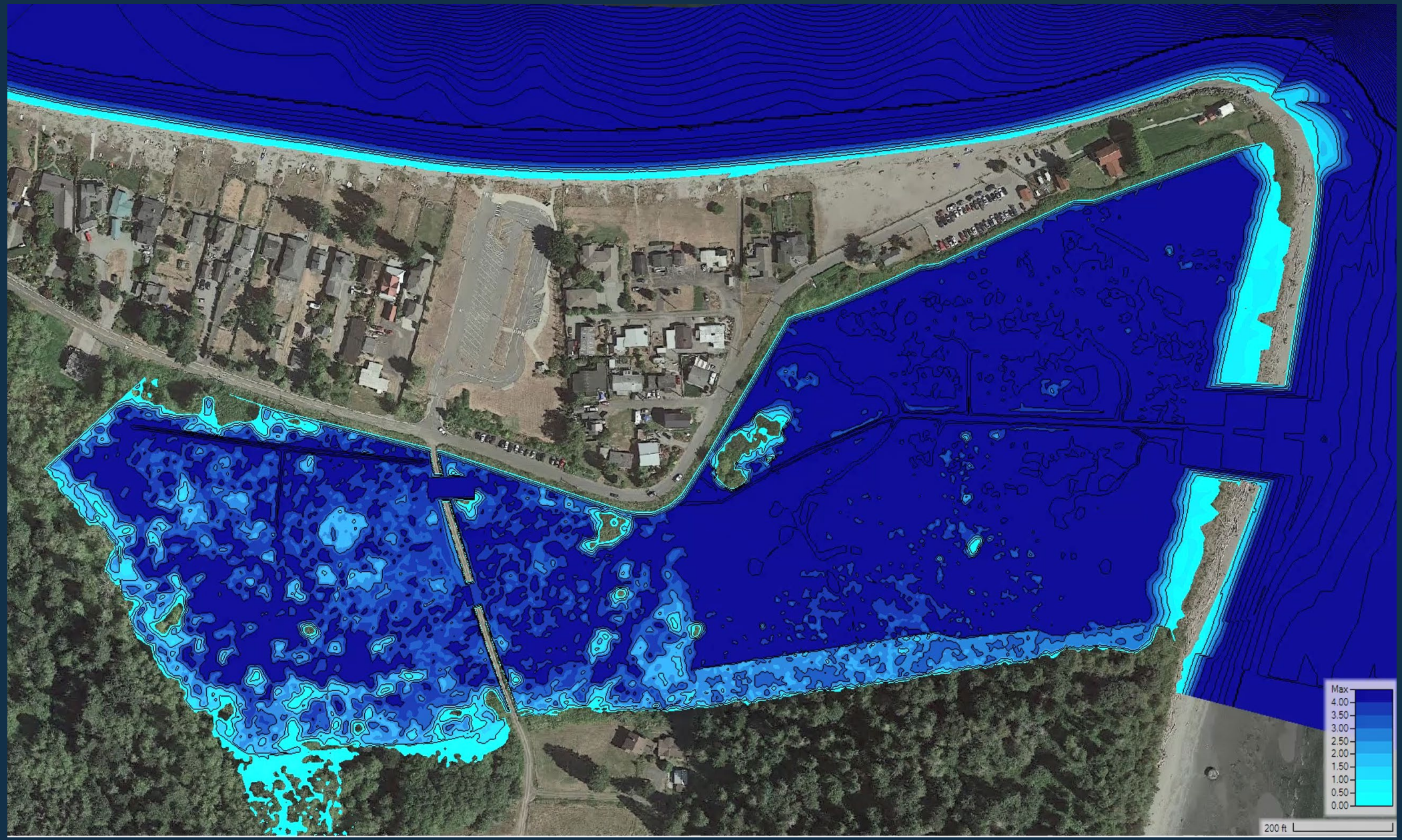
Possible Surface Water Conditions – January 2-4, Intense Rain



Slide 20c

Intense rain and tidal flow fills marsh initially 1 to 2 feet of water.

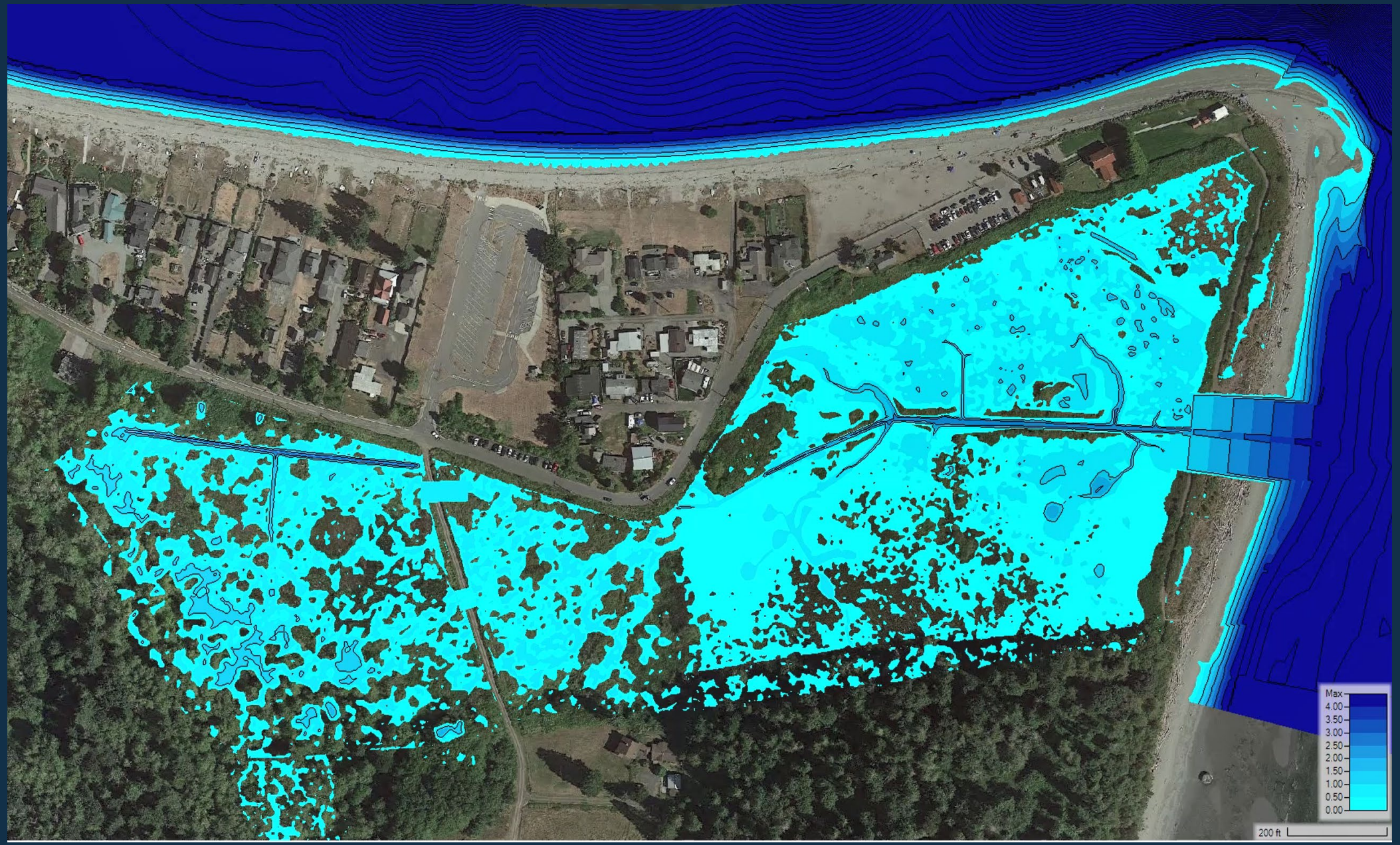
Possible Surface Water Conditions – January 2-4, Intense Rain



Slide 20d

Intense rain and tidal flow maximum marsh water levels reach 4 feet deep but contained within levee.

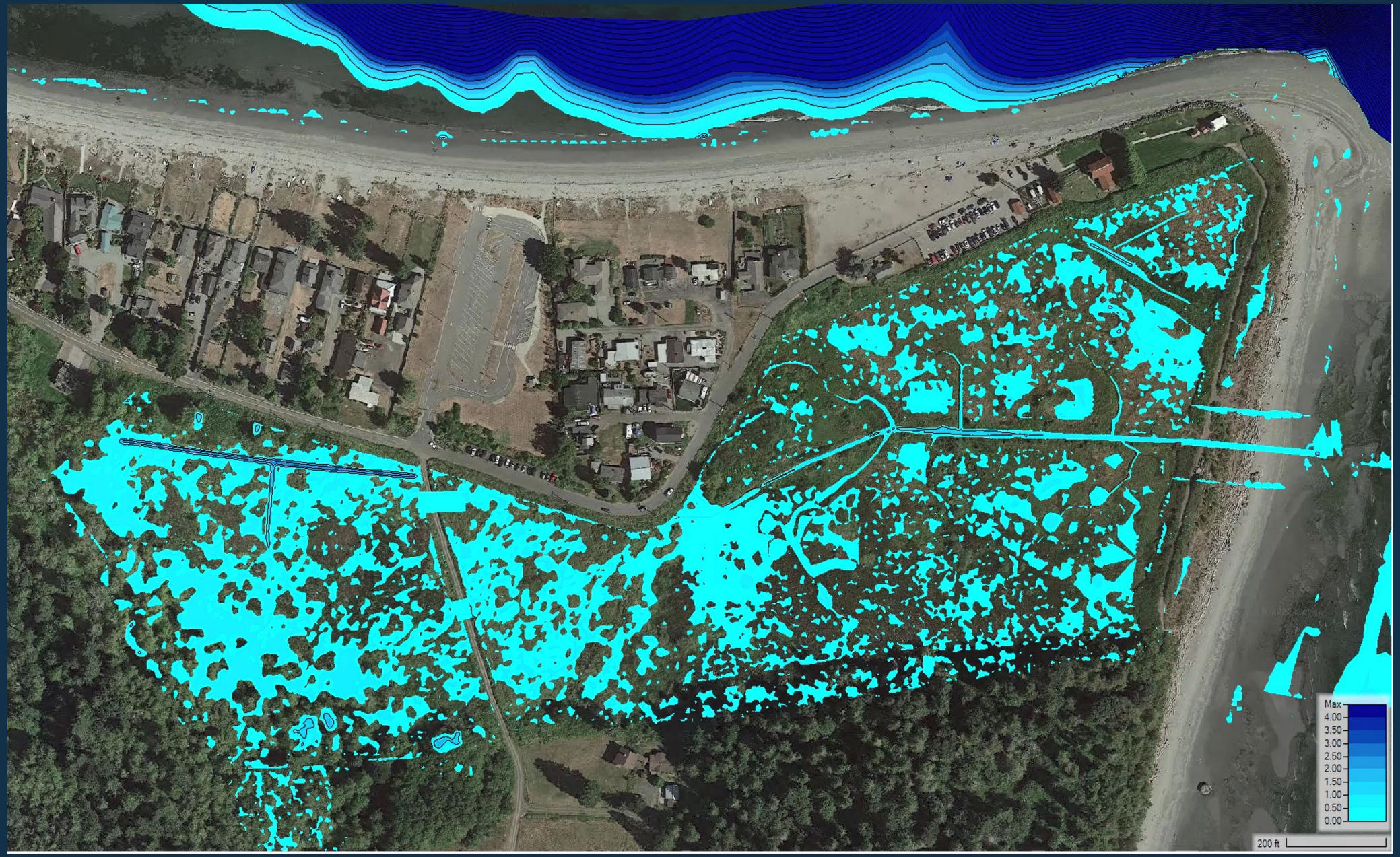
Possible Surface Water Conditions – January 2-4, Intense Rain



Slide 20e

As tides recede (ebb), both salt water and fresh water can drain out through the large tidal channel.

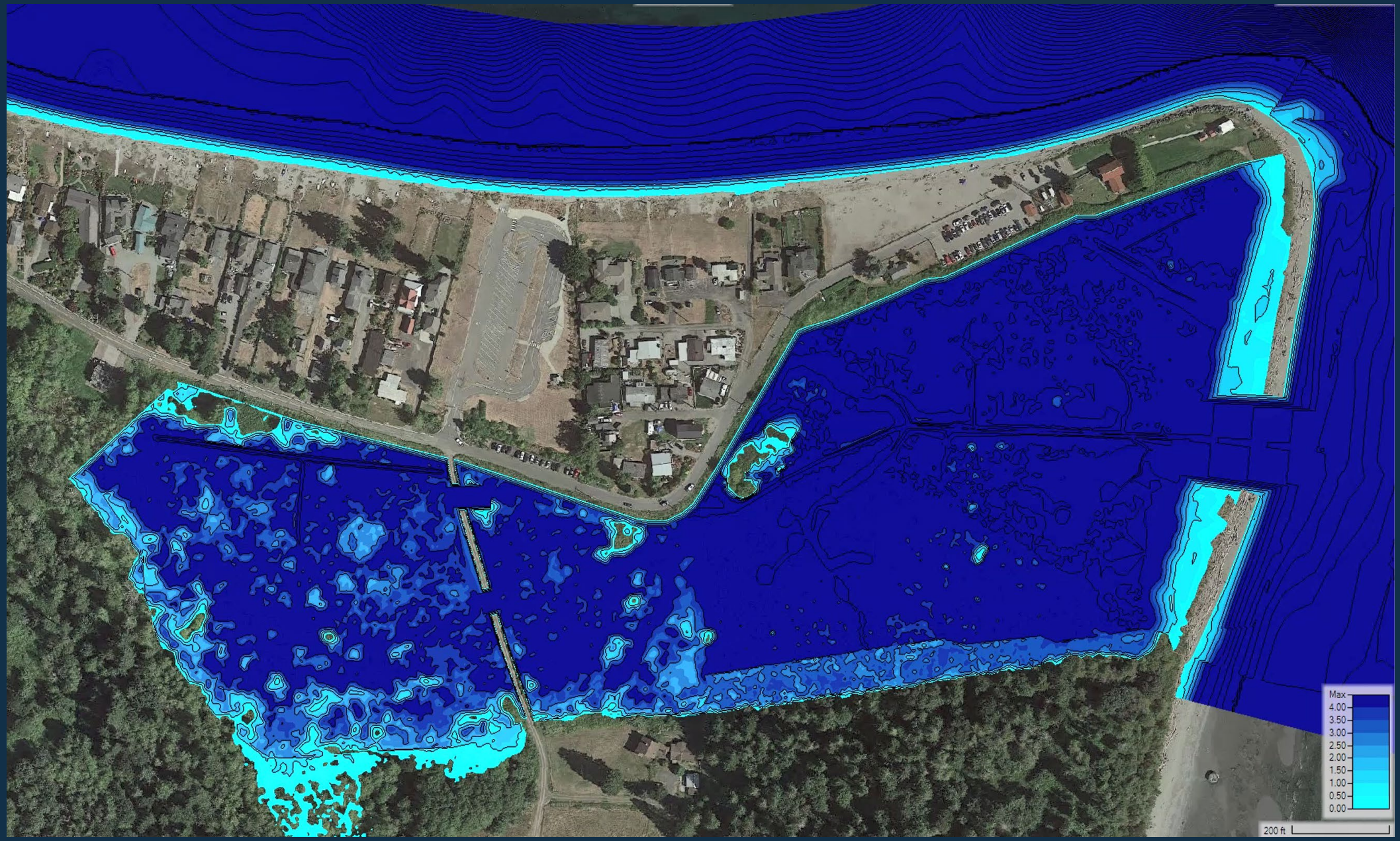
Possible Surface Water Conditions – January 2-4, Intense Rain



Slide 20f

With restoration marsh can drain nearly completely through the large tidal channel and not flood the road.

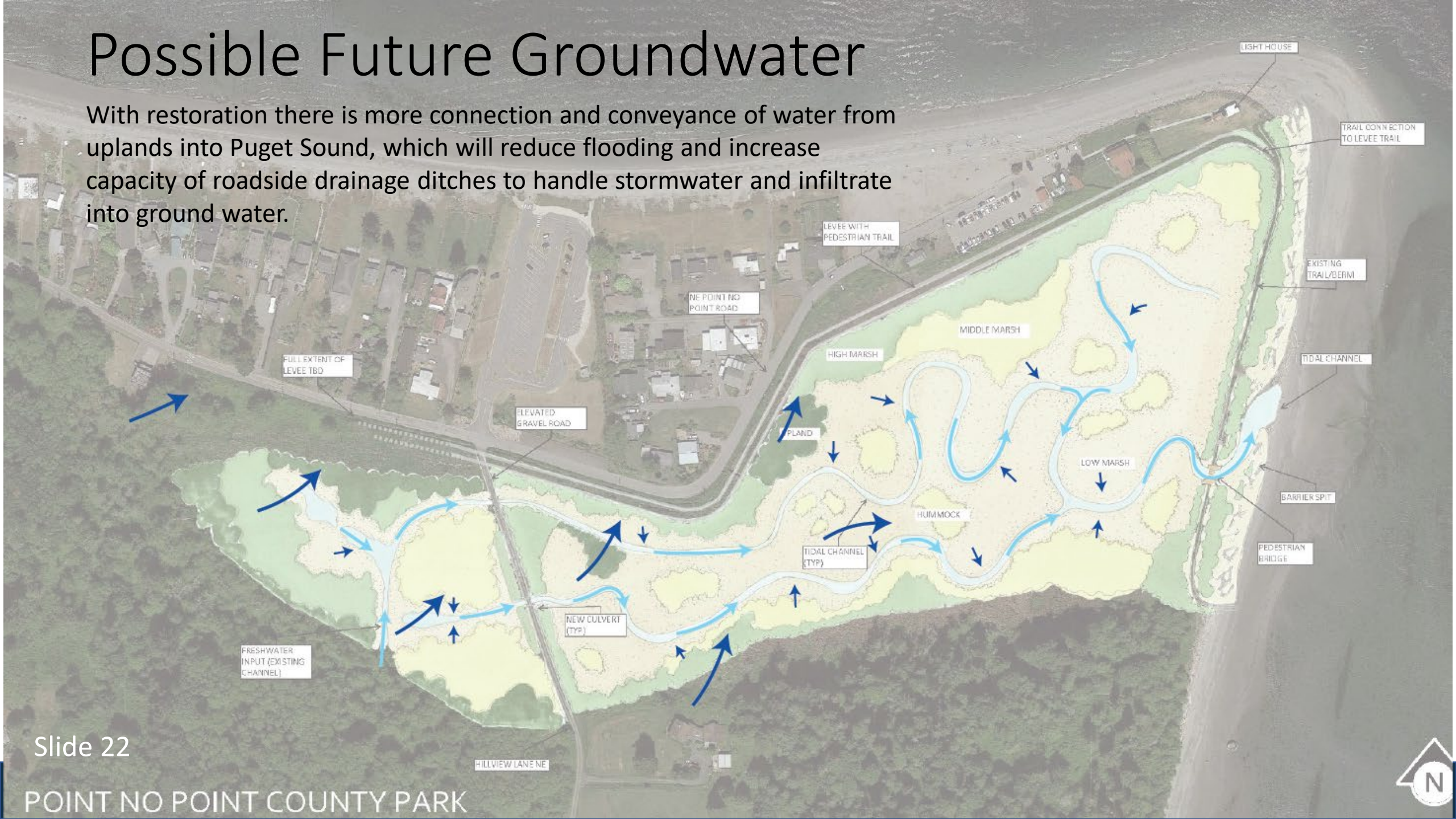
Possible Surface Water Conditions – January 7, King Tide



During extreme high tide water would be contained within the levee and reestablishing north beach to prevent coastal flooding.

Possible Future Groundwater

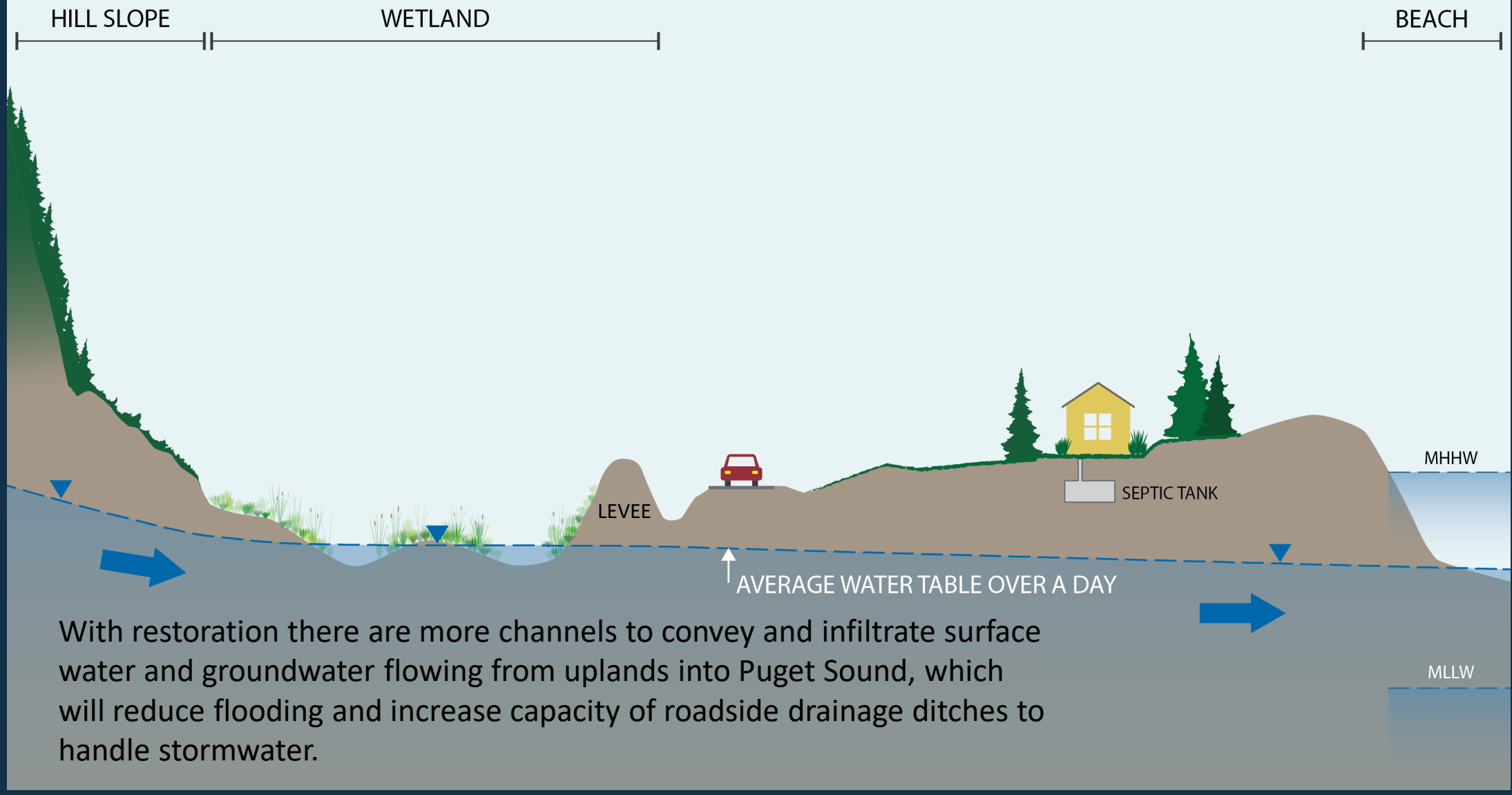
With restoration there is more connection and conveyance of water from uplands into Puget Sound, which will reduce flooding and increase capacity of roadside drainage ditches to handle stormwater and infiltrate into ground water.



POINT NO POINT COUNTY PARK

NEW WETLAND PROFILE

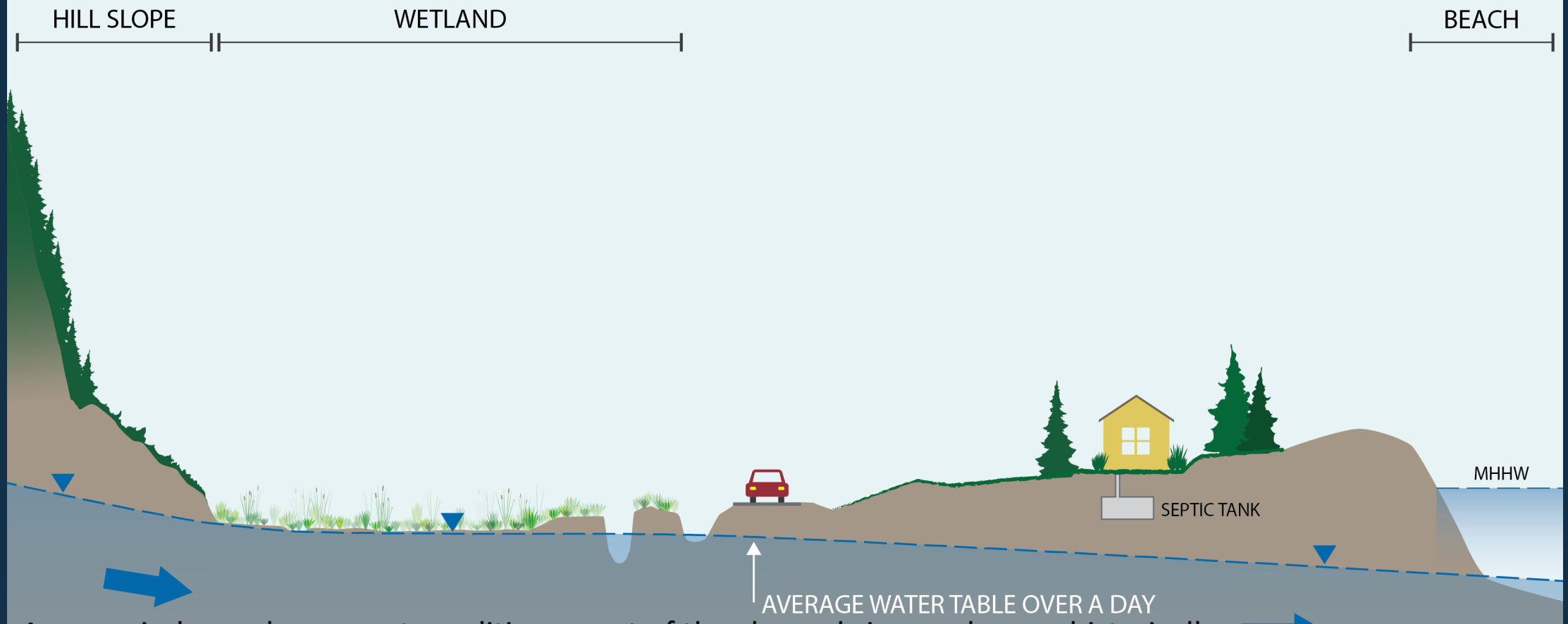
Section View Conceptual Model of Possible Future Ground Water



With restoration there are more channels to convey and infiltrate surface water and groundwater flowing from uplands into Puget Sound, which will reduce flooding and increase capacity of roadside drainage ditches to handle stormwater.

CURRENT CONDITIONS

Section View Conceptual Model of Existing Ground Water



As a reminder under current conditions most of the channels in marsh were historically filled and the few remaining are blocked with invasive species so there is no capacity to convey or infiltrate surface water. In addition, groundwater table is high because there is no path to Puget Sound as there was historically and gets even higher during large rain events and fills stormwater ditches as route to try and drain towards Puget Sound.

Greenbank Groundwater Model Section

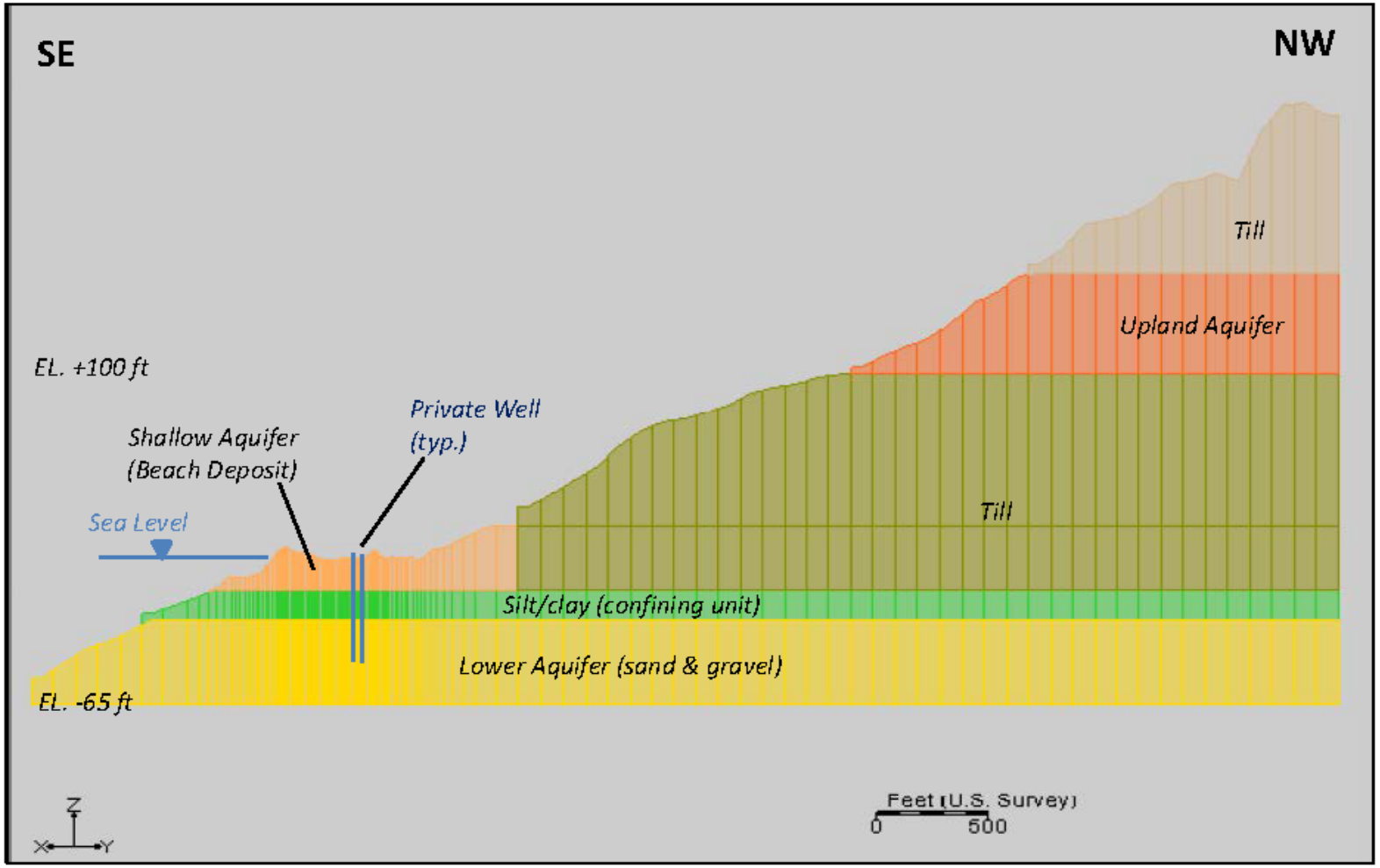


FIG. 8

Groundwater Impact Evaluation
Greenbank Marsh Habitat Restoration Project
Whidbey Island, WA

GROUNDWATER MODEL LAYERING

August 2019 101038-001

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 8

Project Next Steps

Next Steps

- Build existing conditions groundwater model & validate against measurements
- Build detailed surface for possible future conditions
- Run surface water model for possible future conditions
- Run groundwater model for possible future conditions
- Analyze models for changes in stormwater drainage needs