

# SP-152 Climate Resiliency Study

Orange County Sanitation District

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Administration Committee  
November 13, 2019



# Reducing Greenhouse Gas Emissions



## Achieving Greenhouse Gas (GHG) Emission Goals at OCSD

### CALIFORNIA GOAL

Reduce GHG emissions 40%  
below 1990 levels by 2030

Senate Bill 32



### We have reduced GHG emissions using several different means



**Water recycling**  
Avoid emissions from pumping imported water



**Renewable energy sources**  
Solar panels designed for new headquarters building



**Low-emissions transportation**  
Fuel-efficient and electric vehicles, compressed natural gas fueling



**Energy and resource recovery**  
Methane produced during wastewater treatment used as an energy source



**High-efficiency assets**  
Variable frequency drives on motors; occupancy sensors for lighting and HVAC



**Battery storage system**  
Offset power demand during critical times

# Regulatory Drivers



Nov 2008

## **EO-S-13-08**

*State agencies to plan for sea level rise and climate impacts through coordination of the state Climate Adaptation Strategy.*

Sep 2016

## **Assembly Bill 2800**

*State agencies shall consider impacts of climate change when planning, designing, building state infrastructure. (July 2020)*

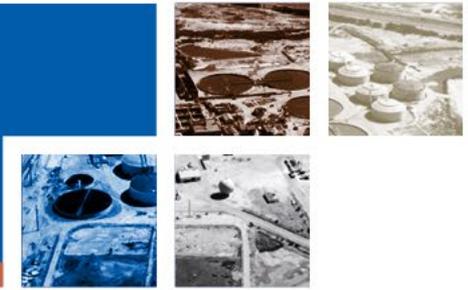
2019

## **OCSD Strategic Plan**

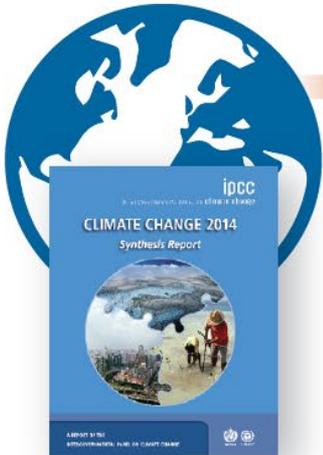
### **NPDES Permit**

*It is anticipated that a "Climate Change Effects Vulnerability Assessment and Mitigation Plan" is required as part of the NPDES Permit*

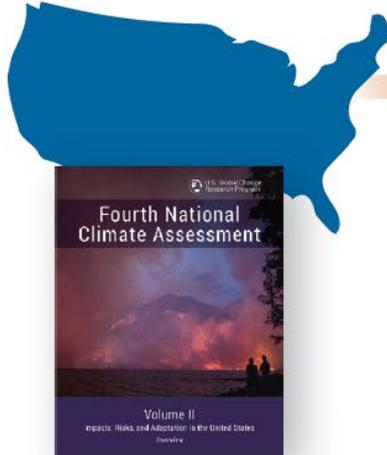
# Recent Climate Science References



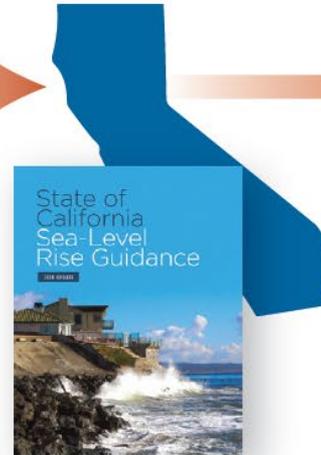
International



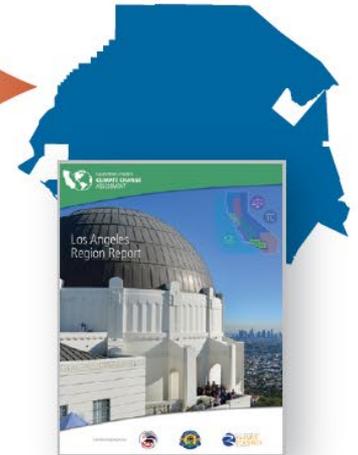
National



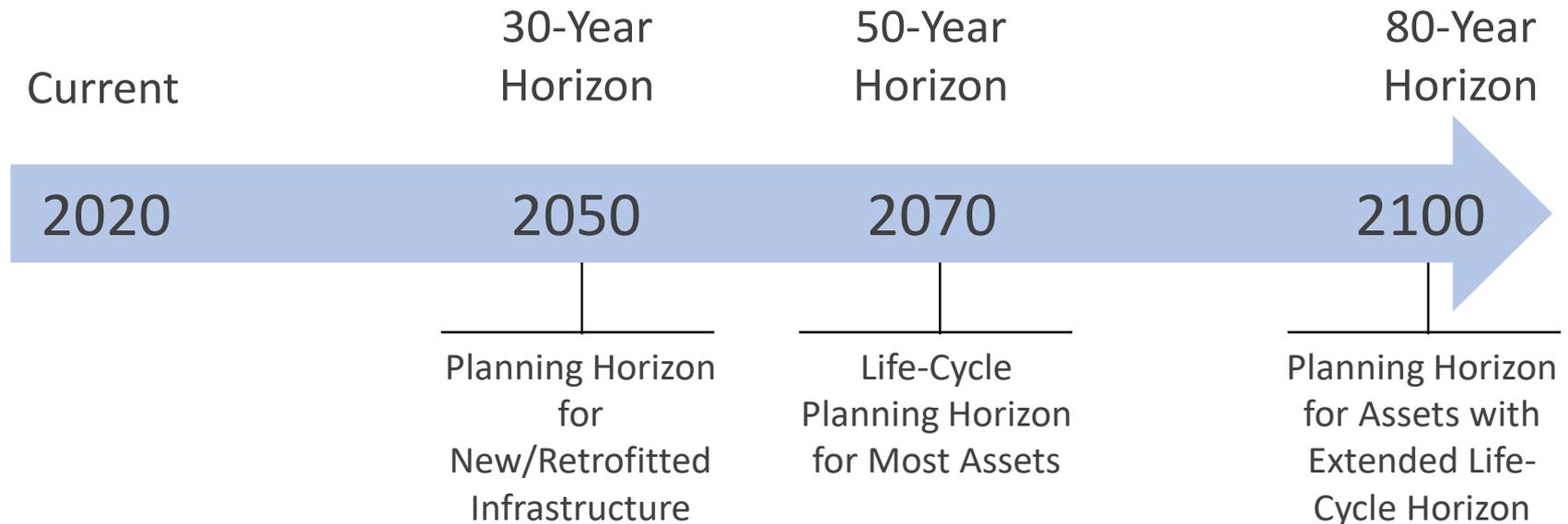
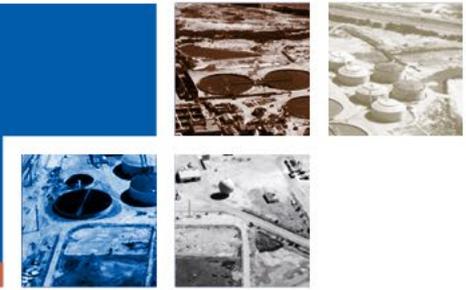
Statewide



Regional



# Planning Horizons for Vulnerability Assessment



***There is time to adapt, and time to course-correct through successive update cycles of the Resiliency Plan***

# Climate Forces



Flooding threatens Plant No. 2 and pump stations near the coast and major channels.



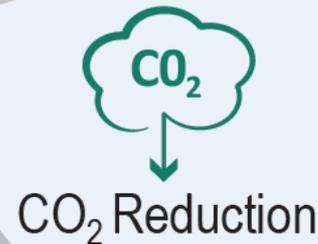
Coastal infrastructure is vulnerable to tsunamis.



Fire and flying embers are a risk to buildings near heavy vegetation.

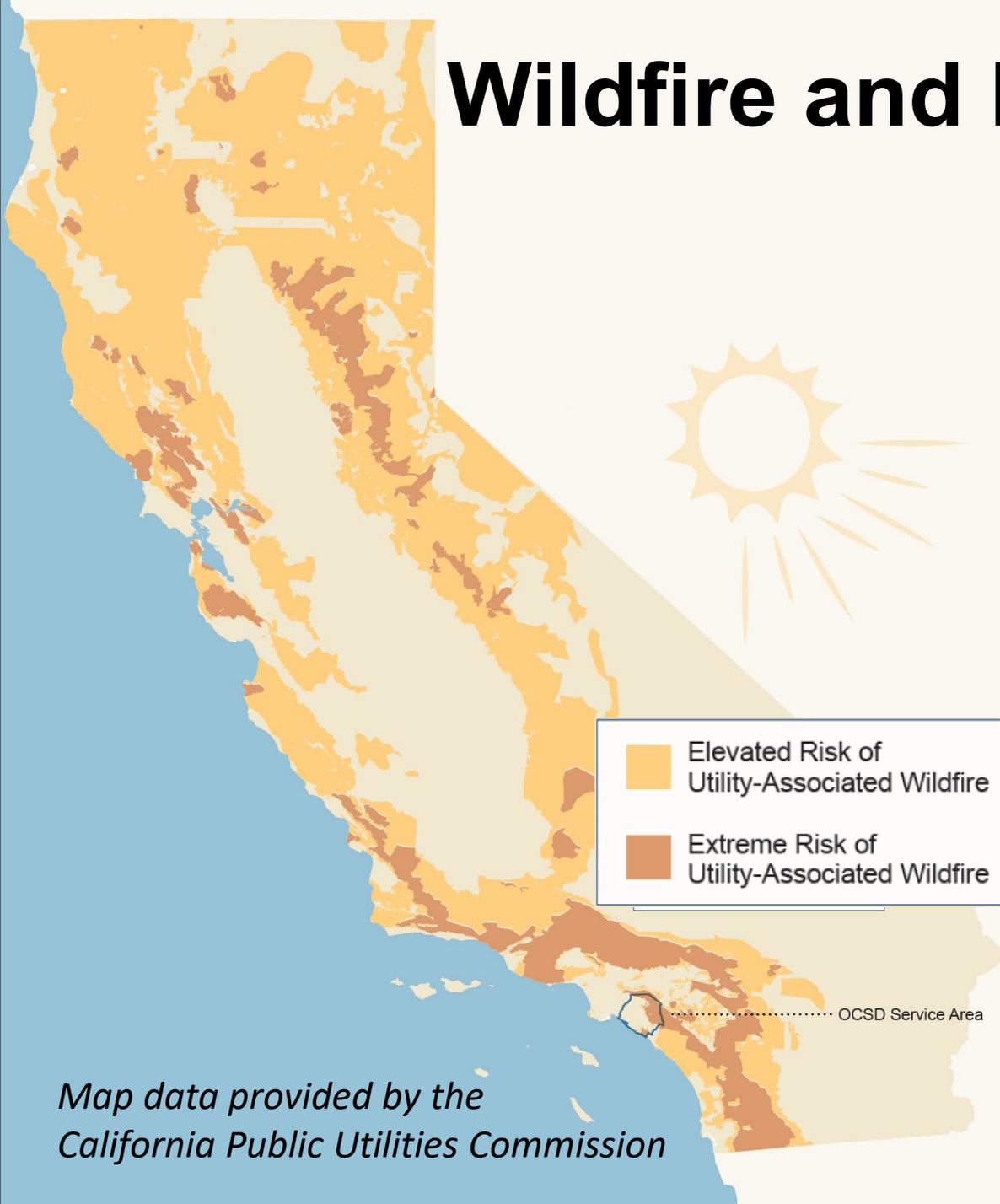


Inland areas are subject to higher temperatures and longer heat waves.



Greenhouse gases, such as carbon dioxide, impact the earth's atmosphere and climate.

# Wildfire and Extreme Heat



Map data provided by the  
California Public Utilities Commission



The Cocos Fire burns in San Marcos, California, in 2014. (theatlantic.com)



Ventura Fire, California, Dec 2017. (@aghakouchak)

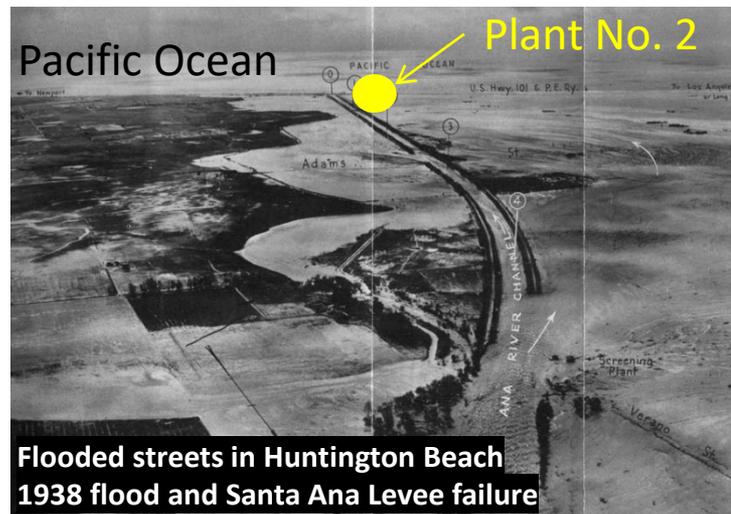
# Flooding in Orange County



Storm Event, Dec 2010  
Balboa Island ([www.scpr.org](http://www.scpr.org))



King Tide 2012, 8th St and Coast Hwy,  
Huntington Beach, (OCREGISTER)



Flooded streets in Huntington Beach  
1938 flood and Santa Ana Levee failure

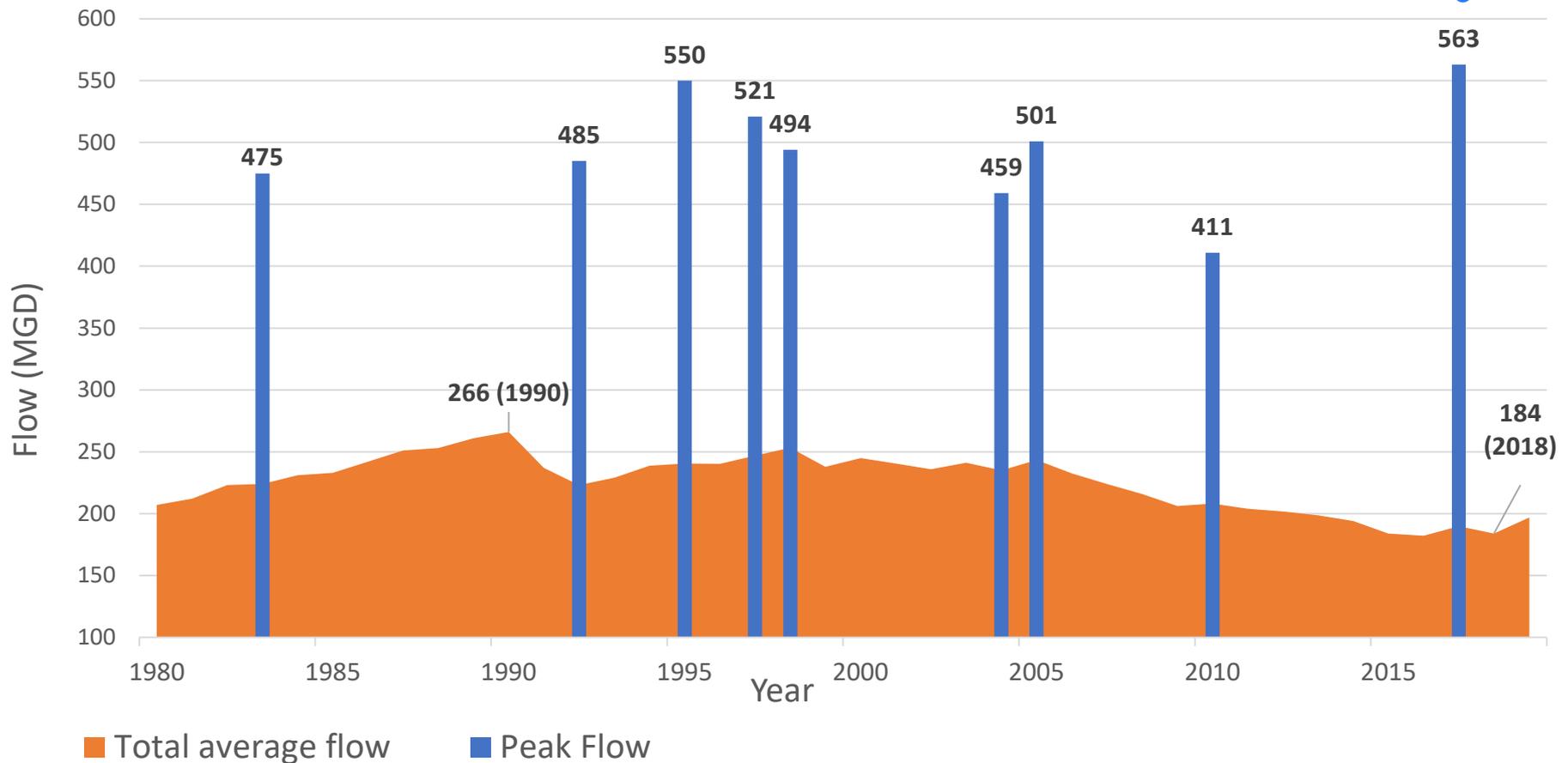


Flooded streets in Newport Beach  
Storm Event 1983, OCREGISTER

# Extreme Flow Events



## Average Monthly Flow (MGD) vs. Peak High Flow Events



# Flooding



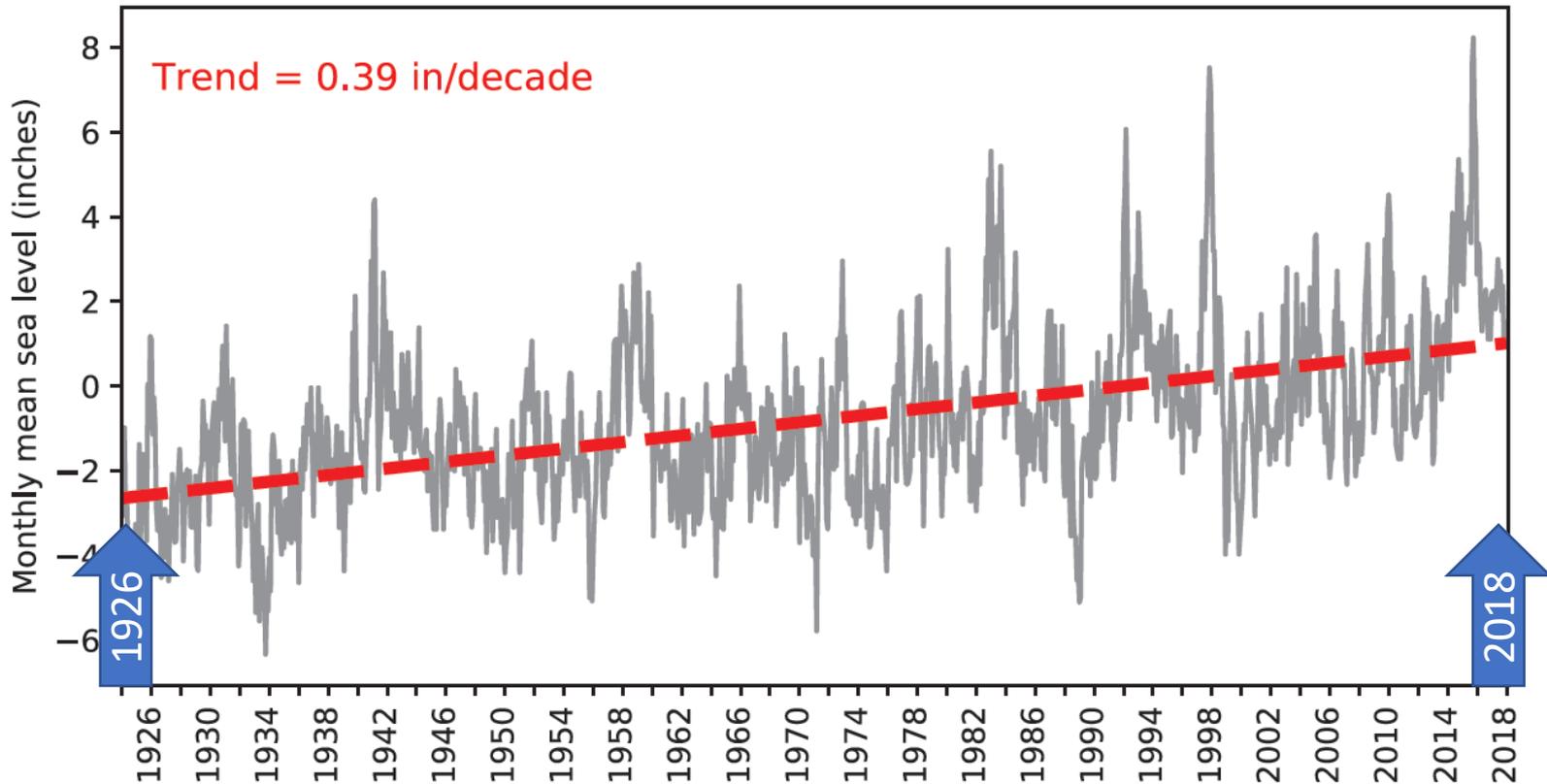
100-year FEMA Flood Maps (2019)



# Sea Level Rise

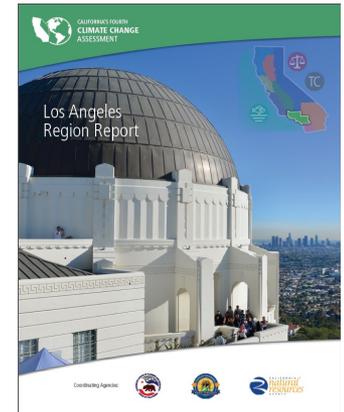
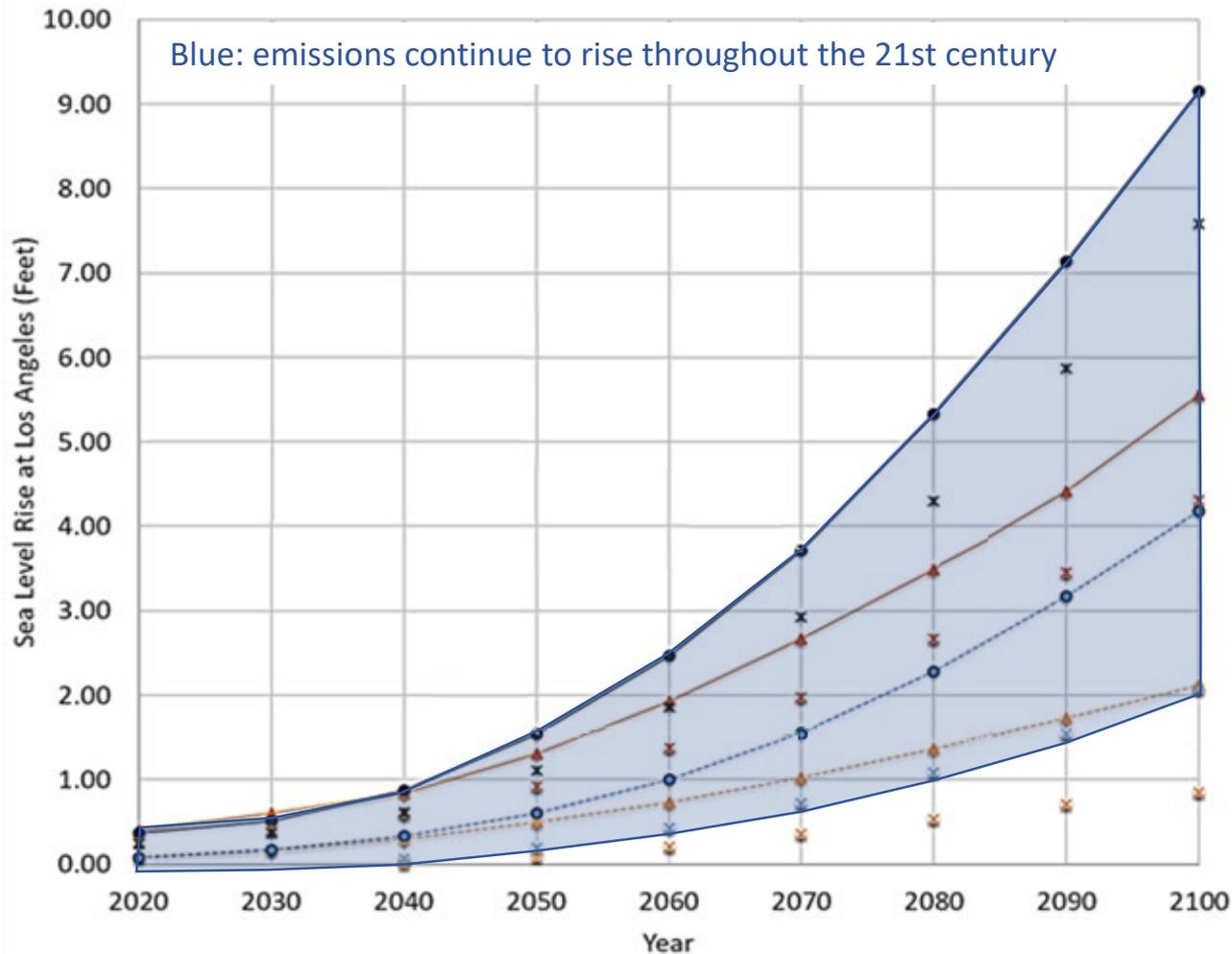
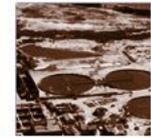


Relative Sea Level at NOAA Los Angeles Tide Gauge [ID:9410660]

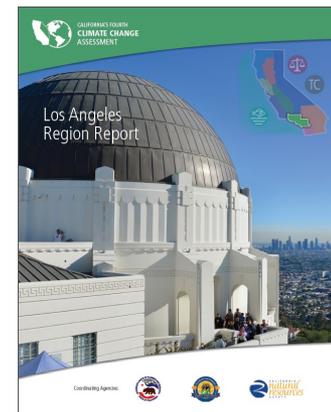
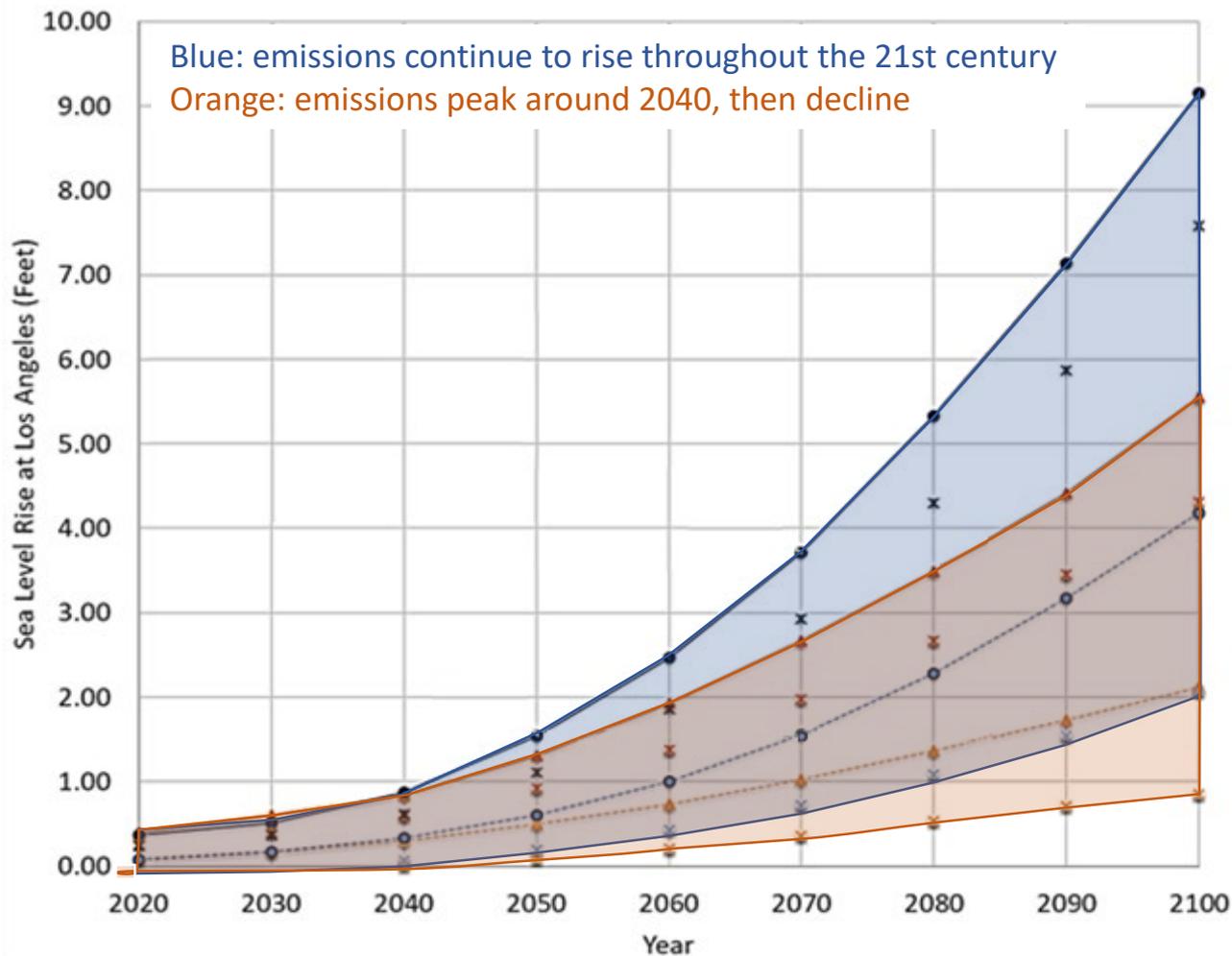


(<http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml>)

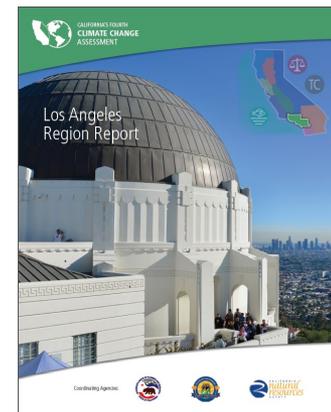
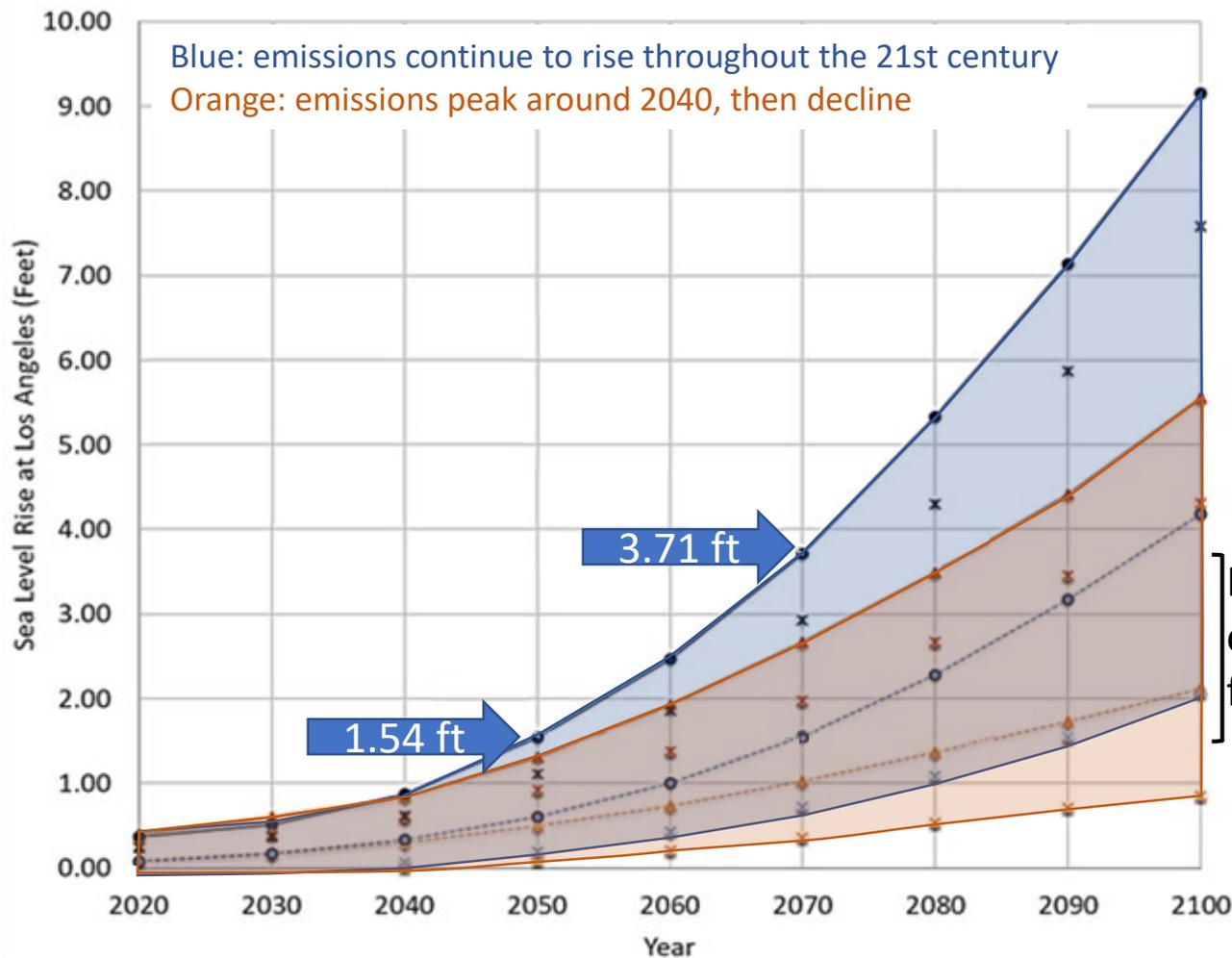
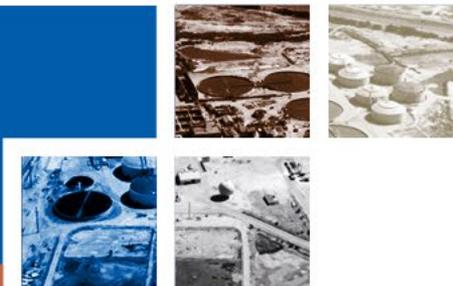
# Sea Level Rise (SLR) Projections



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Recommended range of sea level rise for future CIP projects

# Flooding and Sea Level Rise



100-year Flood + 2070 SLR



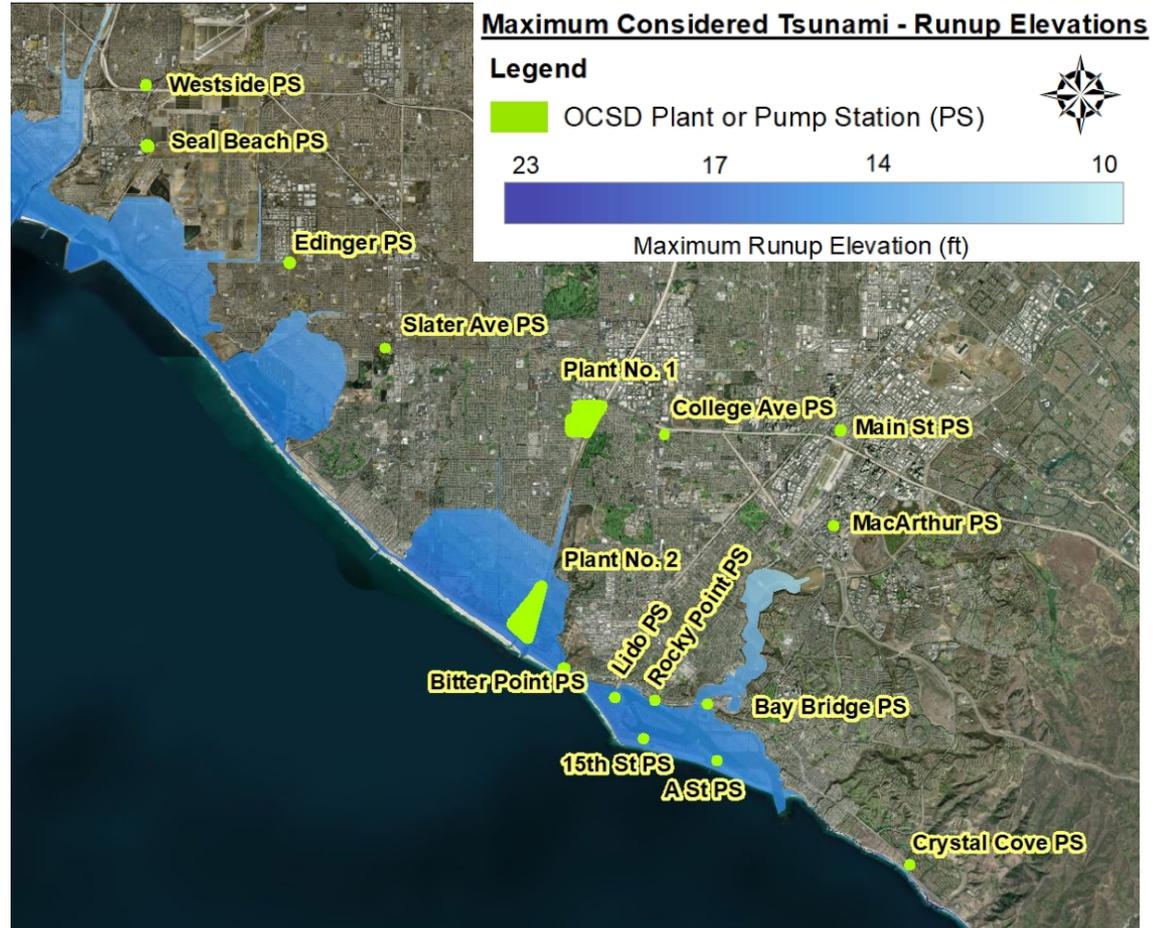
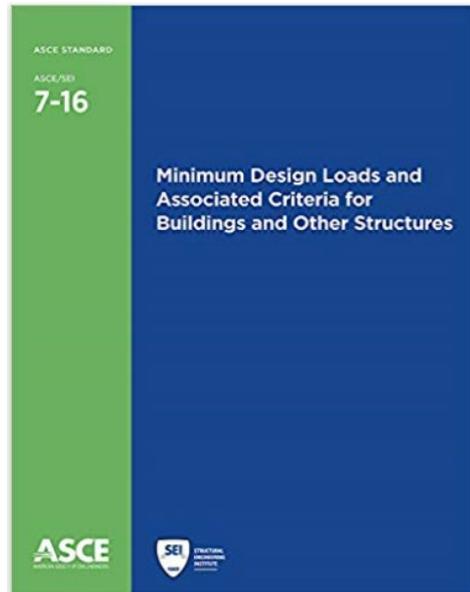
Access to Pump Stations is Flooded

Sea Level Rise Projection of 3.71 ft is assumed in 2070

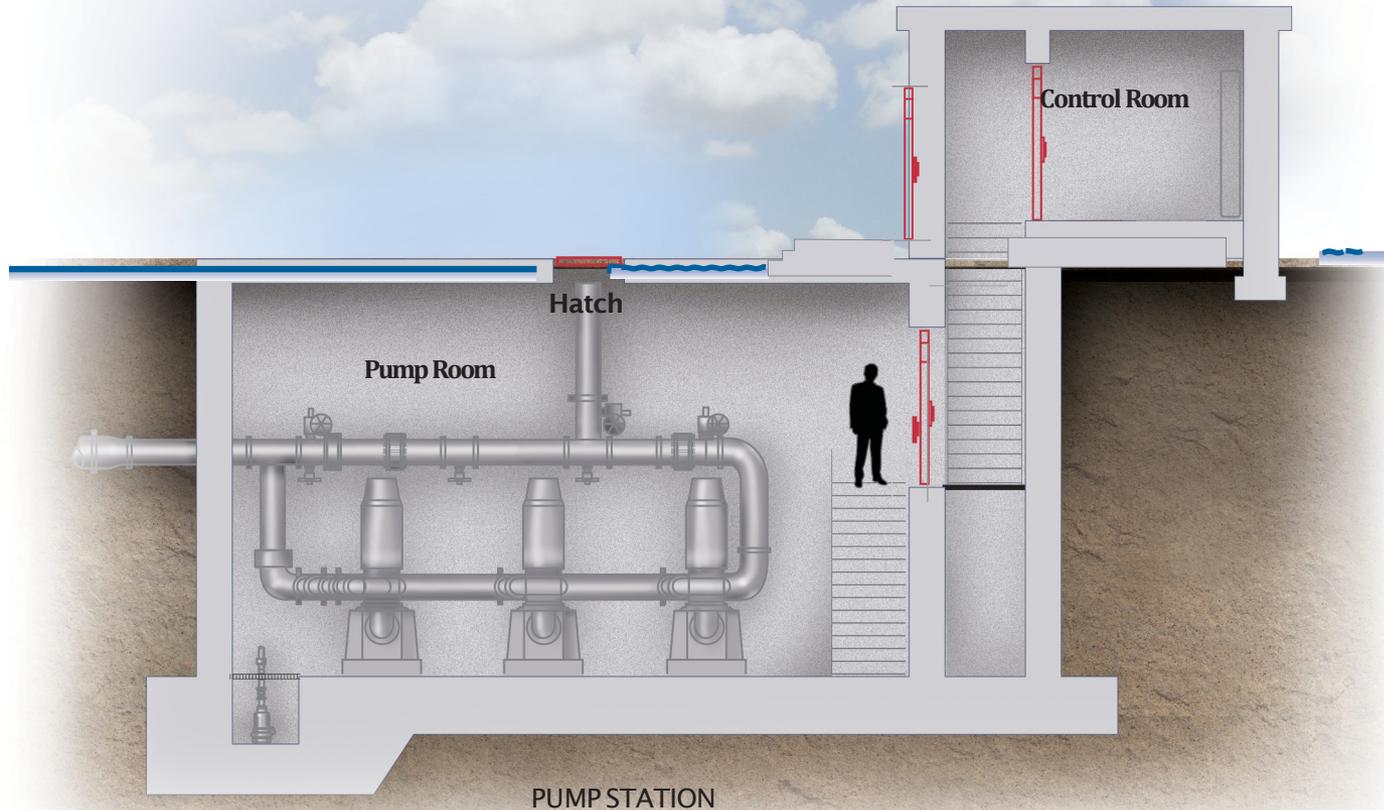
# Tsunami Runup Elevation



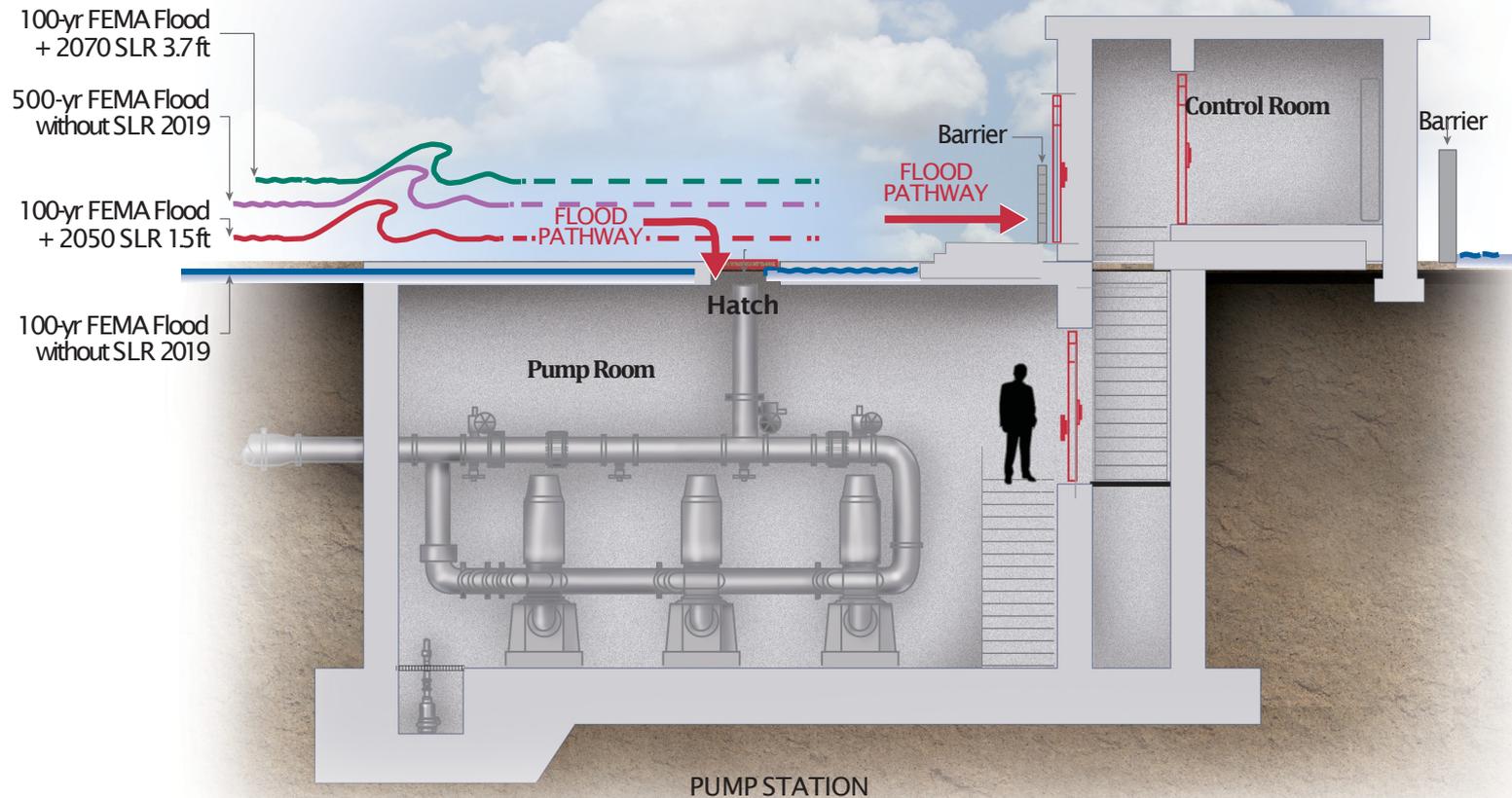
American Society of Civil Engineers (ASCE) 7-16  
Current maximum extent inundation zones.



# Adaptation Example



# Adaptation Example



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## Recommended Capital Improvements for Lido Pump Station



4 drywell hatches below flood level



Watertight replacement of drywell hatches



Flood pathway

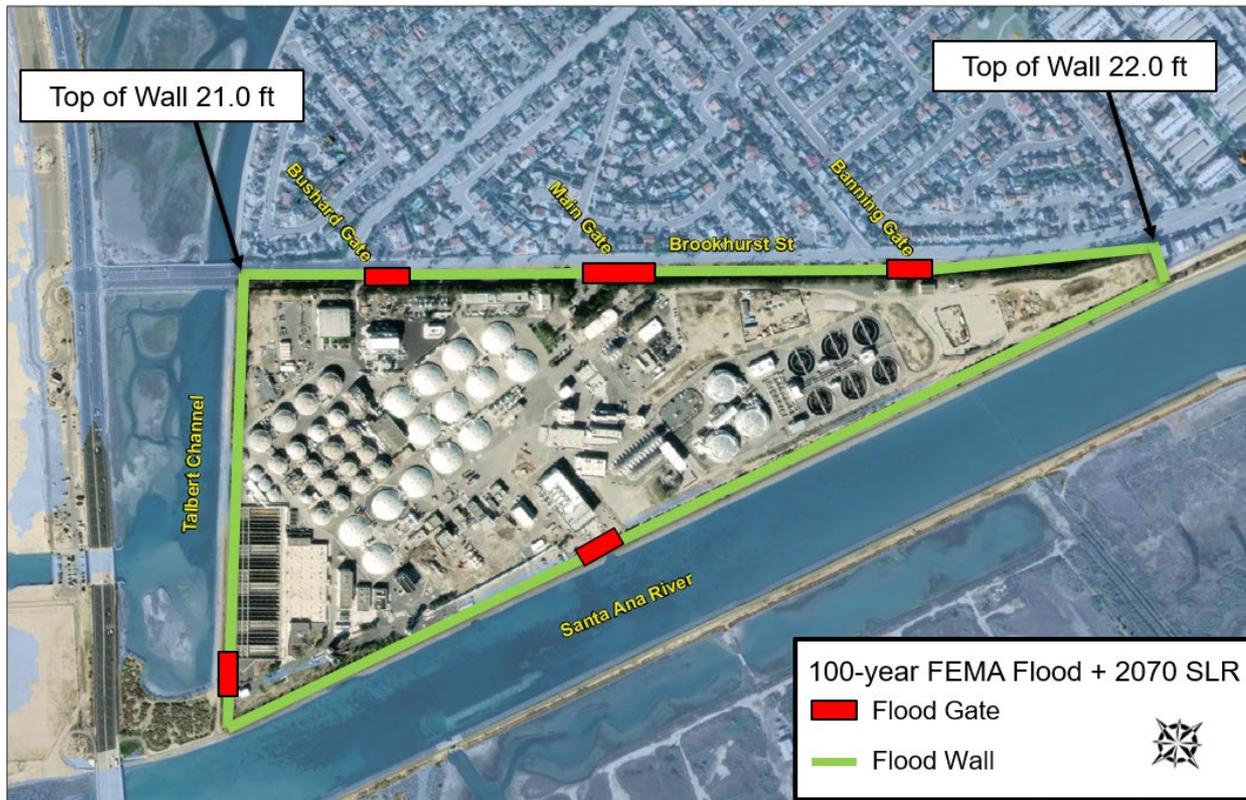


Stop logs over doors or sealed doors

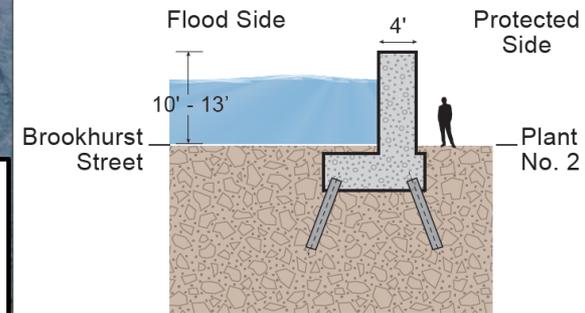
# Protecting the Treatment Plant



## Recommendation: Plant No. 2 Boundary Wall



T-WALL DETAIL DRAWING



# Summary of Impacted Facilities

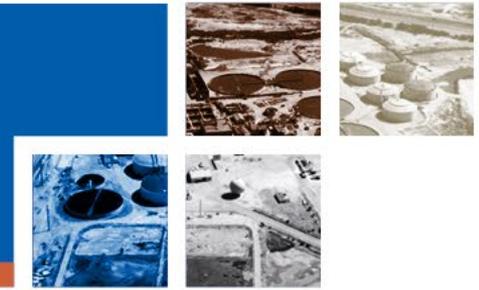


# Study Recommendations



Facility	Construction Cost	Impacted Planning Horizon
Slater Pump Station	\$0.5 million	Current, 2050, 2070
Lido Pump Station	\$0.5 million	Current, 2050, 2070
15th Street Pump Station	\$0.1 million	2070
A Street Pump Station	\$0.4 million	2070
Plant No. 2	\$28 million	2050, 2070

# OCSD Policy



OCSD aims to design, maintain and operate valuable wastewater assets that withstand or adapt to adverse conditions in a reasonable manner that is both cost-effective and sustainable for present and future generations. These adverse conditions include heavy rains, flooding, sea level rise, earthquakes, tsunamis, extreme heat, wildfires and electrical grid interruptions.





**Questions?**