



# Hunters Point Naval Shipyard Climate Resilience Assessment

**Hunters Point Shipyard Citizens Advisory Committee  
Environmental & Reuse Subcommittee Meeting**

April 22, 2024

Michael Pound – BRAC Environmental Coordinator  
Wilson Doctor – Remedial Project Manager

# Agenda

## Topic

- Introductions
- Basis for Climate Resilience Assessment
  - Federal guidance, HPNS Five Year Reviews
- Overview of Navy Climate Resilience Assessment
  - Best available science, methods for conducting the assessment, identification of potential impacts at HPNS
- Climate Resilience Assessment Results
  - Projections for sea level rise and groundwater level, anticipated effects on HPNS parcels, vulnerabilities, considerations for Parcel E-2 landfill
- Next steps in assessing climate resilience at HPNS
- How to learn more and upcoming meeting schedule
- Contacts
- Questions

# Why is the Navy assessing climate resilience?

- To support the **Five-Year Review** of environmental cleanup remedies at HPNS
- Evaluate **short- and long-term protectiveness** of Navy remedies
- **Plan for and improve remedies** based on new information and technologies

January 14<sup>th</sup>, 2016:  
DoD Directive  
4715.21 Climate  
Change Adaptation  
and Resilience:

January 27<sup>th</sup>, 2021:  
President Biden issued  
Executive Order (EO)  
14008, "Tackling the  
Climate Crisis at Home  
and Abroad"

DON: In 2022 DON  
published "Climate  
Action 2030"  
strategy document.

NAVFAC: In 2017  
NAVFAC published  
"Climate Change  
Installation  
Adaptation and  
Resilience Planning  
Handbook"

SECNAV: released in  
2021 strategic guidance  
that lists combating  
climate change among  
top four challenges  
facing Department of  
the Navy (DON)

# Fifth Five Year Review (FYR)

## Components of the FYR

1. Document review
2. Data review and analysis
3. Community notification
4. Site inspection
5. Site specialist interviews
6. Assessment of protectiveness; identify necessary changes

**Fall 2022**  
Contract awarded and planning for FYR began

**January / February 2023**  
Document review; data review and analysis began  
Public Notice announced start of FYR process  
Site inspections conducted

**February 7 – May 7, 2024**  
Draft Final FYR Report available  
for review and comment

**April 30, 2024**  
Regulatory Agency Comments Due on Draft FYR Report

**July 31, 2024**  
Final FYR Report

# Use of Best Available Science through Document Review

- **Implemented federal and state methodologies**
  - California Department of Toxic Substances Control (DTSC): *Draft Sea Level Rise Guidance to DTSC Project Managers for Cleanup Activities* (2023)
  - USEPA: *Guidance on Climate Resilience in Superfund Planning* (2021)
  - US Department of Defense (DoD): *Climate Assessment Tool* (DCAT) (2021)
- **Consulted climate projection reports and other resources**
  - DoD Regional Sea Level Rise (DRSL) database (compiled 2015-2016)
  - DoD Strategic Environmental Research and Development Program
  - California Ocean Protection Council (2018, 2024)
  - Others: City of Alameda (2022), FEMA, NOAA, Cal-Adapt, CA Department of Forestry and Fire Protection, BPTCP, Journal of Hydrology

# Scientific Methodology Used to Assess Climate Impacts at HPNS

## Climate Hazard Identification and Prescreening

- **Identified climate hazards** in DCAT

## Climate Impact Assessment

- **Identified projected impact areas** at HPNS for climate hazards

## Climate Vulnerability Assessment

- **Conceptualized any new potential exposure pathways** attributable to climate change for further assessment

## Climate Risk Assessment (FUTURE)

- **Evaluate potential pathways** to determine if there are potential future unacceptable CERCLA risks to human and ecological receptors

*Note: Not all impacts lead to environmental cleanup program vulnerabilities*

# Sea Level Rise Projections at HPNS

Sea Level Rise Comparisons (measured in feet)

- **Department of Defense Regional Sea Level (DRSL) database projections at HPNS**
  - Consistent with California Ocean Protection Council (2018) projections
  - Accounts for multiple global greenhouse gas (GHG) emissions scenarios
  - Simulated highest and lowest GHG scenarios

	DRSL (Navy)		California Ocean Protection Council (OPC) 2018		California OPC 2024		DTSC 2023
Year	Lowest	Highest	Low	Med-High	Low	Int-High	
2030			0.5	0.8	0.3	0.4	
2035	0.3	1					
2040			0.8	1.3	0.4	0.7	
2050							3.5*
2060			1.5	2.6	0.6	1.5	
2065	0.6	3.2					
2070			1.9	3.5	0.7	2.2	

\* Based on OPC's California SLR Action Plan 2022

# Methods Used to Identify Impacted Areas, Potential Effects at HPNS

## Sea Level Rise Assessment

- Digital elevation model (DEM) used to represent **topography**
- Geographical information system (GIS) used to compare **sea level rise projections** with topography

## Groundwater Table Rise

- Highest historical groundwater table level in past 20 years identified
- Assumption applied: water table rise in future years at a 1:1 ratio with sea level rise at all locations

*Same method used by the City of Alameda in 2022*

## Summary of Impacts

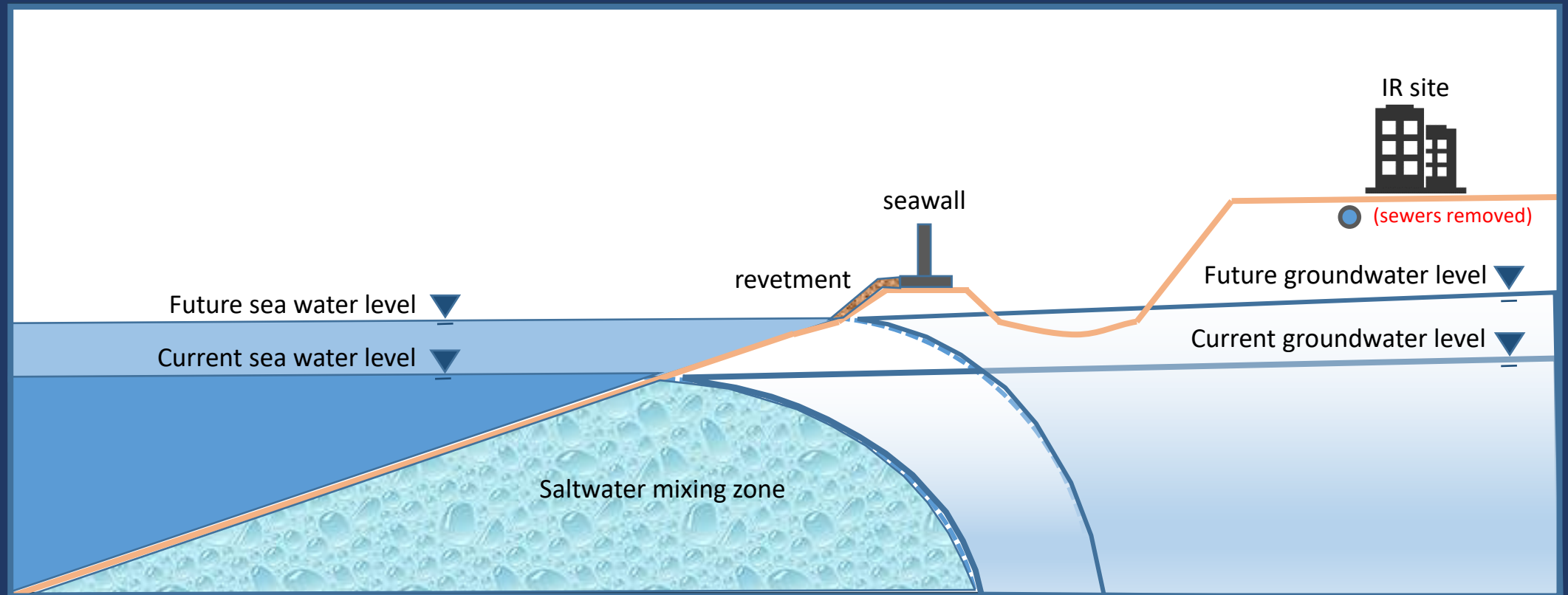
1. Coastal flooding?	<ul style="list-style-type: none"><li>• No permanent seawater inundation</li><li>• Some groundwater table emergence</li></ul>
2. Extreme weather?	Yes: storm surges, rainfall
3. Riverine flooding?	No
4. Drought?	Yes
5. Wildfires?	Yes
6. Energy demand?	Yes: power supply interruptions possible
7. Heat?	No
8. Land degradation?	No

Not all impacts lead to environmental cleanup program vulnerabilities.

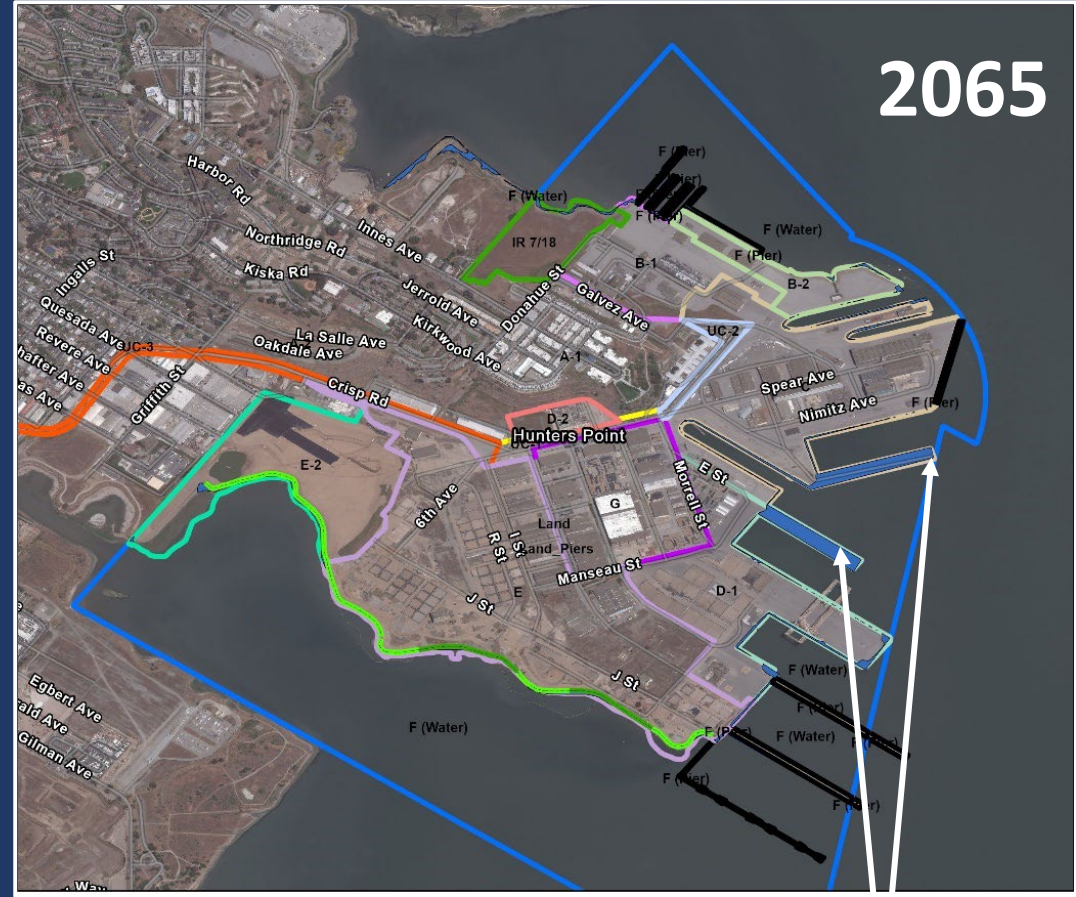
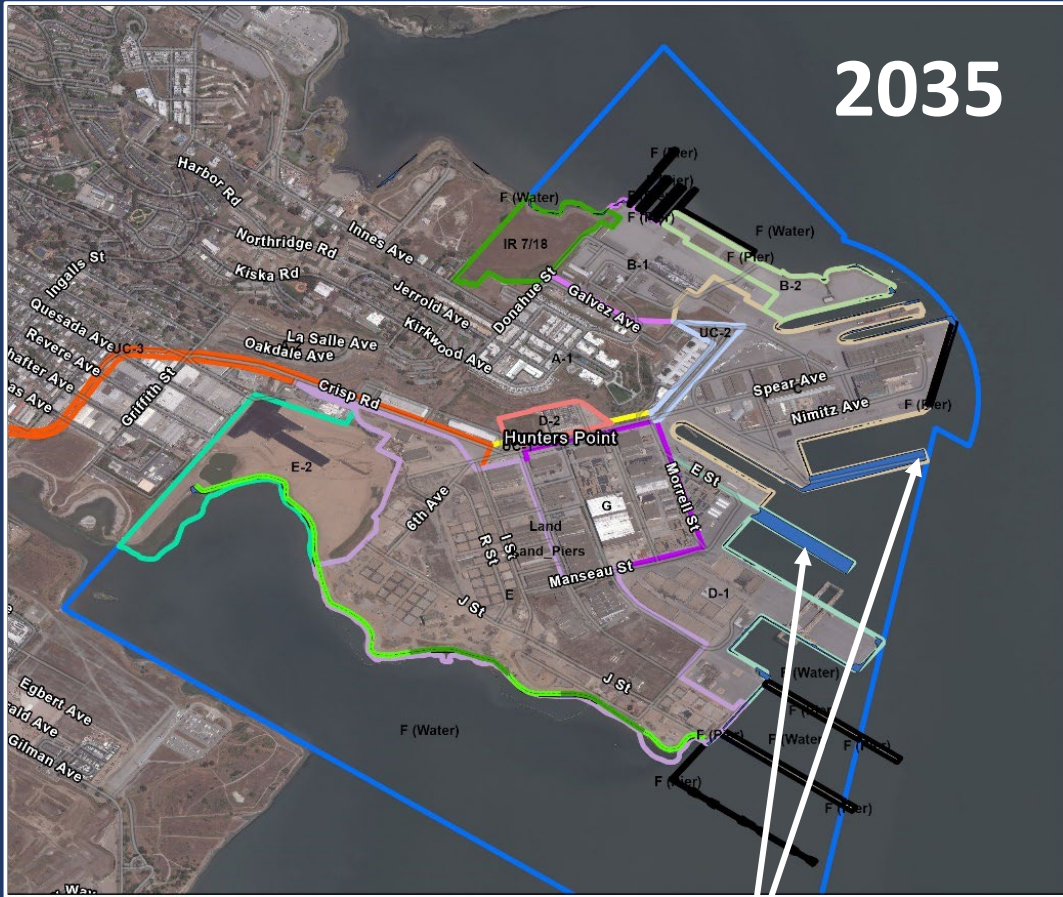


# Groundwater Rise in Response to Sea Level Rise

- A conservative assumption is that **groundwater rises everywhere by the same amount as the sea**
  - More detailed modeling is necessary to determine how close this worst-case scenario is to actual levels



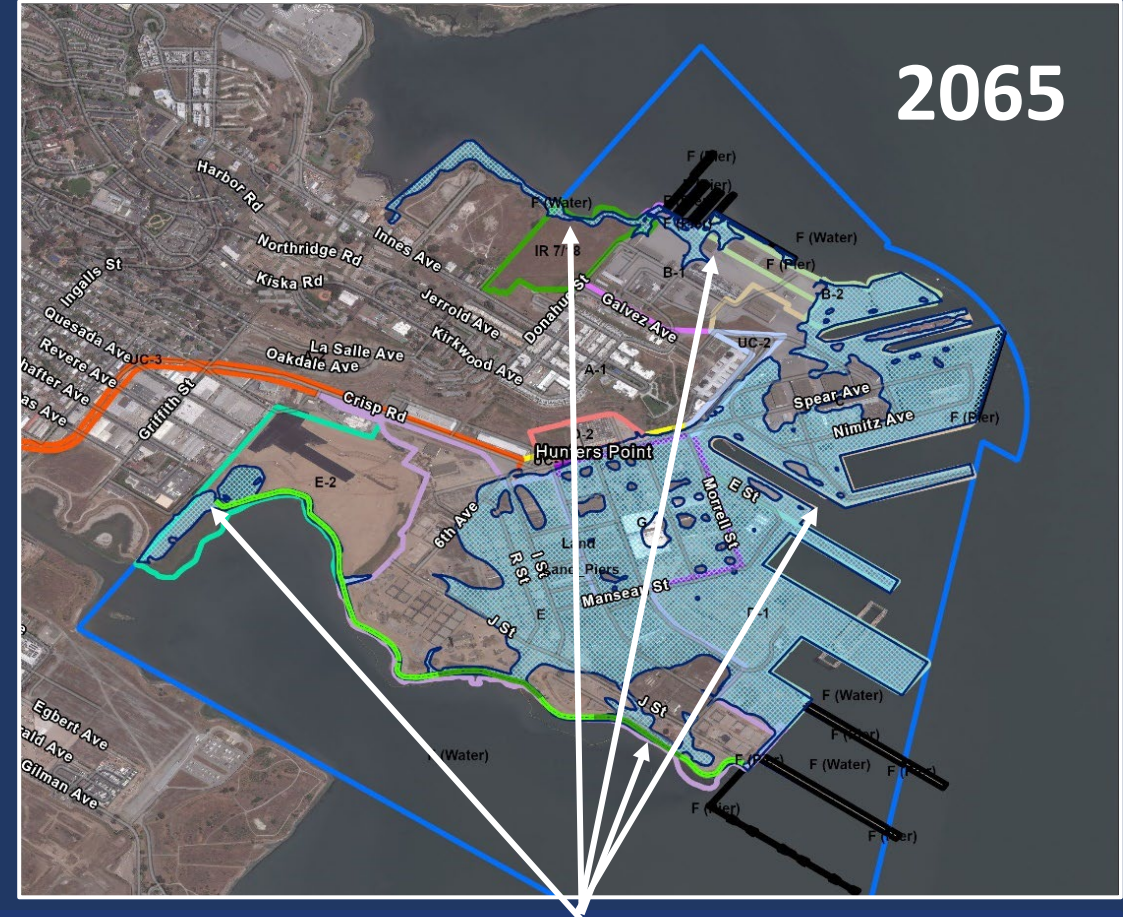
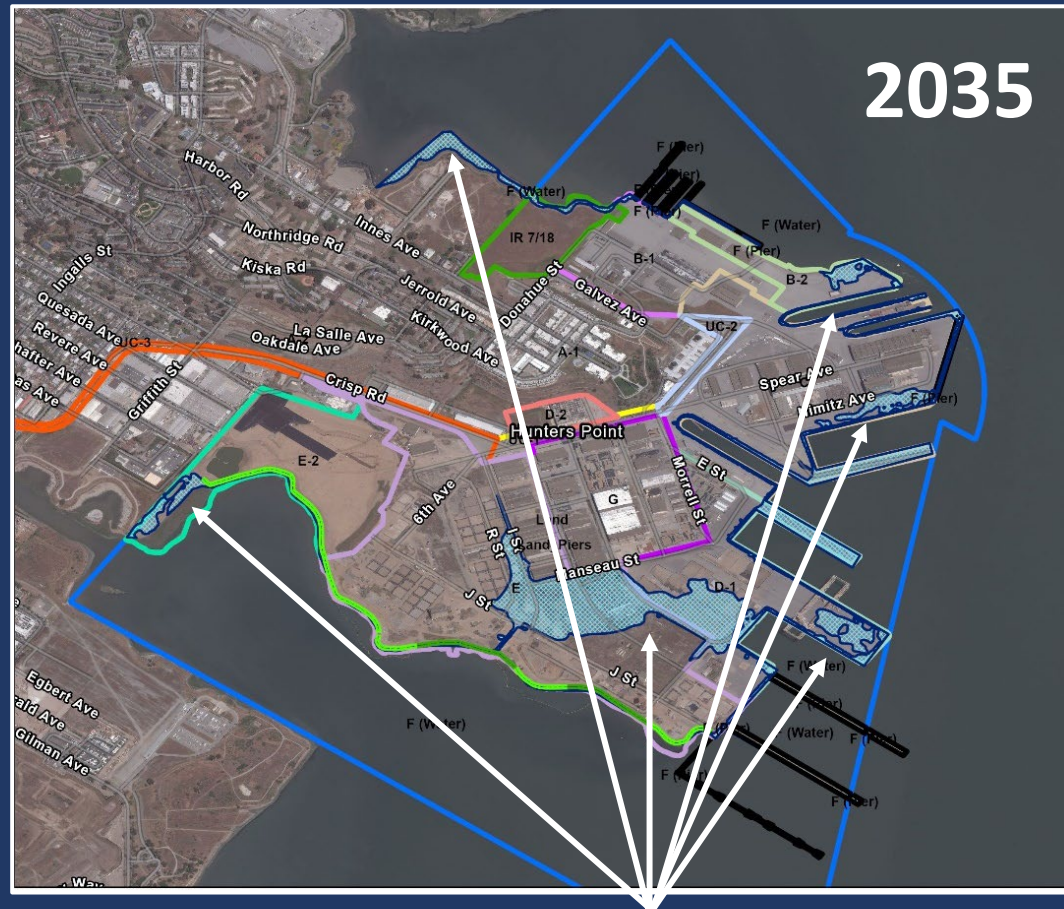
# Projected Permanent Seawater Flooding at HPNS (No Mitigation)



## Permanent seawater inundation – only projected at Parcel F pier structures



# Projected Temporary Flooding from 100-Year Storm at HPNS (No Mitigation)



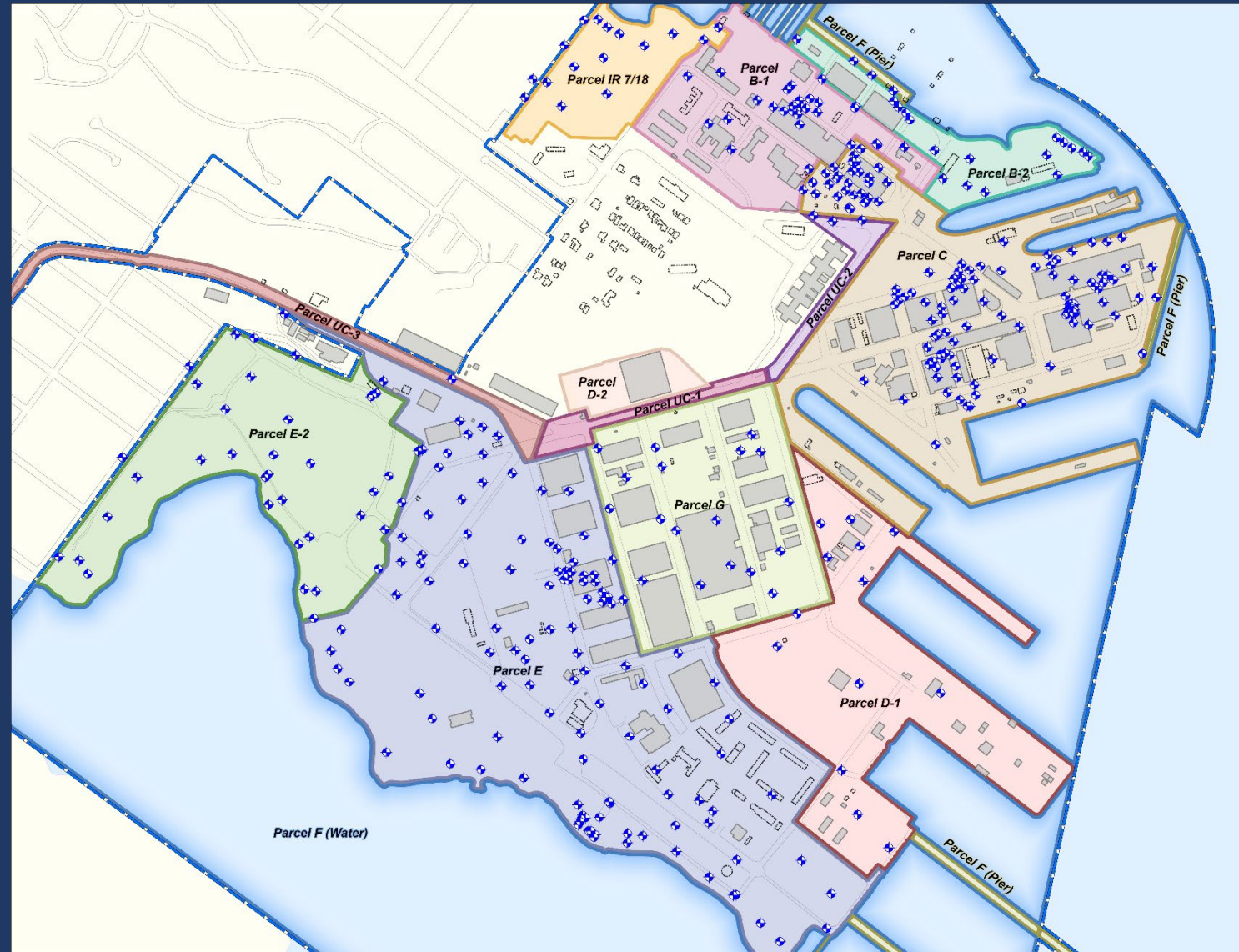
Temporary seawater flooding – limited in 2035 and projected to occur in more areas in 2065



# Existing Groundwater Monitoring System

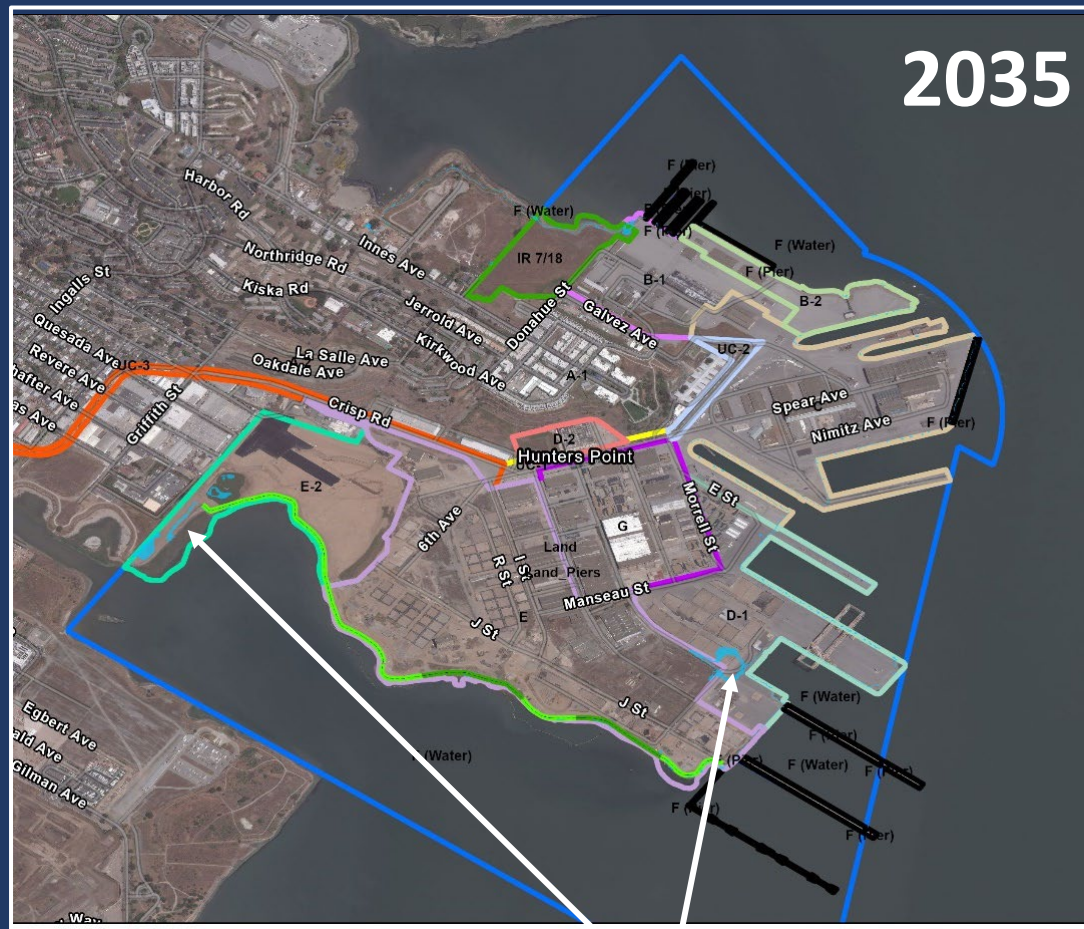
The Navy monitors upper-aquifer groundwater under the HPNS Basewide Groundwater Monitoring Program

- 195 A-aquifer groundwater wells
- Monitored semiannually
- Monitored since 2004





# Projected Rise of Groundwater to Surface



\*Worst case scenarios assessed

**Projected groundwater emergence  
limited to small areas in Parcel D-1 and Parcel E-2 wetlands in 2035; additional parcels in 2065**



# Comparison of Actual Sea Level Rise Measured in Nearby Tidal Gauges in San Francisco Bay

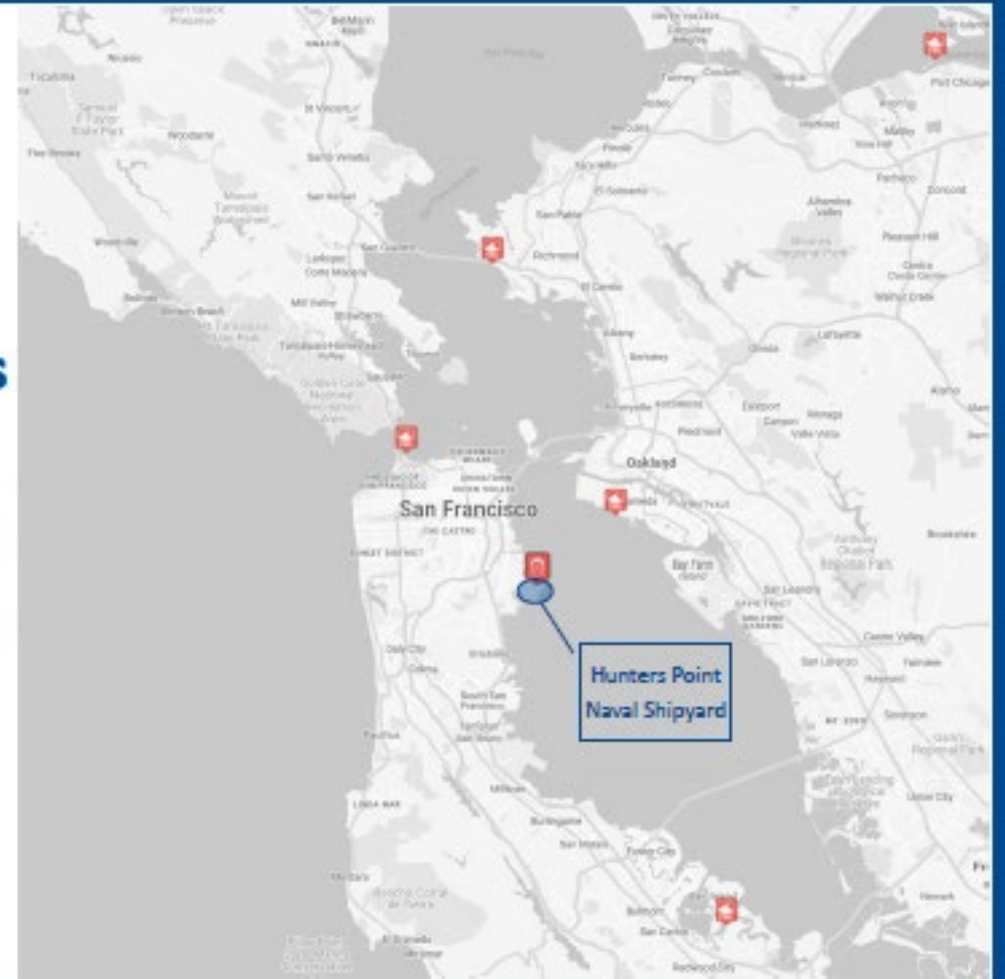
## Tidal gauges used for HPNS DRSL projections



example of tidal gauge

## Tidal gauges used for HPNS DRSL projections

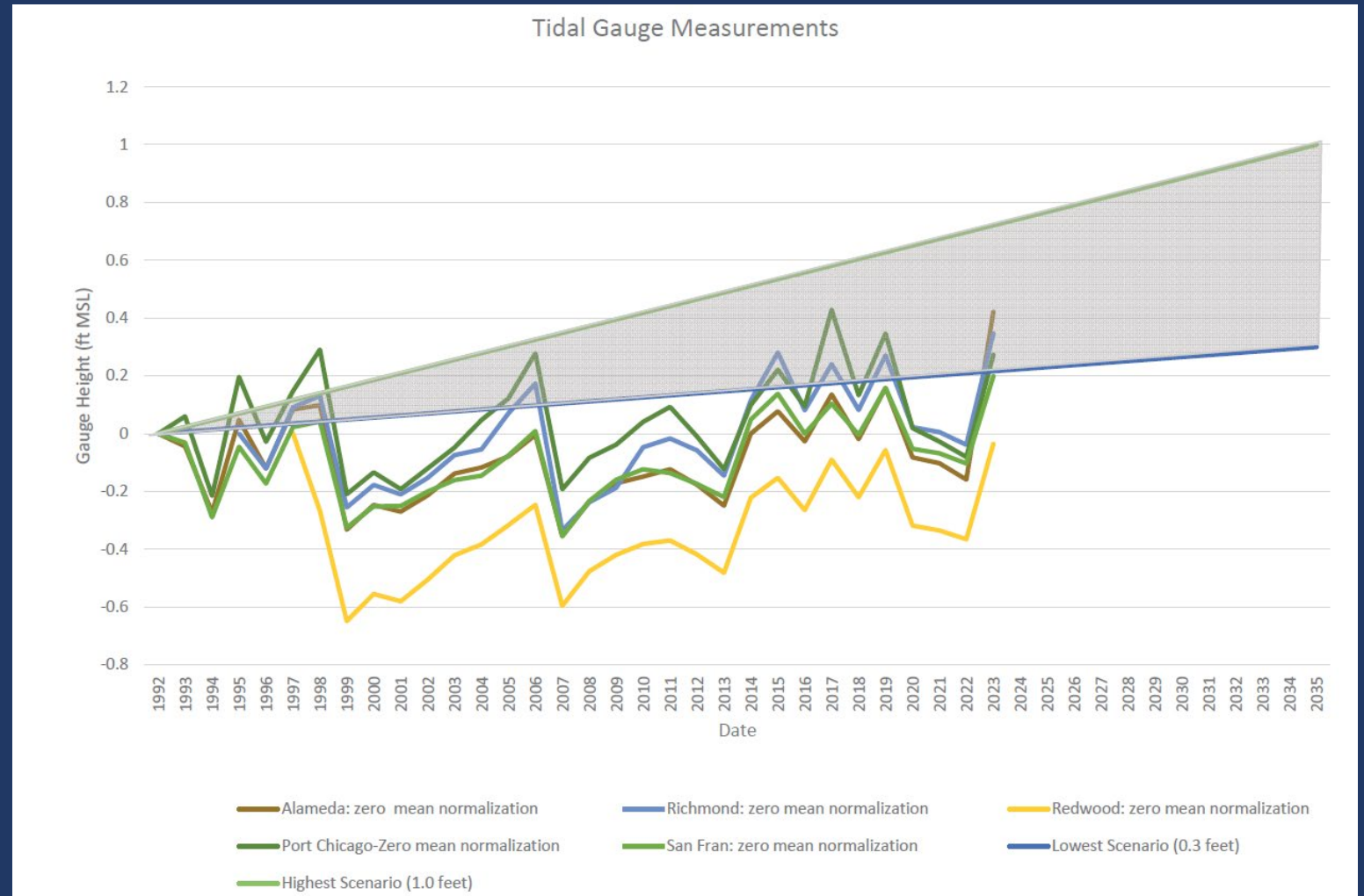
Source: Gauge Locations (serrp-estcp.org)



# Comparison of Actual Sea Level Rise Measured in Nearby Tidal Gauges in San Francisco Bay, over the last 30 years vs. Projections

Comparison to DRSL range of sea level rise projections (gray area), baseline year 1992

Note: Actual sea level rise in the last 30 years has been trending near the lower part of the projected range



Source of tidal gauge data: <https://tidesandcurrents.noaa.gov>

# Vulnerabilities Identified for Further Risk Assessment

- **2035: permanent groundwater rise to the surface in limited areas**
  - Small portions of Parcel D-1
  - Small portions of E-2 wetland areas
  - Groundwater emergence is limited, evaluation of mobilization of contaminants of concern needs to be conducted to determine potential unacceptable risks
- **2065: permanent groundwater rise to the surface in additional areas**
  - Parcels B-1 (including IR 07/18), B-2, C, D-1, E, and E-2 wetlands
  - Potential pathway to above-ground human receptors and ecological receptors in San Francisco Bay



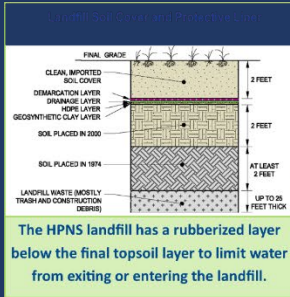
Rock *revetments* and sea walls are important parts of the Navy's proactive efforts to plan for the impacts of climate change



# Measures to Address Sea Level Rise at HPNS



An upland "slurry wall" extends near the property boundary to reduce groundwater flowing into the Parcel E-2 landfill.



The HPNS landfill has a rubberized layer below the final topsoil layer to limit water from exiting or entering the landfill.



Freshwater and saltwater wetlands in Parcel E-2 help manage water events



Nearshore "slurry walls" limit groundwater flow off of Parcels E and E-2, protecting the shoreline and reducing erosion



Rock "revetment" protects shoreline at Parcels B-1 and B-2



Groundwater wells (~195) monitor groundwater level and provide sampling points for the Groundwater Monitoring Program



A combination of vegetation and sediment combined with hard materials provide a hybrid stabilization system to protect areas along portions of the Parcel E shoreline.



A rock "revetment" extends up to 9 feet above mean sea level to provide a barrier from Bay waters at Parcels E and E-2 shorelines. A 3-foot high concrete sea wall sits above portions of the revetment to limit the impacts from the Bay during extreme weather events.

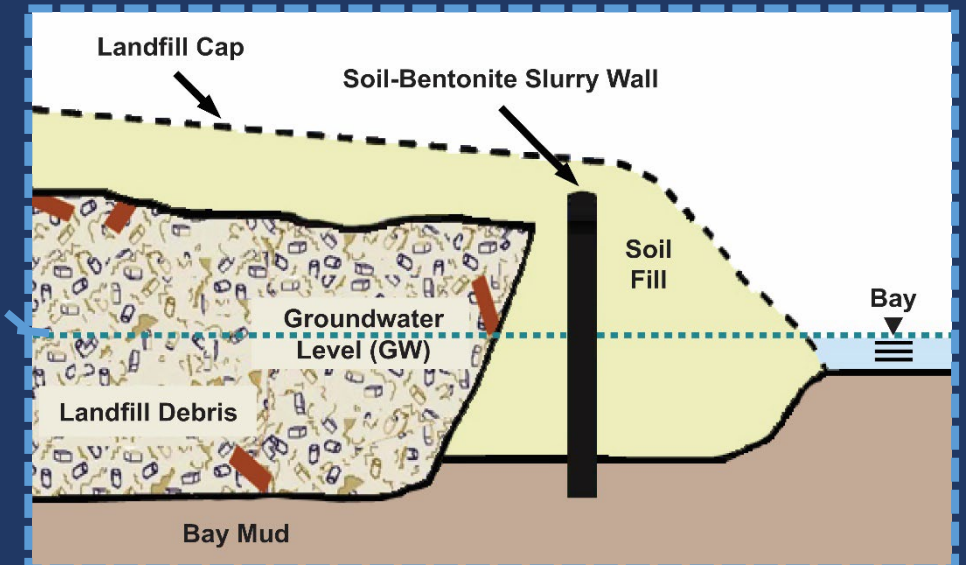
A steel sheet pile wall will be installed to retain the Parcel E-2 shoreline and reduce erosion during future storm events.



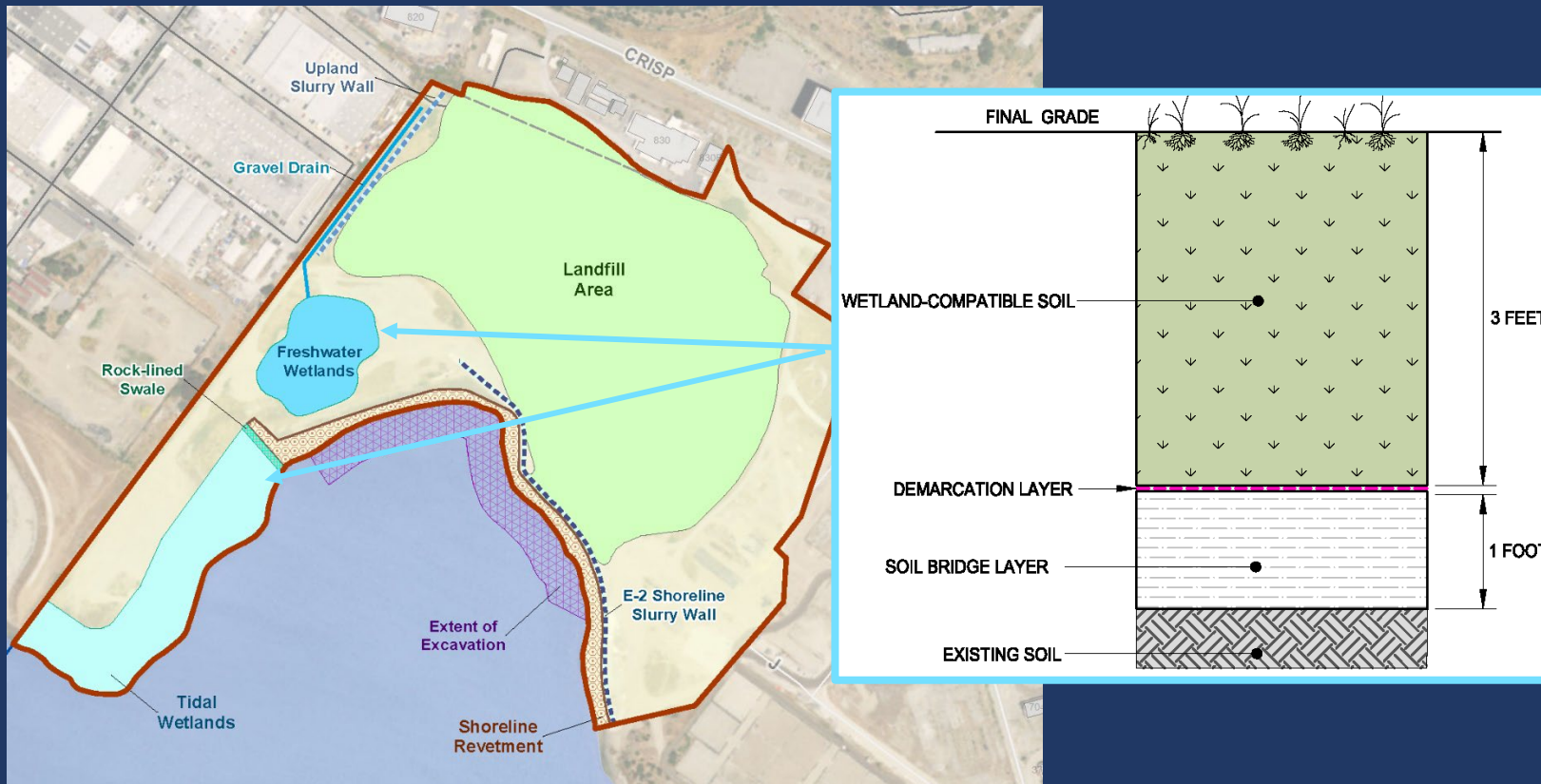
# Parcel E-2: Measures to Manage Groundwater – Slurry Walls



- The shoreline slurry wall limits groundwater migration from Parcel E-2 to the Bay
- The upland slurry wall limits groundwater flow into the landfill and will provide a natural water source for the new freshwater wetlands



# Parcel E-2 Landfill: Measures to Manage Groundwater and Bay Waters - Wetlands

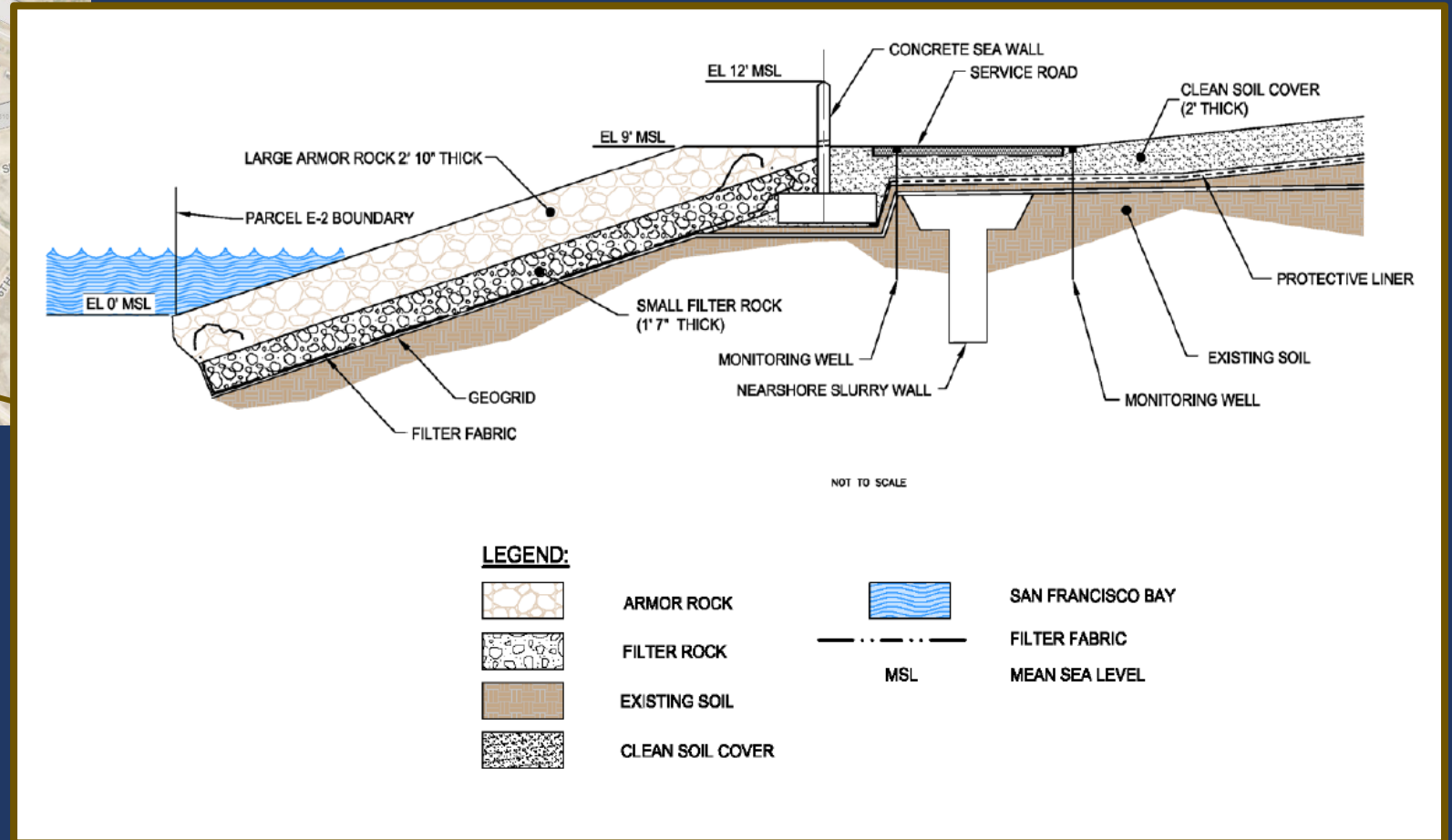


- The freshwater wetland includes a pond that will be fed by the nearby slurry wall to limit groundwater from entering the landfill area
- The tidal wetland lies on the shoreline and helps manage Bay waters on Parcel E-2 from entering the landfill area

# Parcel E-2 Landfill: Measures to Limit Sea Water onto Parcel E-2



- A protective barrier of rocks (“revetment”) at the shoreline and the cement sea wall limit the impact of Bay waters onto the landfill area

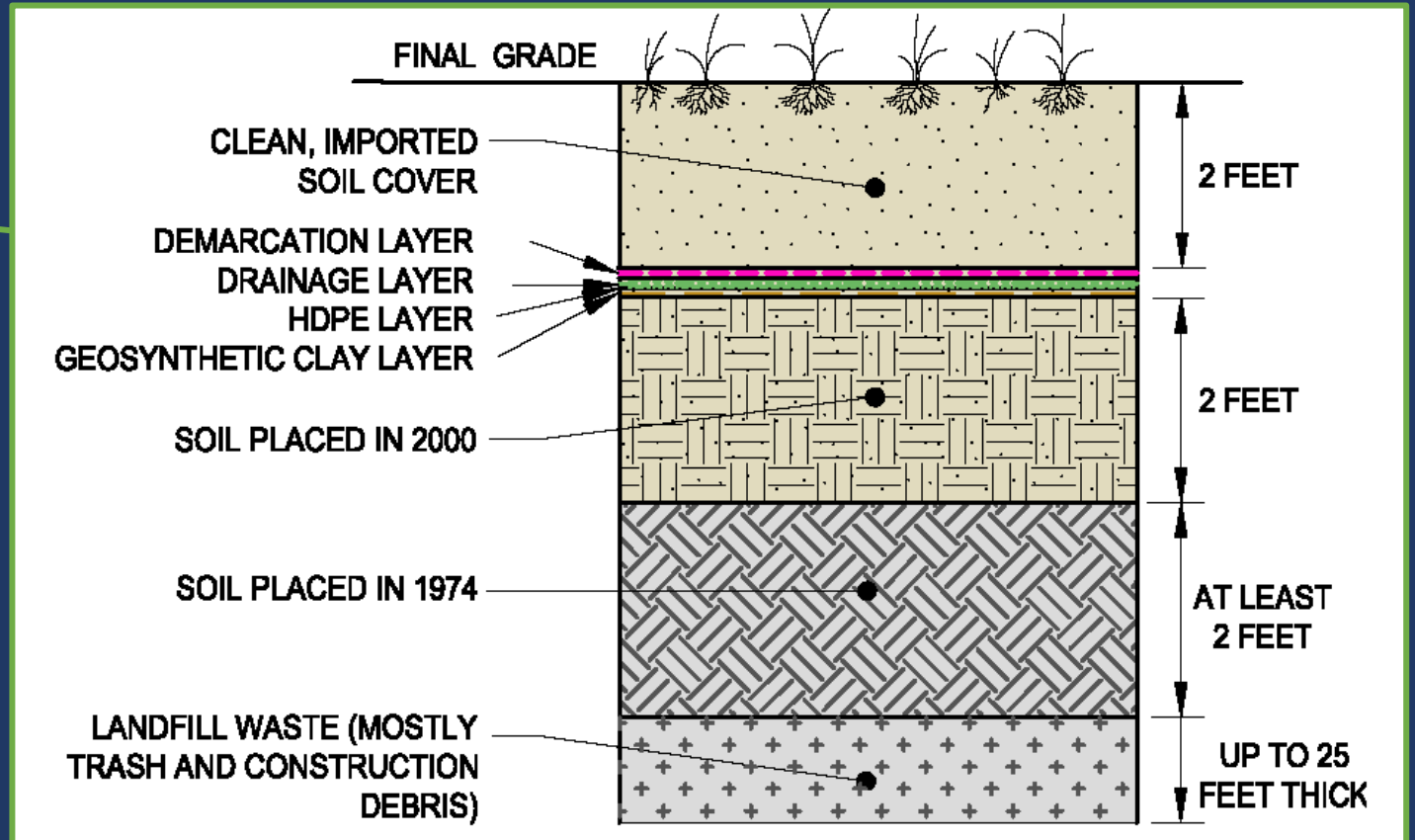




# Parcel E-2 Landfill: Measures to Limit Contaminant Migration



- The multilayer cap allows surface water to drain through the layers to limit standing water
- The remedy design provides for a pump-and-treat solution in the case of excessive flooding of the landfill area



# Next Steps in Climate Resilience Assessment at HPNS

## 2023 CLIMATE RESILIENCE ASSESSMENT REPORT SCHEDULE

**April 30, 2024**

Regulatory Agency Comments Due

**July 31, 2024**

Finalize Fifth Five-Year Review

Discuss site prioritization and schedule for conducting site-specific climate impact assessments upon resolution of regulatory agency comments

- **Conduct site-specific studies to evaluate climate vulnerabilities**
  - Parcel D-1 and wetland areas of E-2 remedies per 2035 projections
  - Parcels B-1 (including IR 07/18), B-2, C, D-1, E, and wetland areas of E-2 per 2065 projections
  - Additional studies as determined (e.g. horizontal groundwater flow)
- **Verify HPNS sea level rise projections**
- **Evaluate annual groundwater elevation data to determine how site-specific measurements compare to projections**
- **Expand Navy's assessment of sea level rise to 2100 projections in site specific assessments and in the Sixth Five-Year Review.**

# Ways to Learn More and Provide Feedback on the HPNS Climate Resilience Assessment

- **Review the HPNS Draft Five-Year Review Report**
  - On the Documents page of the Navy's website: [www.bracpmo.navy.mil/hpns](http://www.bracpmo.navy.mil/hpns)
  - At the San Francisco Public Library, Main Branch, 100 Larkin Street, 5<sup>th</sup> Floor
- **In response to multiple requests, the Navy has extended the public review period to May 7, 2024**



Scan to go to the Documents page on the Navy's website

Email comments to: [HPNS\\_FYR\\_Comments@us.navy.mil](mailto:HPNS_FYR_Comments@us.navy.mil)

**Attend the Navy's Presentation on May 20, 2024 at 6:00 p.m.**

**HPS CAC E&R Subcommittee Meeting**

- Presentation topic includes discussion of public comments received and the Navy's response

# Resources for More Information



## HPNS Program Management



**Michael Pound**  
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Navy BRAC PMO West  
33000 Nixie Way, Bldg 50, Suite 207  
San Diego, CA 92147  
[www.bracpmo.navy.mil/hpns](http://www.bracpmo.navy.mil/hpns)

## Regulatory Agencies

**Andrew Bain**, US Environmental Protection Agency  
[bain.andrew@epa.gov](mailto:bain.andrew@epa.gov)

**Michael Howley**, CA Dept. of Toxic Substances Control  
[michael.howley@dtsc.ca.gov](mailto:michael.howley@dtsc.ca.gov)

**Mary Snow**, San Francisco Reg'l Water Quality Control Board  
[mary.snow@waterboards.ca.gov](mailto:mary.snow@waterboards.ca.gov)

## Other Resources



**Community Technical Advisor**  
**Dr. Kathryn Higley**  
(541) 737-7036  
[kathryn.higley@oregonstate.edu](mailto:kathryn.higley@oregonstate.edu)  
[www.ne.oregonstate.edu](http://www.ne.oregonstate.edu)



**HPNS Information Repository**  
**San Francisco Public Library (Main Branch)**  
100 Larkin Street, 5th Floor, Gov't Information Center

Visit [www.bracpmo.navy.mil/HPNS](http://www.bracpmo.navy.mil/HPNS) to link to the online HPNS Administrative Record (on the home page and documents page)

## HPNS Community Outreach

**Send an email or leave a message**

- For program information
- To join the HPNS Mailing List
- To request language assistance



[info@sfhpn.com](mailto:info@sfhpn.com)



(415) 295-4742