

# Mission Creek

## Subarea 3-2



### Subarea Description

Mission Creek (Subarea 3-2) includes the Mission Creek Channel and much of the watershed in the South of Market (SoMa), Mission and Potrero Hill neighborhoods. It is bordered by Howard Street on the north side, 4th Street on the east, Mariposa Street on the south, and approximately South Van Ness Avenue on the west. The subarea includes all of Mission Creek, including its houseboats, a kayak boat launch, ferry and water taxi piers, berths, and harbor services, and old and new residential housing, grocery stores, and additional community services.

Critical infrastructure further includes two drawbridges, the Lefty O’Doul Third Street Bridge and Peter R. Maloney Fourth Street Bridge that cross the Mission Creek Channel, local and regional transportation assets, such as Muni’s surface light rail T-line, Interstate 280 freeway off-ramps, Caltrain King Street Station and Transit Hub, SoMa Recreation Center, and disaster response assets, such as Fire Stations 1, 8 and 29, and wastewater assets, including five pump stations and six combined sewer discharge outfalls.

The shoreline is mostly engineered (embankment) with some minor fringe wetlands along the north side of the Mission Creek Channel. Mission Creek is subdivided into the Mission Creek inlet (west of the Third Street bridge) and McCovey cove (east of the Third Street Bridge). McCovey Cove includes a ferry dock, a houseboat community along the south side, and a public access walkway along the north side. Wave hazards are minimal within McCovey Cove and Mission Creek.

The primary flooding pathway is overtopping along the shoreline. Flooding first occurs along Mission Creek Shoreline Park, inundating a few streets of the adjacent residential neighborhood. Higher Bay water levels would result in overtopping along most of the Mission Creek shoreline, allowing floodwaters to extend several streets inland and coming with flooding from the adjacent subareas.



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## Assets and Landmarks



### Maritime

1. Mission Creek Harbor



### Disaster Response

- |                    |                                 |
|--------------------|---------------------------------|
| 2. Fire Station 1  | 5. EFWS Suction Connections (3) |
| 3. Fire Station 29 | 6. EFWS Cisterns (15)           |
| 4. Fire Station 8  |                                 |



### Transportation

- |  |   |
|--|---|
| 7. Lefty O'Doul Bridge / 3rd Street Bridge | 9. Caltrain King Street Station / Transit Hub |
| 8. Peter R. Maloney / 4th Street Bridge    |   |



### Utilities

#### Wastewater

- |                                  |   |
|----------------------------------|---|
| 10. Channel Pump Station         | 15. Channel Force Main                    |
| 11. Shotwell Pump Station        | 16. North Channel Transport / Storage Box |
| 12. Merlin Morris Pump Station   | 17. South Channel Transport / Storage Box |
| 13. Harriet-Lucerne Pump Station | 18. Combined Sewer Discharge Outfalls (2) |
| 14. Berry Street Pump Station    |   |



### Open Space and Ecology

#### Open Space

- |                                  |  |
|----------------------------------|--|
| 19. Mission Creek Garden         | 24. SoMa Recreation Center               |
| 20. Mission Creek Shoreline Park | 25. Utah & 18th Mini Park                |
| 21. Franklin Square              | 26. Victoria Manalo Draves Park          |
| 22. Howard & Langton Mini Park   | 27. Bay Trail                            |
| 23. Jackson Playground           | 28. Bay Water Trail Mission Creek Launch |





## Assets and Landmarks



### Critical Facilities

- 29. County Jail 1 (Intake & Release)
- 30. County Jail 2
- 31. County Jail 4
- 32. Public Defender's Office
- 33. San Francisco City Clinic
- 34. County Criminal Courts, Hall of Justice
- 35. Women's Resource Center
- 36. Fifth Street Homeless Center
- 37. San Francisco Jail Health Center

## 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
 <b>Maritime</b>							
<ul style="list-style-type: none"> <li>• Mission Creek Harbor</li> </ul>	52" (10.7 ft. NAVD)	High tide + 52" SLR	>2150	>2150	2120	2092	2076
		100-YR + 11" SLR	2145	2068	2045	2037	2033
 <b>Disaster Response</b>							
<ul style="list-style-type: none"> <li>• EFWS Suction Connections (2 of 3)</li> </ul>	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"> <li>• Fire Station 8</li> <li>• EFWS Cisterns (3 of 15)</li> </ul>	66" (11.8 ft. NAVD)	High tide + 66" SLR	>2150	>2150	2143	2106	2086
		100-YR + 25" SLR	>2150	2116	2073	2061	2053
<ul style="list-style-type: none"> <li>• Fire Station 1</li> </ul>	108" (15.3 ft. NAVD)	High tide + 108" SLR	>2150	>2150	>2150	2140	2119
		100-YR + 67" SLR	>2150	>2150	2146	2108	2087
<ul style="list-style-type: none"> <li>• Fire Station 29</li> </ul>	> 108"	--	--	--	--	--	--



## 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
 <b>Utilities</b>							
<ul style="list-style-type: none"> <li>Combined Sewer Discharge Outfalls (2)</li> </ul>	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"> <li>Berry Street Pump Station</li> </ul>	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"> <li>Channel Pump Station</li> <li>Merlin Morris Pump Station</li> <li>Harriet-Lucerne Pump Station</li> </ul>	66" (11.8 ft. NAVD)	High tide + 66" SLR	>2150	>2150	2143	2106	2086
		100-YR + 25" SLR	>2150	2116	2073	2061	2053
<ul style="list-style-type: none"> <li>Shotwell Pump Station</li> </ul>	> 108"	--	--	--	--	--	--
<ul style="list-style-type: none"> <li>Channel Force Main</li> <li>North Channel Transport / Storage Box</li> <li>South Channel Transport / Storage Box</li> </ul>	--	--	--	--	--	--	--
 <b>Transportation</b>							
<ul style="list-style-type: none"> <li>Lefty O'Doul Bridge / 3rd Street Bridge</li> <li>Peter R. Maloney / 4th Street Bridge</li> </ul>	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"> <li>Caltrain King Street Station / Transit Hub</li> </ul>	52" (10.7 ft. NAVD)	High tide + 52" SLR	>2150	>2150	2120	2092	2076
		100-YR + 11" SLR	2145	2068	2045	2037	2033



## 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
 <b>Open Space and Ecology</b>							
<ul style="list-style-type: none"> <li>Mission Creek Shoreline Park</li> </ul>	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"> <li>Bay Water Trail Mission Creek Boat Launch</li> </ul>	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"> <li>Mission Creek Garden</li> <li>Bay Trail</li> </ul>	66" (11.8 ft. NAVD)	High tide + 66" SLR	>2150	>2150	2143	2106	2086
		100-YR + 25" SLR	>2150	2116	2073	2061	2053
<ul style="list-style-type: none"> <li>SOMA Rec Center</li> <li>Victoria Manalo Draves Park</li> </ul>	108" (15.3 ft. NAVD)	High tide + 108" SLR	>2150	>2150	>2150	2140	2119
		100-YR + 67" SLR	>2150	>2150	2146	2108	2087
<ul style="list-style-type: none"> <li>Franklin Square</li> <li>Howard &amp; Langton Mini Park</li> <li>Jackson Playground</li> <li>Utah &amp; 18th Mini Park</li> </ul>	> 108"	--	--	--	--	--	--
 <b>Critical Facilities</b>							
<ul style="list-style-type: none"> <li>Public Defender's Office</li> <li>Fifth Street Homeless Center</li> <li>San Francisco Jail Health Center</li> </ul>	66" (11.8 ft. NAVD)	High tide + 66" SLR	>2150	>2150	2143	2106	2086
		100-YR + 25" SLR	>2150	2116	2073	2061	2053
<ul style="list-style-type: none"> <li>County Jail 4</li> <li>County Criminal Courts, Hall of Justice</li> </ul>	84" (13.3 ft. NAVD)	High tide + 84" SLR	>2150	>2150	2143	2106	2086
		100-YR + 43" SLR	>2150	2116	2073	2061	2053



## 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
<ul style="list-style-type: none"> <li>County Jail 1 (Intake &amp; Release)</li> <li>County Jail 2</li> <li>San Francisco City Clinic</li> <li>Women's Resource Center</li> </ul>	> 108"	--	--	--	--	--	--

## Timing of Exposure: Subarea

Adaptation Focus	Shoreline Type	Flood Scenario	Return	Timing				
				USACE Low	USACE Inter.	OPC Most Likely	USACE High	OPC 1-in-200
Immediate	Embankment	36" (9.3 ft. NAVD)	High tide + 36" SLR	>2150	2144	2091	2074	2063
			50-YR + 0" SLR	Today	Today	Today	Today	Today
Tipping Point	Embankment; Engineered	48" (10.2 ft. NAVD)	High tide + 48" SLR	>2150	>2150	2113	2088	2073
			100-YR + 7" SLR	2094	2050	2034	2026	2024
Long Term >2050	Embankment; Engineered	77" (12.7 ft. NAVD)	High tide + 77" SLR	>2150	>2150	>2150	2116	2095
			100-YR + 36" SLR	>2150	2145	2092	2075	2064

# Mission Creek

Subarea 3-2



## Flood Progression

### Immediate Flood Risk



### Substantial Flood Risk (Tipping Point)

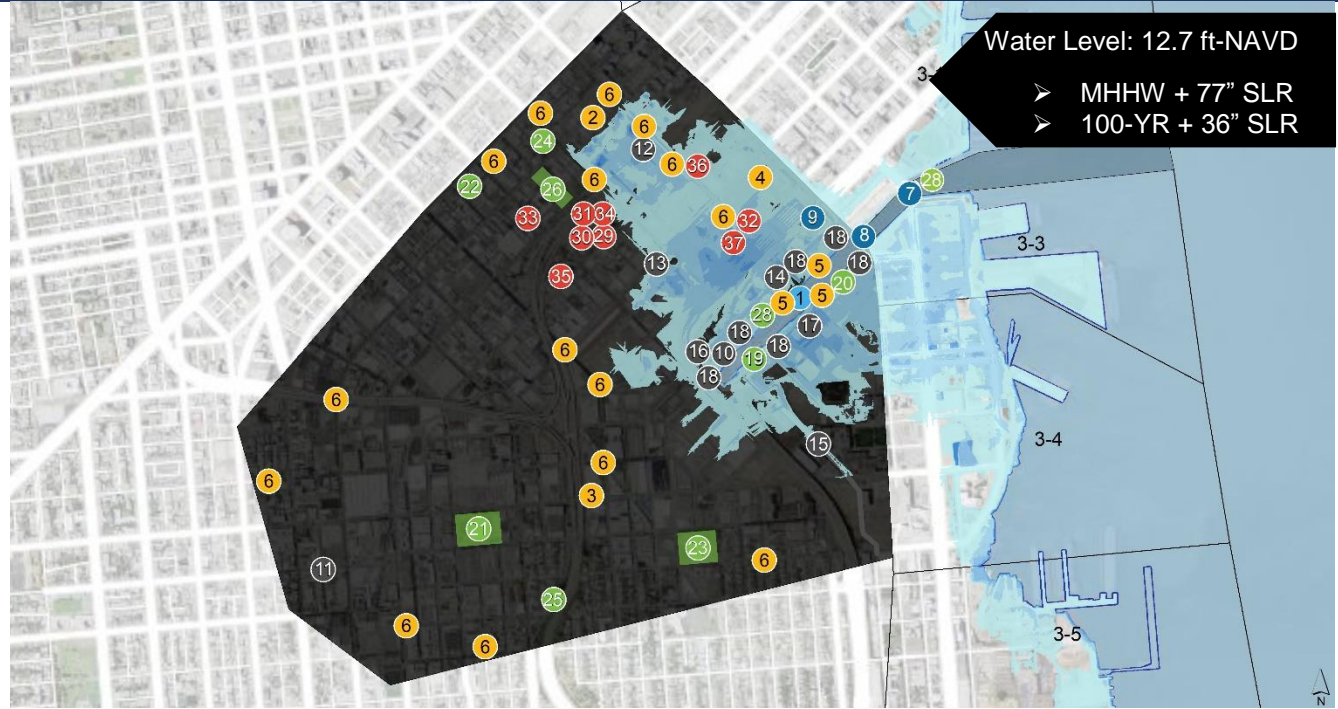


# Mission Creek

Subarea 3-2



## Long-Term Flood Risk (>2050)





# Mission Creek

## Subarea 3-2



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 3-2.

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

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High tide + 24" SLR	5-YR + 0" SLR	Today	Today	Today	Today	Today
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Water Level Elevation: 8.3 ft. NAVD88



### Disaster Response

Two fire suction connections (part of the Emergency Firefighting Water System, EFWS) that allow fire engines to draw water from the Bay for fire suppression are inundated. Suction connections become unusable if they are inundated, primarily due to limitations related to fire truck access.



### Utilities

The higher Bay water levels may reduce the gravity-driven flow of excess combined wastewater and stormwater from the transport / storage boxes to the Bay. This impact is only of concern during intense and prolonged rainfall events that exceed the capacity of the large underground transport / storage boxes that ring the city. This could result in an increase in localized flooding in low-lying areas.



### Transportation

Both drawbridges across Mission Creek (Lefty O'Doul / 3rd Street Bridge and the Peter R. Maloney / 4th Street Bridge) will be impacted, resulting in cascading consequences to local and through traffic and operation of the Muni T-Line. Disruption of the Muni T-Line would create cascading consequences throughout the Muni system.

The Lefty O'Doul / 3rd Street Bridge has five lanes that provide vehicular and shared

# Mission Creek

## Subarea 3-2



Flood Scenario	Assets	Consequences				
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bicycle mobility in addition to separated pedestrian walkways. The lower portion of the span already experiences submergence during present-day high tides; during very high tides, bearing plates and anchor bolts at the bridge pier become submerged and can reach the bottom flange of the main bridge stringers. Some high tides also overtop the concrete pier.

The Peter R. Maloney / 4th Street Bridge has multiple vehicular lanes, supports the Muni T-Line, and has separated pedestrian and bicycle access. This bridge has a single-level deck and structural components (support piles, steel trusses), mechanical components (counterweights, motors), and electrical components that allow the bridge to open for ship navigation through the Mission Creek channel. Inundation of the mechanical or electrical components could impact bridge operations.

High tide + 36" SLR	50-YR + 0" SLR	USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
		Today	Today	Today	Today	Today

Water Level Elevation: 9.3 ft. NAVD88



### Disaster Response

One additional fire suction connection at the shoreline would be inundated.



### Utilities

Streetlights on the south shoreline of Mission Creek would experience inundation.



### Open Space and Ecology

Mission Creek Shoreline Park adjacent to the south shoreline of Mission Creek will experience inundation. Overtopping along the soft (non-engineered) shoreline areas will allow flooding of the nearby residential area.

High tide + 48" SLR	100-YR + 7" SLR	USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
		2094	2050	2034	2026	2024

Water Level Elevation: 10.2 ft. NAVD88



### Open Space and Ecology

The Bay Water Trail Mission Creek Launch is inundated. This low-lying dock allows small boating to access Mission Creek and McCovey Cove.

# Mission Creek

## Subarea 3-2



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

Water Level Elevation: 10.7 ft. NAVD88



### Maritime

Mission Creek Harbor, including its community of approximately 20 houseboats moored on docks, would be affected. Although less than a quarter acre is shown as flooded, support facilities and utilities connected to the houseboats are sensitive to disruption. The utilities have been designed to accommodate sea level rise and flooding. However, permanent inundation could limit the use of the site, and due to its water dependent nature, the harbor would not be easy to relocate. This houseboat community would also be impacted by any loss in the ability to operate the drawbridges.



### Utilities

The Berry Street pump station is potentially inundated. It is a wet-weather pump station located below grade at the corner of Berry Street and 5th Street adjacent to Mission Creek, approximately 200 feet from the San Francisco Bay shoreline. It serves the Channel drainage basin with a pumping capacity of 9.2 mgd. During wet weather, this pump station conveys combined flows from the Berry Street drainage area to a sewer on 5th Street. Electrical equipment and controls are located at and below grade and can be affected by floodwaters entering through openings at grade. The at grade electrical controls are also at risk from shallow flooding. Impacts at this pump station could result in localized flooding during wet weather; however, the larger Mission Creek neighborhood would not be impacted.

Streetlights near both shorelines of Mission Creek would experience inundation.



### Transportation

The Caltrain tracks at the Caltrain King Street Station and Transit Hub are inundated. The station is primarily located at street level and would be impacted at the MHHW + 66" scenario, including pedestrian access, rail infrastructure, and equipment; there is no public parking available. It has building structures, fare vending equipment, waiting areas, and bicycle facilities, as well as bus and shuttle loading areas. It experiences the highest average weekday boarding volume of all Caltrain stations.

# Mission Creek

## Subarea 3-2



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

Water Level Elevation: 11.8 ft. NAVD88



### Disaster Response

In addition to Fire Station 8, three of the fifteen EFWS cisterns will be impacted. The cisterns are large, underground concrete tanks that store water for firefighting purposes.



### Utilities

The Channel pump station will be impacted, which could have widespread consequences for the neighborhood within this Subarea and the city. The Channel pump station is located near Mission Bay in a mixed residential and industrial area directly adjacent to the Mission Bay shoreline. This pump station serves both the Channel and Northshore drainage basins with a pumping capacity of 103 mgd and operates continuously in both dry and wet weather. In dry weather, Channel pump station receives, and transports wastewater pumped from the North Shore pump station and flows from the Channel drainage area. The pump station conveys wastewater through the Channel force main to the Southeast Treatment Plant. In wet weather, combined flows are conveyed from the local drainage area to the Southeast Treatment Plant.

Two additional smaller wastewater pump stations (Harriet Lucerne and Merlin Morris) will also be impacted during this scenario, resulting in localized flooding. The Harriet-Lucerne pump station is a below grade pump station located on Harriet Street with a pumping capacity of 7.3 mgd, and the Merlin Morris pump station is a below grade pump station located on Merlin Street (near Harrison Street) with a pumping capacity of 9.2 mgd. Impacts at these pump stations could result in localized flooding; however, the larger Mission Creek neighborhood would not be impacted.



### Transportation

All facilities at the King Street Station and Transit Hub will be inundated.



### Open Space and Ecology

The Bay Trail crossing over Mission Creek at the 4<sup>th</sup> Street Bridge will be impacted.

Mission Creek Garden along the southern Mission Creek shoreline will be inundated.

# Mission Creek

## Subarea 3-2



Flood Scenario	Assets	Consequences				
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### Critical Facilities

The Public Defender’s Office, Fifth Street Homeless Center, and the San Francisco Jail Health Center will be inundated. The Public Defender’s Office provides legal representation for people who are charged with a crime and unable to afford an attorney. The office provides legal representation to over 25,000 people charged with crimes each year and employs over 100 attorneys and 60 staff members.

The Fifth Street Homeless Center is San Francisco’s largest and most extensive homeless facility. It is also the largest homeless shelter in Northern California, offering a wide range of services and assistance programs aimed to improve the basic quality of life for the individuals and families served.

High tide + 77” SLR	100-YR + 36” SLR	USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
		>2150	2145	2092	2075	2064
Water Level Elevation: 12.7 ft. NAVD88		--	--			

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

Water Level Elevation: 13.3 ft. NAVD88



### Critical Facilities

The County Criminal Courts at the Hall of Justice will be impacted.

County Jail 4 will also be impacted. This jail is the maximum-security facility of the San Francisco County Jail system.

High tide + 96” SLR	100-YR + 55” SLR	USACE Low	USACE Int.	OPC Most Likely	USACE High	OPC 1:200
		>2150	>2150	2126	2096	2078
Water Level Elevation: 14.3 ft. NAVD88		--	--			

# Mission Creek

Subarea 3-2



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



### Open Space and Ecology

The SoMa Recreation Center (athletic and activities center) and Victoria Manalo Draves Park (2-acre community park with gardens, ball fields, and playground) are both inundated.



## Adaptation Focus: Immediate



Shoreline Characteristics	Shoreline Overtopping					Timing of Impact (100-YR)				
	Avg. Elev.	Avg. Depth (ft)	Max Depth (ft)	Length (ft)	%	USACE Low	USACE Inter.	OPC Most Likely	USACE High	OPC 1-in-200
Embankment	8.8 ft. NAVD	0.7	1.6	300	5.4%	Today	Today	Today	Today	Today

### Flood Pathways

- Overtopping occurs along a short distance of non-engineered shoreline (south shoreline) at Mission Creek resulting in localized flooding of the adjacent Mission Creek Park and residential neighborhood.
- Overtopping occurs at an isolated area near the Interstate 280 overpass, resulting in localized flooding of the King Street and Berry Street intersection. Flooding occurs due to overtopping of an existing drainage channel adjacent to the Channel Pump station that discharges into Mission Creek from this intersection.

### Shoreline Focus

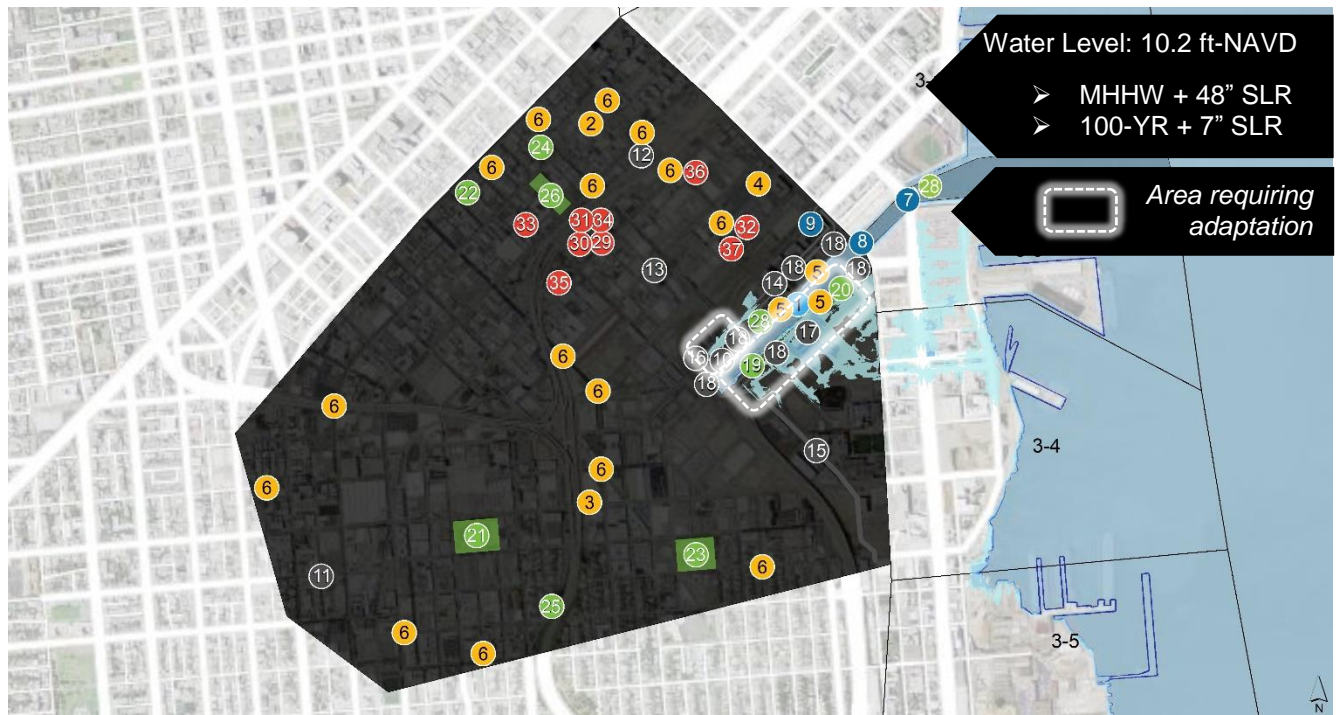
- Isolated adaptation measures at the overtopping locations would address flooding at this scenario.

### Adaptation Considerations

- Higher water levels will eventually overtop most of Mission Creek 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	9.9 ft. NAVD	0.5	2.3	2,000	35.7%	2094	2050	2034	2026	2024

### Flood Pathways

- Overtopping occurs along two locations of the non-engineered shoreline (south shoreline) at Mission Creek, resulting in flooding of multiple streets of the residential neighborhood and impacting local transit routes.
- The flood pathway from overtopping of the southern Mission Creek shoreline is widespread, spanning across several streets.
- Backwater flooding of the drainage channel adjacent to the Channel Pump Station results in floodwaters flowing east along Berry Street. Flooding is localized and contained within 500 feet of the intersection.

### Shoreline Focus

- Addressing overtopping over the low-lying shoreline segments along Mission Creek Shoreline Park will reduce flood risk in this subarea.
- An isolated adaptation measure at the King Street and Berry Street intersection will address flooding on the north side of Mission Creek.

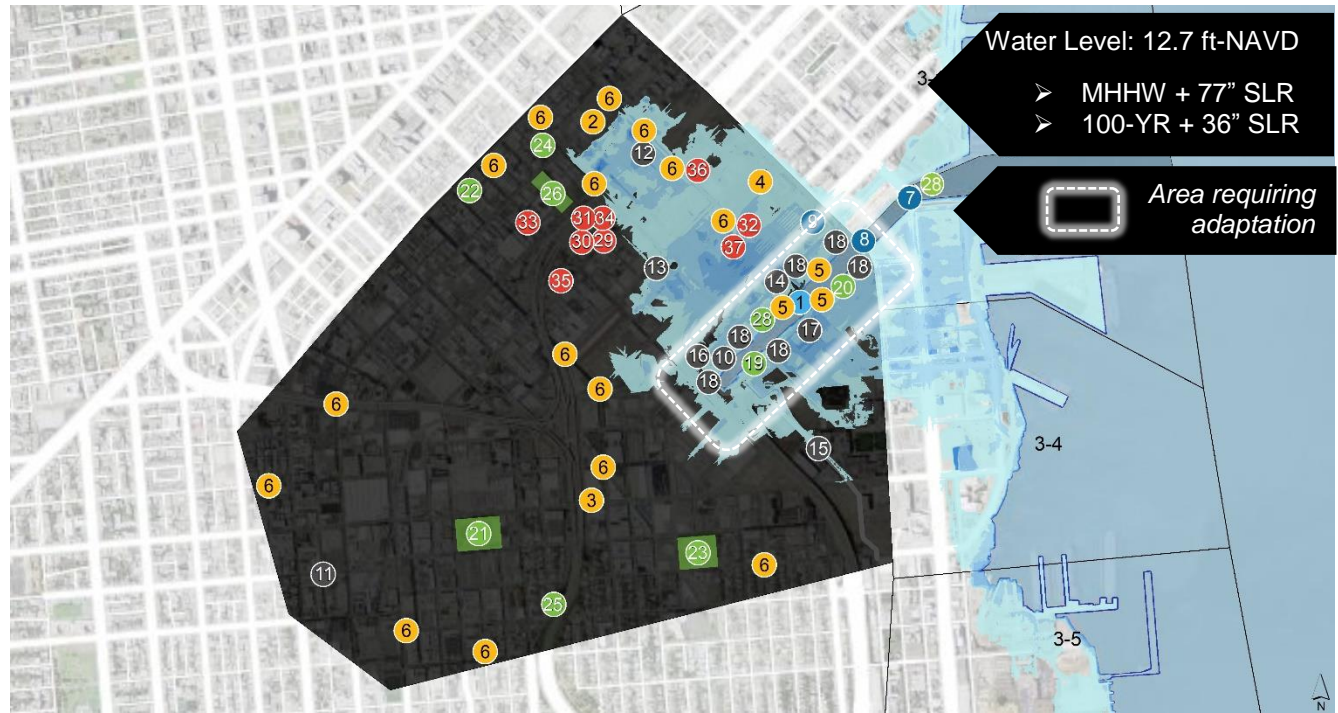
### Adaptation Considerations

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





## Adaptation Focus: Long-Term >2050



Shoreline Characteristics	Shoreline Overtopping					Timing of Impact (100-YR)				
	Avg. Elev.	Avg. Depth (ft)	Max Depth (ft)	Length (ft)	%	USACE Low	USACE Inter.	OPC Most Likely	USACE High	OPC 1-in-200
Embankment; Engineered	10.8 ft. NAVD	2.0	3.5	5,100	91.1%	>2150	2145	2092	2075	2064

### Flood Pathways

- Overtopping occurs over the entire Mission Creek shoreline, resulting in widespread flooding in this subarea.
- The Embarcadero roadway acts as a conduit to convey flooding between the adjacent subareas.
- Flooding extends across Subareas 3-1 and 3-3.

### Shoreline Focus

- Adaptation measures to reduce flood risk are required over the entire southern and northern shoreline of Mission Creek, except at the most upstream shoreline section where the historical creek has been filled and developed.

### Adaptation Considerations

- Adaptation measures to reduce flood risk are required over the entire southern and northern shoreline of Mission Creek, as well as the shoreline of the adjacent Subareas (3-1, 3-2, and 3-3).