



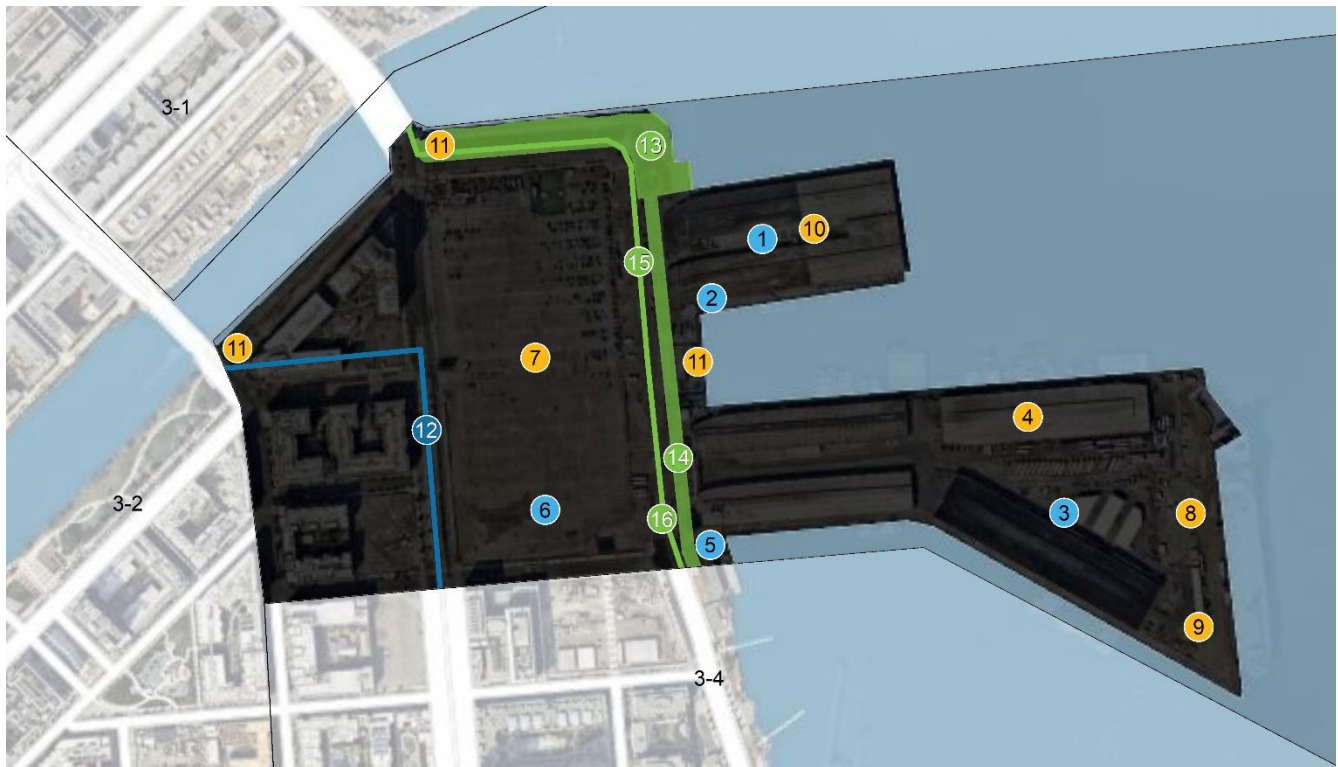
Subarea Description

Mission Rock (Subarea 3-3) covers the area south of the Mission Creek inlet and includes China Basin Park, Piers 48 and 50, and Seawall Lot 337, much of which is planned for redevelopment under the Port’s Mission Rock and Pier 48 project. This project will incorporate sea level rise resilience and adaptation features, and will provide new affordable housing, open space for public use, new living-wage jobs, and renovation of Pier 48.

Critical infrastructure includes staging and disaster response facilities, especially on Pier 50, which has a deep-water large vessel berth, and also provides maritime, industrial, commercial, and emergency response services. The response services include a critical fleet of roll-on/roll-off ships managed by the Maritime Administration Ready Reserve (MARAD) and tugboat facilities.

The Subarea 3-3 shoreline is mostly engineered with piers and hardened edges, but with a section along Mission Creek that is an embankment with riprap armoring to protect the landward China Basin Park.

There is a narrow flood pathway (on Terry Francois Boulevard) that conveys floodwaters from Subarea 3-4 into this subarea. Higher Bay water levels would result in overtopping along the entire Mission Creek, McCovey Cove (east of Third Street Bridge), and the Bay shoreline within this subarea (and adjacent Subareas 3-2 and 3-4), allowing for widespread inundation to occur.



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Assets and Landmarks



Maritime

- 1. Pier 48 (Entertainment Venue)
- 2. Chase Center Ferry Terminal (temporary)
- 3. Maintenance Facilities (Pier 50)
- 4. Westar Marine Services (Pier 50)
- 5. Pier Administration Building (Pier 50.5)
- 6. Promenade (planned) (Seawall Lot 337)



Disaster Response

- 7. Assembly Area (Lot A, Seawall Lot 337N, San Francisco Giants ballpark parking lot)
- 8. Large Vessel Berth (Pier 50)
- 9. Oil Spill Response Equipment (Pier 50)
- 10. Tugboat Facility (Pier 48)
- 4. Tugboat Facility (Pier 50)
- 11. EWFS Suction Connections (3)



Transportation

- 12. Muni T-Line



Open Space and Ecology

Open Space

- 13. China Basin Park
- 14. Promenade (planned) (Seawall Lot 337)
- 15. Bay Trail / Blue Greenway





Timing of Exposure: Assets and Landmarks

Assets / Landmarks	Flood Scenario	Equivalent Events	Timing				
			USACE Low	USACE Inter.	OPC Most Likely	USACE High	OPC 1-in-200
 Maritime							
<ul style="list-style-type: none"> Promenade (planned) (Seawall Lot 337) 	48" (10.2 ft. NAVD)	High tide + 48" SLR	>2150	>2150	2113	2088	2073
		100-YR + 7" SLR	2094	2050	2034	2026	2024
<ul style="list-style-type: none"> Chase Center Ferry Terminal (temporary) Pier Administration Building (Pier 50.5) 	52" (10.7 ft. NAVD)	High tide + 52" SLR	>2150	>2150	2120	2092	2076
		100-YR + 11" SLR	2145	2068	2045	2037	2033
<ul style="list-style-type: none"> Pier 48 (Entertainment Venue) Maintenance Facilities (Pier 50) Westar Marine Services (Pier 50) 	77" (12.8 ft. NAVD)	High tide + 77" SLR	>2150	>2150	>2150	2116	2095
		100-YR + 36" SLR	>2150	2145	2092	2075	2064
 Disaster Response							
<ul style="list-style-type: none"> EFWS Suction Connections (3 of 3) 	24" (8.3 ft. NAVD)	High tide + 24" SLR	>2150	2112	2070	2059	2051
		5-YR + 0" SLR	Today	Today	Today	Today	Today
<ul style="list-style-type: none"> Assembly Area (Lot A, Seawall Lot 337N, San Francisco Giants ballpark parking lot) 	48" (10.2 ft. NAVD)	High tide + 48" SLR	>2150	>2150	2113	2088	2073
		100-YR + 7" SLR	2094	2050	2034	2026	2024
<ul style="list-style-type: none"> Oil Spill Response Equipment (Pier 50) Tugboat Facility (Pier 48) Tugboat Facility (Pier 50) 	77" (12.8 ft. NAVD)	High tide + 77" SLR	>2150	>2150	>2150	2116	2095
		100-YR + 36" SLR	>2150	2145	2092	2075	2064
<ul style="list-style-type: none"> Large Vessel Berth (Pier 50) 	--	--	--	--	--	--	--



Timing of Exposure: Assets and Landmarks

Assets / Landmarks	Flood Scenario	Equivalent Events	Timing				
			USACE Low	USACE Inter.	OPC Most Likely	USACE High	OPC 1-in-200
 Transportation							
<ul style="list-style-type: none"> Muni T-Line 	66" (11.8 ft. NAVD)	High tide + 66" SLR	>2150	>2150	2143	2106	2086
		100-YR + 25" SLR	>2150	2116	2073	2061	2053
 Open Space and Ecology							
<ul style="list-style-type: none"> China Basin Park 	36" (9.3 ft. NAVD)	High tide + 36" SLR	>2150	2144	2091	2074	2063
		50-YR + 0" SLR	Today	Today	Today	Today	Today
<ul style="list-style-type: none"> Promenade (planned) (Seawall Lot 337) Bay Trail / Blue Greenway 	48" (10.2 ft. NAVD)	High tide + 48" SLR	>2150	>2150	2113	2088	2073
		100-YR + 7" SLR	2094	2050	2034	2026	2024

Mission Rock

Subarea 3-3

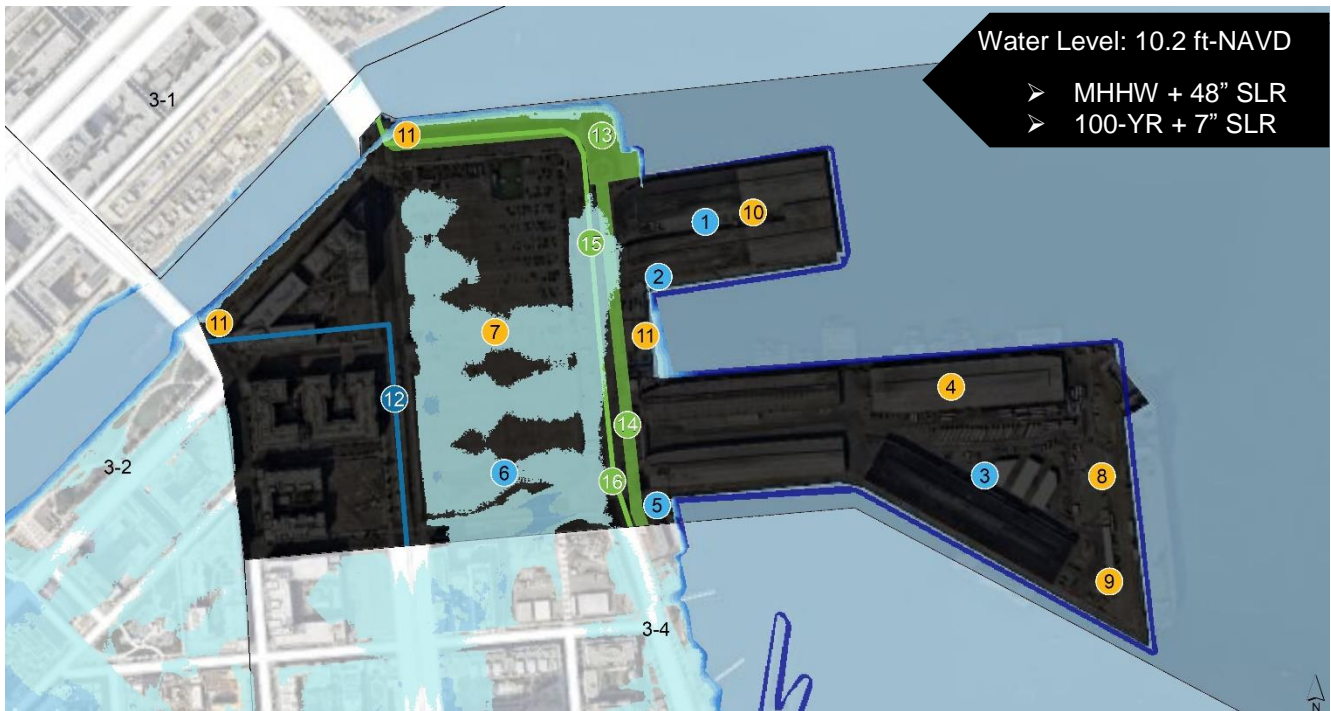


Timing of Exposure: Subarea

Adaptation Focus	Shoreline Type	Flood Scenario	Timing					
			Return	USACE Low	USACE Inter.	OPC Most Likely	USACE High	OPC 1-in-200
Immediate	Engineered	48" (10.2 ft. NAVD)	High tide + 48" SLR	>2150	>2150	2113	2088	2073
			100-YR + 7" SLR	2094	2050	2034	2026	2024
Tipping Point	Embankment; Engineered	66" (11.8 ft. NAVD)	High tide + 66" SLR	>2150	>2150	2143	2106	2086
			100-YR + 25" SLR	>2150	2116	2073	2061	2053
Long Term >2050	Embankment; Engineered	77" (12.8 ft. NAVD)	High tide + 77" SLR	>2150	>2150	>2150	2116	2095
			100-YR + 36" SLR	>2150	2145	2092	2075	2064

Flood Progression

Immediate Flood Risk

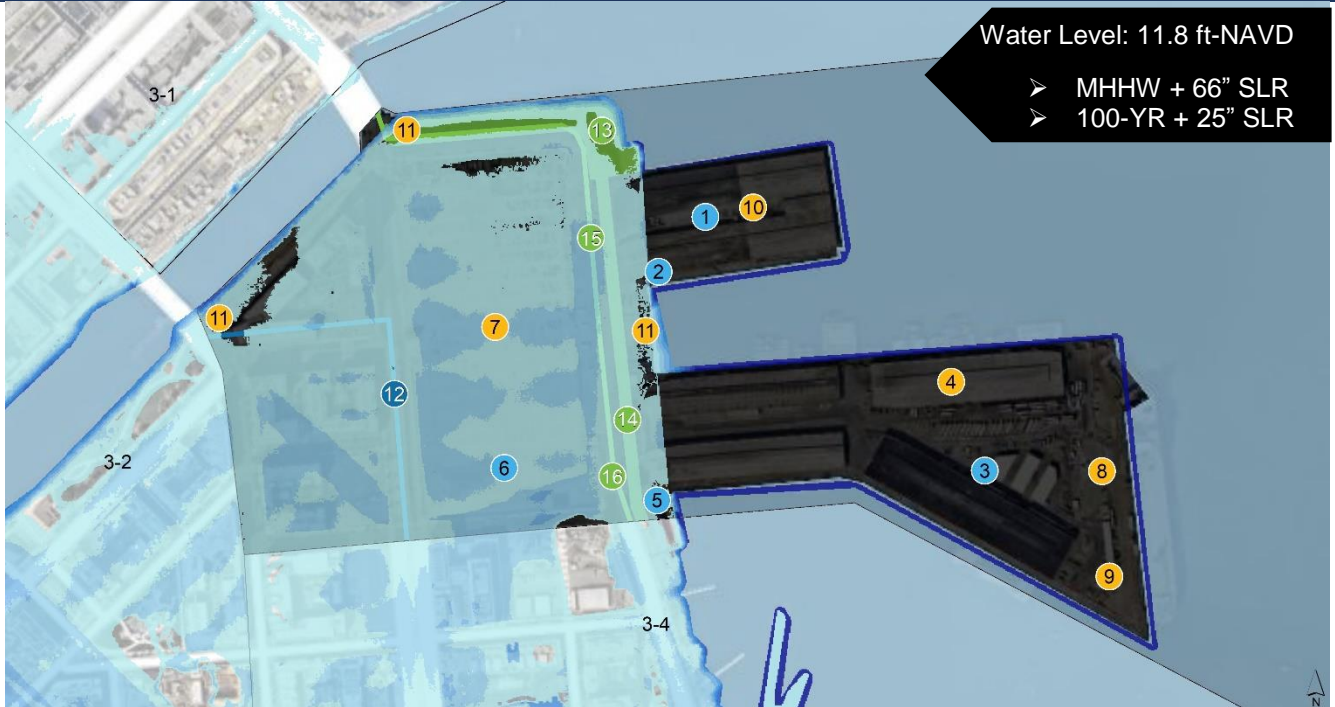


Mission Rock

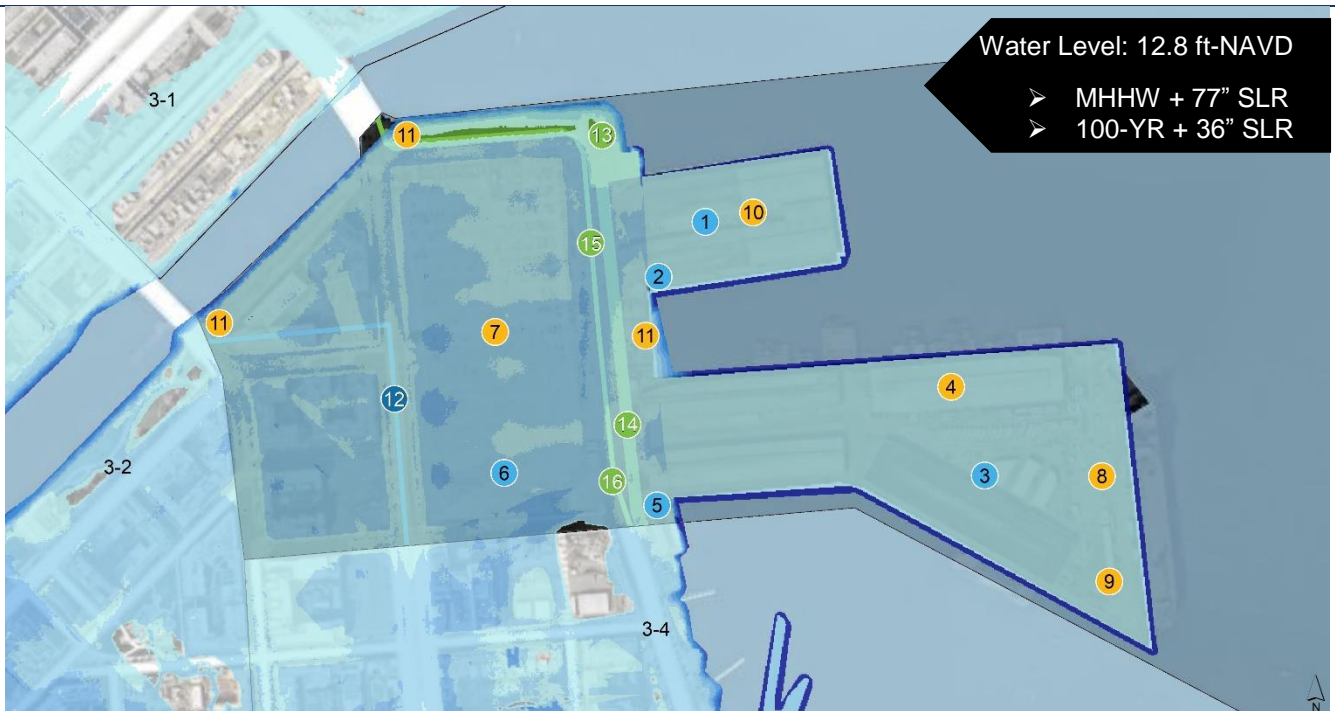
Subarea 3-3



Substantial Flood Risk (Tipping Point)



Long-Term Flood Risk (>2050)



Mission Rock

Subarea 3-3



The following describes the progression of potential extreme tide and sea level rise flooding, along with a brief discussion of the assets that will be impacted within Subarea 3-3.

Flood Scenario	Assets	Consequences				
		USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
High tide + 12" SLR	1-YR + 0" SLR	Today	Today	Today	Today	Today
Water Level Elevation: 7.3 ft. NAVD88		--	--	--	--	--
High tide + 24" SLR	5-YR + 0" SLR	Today	Today	Today	Today	Today
Water Level Elevation: 8.3 ft. NAVD88			Disaster Response			
			Three fire suction connection (part of the Emergency Firefighting Water System, EFWS) that allows fire engines to draw water from the Bay for fire suppression is inundated. Suction connections become unusable if they are inundated, primarily due to limitations related to fire truck access.			
High tide + 36" SLR	50-YR + 0" SLR	Today	Today	Today	Today	Today
Water Level Elevation: 9.3 ft. NAVD88			Open Space and Ecology			
			China Basin Park, along the southern shoreline of Mission Creek, will be impacted. This park space is designed to accommodate temporary inundation and has a funding mechanism that will contribute to onsite and offsite SLR adaptation.			
High tide + 48" SLR	100-YR + 7" SLR	2094	2050	2034	2026	2024
Water Level Elevation: 10.2 ft. NAVD88			Maritime			
			Seawall Lot 337 is inundated. A new waterfront promenade landside of Pier 48 and Pier 50 is planned for this area. Landside access to Pier 48 and Pier 50 will be impacted by inundation of Terry A. Francois Boulevard.			



Flood Scenario	Assets	Consequences
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Disaster Response

Inundation of the Assembly Area located at Seawall Lot 337N (Lot A / San Francisco Giants ballpark parking) impacts its ability to serve people waiting to evacuate after an emergency or disaster.



Utilities

Streetlights within this subarea would experience inundation.



Open Space and Ecology

The planned paved open space at Seawall Lot 337 will be impacted. The Bay Trail and Blue Greenway that run through this subarea will also be inundated.

High tide + 52" SLR	100-YR + 11" SLR	USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
		2145	2068	2045	2037	2033

Water Level Elevation: 10.7 ft. NAVD88



Maritime

The temporary Chase Center Ferry Terminal and Administration Building located on Pier 50½ will be impacted.

High tide + 66" SLR	100-YR + 25" SLR	USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
		>2150	2116	2073	2061	2053

Water Level Elevation: 11.8 ft. NAVD88



Maritime

Landside access to Pier 48 and Pier 50 will be completely blocked due to inundation of Terry A. Francois Boulevard.



Transportation

The Muni T-Line will be impacted. The Muni T-Line is track-based and cannot be rerouted.

Mission Rock

Subarea 3-3



Flood Scenario	Assets	Consequences				
		USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
High tide + 77" SLR	100-YR + 36" SLR	>2150	2145	2092	2075	2064

Water Level Elevation: 12.8 ft. NAVD88



Maritime

Pier 48 and Pier 50 will be inundated. Pier 48 is historic pier within the Embarcadero Historic District. It is leased by several companies and serves a variety of maritime, commercial, environmental, and emergency response uses. Maintenance facilities will be impacted at Pier 50. Westar Marine Services is headquartered at Pier 50 and provides a variety of marine services, including marine construction support, ship assist, barge and tanker escort, storage and delivery to vessels anchored in San Francisco Bay, ship staff water taxi service, offshore towing, and specialty barge services.



Disaster Response

Several assets that disaster response and emergency operations will be impacted, including Tugboat Facilities at Pier 48 and Pier 50. Pier 50 also houses Primary Oil Spill Response Equipment.

Flood Scenario	Assets	Consequences				
		USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
High tide + 84" SLR	100-YR + 43" SLR	>2150	>2150	2105	2083	2069

Water Level Elevation: 13.3 ft. NAVD88

Flood Scenario	Assets	Consequences				
		USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
High tide + 96" SLR	100-YR + 55" SLR	>2150	>2150	2126	2096	2078

Water Level Elevation: 14.3 ft. NAVD88

Flood Scenario	Assets	Consequences				
		USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
High tide + 108" SLR	100-YR + 67" SLR	>2150	>2150	2146	2108	2087

Water Level Elevation: 15.3 ft. NAVD88



Adaptation Focus: Immediate



Shoreline Characteristics	Shoreline Overtopping					Timing of Impact (100-YR)				
	Classification	Avg. Elev.	Avg. Depth (ft)	Max Depth (ft)	Length (ft)	%	USACE Low	USACE Inter.	OPC Most Likely	USACE High
Engineered	9.9 ft. NAVD	0.7	1.7	421	4.8%	2094	2050	2034	2026	2024

Flood Pathways

- Flooding impacts the parking area (for the San Francisco Giants ballpark and other entertainment events) located adjacent to the Mission Bay shoreline, Pier 48, and Pier 50.
- Flooding in this subarea comes from a narrow flood pathway on Terry Francois Boulevard (adjacent to the Bay shoreline) that acts as a conduit to carry floodwaters originating from shoreline overtopping in Subarea 3-4.
- There is very minor localized inundation on both sides of Pier 48 from overtopping of the adjacent Bay shoreline.

Shoreline Focus

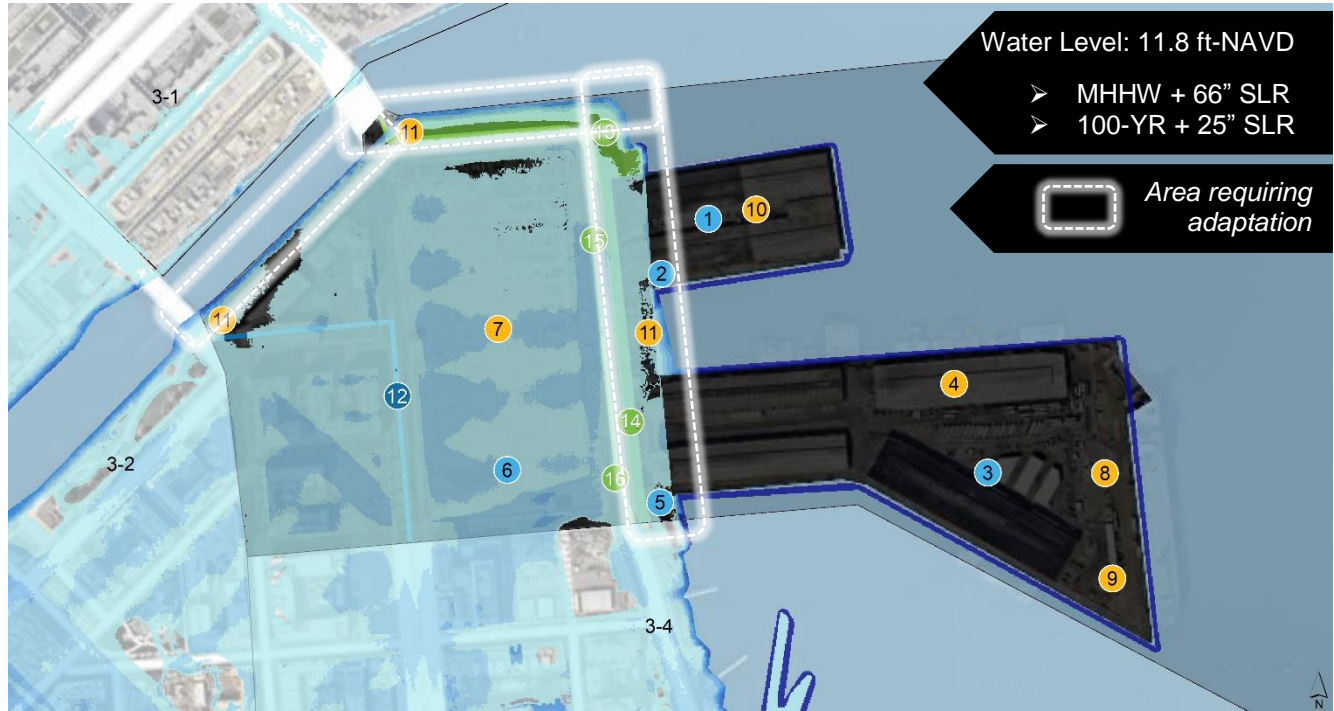
- Isolated adaptation measures at the overtopping locations within this subarea would address flooding at the MHHW + 48" scenario.
- Additional adaptation measures are needed in Subarea 3-4 are required to reduce flood risk in this subarea.

Adaptation Considerations

- Higher water levels will eventually overtop most of Mission Creek, McCovey, and Bay shoreline. Adaptation measures should consider embedding capacity to adapt to higher water levels over time.



Adaptation Focus: Tipping Point



Shoreline Characteristics	Shoreline Overtopping					Timing of Impact (100-YR)				
	Classification	Avg. Elev.	Avg. Depth (ft)	Max Depth (ft)	Length (ft)	%	USACE Low	USACE Inter.	OPC Most Likely	USACE High
Embankment; Engineered	11.1 ft. NAVD	0.7	2.9	2,975	33.7%	>2150	2116	2073	2061	2053

Flood Pathways

- Overtopping occurs over a significant stretch of the Mission Creek, McCovey Cove (east of Third Street Bridge), and Bay shoreline (not including the piers), resulting in widespread inundation of the subarea (not including the piers).
- Flooding comingles with the adjacent 3-2 and 3-4 Subareas.

Shoreline Focus

- Subarea wide shoreline adaptation measures are required.

Adaptation Considerations

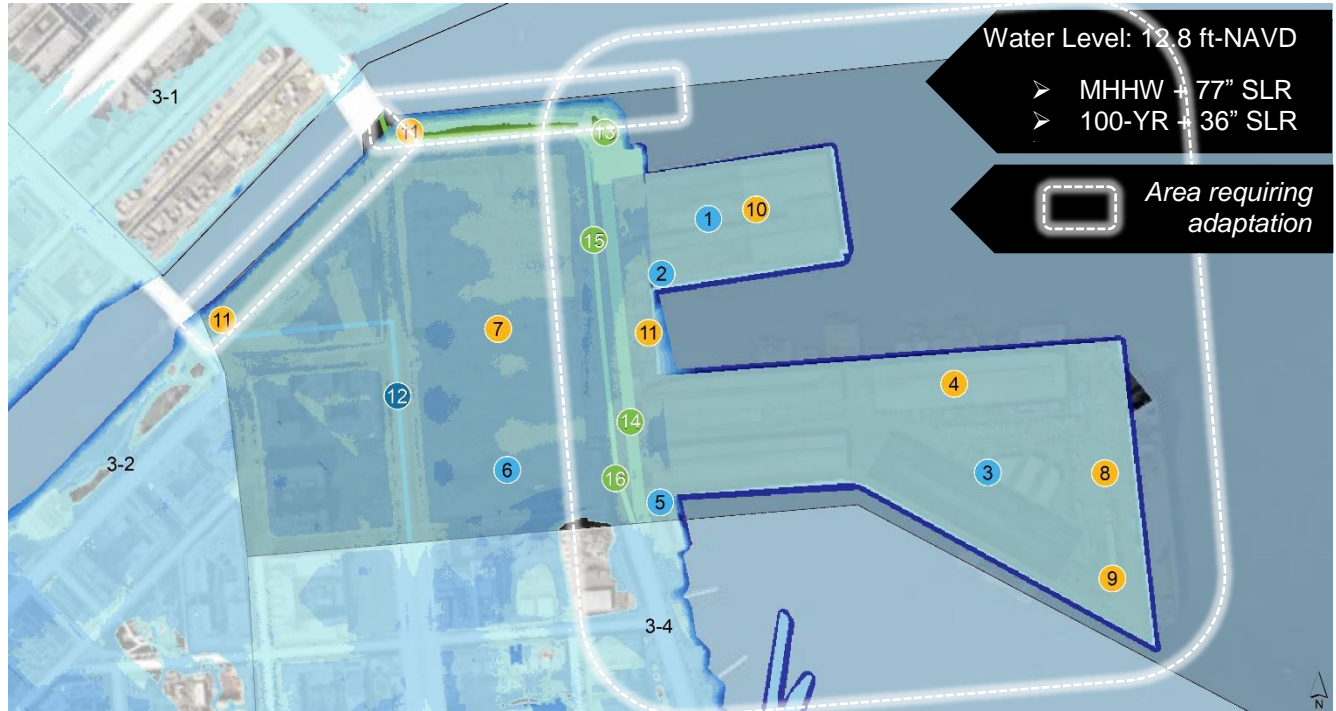
- Flooding comingles with the adjacent 3-2 and 3-4 Subareas, requiring adaptation measures to be coordinated across these subareas and implemented in tandem.
- Adaptation measures should consider embedding capacity to adapt to higher water levels over time.

Mission Rock

Subarea 3-3



Adaptation Focus: Long-Term >2050



Shoreline Characteristics	Shoreline Overtopping					Timing of Impact (100-YR)				
	Classification	Avg. Elev.	Avg. Depth (ft)	Max Depth (ft)	Length (ft)	%	USACE Low	USACE Inter.	OPC Most Likely	USACE High
Embankment; Engineered	11.7 ft. NAVD	1.1	2.9	8,830	100.0 %	>2150	2145	2092	2075	2064

Flood Pathways

- Overtopping occurs over the entire stretch of the Mission Creek, McCovey Cove (east of Third Street Bridge), and Bay shoreline (including Piers 48 and 50), resulting in widespread inundation of the subarea.
- Flooding comingles with the adjacent 3-2 and 3-4 Subareas.

Shoreline Focus

- Subarea wide shoreline adaptation measures are required.

Adaptation Considerations

- Flooding comingles with the adjacent 3-2 and 3-4 Subareas (the entire shoreline within these subareas will be overtopped), requiring adaptation measures to be coordinated across these subareas and implemented in tandem.