

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

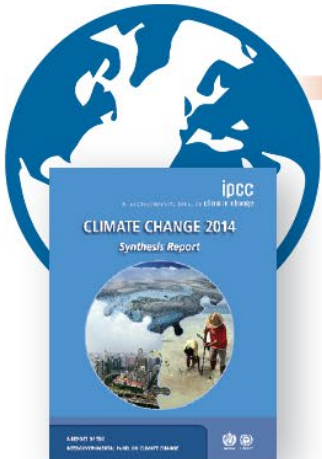
NPDES Permit

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

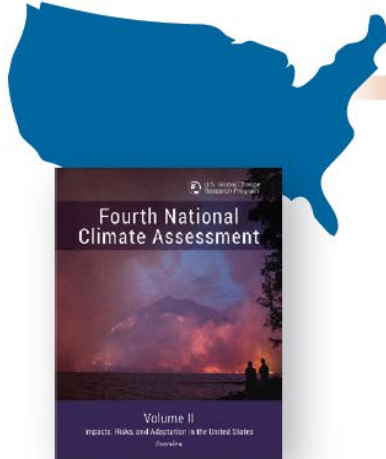
Recent Climate Science References



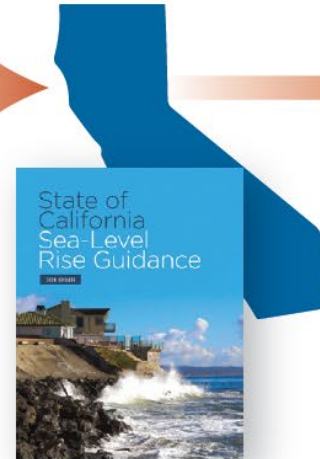
International



National



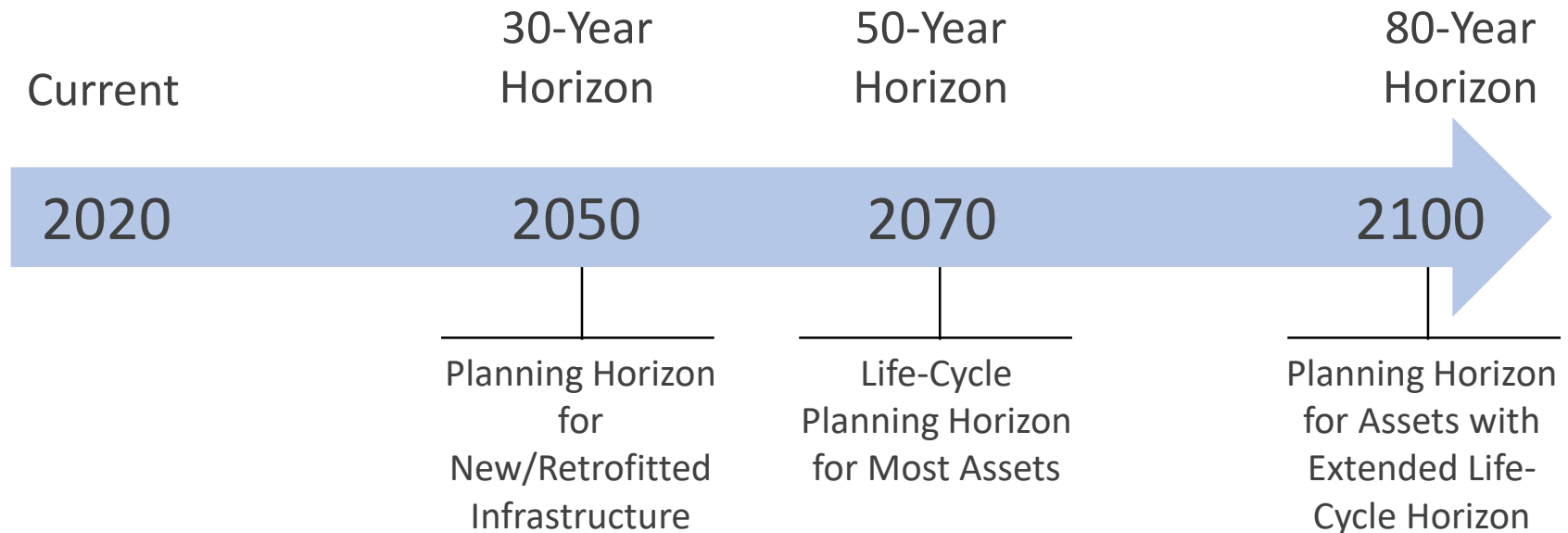
Statewide



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.



Sea Level Rise
and Flooding

Coastal infrastructure is vulnerable to tsunamis.



Tsunami

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

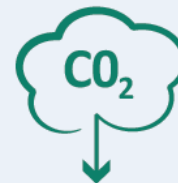


Wildfires

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



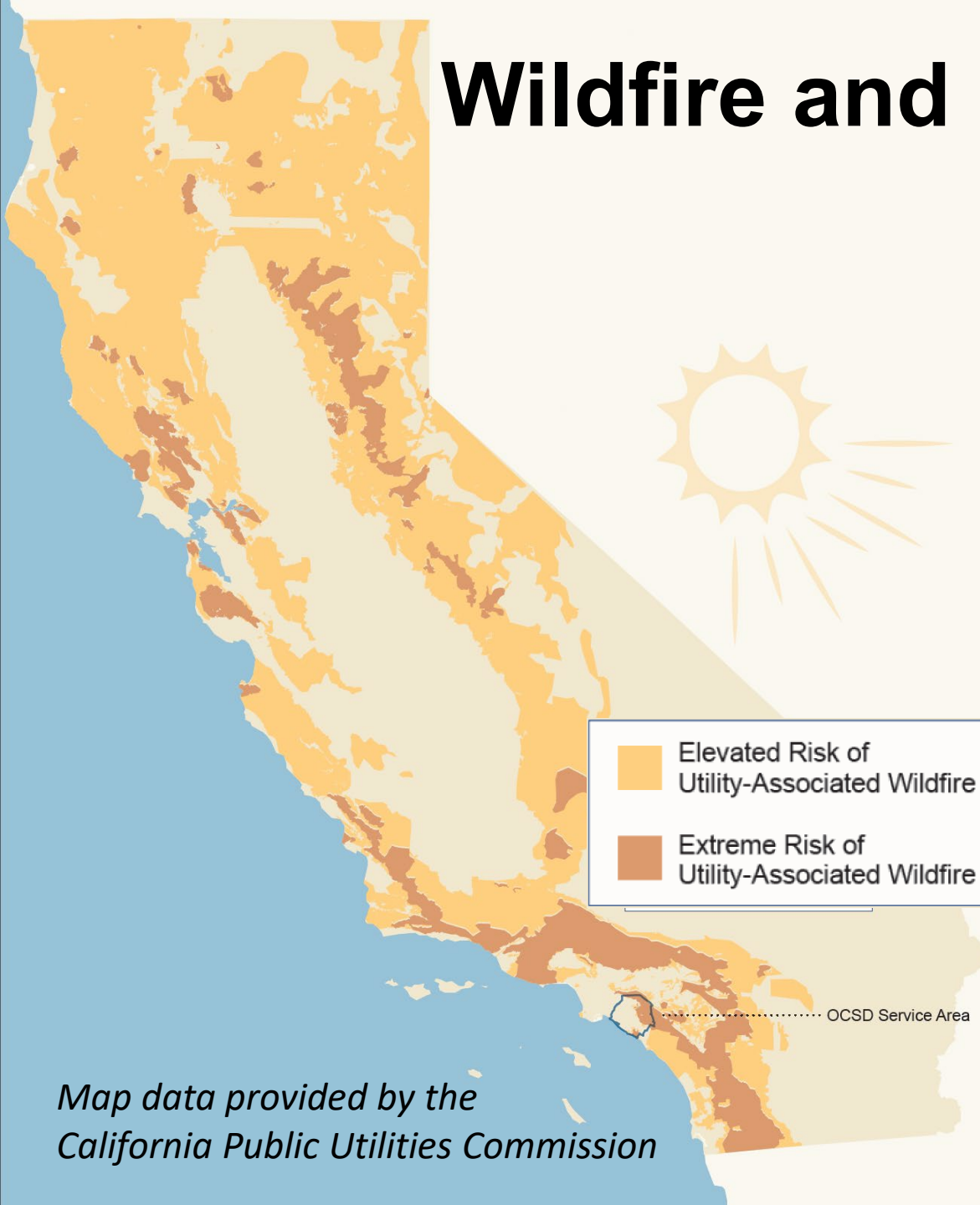
Extreme Heat



CO₂ Reduction

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*

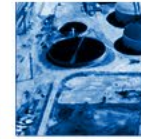
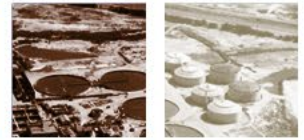


The Cocos Fire burns in San Marcos, California, in 2014. (theatlantic.com)



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

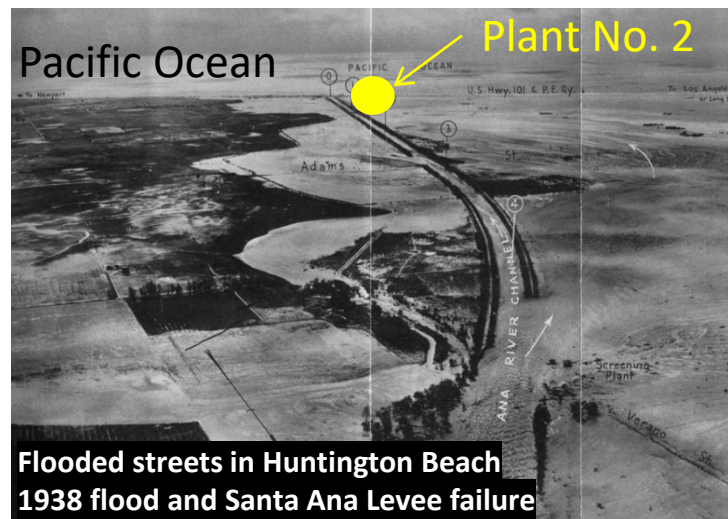
Flooding in Orange County



Storm Event, Dec 2010
Balboa Island (www.scpr.org)



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



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

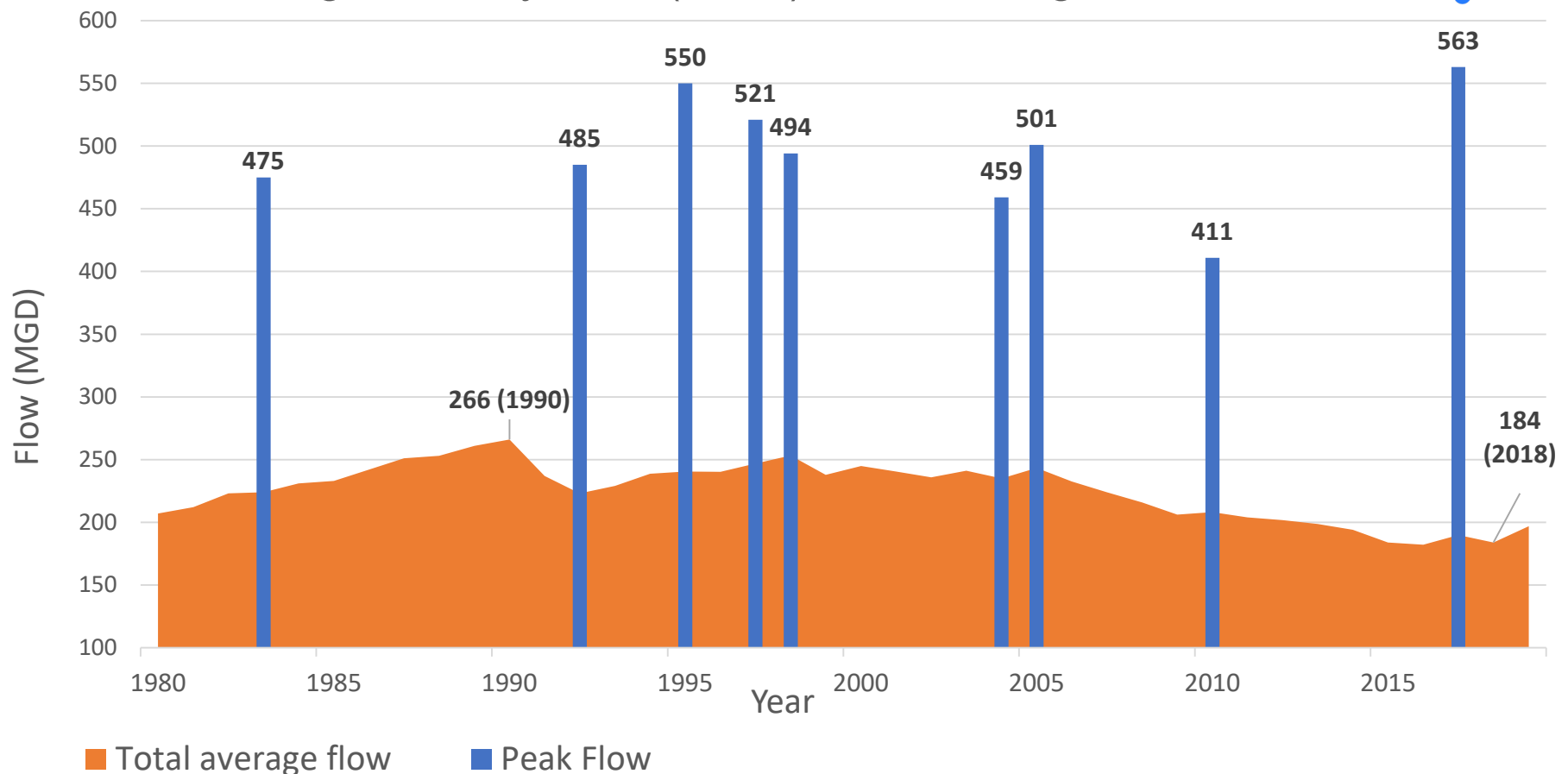


Flooded streets in Newport Beach
Storm Event 1983, OCREGISTER

Extreme Flow Events



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



Flooding



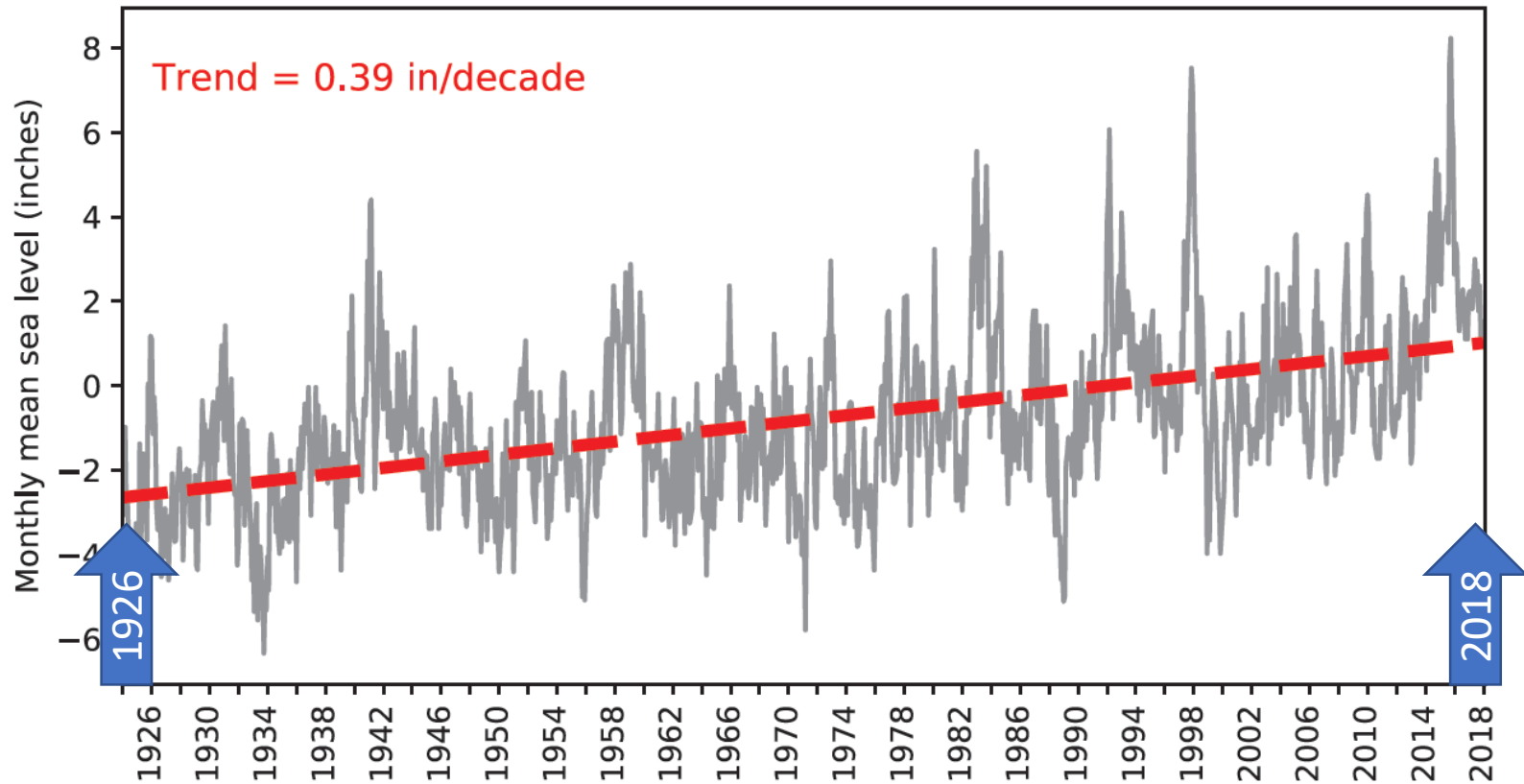
100-year FEMA Flood Maps (2019)



Sea Level Rise

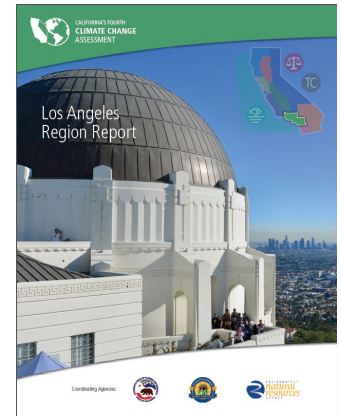
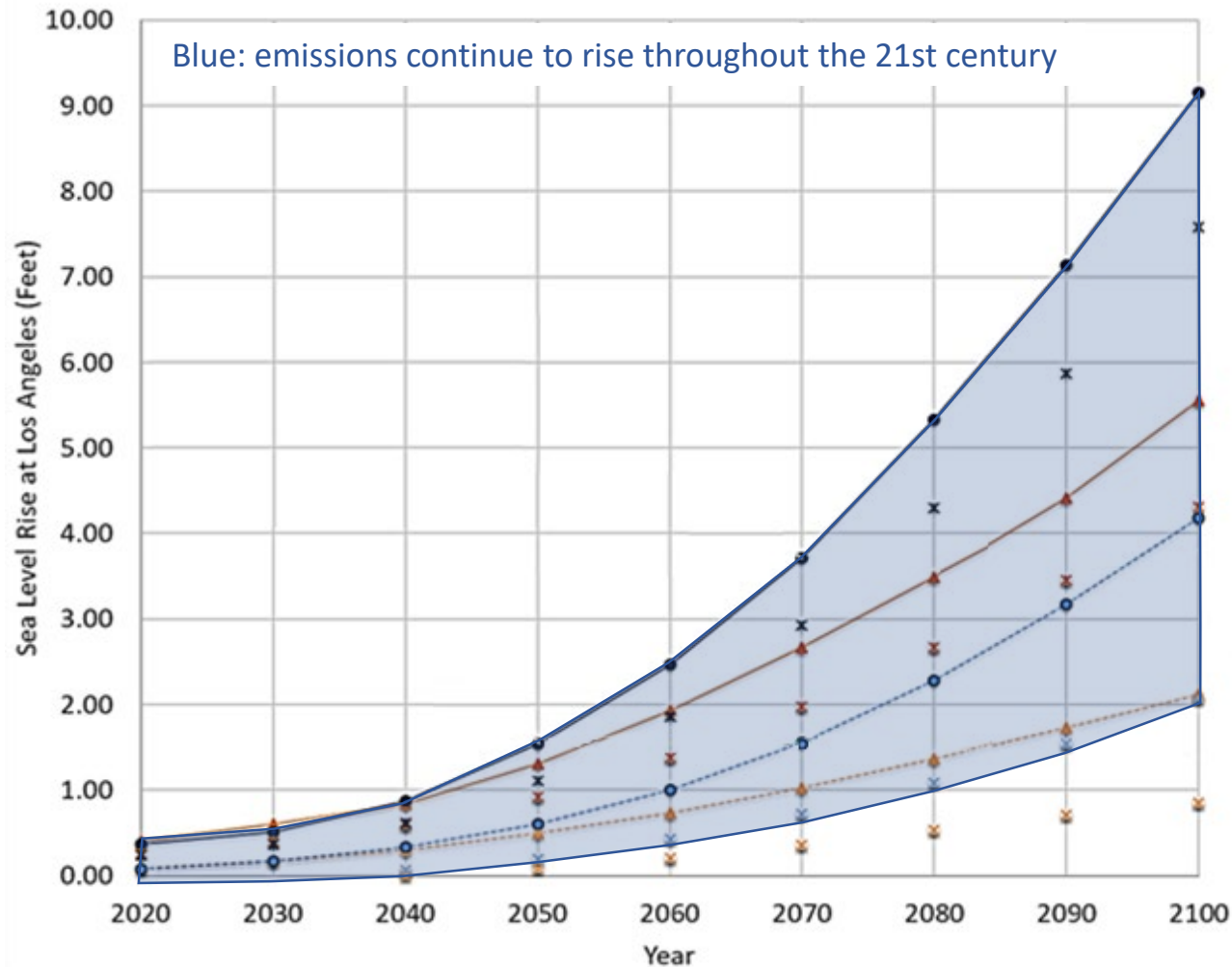


Relative Sea Level at NOAA Los Angeles Tide Gauge [ID:9410660]

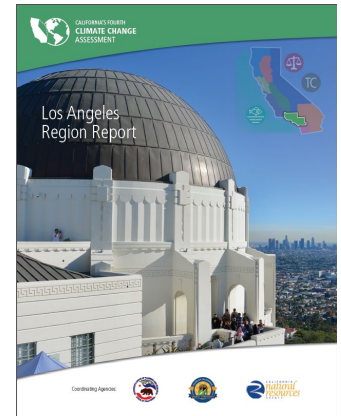
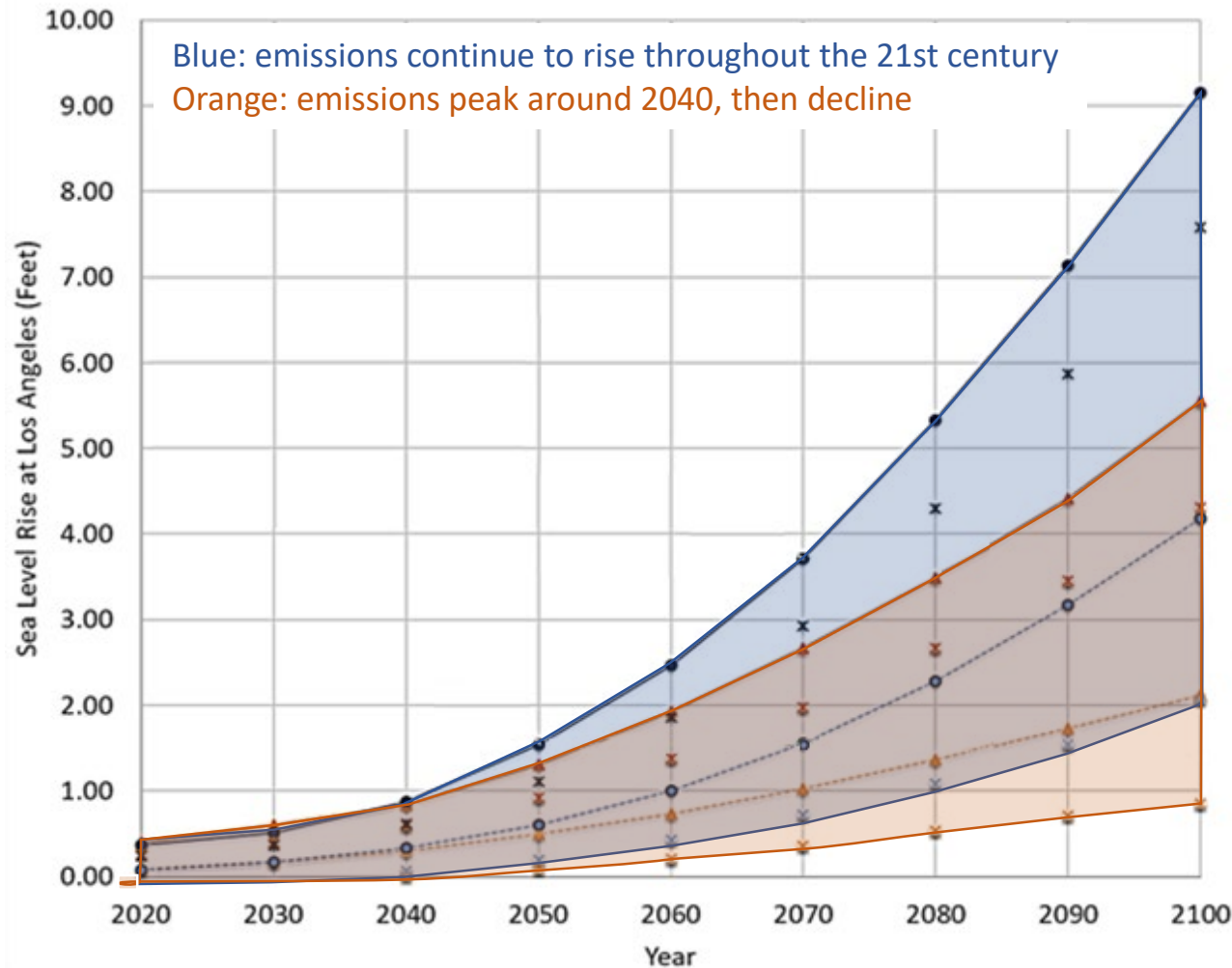


(<http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml>)

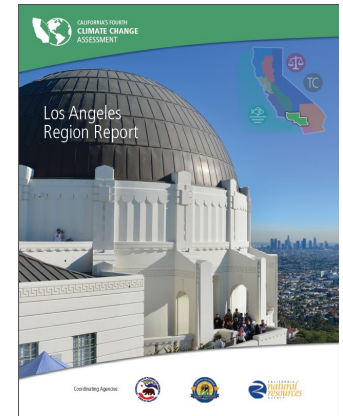
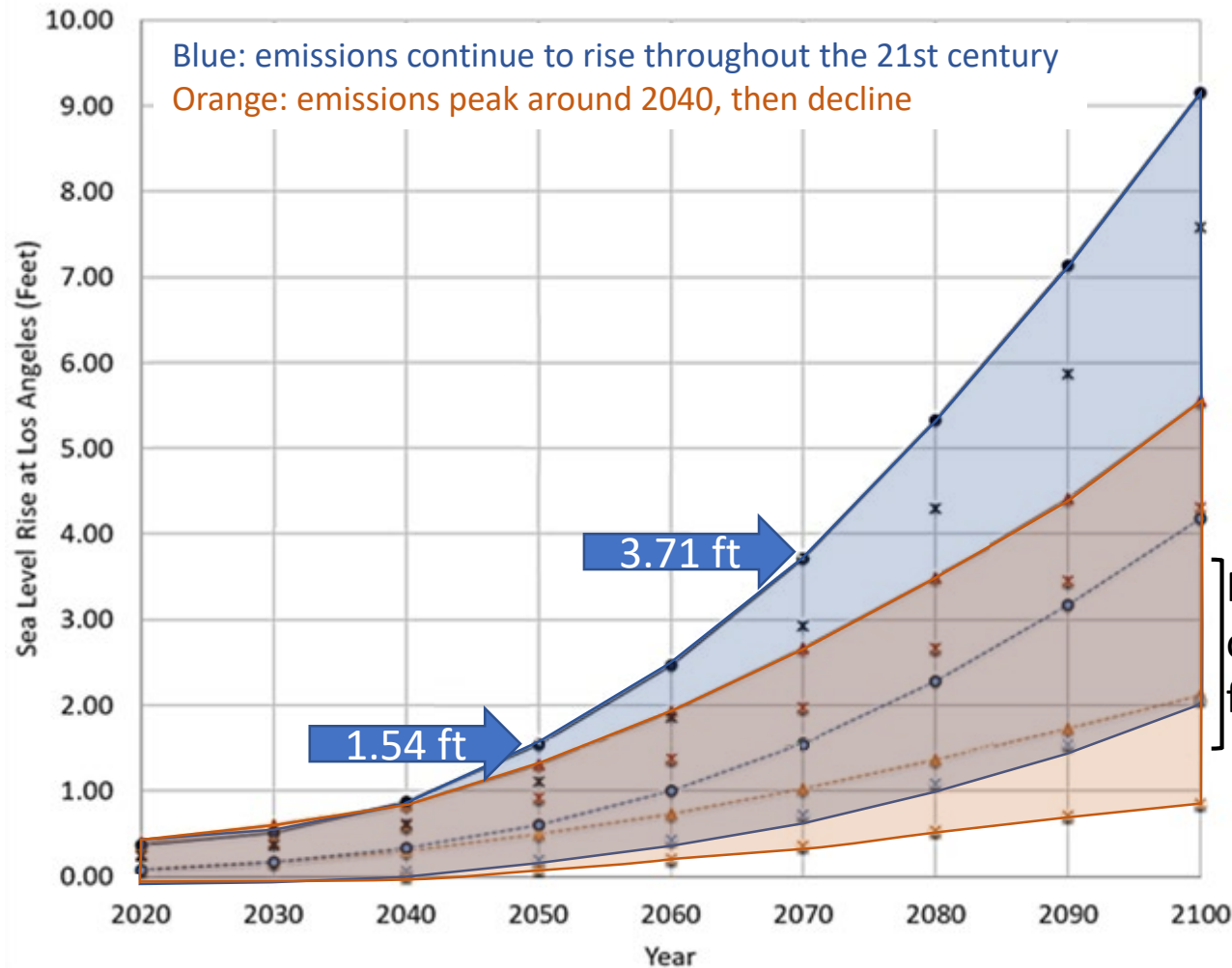
Sea Level Rise (SLR) Projections



Sea Level Rise (SLR) Projections

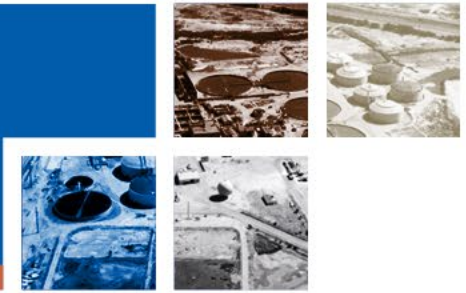


Sea Level Rise (SLR) Projections

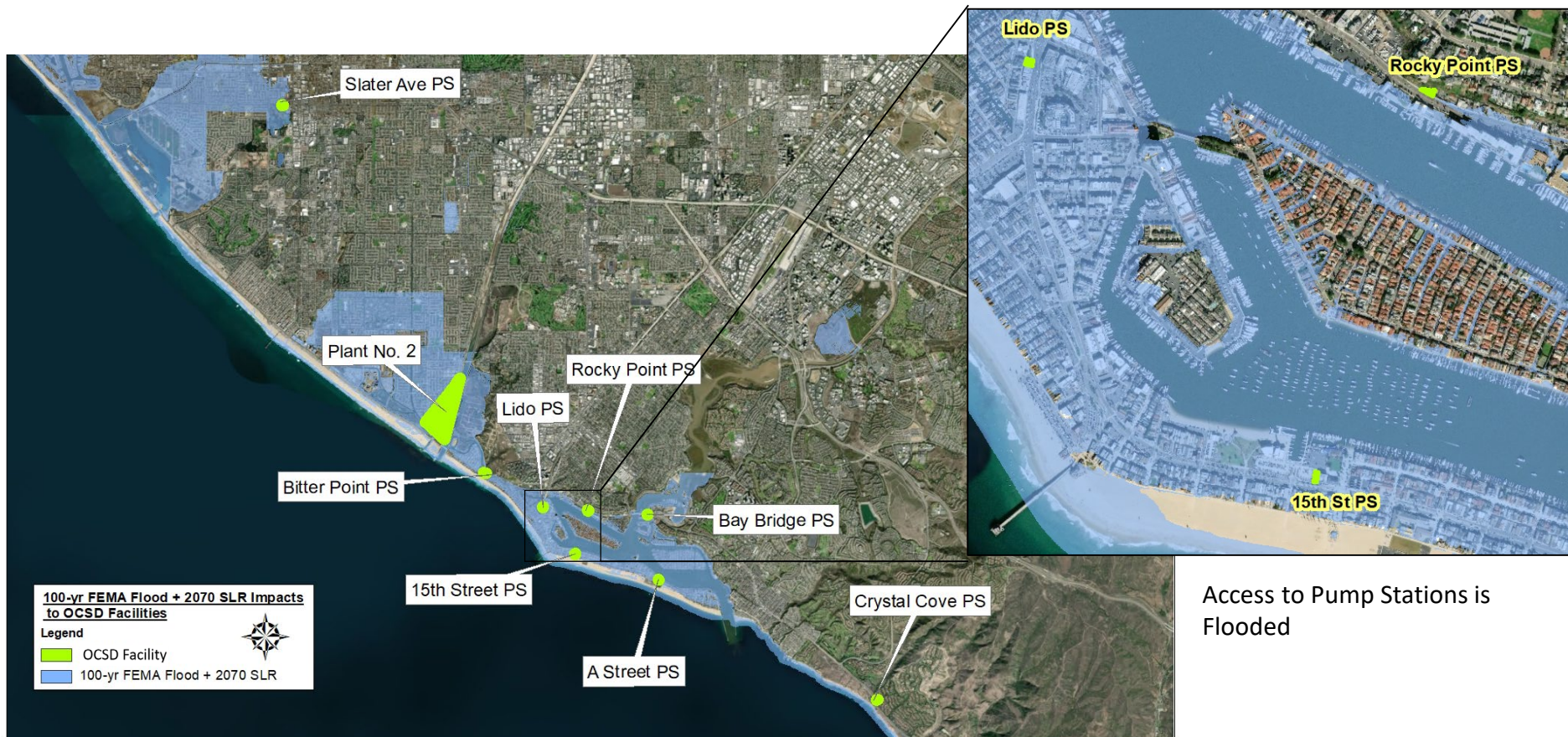


Recommended range
of sea level rise for
future CIP projects

Flooding and Sea Level Rise



100-year Flood + 2070 SLR



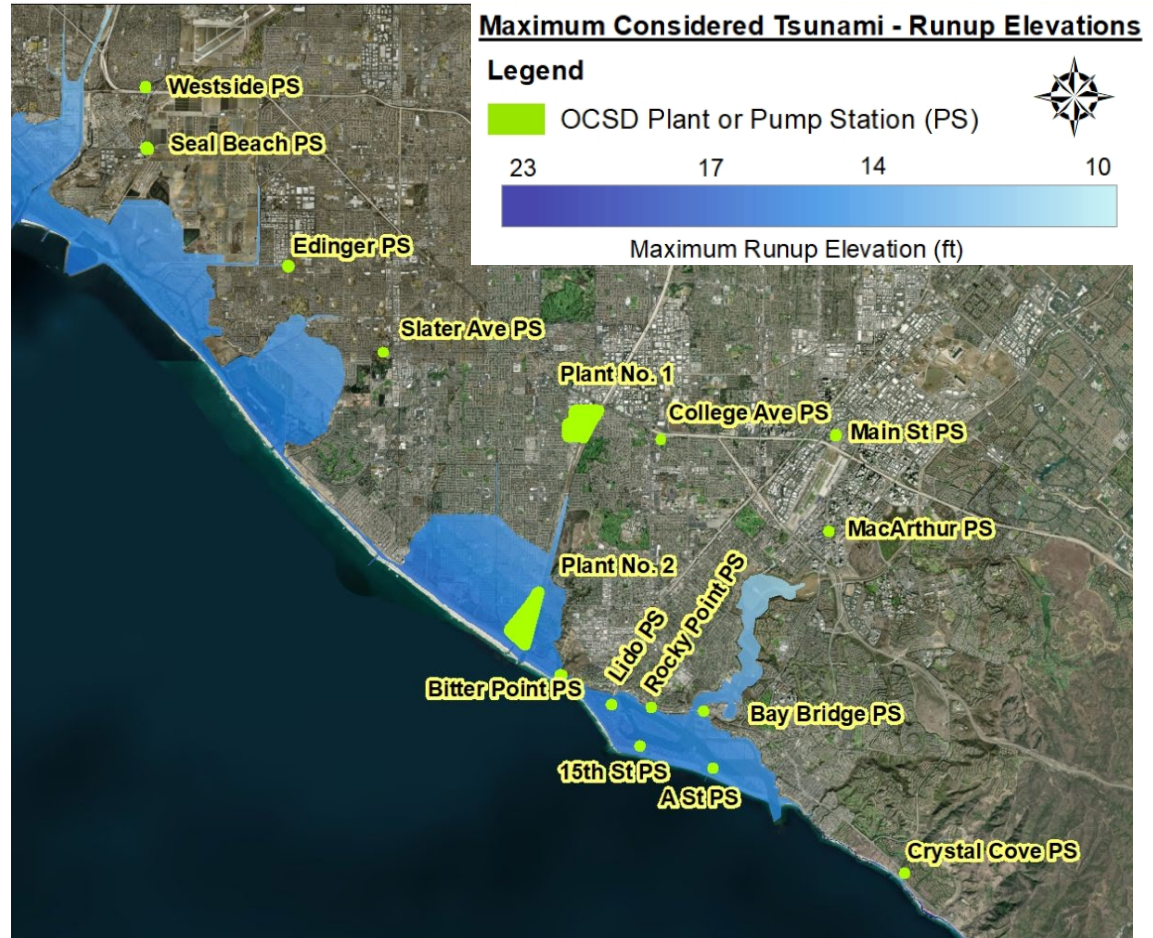
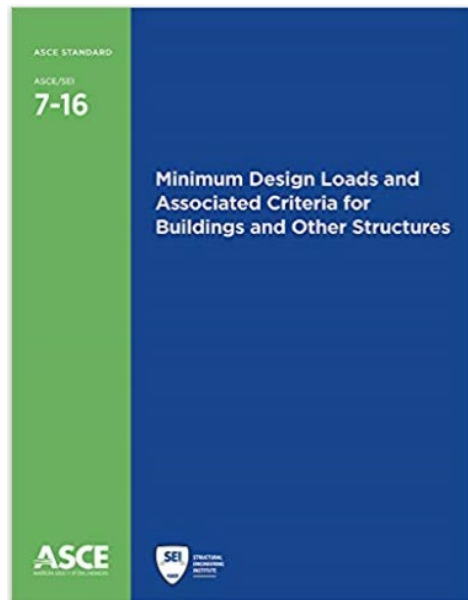
Sea Level Rise Projection of 3.71 ft is assumed in 2070

Tsunami Runup Elevation

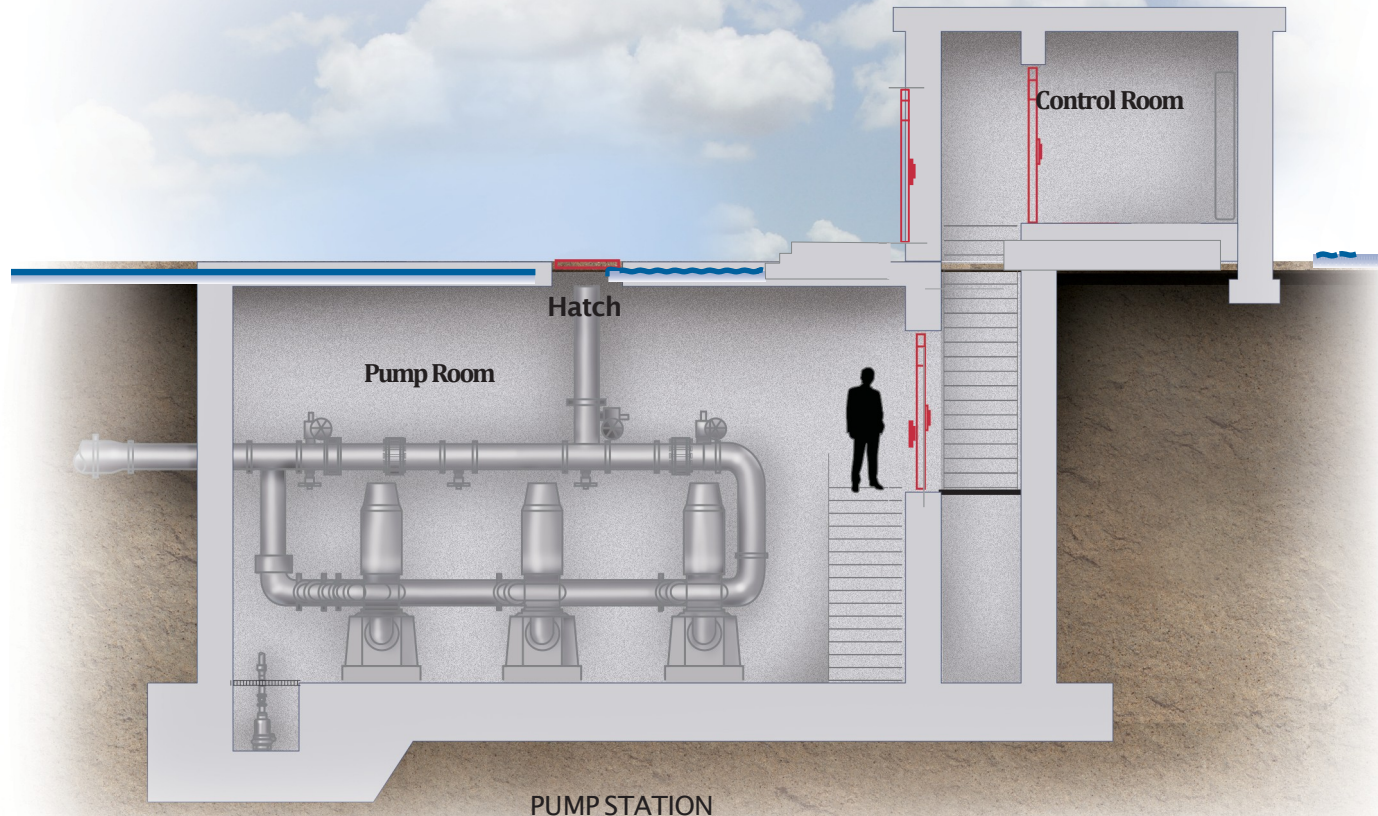
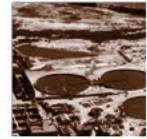
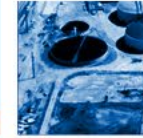


American Society of Civil Engineers (ASCE) 7-16

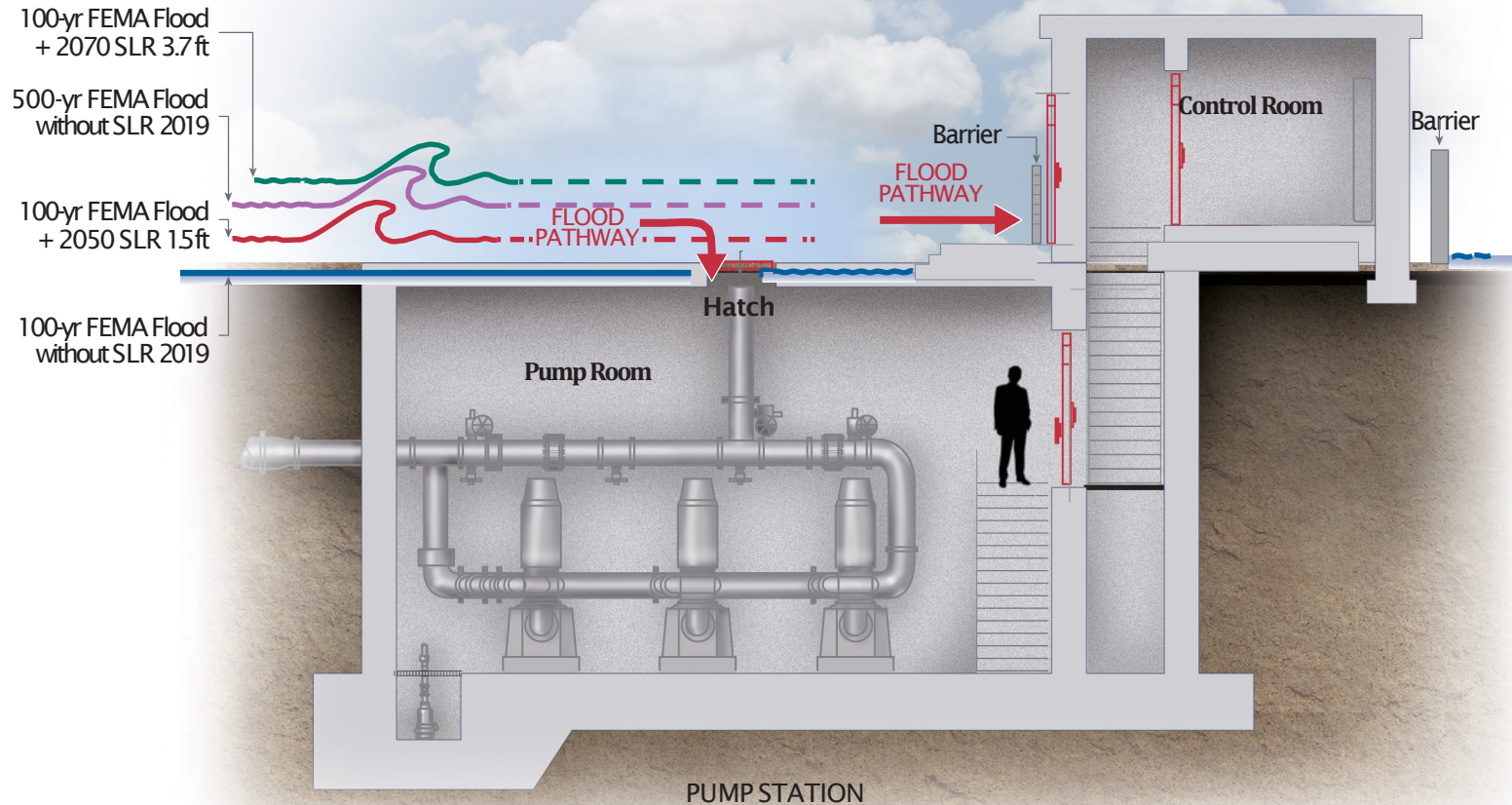
Current maximum extent inundation zones.



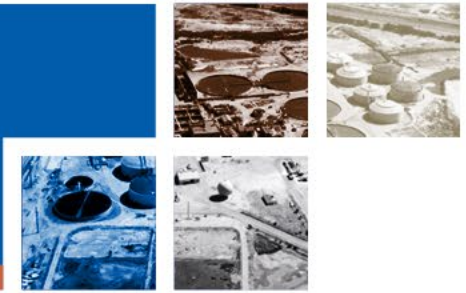
Adaptation Example



Adaptation Example



Adaptation Example



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

Top of Wall 21.0 ft

Top of Wall 22.0 ft

Bushard Gate

Main Gate

Brookhurst St

Banning Gate

Talbert Channel

Santa Ana River

100-year FEMA Flood + 2070 SLR

Flood Gate

Flood Wall

North Arrow

The diagram shows a cross-section of a flood wall. On the left, labeled 'Flood Side', is a body of water. A vertical dimension line indicates the water level is '10' - 13'' above the ground line. The ground line is labeled 'Brookhurst Street'. The wall itself is a thick, grey structure, with a horizontal dimension line at the top indicating a width of '4''. To the right of the wall is the 'Protected Side', where a black silhouette of a person stands on the ground. The ground is depicted with a textured, brownish-grey pattern and is labeled 'Plant No. 2' on the right. The wall is supported by two angled, grey beams that extend into the ground.

Summary of Impacted Facilities



Study Recommendations



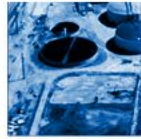
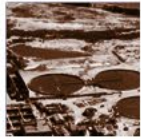
Facility	Construction Cost	Impacted Planning Horizon
Slater Pump Station	\$0.5 million	Current, 2050, 2070
Lido Pump Station	\$0.5 million	Current, 2050, 2070
15th Street Pump Station	\$0.1 million	2070
A Street Pump Station	\$0.4 million	2070
Plant No. 2	\$28 million	2050, 2070

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?