

Foster City Local Hazard Mitigation Plan & Safety Element

Appendices

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Appendix A: Stakeholders Invited to Participate in the LHMP Planning Process

The following stakeholders, neighboring communities, and local and regional agencies involved in hazard mitigation activities were given an opportunity to be involved in the Foster City's Local Hazard Mitigation Planning process. These stakeholders were invited as participants and given the chance to provide input to affect the plan's content. These stakeholders were asked to participate due to their expertise needed to develop the plan, their responsibility or authority to implement hazard mitigation activities, or by being most affected by the plan's outcomes.

Agency	Stakeholder Title	Method(s) Contacted
Association of Bay Area Governments	<ul style="list-style-type: none"> Resilience Planner 	<ul style="list-style-type: none"> Email Phone
City of Belmont	<ul style="list-style-type: none"> Police Captain 	<ul style="list-style-type: none"> Phone Email Meeting
City of San Mateo	<ul style="list-style-type: none"> Deputy Director WWTP Engineering Manager 	<ul style="list-style-type: none"> Meeting
Comcast Communications	<ul style="list-style-type: none"> Government Affairs Director 	<ul style="list-style-type: none"> Phone
Foster City Chamber of Commerce	<ul style="list-style-type: none"> President & CEO 	<ul style="list-style-type: none"> Email Meeting
Pacific Gas and Electric	<ul style="list-style-type: none"> Government Relations Representative Public Safety Specialist, Senior 	<ul style="list-style-type: none"> Phone Email
San Francisco Bay Ferry / Water Emergency Transportation Authority	<ul style="list-style-type: none"> Program Manager/Analyst 	<ul style="list-style-type: none"> Email Phone
San Mateo County Emergency Managers Association	<ul style="list-style-type: none"> Local Hazard Mitigation Plan Steering Committee Chair 	<ul style="list-style-type: none"> Email Phone Meeting
San Mateo County Health System	<ul style="list-style-type: none"> Emergency Preparedness Specialist & Deputy Medical Health Operational Area Coordinator 	<ul style="list-style-type: none"> Phone Email
San Mateo County Office of Emergency Services	<ul style="list-style-type: none"> Battalion Chief 	<ul style="list-style-type: none"> Phone Email Meeting
San Mateo-Foster City School District	<ul style="list-style-type: none"> Assistant Superintendent Chief Business Official Director Facilities, Maintenance & Operations and Transportation 	<ul style="list-style-type: none"> Email Meeting
San Mateo-Union High School District	<ul style="list-style-type: none"> Director of Student Services 	<ul style="list-style-type: none"> Email Meeting

Appendix B: Summary of Survey Findings

Foster City Forum – Local Hazard Mitigation Plan Topic – Outcome Statement

On July 29, 2015, the City began phase one of a two question survey to collect paper based feedback from residents to support an update to Foster City's Local Hazard Mitigation Plan. Phase two of the survey effort began on October 6, 2015 when the survey was posted online on Foster City Forum. Both phases closed on November 13, 2015. The online survey received 237 visits and 85 responses, while the paper based survey received 363 responses.

The survey asked, "What hazards around your community most concern you today?" and of the combined 448 responses:

- 352 responses identified earthquakes
- 217 responses identified drought
- 125 responses identified sea level rise
- 123 responses identified flooding
- 117 responses identified levee failure
- 66 responses identified hazardous material events
- 46 responses identified "other"
- 43 responses identified dam failure

The second question asked, "What are some steps that the City could take to reduce the risk to life and property from hazards?" and allowed for open ended responses, where participants could identify and explain their recommendations. Common themes that emerged included observations of the effects of traffic volume, levee maintenance and infrastructure, and increased public education programs about hazard awareness and continuing to grow the Community Emergency Response Team (CERT).

The City also sponsored a workshop on Tuesday November 17, 2015 and led an in depth discussion with the community related to the above hazards and recommendations. All of the input received will be used to determine Foster City's priorities and plans of action in the updated Local Hazard Mitigation Plan. A draft plan will be available for public review in January 2016. After additional vetting by the Planning Commission and City Council, the plan will be sent to the California Office of Emergency Services, and then to the Federal Emergency Management Agency (FEMA) for consideration. Once approved by FEMA, the plan will be sent to City Council for formal adoption.

Thank you to all those who offered feedback to this important topic. Look for future Foster City Forum topics to continue to join the conversation and see what others are saying. Your feedback is key to helping the City of Foster City offer the best services.

Appendix C: Press Release, October 29, 2015



NEWS

Contact: Jenelle Masterson, Emergency Preparedness Coordinator
(650) 522-7960
jmasterson@fostercity.org

FOR IMMEDIATE RELEASE

Mitigating Local Hazards is a Community Concern Help the City of Foster City update the Local Hazard Mitigation Plan

Foster City, CA; October 29, 2015 -- In a recent survey, Foster City residents indicated that earthquakes, drought and sea level rise are the three natural disasters of greatest concern to them. These are potential natural events that have occurred in the past and could impact Foster City and the greater Bay Area in the future.

On **Tuesday, November 17, 2015**, the City of Foster City will hold a community workshop. Anyone interested in making sure our City government and all the members of our community are ready to respond to a disaster are invited to come share thoughts and ideas for helping Foster City reduce the risks and become better prepared for possible future natural disasters.

We all know that natural disasters are unavoidable and unpredictable, but that doesn't mean we can't take actions that will reduce their impact and make us more prepared to respond. The City of Foster City is undertaking a natural disaster preparation and planning effort so that our community can be as prepared as possible for the next disaster. This effort will result in the preparation of a document called the Local Hazard Mitigation Plan (LHMP), which can be submitted to the Federal Emergency Management Administration (FEMA) in order to qualify for grant funding for projects that will enhance our resiliency as a community.

The City would like to hear from individuals and groups in our community on this subject. By gathering together, we can all better understand the risks and identify the steps that can be taken to mitigate possible disasters in the City of Foster City. Input from the community will inform

--more--

the update to Foster City's LHMP while also educating residents on the steps they can take to better secure their home and protect their loved ones in the event of a disaster.

“Foster City is geographically located in an area that faces many different potential risks,” says Foster City/San Mateo Fire Chief, John Healy. “It is important for community members to share their concerns and participate in the planning process so we can develop a thorough plan that better prepares our community.”

The LHMP is a written plan, updated every five years, that identifies potential risks and strategies for reducing potential harm of natural disasters throughout the community. In other words, if we consider what could happen during a natural disaster by putting strategies and resources in place before it happens, we can reduce the number of lives lost, injuries sustained and properties damaged.

The community workshop will be held on **Tuesday, November 17, 2015** in the **Vibe Teen Center at 670 Shell Boulevard** from **6:30 to 8:30 PM**. Attendees can register and reserve their space using [Eventbrite](#). Community members can also provide their input by responding to the [Local Hazard Mitigation survey](#) (there is a link to the survey on the City's website www.fostercity.org). Those including their contact information in their survey response will be kept informed of future ways to participate and will be automatically entered to win a Personal Emergency Preparedness Kit valued at over \$40.

Input from the community is vital to the creation of the plan as the information you share will help Foster City plan ahead and be better prepared for what COULD happen. More information about the Local Hazard Mitigation Plan is available at www.fostercity.org or email Jenelle Masterson, Emergency Preparedness Coordinator at jmasterson@fostercity.org with questions or comments.

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Appendix D: Public Workshop Summary, November 17, 2015

Report of community comments from Foster City Local Hazard Mitigation Plan Public Workshop Tuesday, November 17, 2015, 6:30-8:30pm

What are the hazards facing Foster City?

Hazards of Concern:

Fire	Communication/cell tower Outages
Earthquake	Airplane crash
Flood	HV Powerline failure, (seismic integrity of above ground and below ground utilities)
Drought	Cyberattack
Gas pipeline failure	Oil spills/Lagoon Pollutants
Freight/rail traffic	Crime/looting Activity
Levee Failure	
Chemical hazards with prevailing winds	

Assets of Concern:

Bridge conditions; soundness of evacuation routes	Levee
Local Medical Facilities	Gas Pipelines/Powerlines
Fire Stations/equipment/number of fire personnel on duty	High rise buildings
Public Works assets (include Corporation Yard & Water storage tanks, lagoon pump)	High employee counts (Visa/Gilead)
	Leo Ryan Park (Highest elevation in Foster City)
	Waste Water infrastructure (pipelines/WWTP)

What has happened in the past?

Transportation Accidents: Car Crashes, Airplane Crash (SFO/San Carlos)	Daily gridlock/traffic
Large Structure Fires/displaced families	Hazardous Materials Incidents (tanker on 92)
Earthquake (1989 Loma Prieta)	Closed 101 for PG&E lines
Utility Failures (transmission lines)	San Bruno/Gas Line Explosion
Drought	Winter storms/trees down
	Flooding on 101

Report of community comments from
Foster City Local Hazard Mitigation Plan Public Workshop
Tuesday, November 17, 2015, 6:30-8:30pm

What is being done?

Levee is built to ocean standards, will be designed to meet revised FEMA standards in 2016.

Bridges are inspected every 2 years, shortcomings are addressed based on severity and funding availability.

Lift stations are on automatic generator back up based on an analysis, portable generators can be transported to lift stations without automatic generator back ups as needed. Generators are on an equipment replacement list and schedule.

Continued maintenance for public works infrastructure, assets and equipment.

What should we do in the future?

Maintain Mutual Aid Agreements

Plans for debris removal, equipment needs

Building Codes for high rise buildings-glazing/safety glass to prevent glass from popping out

Working with high employee count employers (Visa/Gilead) to confirm plans for building functionality and backup generators

Identify locations of PG&E auto valve shut offs

Plan for security during flooding

Add USB charging capabilities to light poles

Evacuation routes & plans, especially for disabled

Create capacity for good response times to inspect buildings after earthquakes.

Consider a city program to fund seismic residential retrofits, or rebates

Include the detail level of risk assessment information in the LHMP or otherwise make available to public

Include information on private partners (PG&E) identified as risks, document or reference what they are doing to mitigate. Can power lines be disabled?

Set up Facebook check in features

Evaluate and address long term effects of drought (environmental/air quality/erosion/property values)

Implement tsunami or seiche warning systems

Make our hazard maps available to the public

How will water distribution from storage tanks be managed in an emergency

Is there a contingency plan for water storage tank failure?

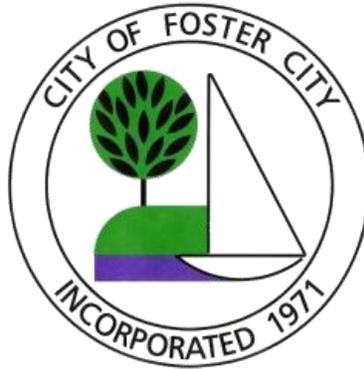
Assess if there are enough local medical facilities

Share neighborhood assets with CERT teams (example NBH 2 has many elderly care facilities)

Collaborate with CalTrans for Hwy 92 ramps

Foster City Local Hazard Mitigation Plan & Safety Element Appendix E: Levee Protection Planning Study, July 2015

City of Foster City Levee Protection Planning Study



Updated July 2015



870 Market Street, Suite 1278
San Francisco, California 94102

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1. Executive Summary

Purpose

Foster City is protected from flooding hazards by approximately 43,000 feet (8 miles) of levees that surround the perimeter of the city. The purpose of this study is to provide the City with a comprehensible framework as to how its flood risk is impacted by the newly released coastal study results for San Francisco Bay and the recent levee crest survey. This includes outlining:

- The potential impact on levee accreditation;
- Potential regulatory constraints the City may face as it improves its levee system;
- How the levee system can be adapted to future estimates of sea level rise and the uncertainty inherent in those estimates;
- Potential levee improvement alternatives that may be used to retain FEMA levee accreditation per 44 CFR 65.10; and
- Planning level cost estimates to retain the accredited status of the levee system.

This study does not include an evaluation of the geotechnical stability of the levees per USACE's levee system evaluation criteria for the National Flood Insurance Program (NFIP).

Summary of Findings

Based on the revised FEMA coastal flood hazard study, roughly 85 percent of Foster City's levees do not meet the required freeboard elevation per 44 CFR 65.10 and therefore, will not retain their accredited status when FEMA remaps San Mateo County for coastal flood hazards. In addition, four percent of the levee system is overtopped by the one-percent (100-year) stillwater tide. The average freeboard elevation deficiency across the levee system is approximately 2 feet, with a maximum deficiency of 4 feet. Figure 1-1 shows an overview of the entire Foster City levee system with color coded segments that are freeboard deficient (yellow), overtopped by the one-percent stillwater tide (red) and meet the required elevation for accreditation (green). Levee status is discussed in detail throughout the report and detailed profiles of the required levee crest elevations to meet FEMA accreditation and compliance per 44 CFR 65.10 are provided as plan and profile sheets are divided into 3,000 feet long sections of the levee starting at Station 0+00 at the San Mateo City Limit, and generally increasing toward the south and the terminus of the outboard levee system adjacent to Belmont Slough near the Belmont and San Mateo City Limits.

Marina Lagoon forms Foster City's western boundary and controls runoff from Laurel Creek, the 16th Avenue Drainage Channel and the 19th Avenue Drainage Channel in neighboring San Mateo. There is no regulatory threat of flooding from this facility based on a recently approved appeal to the Flood Insurance Rate Map. Similarly there is no regulatory risk of flooding from Foster City's Central Lagoon, which controls storm water runoff on the interior side of the levee system, as determined by FEMA through a recent appeal made by Foster City to the Flood Insurance Rate Map.

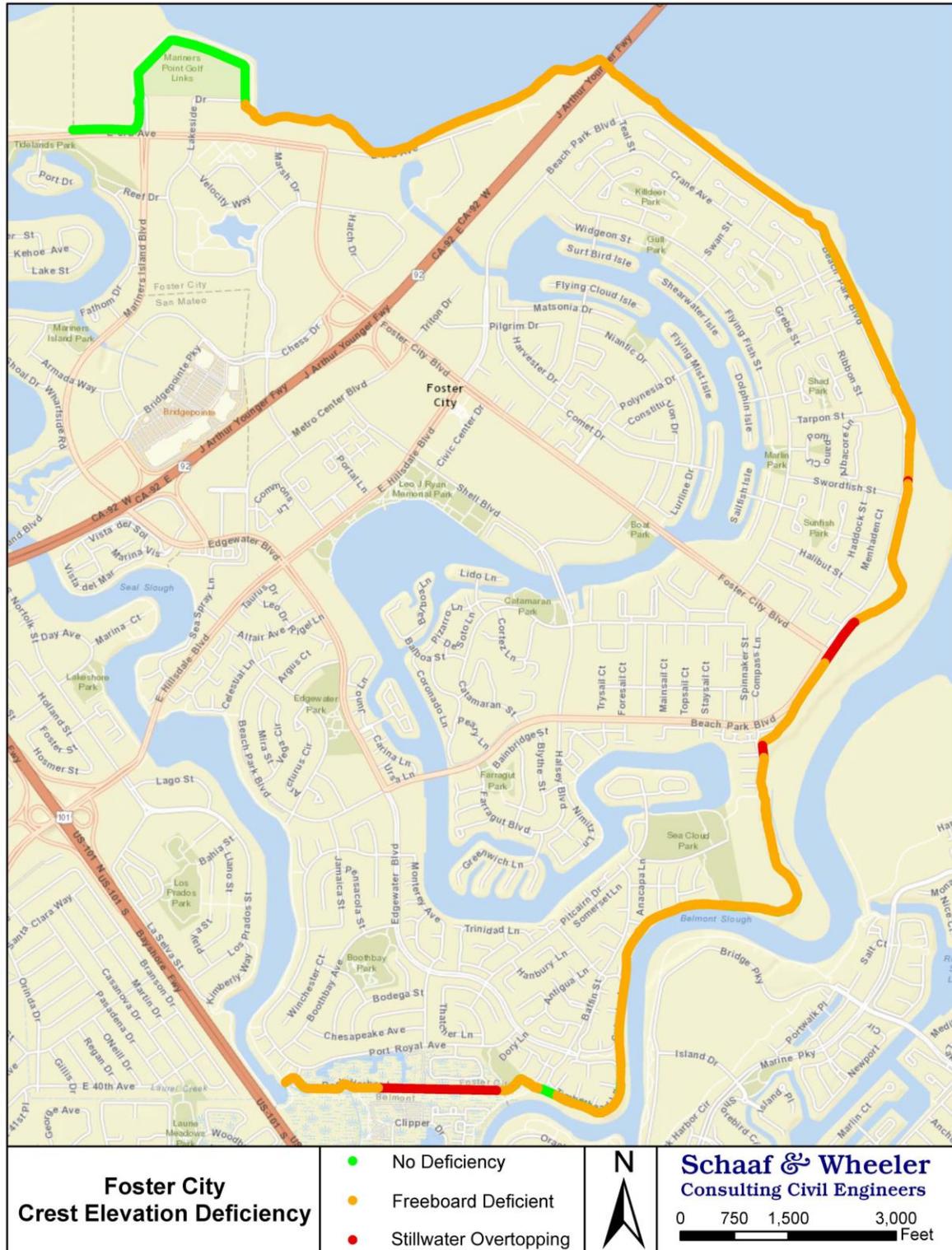


Figure 1-1. Foster City Levee System Deficiencies

2. Introduction

Flood Hazard Mitigation in Foster City

Approximately 9,000 properties in Foster City are protected from the one-percent annual chance of flooding by a 43,000 feet long outboard levee system that was primarily designed for flood protection. This represents nearly 8 miles of earthen levees. An additional 8,000 properties in the City of San Mateo are also protected by the Foster City levee system. Conversely, properties in Foster City are protected from the one-percent flood by San Mateo's levee and floodwall systems south of San Mateo Creek.

The U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA) certified Foster City's levee in 2007 as providing protection from the one-percent annual chance (base) flood. This flood is often called the "100-year flood", but should not be confused with an event that is expected to occur only once every 100 years. It is the event that has the one-percent chance of occurring every year.

Currently land within the Foster City limits is classified as Shaded Zone X, where mandatory flood insurance is not required. While flood insurance is not mandatory, FEMA does encourage homeowners to purchase flood insurance through the National Flood Insurance Program (NFIP) to insure against flood losses.

Foster City is also protected from flooding by the Bayfront levee system in the City of San Mateo. In 2011 the City of San Mateo improved their levee system south of San Mateo Creek and received FEMA accreditation in March 2012. This accreditation is still recognized.

FEMA recently updated its analysis of the flood hazards posed by San Francisco Bay through the California Coastal Analysis and Mapping Program (CCAMP). Details of this study are provided in Chapter 3. Once new maps become effective (anticipated in 2016), Foster City's levees will no longer be considered accredited against coastal flood hazards. Changing this outcome will require levee re-certification as discussed herein.

The levee system also provides recreational uses for the community and these uses must be considered in any advanced levee planning. Residents enjoy walking, running, bicycling and skating on the levee pathway, which also forms part of the San Francisco Bay Trail system for the greater Bay Area community. Figure 2-1 shows an aerial extent of the Foster City levee system. The figure also shows the levee system broken up into sections which correspond to more detailed levee plan and profile sheets that are provided as Attachment 1.

Although the flood protection is provided by a number of levee segments that might differ in elevation and cross section, the segments are considered as an integrated system by FEMA when they establish levee accreditation and Special Flood Hazard Areas (SFHA) for Foster City. It may be noted, however, that the published CCAMP report on San Mateo County coastal (Bayfront) flood hazards does not specifically address the levees adjacent to Marina Lagoon or Belmont Slough.



Figure 2-1. Foster City Levee System

History of Levee System

The original perimeter levee system in Foster City was put in place in the early 1900s to reclaim tidal mud flats for agricultural use. The levees were formed with dredged bay mud deposited on the outboard side of a perimeter channel system formed by the dredging. The development of Foster City in the 1960s made use of the existing perimeter levee system to provide protection for the new development. It is believed that some upgrades to the levee system were performed at this time; however, paper records have not been identified. The perimeter channels were filled with dredged material from the interior lagoon.

In 1984 FEMA issued new Flood Insurance Rate Map (FIRM) for the City which significantly altered the presumed level of flood protection provided by the levee system. The City appealed the new maps and hired Robert H. Born Consulting Engineers, Inc. Mr. Born compiled information and analyses into a report that is referred to as the "Born Report."¹ The Born Report includes analyses on coastal flooding, 100-year riverine flooding, and presents the results of a geotechnical investigation by J.H. Kleinfelder and Associates.

The Born Report recommends the City appeal to FEMA that a relaxed levee freeboard requirement be accepted for the Foster City perimeter levee system. Born considered a freeboard allowance of no more than two feet as reasonable for the riverine levee along Belmont Slough (in contrast to three feet for riverine levees that is required by FEMA), and two feet above the 100-year stillwater elevation would be reasonable for the coastal levees. Born's original recommendations are summarized by Table 2-1.

Table 2-1. Findings from the 1988 Born Report

Criteria	North levee ¹	East levee ¹	Belmont Slough levee ²
100-yr stillwater elevation (ft, NAVD)	9.7	9.7	9.7
Maximum wave runoff (ft, NAVD)	11.7	11.7	-
100-yr flood level (ft, NAVD)	-	-	9.7 to 10.2
Freeboard (ft)	1.0	1.0	2.0
Required crown elevation (ft, NAVD)	12.7	12.7	12.7 to 13.2

1. North levee from San Mateo City border to San Mateo Bridge, East levee from San Mateo Bridge to Belmont Slough
2. Analyzed as riverine levee – Minimum 3ft of freeboard above the 100-yr flood level, however recommended that only 2-ft of freeboard be required

Foster City raised their levee system by about 18 inches in 1995 in response to the recommendations made in the Born Report. The cost estimate for this work was \$1.3 million in 1987 dollars.

Levee Accreditation

Code of Federal Regulations

Title 44 of the Code of Federal Regulations (44 CFR) Section 65.10 provides the minimum design, operation, and maintenance standards levee systems must meet and continue to meet in order to be recognized as providing protection from the base flood on a Flood Insurance Rate Map.

¹ Robert H. Born Consulting Engineers, Inc., "Report on Analysis of Foster City Levees," June 15, 1988.

For levees to be recognized by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists must be provided. The following requirements must be met:

Freeboard Requirements

For riverine levees, the freeboard must be established at three feet above the water surface level of the base flood.

For coastal levees, the freeboard must be established at one foot above the height of the one percent wave or the maximum wave runup (whichever is greater) associated with the 100-year stillwater surge elevation at the site. In Foster City the criterion for 1 foot of freeboard above the maximum wave runup elevation generally controls the levee elevation requirements for those levee segments exposed to wind-waves from San Francisco Bay. A freeboard of less than two feet above the 100-year stillwater surge elevation will not be accepted for an accredited levee by FEMA.

Geotechnical Requirements

In addition to required freeboard, levee systems must be evaluated for their ability to resist the various loads placed on them, and with earthen levee systems, meeting geotechnical performance standards is paramount. These standards are also explicitly stated in 44 CFR 65.10. While not the primary focus of this planning level study, these standards are listed herein as they help inform planning alternatives and cost estimates.

Embankment protection. Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves.

Embankment and foundation stability. Engineering analyses must evaluate levee embankment stability must be submitted. The analyses shall evaluate expected seepage during loading conditions associated with the base flood and shall demonstrate that seepage into or through the levee foundation and embankment will not jeopardize embankment or foundation stability.

Settlement. Engineering analyses must be submitted that assess the potential and magnitude of future losses of freeboard as a result of levee settlement and demonstrate that freeboard will be maintained within the minimum standards.

Other Requirements

Closures. All openings must be provided with closure devices that are structural parts of the system during operation and design according to sound engineering practice

Interior drainage. An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and, if the average depth is greater than one foot, the water-surface elevation(s) of the base flood. This work has been completed.²

² Schaaf & Wheeler Consulting Civil Engineers, "Foster City Central Lagoon Base Flood Elevation," January 2014.

Levee Accreditation Status

In July 2007 the Foster City levee system was recertified and accredited by FEMA. The following the data and documentation was submitted to FEMA by Foster City:

- written commentary on the performance of the levee system in an actual flood event; and
- geotechnical information submitted in accordance with 44 CFR 65.10 (b) (4) evaluating expected seepage during conditions associated with the base flood demonstrating that seepage through the levee foundation will not jeopardize stability.

Based on this documentation and data, FEMA found the levee shown in green on Figure 2-2 met the minimum certification criteria outlined in 44 CFR 65.10.

In March of 2012, San Mateo's Bayfront levees were accredited by FEMA which meant that all of Foster City and San Mateo were to be shown on updated maps as Shaded Zone X, which does not require property owners to buy flood insurance.

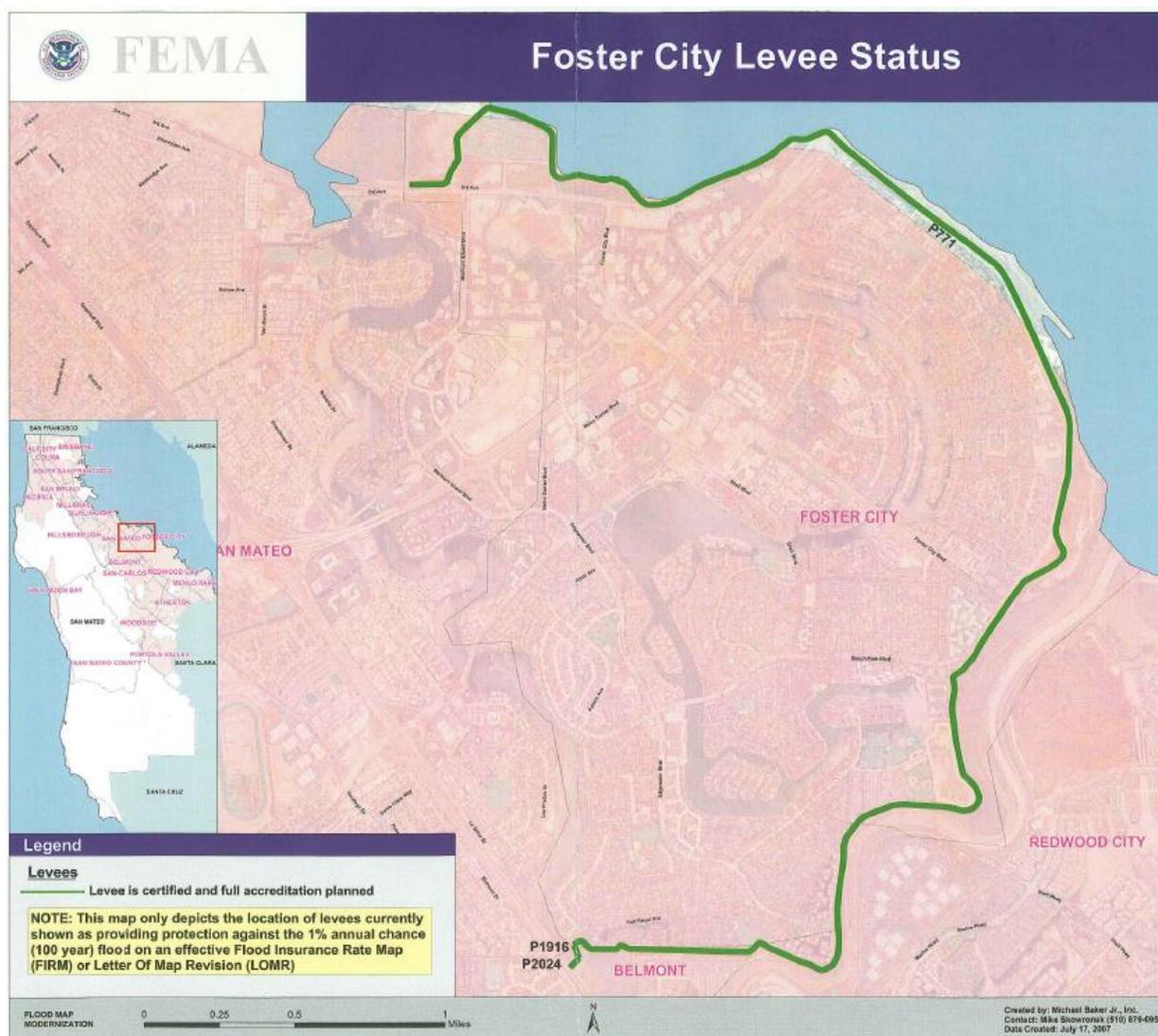


Figure 2-2. Foster City Levee Recertification Map

3. San Mateo County Coastal Hazard Study

One primary driver of this levee planning study is FEMA’s California Coastal Analysis and Mapping Program (CCAMP). This study will revise and update flood and wave data included in the National Flood Insurance Program (NFIP), Flood Insurance Study (FIS) reports, and Flood Insurance Rate Map (FIRM) panels. Foster City regulates its floodplains using the FIRM dated October 16, 2012. FEMA is in the process of updating San Mateo County flood hazard mapping and is following a timetable outlined in Figure 3-1.

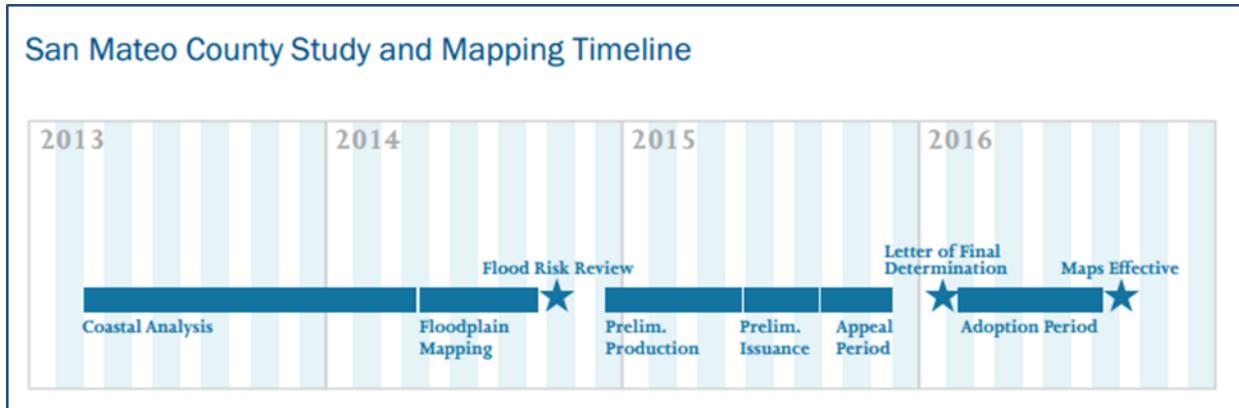


Figure 3-1. San Mateo County Flood Hazard Mapping Timeline

California Coastal Analysis and Mapping Project

FEMA recently completed an engineering study of San Francisco Bay including detailed analyses of coastal hazards as part of the California Coastal Analysis and Mapping Project (CCAMP). Results summarized in the “Central San Francisco Bay Coastal Flood Hazard Study” prepared in July 2014 will be used by FEMA to remap the coastal flood hazards for San Francisco Bay communities including Foster City. Coastal flood hazards are illustrated schematically in Figure 3-2, with relevant terms defined below.

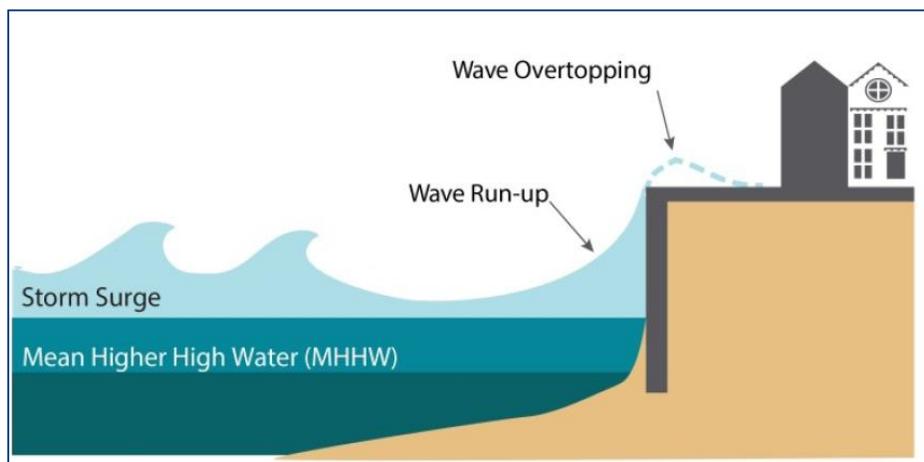


Figure 3-2. Definition of Coastal Flood Hazards (ref. San Francisco PUC)

Mean Higher High Water (MHHW)	The arithmetic average of the elevations of the higher high tides over a specific 19-year period.
Storm Surge	An abnormal rise of water generated by a storm, over and above the predicted astronomical tide. Storm surges may be caused by a combination of low barometric pressure and onshore winds.
Wave Runup	Wave runup occurs when a wave breaks near the shoreline and water is propelled onto the beach or a barrier.
Wave Overtopping	Wave overtopping takes place when waves meet the shore or structure lower than the approximate wave height.

FEMA's technical contractor (BakerAECOM) evaluated coastal flooding hazards from San Francisco Bay with one-dimensional transect-based models to calculate wave setup, runup, overtopping and overland wave propagation. Water levels and wave parameters used in the transect analyses were derived from a regional hydrodynamic and wave model for north and central San Francisco Bay completed by DHI in 2011. These water levels include the effects of tides, storm surge and riverine discharges. Since DHI's hydrodynamic and wave modeling work did not transform the waves at a sufficiently fine discretization to resolve surf zone dynamics including wave breaking and the generation of wave setup, the one-dimensional transects were necessary to establish special flood hazard areas along the shoreline of San Francisco Bay. Transects were placed perpendicular to the shore with consideration of variations in topography, shoreline type and incident wave conditions. Figure 3-3 shows the CCAMP transects in the vicinity of Foster City.



Figure 3-3. Foster City Transects from FEMA Coastal Study of San Francisco Bay

CCAMP Results

Wave runup was calculated for those transects with coastal armoring (e.g. riprap) or steeply sloping ground profiles near the flooded shoreline. Wave setup and runup were combined with coincident water levels from the DHI surge model to develop Total Water Level (TWL) values. As statistical extreme value analysis was performed on TWL estimates over a range of the 54 years modeled to arrive at the one-percent TWL for flood hazard analysis. FEMA's Wave Height Analysis for Flood Insurance Studies (WHAFIS) model was used for overland wave propagation and dissipation by marsh grasses to establish the TWL at Foster City Transect No. 28.

Preliminary coastal hazard maps prepared for CCAMP and summarized by Table 3-1 show Special Flood Hazard Areas on the Foster City shoreline that are up to three feet higher than the currently effective Flood Insurance Rate Map shows. In the absence of levee accreditation Foster City would be shown as subject to 100-year inundation at an elevation of 10 feet NAVD, which is the rounded one-percent stillwater elevation.

Table 3-1. Coastal Flood Hazards along Foster City Shoreline

Location	CCAMP Transect Number	CCAMP		Effective FIS		Increase in Hazard (feet)
		Stillwater Elevation (ft NAVD)	Maximum Wave Runup (ft NAVD)	Stillwater Elevation (ft NAVD)	Maximum Wave Runup (ft NAVD)	
San Mateo City Limit	28	10.4	12.8	10.0	10.0	2.8
Mariner's Point	29	10.4	14.0	10.0	10.0	4.0
Estero WPCP	30	10.4	14.5	10.0	10.0	4.5
Lincoln Center Dr.	31	10.4	14.4	10.0	10.0	4.4
Egret Street	1000	10.2	13.7	10.0	10.0	3.7
Marlin Avenue	1001	10.2	14.1	10.0	10.0	4.1
Swordfish Street	1002	10.2	n/a	10.0	10.0	0.2
Belmont Slough	n/a	10.2	n/a	10.0	n/a	0.2
O'Neill Slough	n/a	10.2	n/a	10.0	n/a	0.2

Potential Regulatory Flood Hazards

The Flood Insurance Rate Map for San Mateo County that became effective October 16, 2012 shows all of Foster City outside of the Central Lagoon in a moderate flood hazard zone (Shaded X). This designation shows the area protected from one-percent flooding by an accredited levee system. As demonstrated by Table 3-1 this status could be in jeopardy.

According to FEMA regulations "under the provisions of the Flood Disaster Protection Act of 1973, individuals, businesses and others buying, building or improving property located in identified areas of special flood hazards within participating communities are required to purchase flood insurance as a prerequisite for receiving any type of direct or indirect federal financial assistance (e.g., any loan, grant, guaranty, insurance, payment, subsidy or disaster assistance) when the building or personal property is the subject of or security for such assistance." The City desires to prevent this burden from being placed on to qualifying property owners located within the area protected by Foster City's levees, which includes all of Foster City and part of San Mateo. There are close to 9,000 parcels within Foster City and an additional 8,000 parcels within San Mateo protected from one-percent tidal flooding by the combined levee system.

Vertical Datum Conversions

A given elevation may be on one or more of the four vertical datums often used in Foster City:

MLLW	Mean Lower Low Water (tidal datum at San Mateo Bridge)
NGVD29	National Geodetic Vertical Datum of 1929
NAVD88	North American Vertical Datum of 1988
CFC	City of Foster City Survey Datum

Depending upon the context and source of information, vertical datums are used interchangeably depending upon the source of information. Figure 3-4 shows the factors used to convert an elevation from one vertical datum to another. Results from the CCAMP study are on the North American Vertical Datum of 1988 (NAVD88) as are FEMA’s official mapping products. Earlier studies including the Born Report often refer to the National Geodetic Vertical Datum of 1929 (NGVD29). Tidal elevations are often given as feet MLLW. Finally City staff are often more familiar with the Foster City Datum, which adds 100 feet to the NGVD29 datum, to avoid negative elevations.

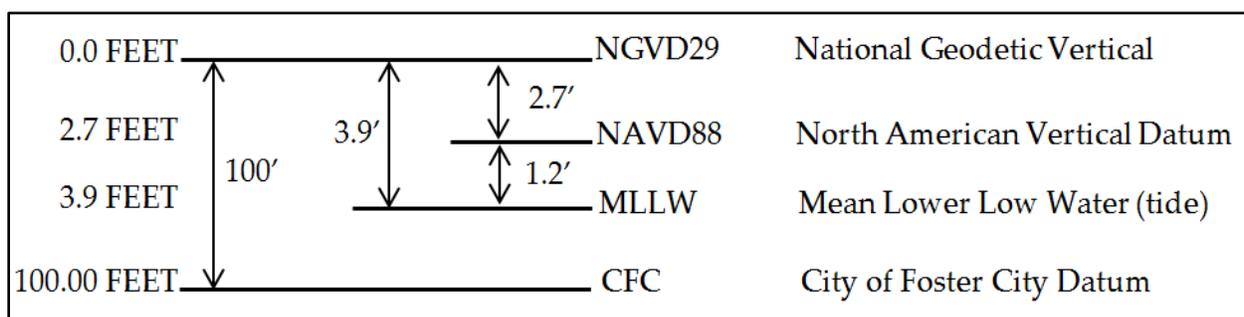


Figure 3-4. Vertical Datum Conversions

4. Evaluation of Existing Levees

The CCAMP report concludes that Foster City's levees do not provide the requisite coastal freeboard as required by 44 CFR 65.10 for levee accreditation, and as such flood hazard mapping for Foster City should not consider the protection provided by the levee system. With this conclusion, the entirety of Foster City and adjacent portions of San Mateo will be shown as within a Special Flood Hazard Area (Zone AE – Elevation 10 feet NAVD).

To further evaluate potential deficiencies in the Foster City levee system, results from the CCAMP (BakerAecom) studies have been compared to the surveyed crest elevations of the existing levee segments using the stated requirements from 44 CFR 65.10 to analyze the current levee system for freeboard based on the 100-year stillwater and maximum wave runup elevations determined by FEMA through CCAMP.

100-year Stillwater and Wave Runup Elevations

Table 4-1 lists the levee crest elevations, one-percent stillwater elevations and maximum wave runup elevations along with their associated levee freeboard criteria at the CCAMP transect locations in Foster City. Transect 28 starts in San Mateo with transect numbering increasing towards Redwood City, ending with transect 1002 at the mouth of Belmont Slough as shown in Figure 3-3.

Table 4-1. CCAMP Results for Foster City Levee System

Transect Number	Levee Crest Elevation (ft NAVD)	Stillwater Elevation (ft NAVD)	Max. Wave Runup Elevation (ft NAVD)	2 ft above Stillwater Elevation (ft NAVD)	Freeboard Criteria Met?	1 ft above Wave Runup (ft NAVD)	Freeboard Criteria Met?
28	14.7	10.4	12.8	12.4	Yes	13.8	Yes
29	11.1	10.4	14.0	12.4	No	15.0	No
30	11.4	10.4	14.5	12.4	No	15.5	No
31	11.6	10.4	14.4	12.4	No	15.4	No
1000	12.1	10.2	13.7	12.2	No	14.7	No
1001	12.3	10.2	14.1	12.2	Yes	15.1	No
1002	11.6	10.2	n/a	12.2	No	n/a	n/a

Sources of Levee Elevation Data

A number of sources of elevation data have been consulted to cross-check existing levee conditions within Foster City and compare crest elevations to freeboard requirements provided by the CCAMP study.

Wilsey Ham Survey

Wilsey Ham conducted a levee pedway and boundary survey in 2008 and 2009. In 2014 the data were re-evaluated through control surveys to ensure the vertical datum was correct. The survey appears to collect the elevations along the edge of pavement for the bike path. The extent of this survey is shown in Figure 4-1.



Figure 4-1: Wilsey Ham Survey Extent

Towill Survey

In 1991 Towill Inc. surveyed the city and prepared AutoCAD drawings. In addition, orthophotos were taken in 1998 and 2004.

LiDAR

In 2001 NOAA published the 2011 Northern San Francisco Bay Area LiDAR Light Detection and Ranging (LiDAR) dataset. This dataset is available for download at <http://earthexplorer.usgs.gov/>.

Bathymetry Data

In 2012, the Department of Water Resources Bay Delta Office produced a digital elevation model (DEM) of the San Francisco Bay and Sacramento-San Joaquin Delta. A portion of this DEM covers the Belmont Slough. While it is impossible to tell without detailed survey data, the Bathymetry data and LiDAR data seem to be in agreement for the crest elevations that are used in Belmont Slough.

Required Coastal Levee Elevations for Continued FEMA Accreditation

Levee deficiencies have been evaluated by breaking the levee system into 3,000 linear-foot sections, starting at the confluence of the San Mateo and Foster City levees. Transect data are applied to the closest levee section, and interpolated between transect sections. Attachment 1 to this report contains 14 sheets that show the levee crest elevation profile in comparison with FEMA-required levee elevations for accreditation. Based on this analysis, it is found that 36,000 feet or roughly 85 percent of the levee system does not meet FEMA's freeboard requirements. Furthermore, 2,000 feet of the levee system would be overtopped by the one-percent stillwater elevation. The average height increase required is about two feet and the maximum height increase is four feet. These values do not consider sea level rise or settlement, which could amount to an additional 1.5 feet. Table 4-2 summarizes the levee deficiencies and the required levee crest elevations for each levee sheet section, per the requirements of 44 CFR 65.10.

Table 4-2. Levee Deficiencies and Required Levee Crest Elevations

Levee Sheet	Transect Number(s)	Linear Feet of Deficiency	Height Deficiency (ft)	Required Levee Crest Elevation (ft, NAVD)
1	28/29	1000	1	13.8/14.4
2	28/29/30	1000	4	14.4/15.0/15.3
3	30/31/1000	3000	4	15.3/15.5/15.4
4	31/1000	3000	4	15.4/15.1
5	31/1000/1001	3000	3	15.1/14.7/14.9
6	1001/1002	3000	2	14.9/12.2
7	1002	3000	1.5	12.2
8	1002	3000	2	12.2
9	1002	3000	3	12.2
10	1002	3000	2	12.2
11	1002	3000	1.5	12.2
12	1002	3000	1.5	12.2
13	1002	3000	1.5	12.2
14	1002	1000	1	12.2
15	1022	800	1	12.2

The deficiencies presented in table 4-2 are based on calculating the highest crest elevation from LiDAR data. It is believed that the calculated highest crest elevation included the walls along Belmont Slough, however, it is possible that floodwalls may have been missed as the width of the walls (~6 inches) is close to the level of accuracy of the Lidar data. A detailed survey data should be performed to accurately determine the height deficiency throughout the entire levee system.

Belmont Slough Levee

Belmont Slough forms much of the eastern border of Foster City and there is a protective levee along the slough from its mouth of at San Francisco Bay south to the O'Neill Slough tide gate structure operated by the City of San Mateo near U.S. Highway 101. This levee is not evaluated in the CCAMP study since without exposure to wind-wave action from San Francisco Bay, it is not considered to be a coastal hazard. With respect to FEMA levee accreditation, the question is whether this levee is a riverine levee or a coastal levee.

Evidence for Coastal Hazard Control

The currently effective and proposed FIRMs show a level water surface for all of Belmont Slough to its terminus near Highway 101. Unfortunately the effective Flood Insurance Studies for Foster City and Belmont do not define a base flood discharge or water surface profile in Belmont Creek downstream of Highway 101, and it appears there are no published detailed studies or profiles of Belmont Creek.

Consequently, a cursory hydraulic analysis has been conducted for Belmont Slough to assess whether levee freeboard should be set using the coastal standard of two feet above the one-percent stillwater elevation (the minimum allowed) or three feet above the one-percent water surface profile as required for riverine systems. Because there are no published discharges for Belmont Creek, unit discharges previously estimated under separate contract for the immediately adjacent Laurel Creek watershed are used to estimate the 100-year discharge for Belmont Creek, which becomes Belmont Slough at Marine Parkway.

The Laurel Creek watershed is within close proximity of the Belmont Creek watershed and has similar land use characteristics, range of topographic elevation and rainfall. The Laurel Creek watershed is an approximately 4.6 square mile basin that produces approximately 420 cfs/mi² during the one-percent storm event (i.e., 100-year unit discharge). The Born Report indicates that the Belmont Slough drains an area of approximately 3.2 square miles. Using the unit discharge per square mile for the Laurel Creek watershed, the estimated Belmont Slough one-percent discharge is about 1,350 cfs.

Cross sections through Belmont Slough have been cut using the same bathymetric data collected in 2012 by FEMA for the South Bay portion of the CCAMP study. Figure 4-2 shows the aerial extent of this bathymetry and cross sections cut to build an HEC-RAS model to establish water surface profiles for Belmont Slough.

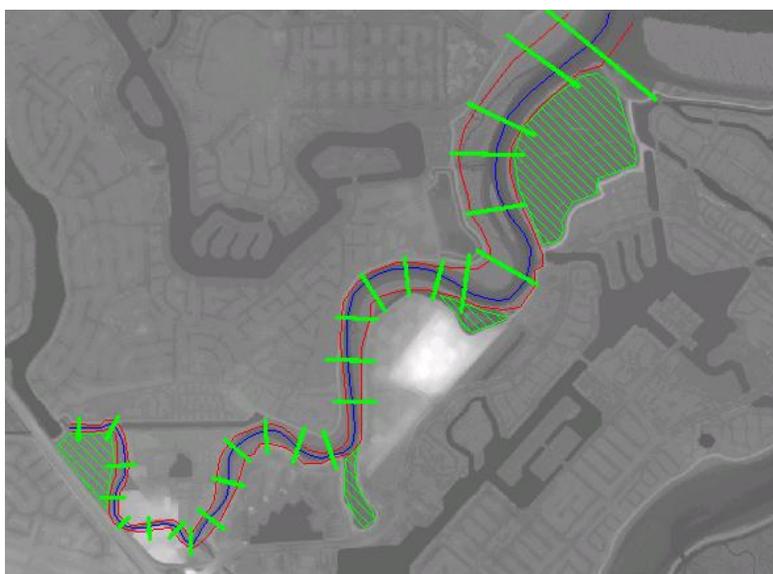


Figure 4-2. HEC-RAS model of Belmont Slough

The estimated base flood (100-year) discharge of 1,350 cfs is run in a steady state model against two different downstream tidal boundary conditions. In Foster City the MHHW is 7.5 feet NAVD. The model is also run against what is known as a coincident tide to assess the robustness of levee freeboard with a more conservative assumption. The statistically coincident 100-year tide at the mouth of Belmont Slough is 9.5 feet NAVD. The coincident tide represents the highest tide on the day of the peak annual stormwater runoff event and does not account for the precise timing differences between maximum tide and peak riverine discharge. As such, there is built-in conservatism. These tidal boundary conditions were analyzed in 2014 by Schaaf & Wheeler and described in the report "Foster City Central Lagoon Base Flood Elevation."

HEC-RAS model results show a water surface elevation at the O'Neill Slough Tide Gate of approximately 9.7 feet NAVD for the 100-year coincident tidal boundary condition and 8.2 feet NAVD for the MHHW boundary condition. For riverine flooding, FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* require that one-percent riverine flooding be evaluated against a mean higher high water (MHHW) tide as the downstream boundary condition. This would indicate a minimum required levee elevation height of 11.2 feet NAVD at the south end of O'Neill Slough. Figure 4-3 shows modeled water surface profiles for the Belmont Slough reach.

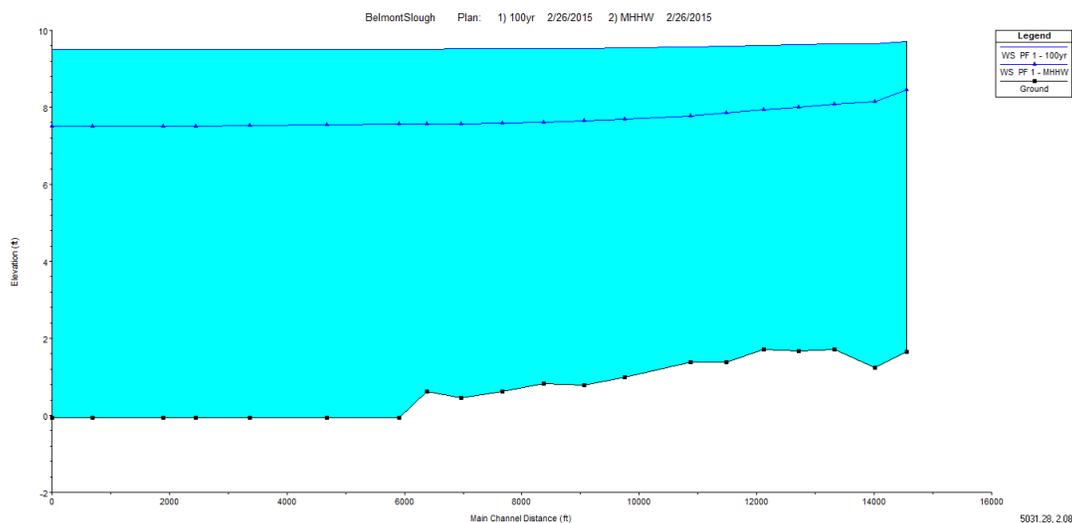


Figure 4-3. HEC-RAS Model Profiles for MHHW and 100yr Coincident Tides

Freeboard Requirements

If Belmont Slough is considered to be a coastal hazard, the levee height requirement is 2 feet above the one-percent stillwater elevation (10.2 feet NAVD), which requires two feet of freeboard and a minimum levee elevation of 12.2 feet NAVD.

Based on this cursory analysis, the coastal levee height is greater, indicating that the coastal process dominates within the Slough and that containment levees should be designed to provide freeboard above the stillwater elevation. When set using this criterion, the resulting levee elevation provides 4 feet of freeboard above the maximum water surface elevation for a 100-year riverine event coincident with a MHHW tide and 2.5 feet of freeboard above the maximum water surface elevation for a 100-year riverine event coincident with a 100-year tide.

Marina Lagoon Levee

The adopted 100-year base flood elevation for the Marina Lagoon, as operated by the City of San Mateo, is 2 feet NAVD. While Foster City is protected from Marina Lagoon by a relatively low height levee, the LiDAR data set indicates that ground elevations on the land side of this levee are on the order of 5 feet NAVD, so the levee is not necessary to protect Foster City from Marina Lagoon flooding and levee accreditation is not an issue.

Foster City Central Lagoon

Interior flood hazard analyses have been completed by Schaaf & Wheeler in January 2014 and subsequently accepted by FEMA. These analyses indicate that the base flood elevation for Foster City inside an accredited levee system is also 2 feet NAVD.

5. Evaluation of Future Sea Level Rise

This section examines the resiliency and adaptability of the Foster City levees to provide flood protection against coastal hazards from San Francisco Bay when considering future sea level rise that may result from global climate change. Resiliency refers to the robustness of a flood protection solution should San Francisco Bay water levels increase over time in response to certain sea level rise scenarios. Adaptability refers to the how easily the protective elements could be altered to accommodate those sea level rise scenarios. Project resiliency and adaptability must be evaluated in light of the large uncertainties regarding future sea level rise. Figure 5-1 provides a generalized graphic illustration of this uncertainty from the Intergovernmental Panel on Climate Change (IPCC).

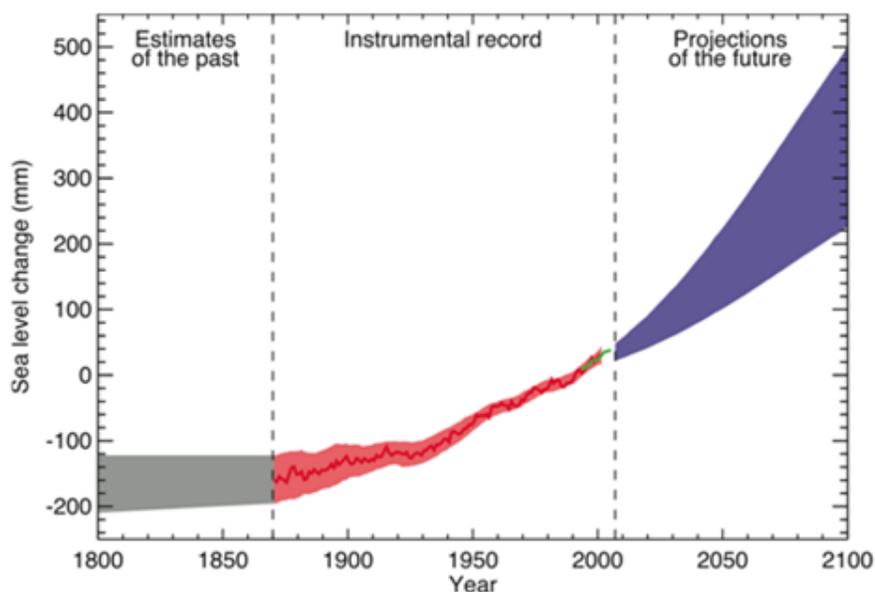


Figure 5-1. Uncertainty in Sea Level Rise Projections (ref. IPCC)

Sea Level Rise in the Bay Area

The science associated with sea level rise is continually being updated, revised, and strengthened. Although there is no doubt that sea levels have risen and will continue to rise at an accelerated rate over the coming century, it is difficult to predict with certainty what amount of sea level rise will occur at any given time in the future. The uncertainty increases over time (e.g. the uncertainties associated with 2100 projections are greater than with 2050 projections) because of uncertainties in future greenhouse gas emissions trends, the evolving understanding of the sensitivity of climate conditions to GHG concentrations, and the overall skill of climate models.

In March 2013, the State of California adopted the 2012 National Research Council Report, *Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past Present and Future* (NRC Report), as the best available science on sea level rise for the state and published guidance on incorporating sea level rise into state planning. The California Coastal Commission (CCC) also supported the use of the NRC Report as best available current science. The CCC also noted that the science of sea level rise is continually advancing, and future research may enhance the scientific understanding of how the climate is changing, resulting in the need to regularly update sea level rise

projections. The NRC Report includes discussions of historic sea level observations, three projections of likely sea level rise for the coming century, high and low extremes for sea level rise in the coming century, and consideration of local conditions along the California, Oregon, and Washington coast that contribute to “relative sea level rise.”

Low and high range of the projections are both used to reflect the uncertainty bounds inherent in developing the projections and applying them to a single location. Table 5-1 provides a summary of the range of SLR projections contained in the 2012 NRC document.

Table 5-1. Summary of NRC Sea Level Rise Scenarios

Time Period	Low Range SLR (inches)	High Range SLR (inches)
2000 – 2030	2	12
2000 – 2050	5	24
2000 – 2100	17	66

Local Planning Policies

Local agencies have been formed to protect the San Francisco Bay from development. California’s two coastal zone management agencies are the San Francisco Bay Conservation and Development Commission (BCDC) and the California Coastal Commission (CCC). These agencies are required to ensure that projects and plans subject to their jurisdiction avoid or minimize hazards related to sea level rise. In 2014, the City and County of San Francisco adopted a guidance document for incorporating sea level rise into capital planning. While other jurisdictions have also produced guiding documents, the City and County of San Francisco’s guidance is the most recent.

San Francisco Bay Conservation and Development Commission (BCDC)

BCDC has permit jurisdiction over San Francisco Bay and the land lying between the Bay shoreline and a line drawn parallel to, and 100 feet from, the Bay shoreline known as the 100-foot shoreline band. In October 2011, BCDC adopted amendments to the San Francisco Bay Plan addressing sea level rise. These policies require sea level rise risk assessments when planning in shoreline areas or designing larger shoreline projects. If sea level rise and storm surge levels that are expected to occur during the life of the project would result in public safety risks, the project must be designed to cope with flood levels expected by mid-century. If it is likely that the project will remain in place longer than midcentury, the applicant must have a plan to address the flood risks expected at the end of the century.

California Climate Change Center (CCC)

All public and private projects in the City’s coastal zone must be undertaken in accordance with an approved coastal development permit from either the City Planning Department or the CCC. The CCC oversees a grant program to support local government planning efforts addressing sea level rise, and released Draft Sea-Level Rise Policy Guidance for public review and comment on October 14, 2013. In that Draft Guidance, consistent with this CCSF Guidance, the CCC considers the NRC 2012 report as the best available science on sea level rise in California, though this Guidance treats the NRC 2012 report somewhat differently than the draft CCC Guidance.

City and County of San Francisco

The City and County of San Francisco released *Guidance for Incorporating Sea Level Rise into Capital Planning in San Francisco* (Guidance) in 2014. This Guidance document presents a framework for considering sea level rise within the capital planning process. The Guidance also outlines some key issues related to sea level rise adaptation planning; however, specific adaptation strategies and approaches are not provided. The range of available potential adaptation strategies is ever increasing, and selecting the appropriate adaptation measures requires site and project specific information that will best emerge at a departmental level, informed by this Guidance, and coordinated through the City and County capital planning processes. This Guidance provides direction from the Capital Planning Committee (CPC) to all departments on how to incorporate sea level rise into new construction, capital improvement, and maintenance projects. The Guidance identifies and describes key steps for assessing and adapting to the effects of sea level rise in capital planning including the vulnerability to risk and means for adapting to changing conditions.

Table 5-2 presents the NRC Report's sea level rise estimates for San Francisco relative to the year 2000 that the City and County have adopted. The table comes from the Guidance document and presents the local projections (mean \pm 1 standard deviation) from the NRC Report. These projections (for example, 36 \pm 10 inches in 2100) represent the likely sea level rise values based on a moderate level of greenhouse gas emissions and extrapolation of continued accelerating land ice melt patterns, plus or minus 1 standard deviation. The extreme limits of the ranges (for example, 17 and 66 inches for 2100) represent unlikely but possible levels of sea level rise using both very low and very high emissions scenarios and, at the high end, including significant land ice melt that is currently not anticipated but could occur.

Table 5-2. San Francisco's Adopted Sea Level Rise Estimates from Guidance Document

Time Period	Projections (inches)	Ranges (inches)
2000 – 2030	6 \pm 2	2 to 12
2000 – 2050	11 \pm 4	5 to 24
2000 – 2100	36 \pm 10	17 to 66

Adopted Sea Level Rise Projections for Foster City Levees

San Mateo County is one of the most vulnerable regions of the Bay Area to the problem of rising sea levels from climate change. As a result, a multi-stakeholder working group spearheaded by Supervisor Dave Pine has been established in order to develop a vulnerability assessment for the entire County. The working group has been established and meets regularly, but has not yet published a guidance document for San Mateo County. It is anticipated that the working group will model any guidance after what has been established in San Francisco County. For this reason, it is recommended SLR planning scenarios for Foster City are 0.5 foot by 2030, 1 foot by 2050 and 3 feet by 2100 (from Table 4-2). Corrective action taken to restore FEMA accreditation should include an extra one foot of freeboard with levee or floodwall foundations built to accommodate an extra two feet of freeboard in the future. This is based on the understanding that the levee improvements will be built to last at least until 2050 and likely longer. So the inclusion of an extra one foot of freeboard should prolong future improvements to incorporate SLR.

6. Levee Improvement Alternatives

Three basic alternatives are described in this study as alternatives for City consideration to meet FEMA levee accreditation requirements as outlined in the CCAMP study: earthen levees, lightweight fill levees, and floodwalls. An alternative known as the “horizontal levee” (that is, new marsh and/or beach creation to help reduce the height of maximum wave runup) has also been considered (Figure 6-1), but due to the space required and regulatory permitting issues associated with adding substantial new fill into the Bay, horizontal levees are not recommended as a typical levee improvement alternative for Foster City at this time. It is also suggested that as much work as possible be conducted on the landward side of the levee to limit the amount of disturbance on the Bay side of the existing levee. While this approach will not eliminate the need for regulatory approval, it should help alleviate significant permitting delays and compensatory mitigation requirements.

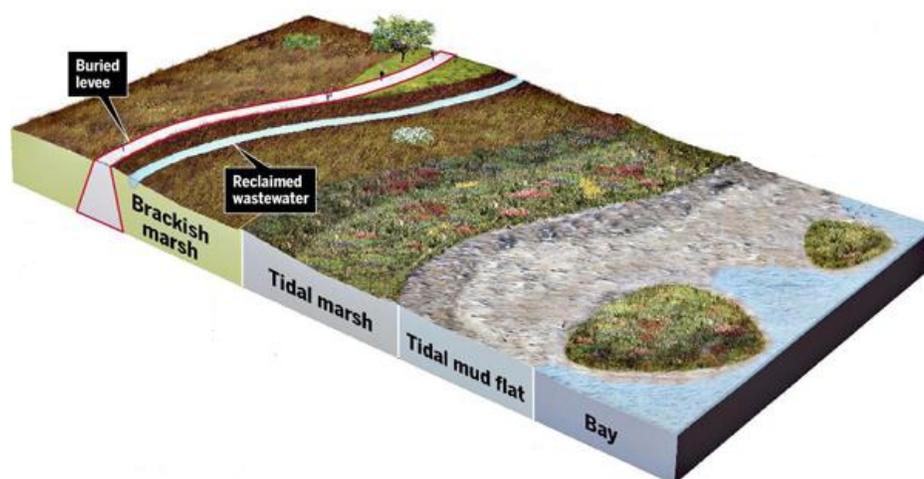


Figure 6-1. Horizontal Levee (ref. San Francisco Estuary Partnership)

Raise Earthen Levees

The existing levee system is an earthen levee with a pedway on or near the top of levee. In some sections there is rip rap on the bay side of the levee, but in no sections is there backside protection. The pedway provides erosion control on the top of the levee. Levee fill embankments exposed to wave action need to include rock slope protection on the Bay side.

In many areas, particularly along the Belmont Slough Levee, there is a mound that is slightly higher than the pedway. This mound might have been placed in 1995 as part of the levee raising project to raise the levees 18 inches and is assumed to be the levee crest elevation in the profiles attached to this report. As shown in Figure 6-2, this “levee” section may not necessarily conform to good engineering practice for levee design as the levee is narrow and lacks erosion protection. Field reconnaissance indicates several locations where this narrow levee crest has been compromised (lowered) as pedestrian and bicycle traffic have worn through the levee. An example is shown in Figure 6-3. Ideally, the paved pedway would be located at the crest of the raised earthen levees with a width of 10 feet with one foot of shoulder on each side, so the total top width of the levee would be 12 feet.



Figure 6-2. Foster City Levee Section with Adjacent Levee Crest Higher than Pedway



Figure 6-3. Foster City Levee Section with Levee Crest Compromised (yellow)

In general, the height of an earthen levee cannot be increased without widening the base of the levee. The Foster City levee system appears to have sufficient rights-of-way to increase the footprint of the levee system without having to tear down streets. There appears to be sufficient vegetation between the streets and the levee system that could be used to increase the levee footprint. The constraint will be on increasing the levee footprint into the Bay as permitting will become an issue due to sensitive habitats and endangered species. If possible, all widening of levees should be done within the right-of-way and landward side of the levee and not extending levee out into the Bay. Figure 6-4 shows a typical cross section of an earthen levee (note for Foster City the top width proposed is 12 feet to include a 10 feet wide paved path and 1-foot shoulders on each side).

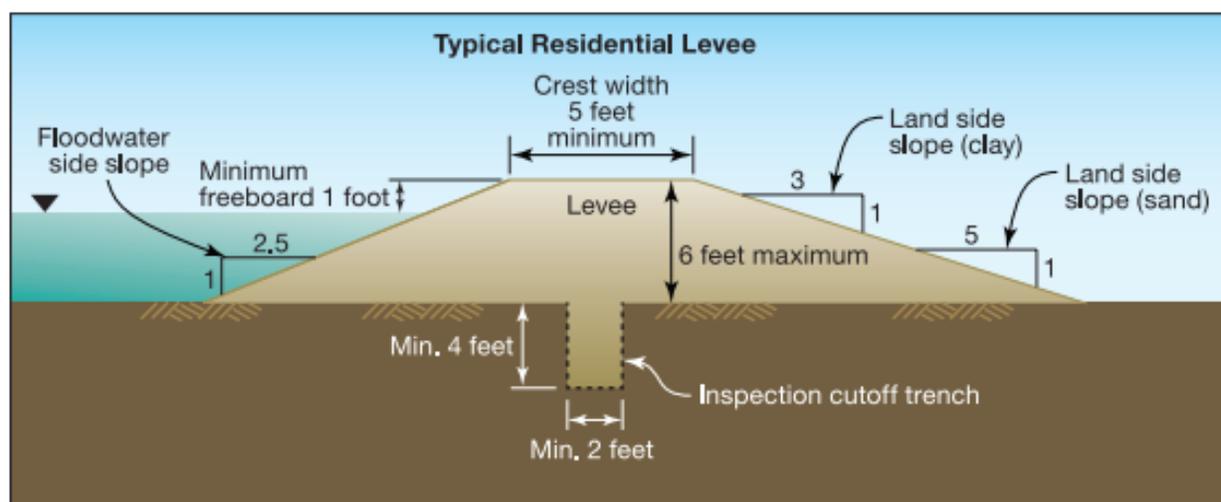


Figure 6-4. Typical Earthen Levee Cross Section (ref. FEMA)

Settlement Allowance

Based on local experience with projects in Foster City, Bay Mud thickness may range from 40 to 70 feet. Usually the Bay Mud is thicker along the waterfront. If new earthen fill is placed outside the limit of the existing levee on native marsh land, 6 to 8 inches of settlement per foot of new fill placed can be expected. It is typically recommended to place new fill on native tidal land in one- to two-foot intervals with 3:1 (h:v) or flatter bank slopes, since rapid loading from fill placement may cause shoreline instability. For new fills placed on top of an existing levee, settlement will generally be in the range of 3 to 5 inches per foot of new fill. (Moreover, up to 3 feet of fill can be placed at once within the limits of the existing levee with a 3:1 side slope should be relatively stable.)

Levee improvement profiles included with this report do not show a settlement allowance. The actual settlement allowance required is a function of levee location, the underlying stratigraphy and Bay Mud thickness. These parameters need to be identified with a thorough program of subsurface exploration, laboratory testing, and geotechnical engineering during more advanced planning and design phases and cannot be specifically known at this time. Rather, for preliminary cost estimating purposes it is assumed that the amount of earthen fill to be placed must be doubled to ultimately result in the levee profiles needed to retain FEMA levee accreditation. This assumption essentially reflects a settlement allowance of 6 inches for every foot of levee fill added as well as a remobilization cost since only so much fill can be placed at one time while maintaining system stability.

Seepage Protection

For the raised earthen levees alternative, seepage protection is provided by the fill material itself. As part of the Born Report, Kleinfelder indicated that the previously placed embankment material was suitably impermeable for a levee application. New fill material specifications would provide for compatible impermeability, including the possibility for blending with the existing levee fill.

Lightweight Levee Fill

The construction of levee improvements, but with lightweight fill, would be very similar to that of an earthen levee using a specified fill material from volcanic sources that has a unit weight on the order

of 70 to 90 pounds per cubic foot compared to a saturated unit weight of 125 pounds per cubic foot for conventional levee fill material. Using lightweight fill material could reduce the total settlement of the levee to one-third or one-half that of a conventional raised levee.

Lightweight fill material must be imported from distance and is more expensive due to the cost of the fill material itself and the ancillary seepage cutoff wall required (lightweight fill, even when blended with more conventional fill, is relatively porous), but there is the significant added benefit that the raised levee will not experience as much settlement as a conventional earthen levee, and single-pass construction can be used. That is, a second phase of construction will not be necessary to maintain levee accreditation as may be the case with conventional levee fill. San Mateo selected this alternative for their Bayfront Levee Improvement Project in 2011.

Structural Floodwalls

While the majority of the Bayfront flood protection system is made up of earthen levees, there are a few newer sections that do contain floodwalls along Belmont Slough (Figure 6-5). Floodwalls can be placed on the Bay side or the landward side of the pedway. If floodwalls are placed on the landward side, access ramps over the wall or closure devices are required for pedestrians and bikers to access the trail. However, if floodwalls are placed on the Bay side, permitting may be more complex and require additional coordination with agencies such as BCDC and the USACE. In addition, a floodwall on the Bay side may detract from the trails appeal as it may limit the view into the Bay.



Figure 6-5. Floodwall along Belmont Slough

Figure 6-6 shows a conceptual cross section of a typical floodwall that could be placed on the Bay or land side of the existing earthen levee to meet freeboard requirements for FEMA accreditation. Floodwalls do not require widening of the existing levee as much as raising earthen levees, and therefore lessen the burden of additional land. Floodwalls do have an added benefit that they are generally easier to increase in height in the future (without a commensurate increase in footprint) and may be considered more readily adaptable to sea level rise than an earthen levee. While floodwalls will not experience as much settlement as earthen levees, a wall on a shallow spread footing may experience three to six inches of settlement that should be added to the height of the wall to compensate.

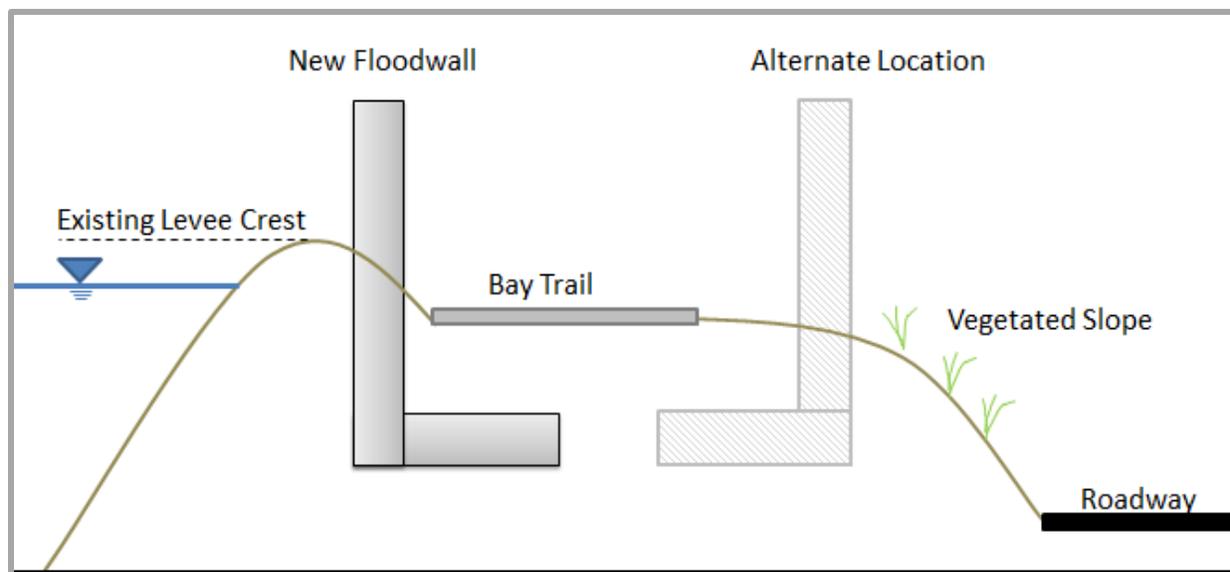


Figure 6-6. Typical Floodwall Cross Section (not drawn to scale)

Aesthetics

The trail that runs along the existing levees is part of the San Francisco Bay Trail. Part of the appeal of Foster City is the ready access to its waterfront. Raising the levees or constructing a structural floodwall may impact the ease of access and the visibility of the Bay from the trail and surrounding area. The existing levees are raised from surrounding ground and already block views from low lying areas, but the additional levee elevation will need to be acknowledged during the CEQA and permit processes. Levee accreditation requirements are considered superior to aesthetic considerations.

Permitting Challenges

The San Francisco Bay area of Foster City is a sensitive habitat and may be home to endangered species. The City of San Mateo Bayfront Levee Project endangered species assessment noted that the project could impact the native California Clapper Rail. In the 1990s, Redwood City and the USACE determined that the Redwood Shores levees needed to be raised. Environmental reports for this work indicated the presence of California Clapper rail and the salt marsh harvest mouse on the outside wetlands of the levee system.

Prior to any sort of construction project to raise the height of the levees and the commensurate footprint required for geotechnical stability, the California Environmental Quality Act (CEQA) requires documentation to identify sensitive habitats and species that might be impacted by levee construction and compensatory mitigation measures that render those impacts less than significant. Permits will also need to be obtained from entities such as the United States Army Corps of Engineers (USACE) and Bay Area Conservation and Development Commission (BCDC). The following is an indication of the types of agencies that will required permits to improve the levee system:

- Local
 - San Francisco Bay Conservation and Development Commission (BCDC)
 - Regional Water Quality Control Board (RWQCB)

- State
 - California Environmental Quality Act (CEQA)
 - California Department of Fish and Wildlife (CDFW)
- Federal
 - Corps of Engineers Section 10 permit (USACE)
 - Corps of Engineers Section 404 permit (USACE)
 - United States Fish and Wildlife (USFWS)
 - National Marine Fisheries (NMFS)

Bay Trail Access during Construction

Since access to the Bay Trail will be limited for the duration of the levee construction/modification, a comprehensive detour plan will need to be addressed in the CEQA document and Joint Aquatic Resource Permit Application (JARPA). JARPA is used to apply for regulatory approval of projects that take place along the San Francisco Bay and the coastline. The San Francisco BCDC will be keenly interested in Bay Trail access during construction.

Adaptive Management Techniques for Sea Level Rise

It is recommended that the priority for improvements is placed on meeting accreditation based on the 2014 FEMA coastal flood hazard risk study. If feasible, levee improvement planning and design should consider additional freeboard for future sea level rise projections. This entails increasing the base width of earthen levees and increasing the footing of floodwalls. In general, it is easier to raise the height of floodwalls in the future. In addition, if earthen levees are selected initially, a short wall can be built on top of the previously raised levee to meet sea level estimates. The ultimate lifespan of inert substances such as earth and concrete should approach or exceed 100 years.

Given the uncertainty in sea level rise projection, provisions for 1 foot of sea level rise by 2050 should be incorporated into the design now with design considerations (i.e. wider base foundation) for an additional 2 feet of sea level rise by 2100. Figure 6-7 illustrates how the developers of Treasure Island are building levees that are adaptable to future sea level rise.

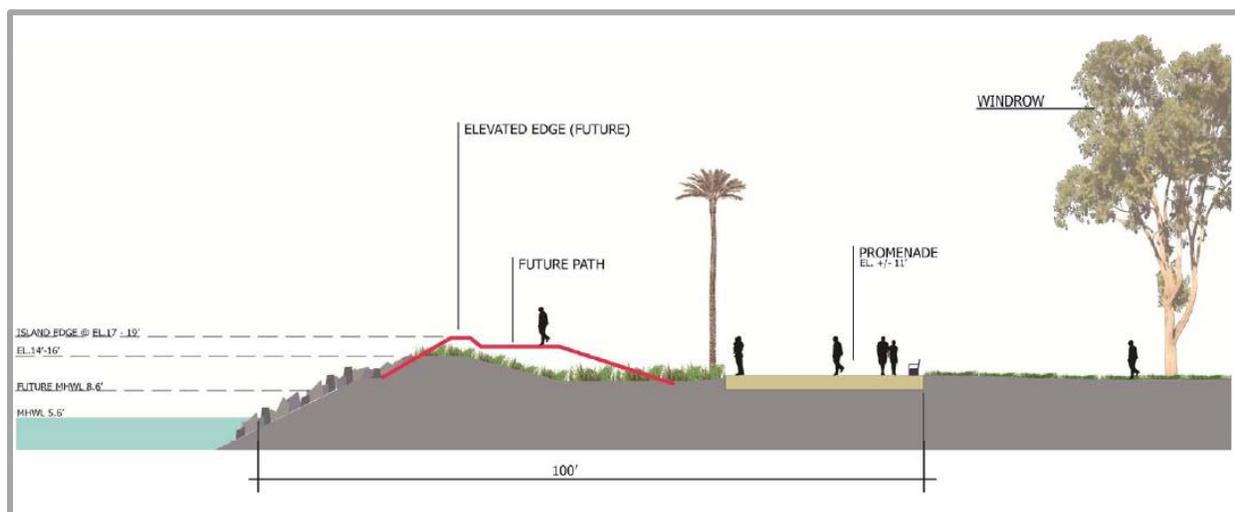


Figure 6-7. Adaptive Design on Treasure Island for Sea Level Rise (ref. Moffatt & Nichol)

7. Cost Estimates

Basis of Estimates

Preliminary capital costs for a range of alternatives have been estimated to meet FEMA accreditation: raising levees or constructing floodwalls. These estimates are meant to serve as order-of-magnitude estimates to gage the potential scale of this effort. Cost estimates are based on existing information from local jurisdictions such as San Mateo, San Francisco International Airport, and Redwood City that have recently completed significant levee improvements.

It is understood that one alternative will not meet all challenges in all locations. Earthen levee improvements may be used in conjunction with structural floodwalls. Even if structural floodwalls are selected for the majority of the levee system improvements, earthen levee modifications may still be needed where local pedestrian trails access the Bay Trail, to avoid the need for closure structures in the floodwall.

The cost estimating methodology is to first calculate the unit cost per foot of levee to raise an earthen levee in elevation by 1 foot to 5 feet, or to construct a floodwall 1 to 5 feet in height, including settlement and near-term sea level rise allowances. This provides a preliminary estimate as to the associated costs of raising levees of the various heights that will be encountered in Foster City compared to constructing floodwalls, which are done in Figure 7-1 and Table 7-1. (Geotechnical investigations into current levee conditions will be required to achieve more precise estimates.) Secondly, the levee improvement profiles attached to this report are used to disaggregate the levee system by the height of required improvement and distance. The unit costs per foot by height are then multiplied by the total length of levee improvement at that height to estimate total capital costs.

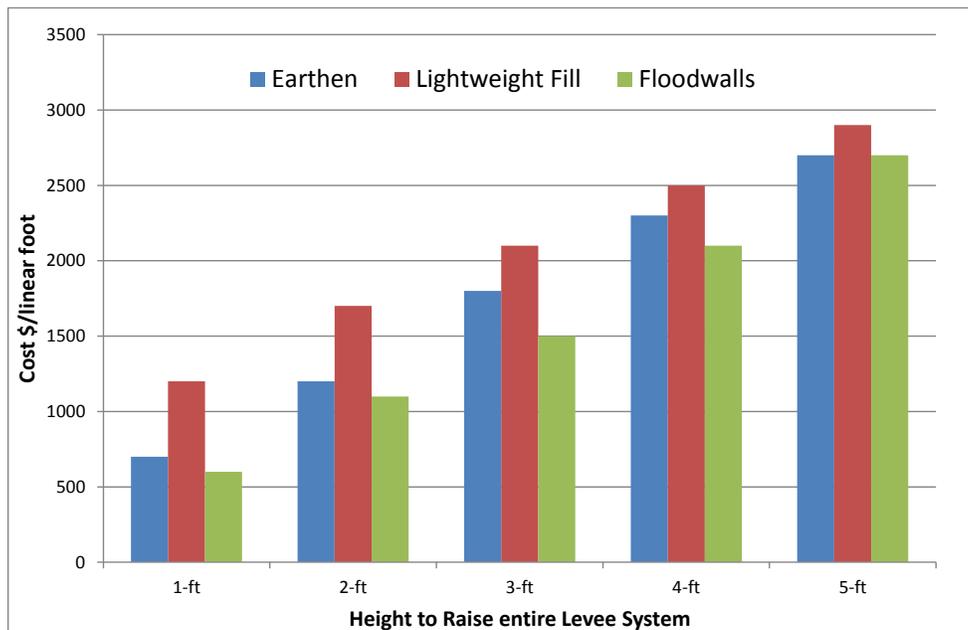


Figure 7-1. Unit Cost Comparison of Raising Levee Systems

Table 7-1. Unit Cost Comparison of Raising Levee Systems (\$/linear foot/levee height increase)

Height Increase	Conventional Earthen Levee (\$/linear ft)	Lightweight Fill Earthen Levee (\$/linear ft)	Structural Floodwall (\$/linear ft)
1 foot	\$700	\$1,200	\$600
2 feet	\$1,200	\$1,700	\$1,100
3 feet	\$1,800	\$2,100	\$1,500
4 feet	\$2,300	\$2,500	\$2,100
5 feet	\$2,700	\$2,900	\$2,700

Earthen Levee Fill

Cost estimates have been completed for two types of levee fill with an assumed levee top width of 12 feet to accommodate a 10 foot wide trail with one foot of shoulder on each side. The first levee estimate is for the cost of an earthen fill levee. Since the levee is built on top of the poor soils known as "Bay Mud", a newly placed earthen levee is expected to settle. The settlement of raised levee sections will also require additional fill to be placed 1-2 years after initial fill placement as previously described to prevent levee instability. The additional cost to place extra fill is included in the rough estimate as additional mobilization and fill costs.

Lightweight Levee Fill

The second levee estimate is for the cost of a lightweight levee fill. Lightweight fill typically consists of permeable volcanic rock, requiring the installation of vinyl sheet piles to prevent water seepage through the levee. Lightweight fill levees settle less than conventional earthen levees and therefore require less fill material; however, they are more costly due to the addition of sheet piles.

Structural Floodwalls

The cost estimate for structural floodwalls is calculated assuming the use of a shallow foundation. Since the exact soil conditions are not known, structural floodwall costs may increase if soil conditions deem the use of deep foundations necessary, noting that any deep foundation needs to penetrate through the total Bay Mud thickness to solid foundation material, to prevent Bay Mud from dragging the foundation down. An estimated six inches of settlement is expected to occur, so the cost assumes the height is increased by six inches to reach the desired height. Also, the cost of concrete and rebar may change depending on market price at the time of construction.

Right-of-Way Costs

It appears there will no significant right-of-way issues for levee construction and modification since San Francisco Bay is on one side and public right-of-way the other. (Private adjacent rights-of-way are more prevalent along Belmont Slough.) Right-of-way cost markup is therefore estimated to be approximately 5% of the total project cost. This cost is anticipated to be mostly for temporary easements for construction laydown and staging areas.

Construction Management

Construction Management markups of 10% are added to the overall cost of each option. The added cost accounts for construction mobilization, the purchase of bonds and insurance, pedestrian and traffic control, and construction planning and submittals.

Environmental Mitigation

Environmental mitigation markup is estimated to be approximately 10% of total project cost. This amount can vary greatly depending on environmental conditions of the site and the ultimate footprint of levee improvements.

Additional Contingencies

A design contingency of 40% was added to unit costs as well as escalation, bonds, general conditions, and O/H/P. The total increase of unit costs for miscellaneous contingencies is about 65% of the estimated construction cost.

Estimated Costs to Maintain FEMA Levee Accreditation

Sections of levee are summarized by the required height increase to maintain FEMA levee accreditation and costs are estimated considering that one alternative would be used for the entire levee system improvement. In reality a combination of different alternatives might be more appropriate and will need to be studied in more detail. Table 7-2 shows the cost estimates to raise the height of the existing levee system to meet FEMA freeboard requirements for accreditation using each of the alternatives described herein along the entire levee system. Table 7-2 also includes the cost estimate to maintain FEMA levee accreditation and to include one foot of SLR freeboard to meet the 2050 SLR projection.

Table 7-2. Cost Estimates for FEMA Accreditation of Entire Levee System in 2015 Dollars

Alternative	Estimated Cost for Accreditation	Estimated Cost including SLR ³
Raise Earthen Levee ¹	\$50,000,000	\$67,000,000
Lightweight Fill Levee	\$62,000,000	\$75,000,000
Floodwalls ²	\$44,000,000	\$64,000,000

- 1. Earthen levee cost estimates assumes a double quantity of fill is required due to long-term settlement.*
- 2. Floodwall cost estimates include six inches of settlement.*
- 3. Additional one foot of freeboard added for SLR allowance to 2050.*

Funding

While beyond the scope of this planning study, Foster City has the option of establishing an Assessment District to collect the requisite fees or taxes to finance the levee improvements. In this situation, since all of Foster City will benefit from flood protection, the entire City could be considered an Assessment District with benefits proportional to the increased value of each property that results from accredited levee protection. More than 8,000 properties in San Mateo also benefit from Foster City levee improvements, noting that those properties are currently assessed for the San Mateo Bayfront Levee Improvement Project, which also benefits the entirety of Foster City.

FEMA Mapping Procedures for Non-Accredited Levees

FEMA will not recognize the flood protection provided by a levee unless it is certified to meet design requirements related to geotechnical, freeboard, and maintenance criteria as outlined in 44 CFR §65.10, which deal specifically with the design and physical condition of the levee, and are the responsibility of the levee owner or community in charge of the levee's operation and maintenance. Certification must be completed for the levee to be eligible for accreditation by FEMA. Once a levee is certified as meeting the requirements of 44 CFR §65.10, FEMA can accredit the levee and show the area behind it as being a moderate-risk area on a Flood Insurance Rate Map (FIRM).

It is recognized that maintaining FEMA accreditation will be a significant endeavor in Foster City. In the interim those levee systems that do not meet all of the requisite criteria for certification are termed to be "non-accredited" or "uncertified". The performance of a levee system, particularly its status related to FEMA certification, can have a profound impact on mapped flood hazards.

FEMA has updated the methodology used to analyze the behavior of non-accredited (uncertified) levee systems and released revised procedures for the treatment of non-certified levees that provide a more flexible approach to the technical hydraulic analysis of non-certified levees that is based on the actual data available. FEMA's "Analysis and Mapping Procedures for Non-Accredited Levees" (aka Levee Analysis and Mapping Procedures or LAMP, published July 2013) provides an alternative procedure for levees that lack FEMA accreditation status. FEMA representatives indicate that these methods, originally formulated for riverine systems, can be adapted to coastal levee analysis.

Flood Risk Zone D

Placement within a Special Flood Hazard Area (SFHA) designated as Zone A is the traditional mapping outcome for high hazard areas protected by non-accredited levee systems. The level of flood risk is indicated on the FIRM by a letter. For example the high-risk SFHAs are designated by the letters A or V. Moderate- and low-risk areas are represented with the letters B, C or X. The Zone D designation is used for areas where there are possible but undetermined flood hazards. FEMA's LAMP allows for flood hazards within areas protected by non-accredited levee systems to be designated as Zone D.

Flood insurance is available but not federally required by lenders for loans on properties within a Zone D. Flood insurance rates for properties with a Zone D designation are commensurate with the uncertainty of flood risk. Zone D premiums can be higher than a standard low-risk zone premium and significantly higher than Preferred Risk Policy (PRP) premiums. As an example,³ someone with a post-FIRM PRP might see a typical premium increase from \$200 per year in Shaded Zone X to \$950 per year after the change in designation to Zone D.

As an interim measure the City may feel that a Zone D designation is preferable to Zone AE (Elevation 10 feet NAVD) and the mandatory insurance requirement. If so, individual levee reaches need to be evaluated geotechnically along with their freeboard deficiencies (described herein) to determine the proper designation as described subsequently. Predicted levee overtopping volumes would be traced through city streets and adjacent properties to the Central Lagoon, with average flow depths in excess of one foot mapped as SFHAs. Central Lagoon operation would also be analyzed with coincident levee overtopping volumes to re-establish its base flood elevation.

³ National Flood Insurance Program, "Fact Sheet for Stakeholders: Understanding Zone D," August 2011.

Sound Reach

A sound reach is a reach of levee designed, constructed, and maintained to withstand and reduce base flood hazards using sound engineering practices. To be considered a sound reach, the levee must be owned, operated, and maintained by a responsible agency or party who provides an operations and maintenance plan that discusses closures, interior drainage management and the stability, elevation, and overall integrity of the levee and its associated structures and systems. This designation generally applies to levees that could be certified but are not yet accredited, with sufficient freeboard in conformance with 44 CFR §65.10 as illustrated in Figure 7-2.

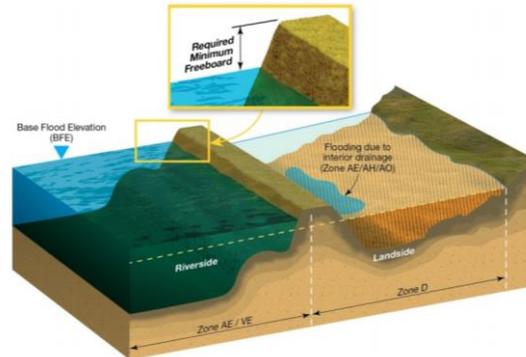


Figure 7-2. Sound Levee Reach (ref. FEMA)

Freeboard Deficient Levees

To be eligible for NFIP accreditation through FEMA, a levee must provide at least two feet of freeboard above the one-percent still water elevation or at least one foot of freeboard above the one-percent total water elevation; whichever resulting freeboard elevation is higher. FEMA will now apply a “Freeboard Deficient Procedure” to those levee systems that meet all the requirements of 44 CFR §65.10 other than the requisite freeboard. Figure 7-3 illustrates this case.

If Foster City can provide documentation demonstrating that the levee system is structurally sound and the top of levee elevation is higher than the base flood elevation, the affected area can be mapped on the landward side of the levee as Zone D based on the Natural Valley Procedure, including any residual interior flooding. In this case the entirety of Foster City would be mapped as Zone D. San Mateo from the Foster City limit to San Mateo Creek would also be mapped as Zone D, from San Francisco Bay to the elevation contour reflecting a stillwater elevation of 10.4 feet NAVD.

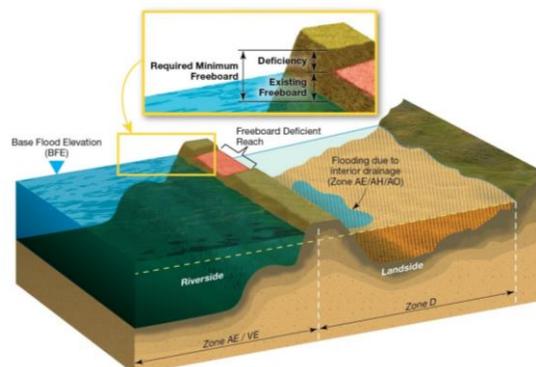


Figure 7-3: Freeboard Deficient Levee Reach (ref. FEMA)

Levee Overtopping

The overtopping condition applies where the base flood elevation is above the top of levee or floodwall, but there is armoring to protect against erosion, or the levee is otherwise certifiable and the amount and duration of overflow is limited. This would generally apply to overflows from wave runoff of limited duration, where the levee is expected to remain intact as illustrated by Figure 7-4. The volume of overflow would be calculated based on wave setup and added to the residual interior flow at the Central Lagoon, with potential impacts to the calculated base flood elevation of the lagoon.

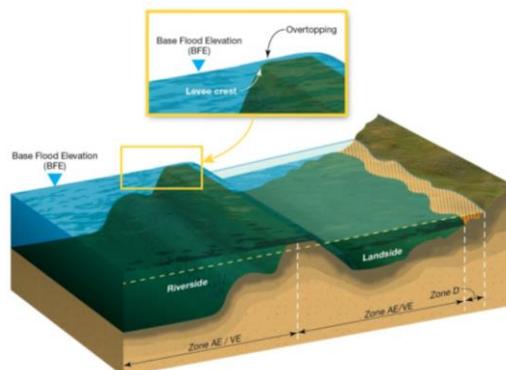


Figure 7-4. Levee Overtopping Analysis (ref. FEMA)

FEMA's procedures for analyzing a non-accredited levee that is overtopped without adequate erosion protection consider that reach to be structurally deficient and the levee is analyzed as breached to the levee toe as illustrated generically by Figure 7-5. If enough of the levee is considered to be breached, it would be as if the levee does not exist and Foster City would be mapped as Zone AE (Elevation 10 feet NAVD).

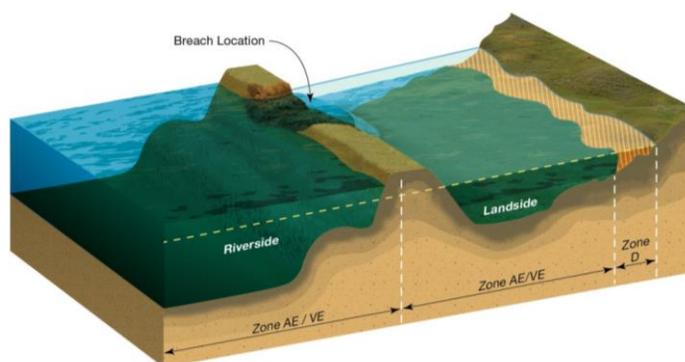


Figure 7-5. Structurally Deficient Levee Breach Analysis (ref. FEMA/BakerAECOM)

8. Next Steps

Flood Insurance Rate Maps

For Foster City to be able to retain their Zone X designation while the levee modifications are being made, the City has accepted levee seclusion mapping and could apply for a Zone A99 designation as the levee improvements progress. The goal of these designations is to “buy time” for the City to raise funds, complete design, and start construction on improvements without impacting the residents with mandatory flood insurance policy requirements.

Levee Seclusion Mapping

Seclusion mapping was developed by FEMA as a process to allow the release of impacted FIRM updates prior to conducting a more detailed analysis on non-accredited levee systems. Levee seclusion mapping will maintain the flood hazard information as depicted on the current effective FIRM with map notes explaining that these flood hazards will be updated at a later time when the updated levee analysis and mapping approach is applied.

Foster City and the City of San Mateo have both accepted the levee seclusion mapping designation, which will first be shown on the preliminary maps due in mid-August 2015.

Zone A99

Once the levee system construction project reaches certain completion milestones, the City may choose to submit data and documentation to request that FEMA make an “adequate progress” determination for the construction project and revise the effective FIRM to designate the impacted area as Zone A99. To qualify for an “adequate progress” determination, Foster City has to meet the following requirements:

- One hundred percent of the total financial project cost of the completed flood control system has been authorized;
- At least 60 percent of the total financial project cost of the completed flood control system has been appropriated;
- At least 50 percent of the total financial project cost of the completed flood control system has been expended;
- All critical features of the flood control system, as identified by FEMA, are under construction, and each critical feature is 50 percent complete, as measured by the actual expenditure of the estimated construction budget funds; and
- The community has not been responsible for any delay in the completion of the system

Properties located in Zone A99 will be charged the same standard flood insurance premium rates that would be applicable once the project is complete (i.e., Zone X).

Advanced Levee Planning and Design

Once the City has elected to re-establish FEMA levee accreditation in light of the newly published coastal flood hazards, the following steps need to be completed when funding is available:

1. Obtain a detailed survey of the entire levee frontage, most likely through aerial photogrammetry. This will allow for definitive levee and/or floodwall improvement design including an evaluation of the improved levee footprints, right-of-way needs, and potential environmental impact.
2. Prepare a detailed design for levee and floodwall improvements to meet freeboard requirements.
3. Evaluate the proposed levee improvement design for geotechnical stability using the requirements of 44 CFR 65.10 as previously described. This will include subsurface exploration, laboratory testing, and engineering. Refine levee improvement design as appropriate.
4. Prepare CEQA documentation and apply for regulatory approval.
5. Complete construction documents suitable for public bid.
6. Construct levee improvements.
7. Apply for FEMA accreditation.
8. Celebrate with ribbon cutting ceremony.

9. Conclusions

FEMA indicates that it no longer considers the existing levee system that protects Foster City from San Francisco Bay floodwaters to meet the requirements for levee accreditation as set forth in the National Flood Insurance Program and 44 CFR 65.10.

If Foster City does nothing, the entire City, including parts of the City of San Mateo, is subject to placement within a high-risk Special Flood Hazard Area and property owners with federally backed loans will be required to buy flood insurance at higher rates.

Raising at least 85 percent of the City's levee system to restore its accredited status will be a multi-million dollar project and may take several years to design, permit, construct and accredit. The City should consider investigating available programs such as seclusion mapping and A99 mapping to delay or avert remapping while raising the funds to design and complete the necessary levee system improvements. Both of these mapping programs would allow the City to be mapped as a low-risk Zone X or an uncertain-risk Zone D, which do not necessarily require property owners to buy flood insurance, although they may be advised to purchase flood insurance at discounted rates until levee accreditation is restored.

Based on the current data available, the maximum levee freeboard deficiency is about four feet and the average deficiency over the approximately 43,000 feet of levees is two feet. There are about 6,000 linear feet of levee that meet the FEMA required height, but the rest of the system is at least freeboard deficient if not overtopped by the one-percent tidal stillwater or wave runup. Improved levees need to be further increased in elevation to accommodate some long-term settlement and sea level rise. Levee designs should adaptively incorporate future increases in elevation without significant reconstruction or environmental impact.

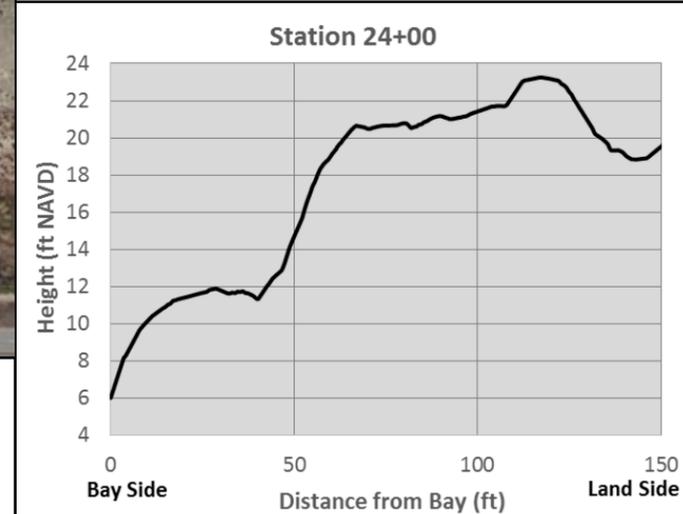
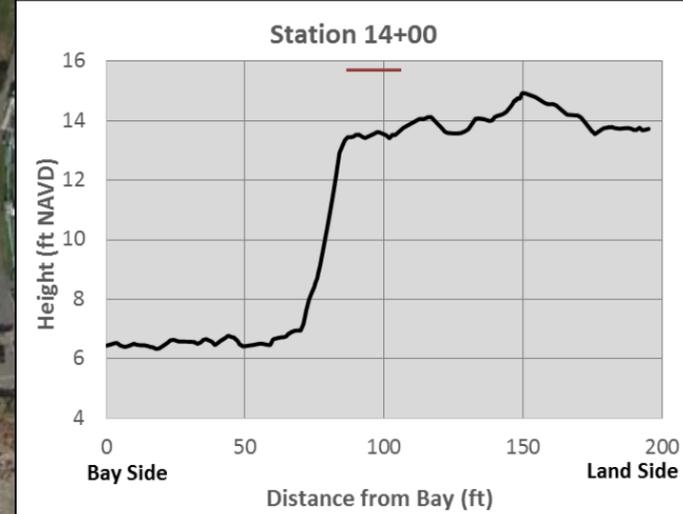
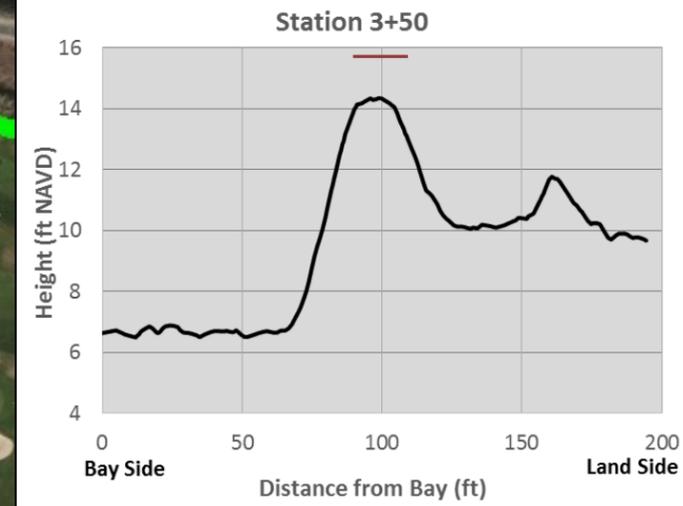
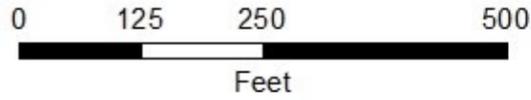
This study is focused on the freeboard deficiencies identified of the levee system and does not include a geotechnical study. The City should consider a detailed levee system elevation survey and geotechnical study of the levee system prior to moving forward with alternative designs for improving the levee system to a condition that can be accredited by FEMA.

Attachment 1

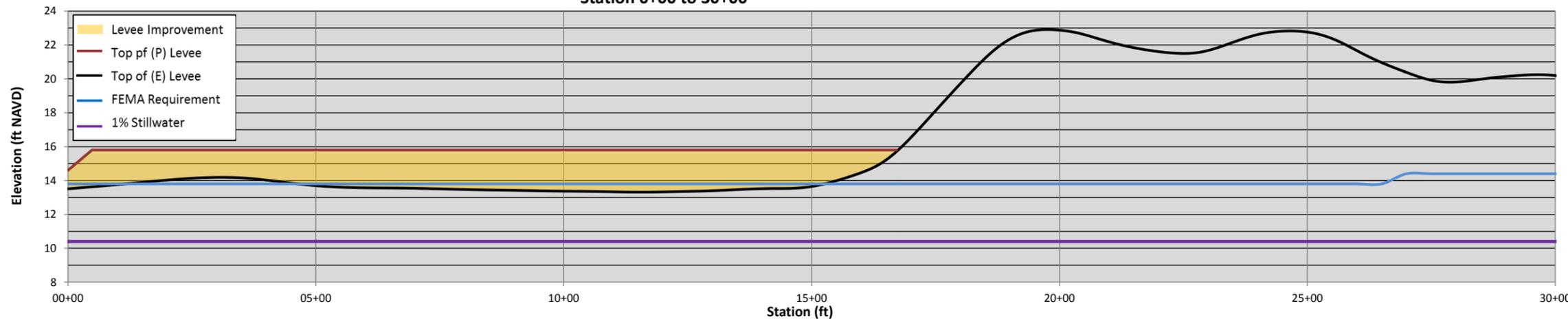
Levee Deficiency Profiles

Proposed Increase in Levee Elevation (feet)

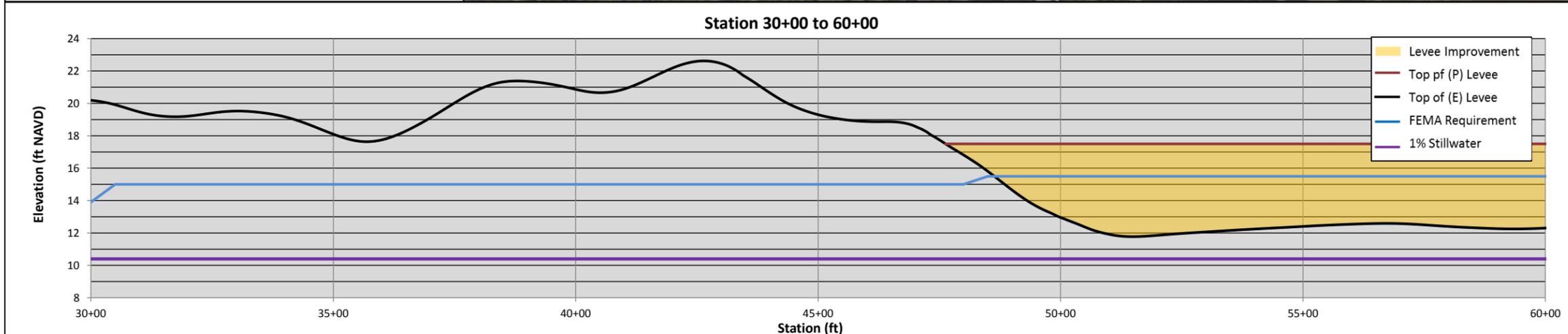
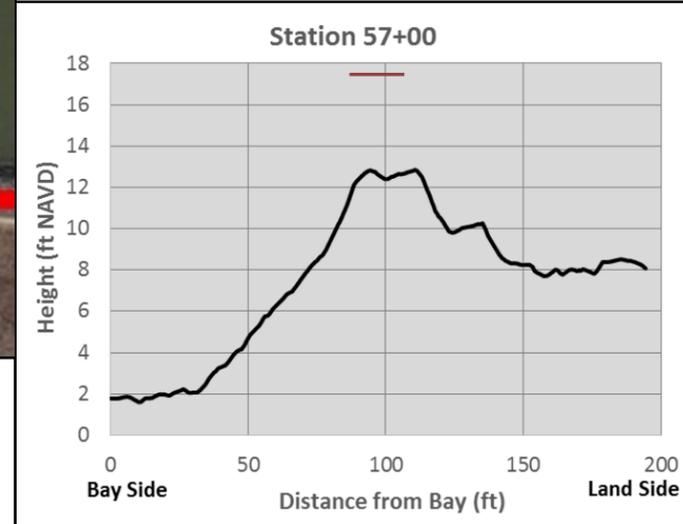
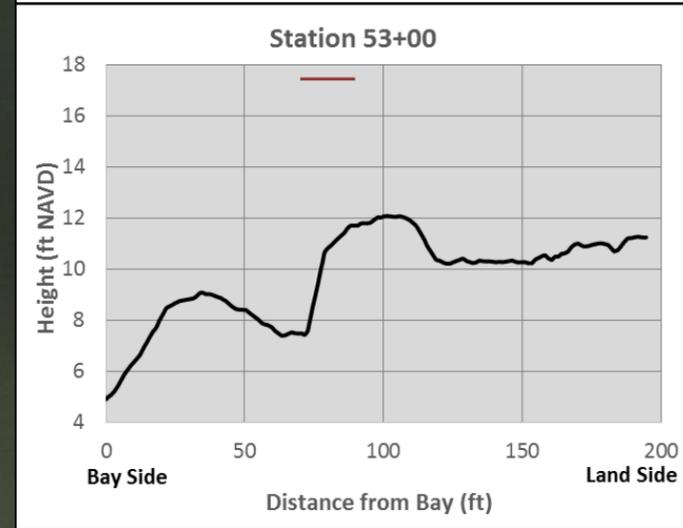
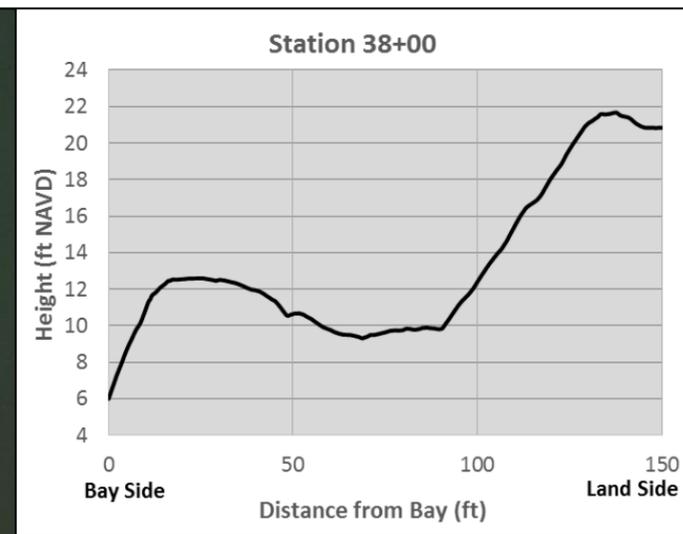
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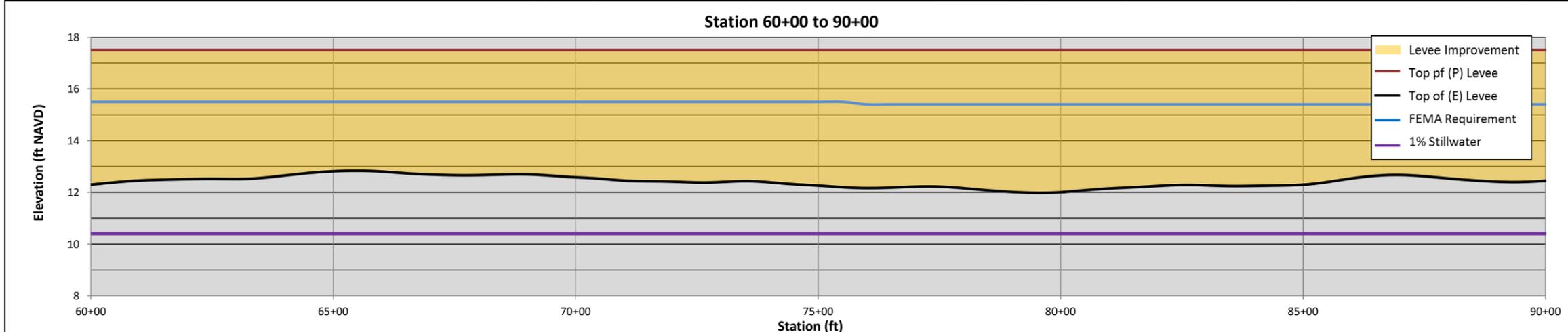
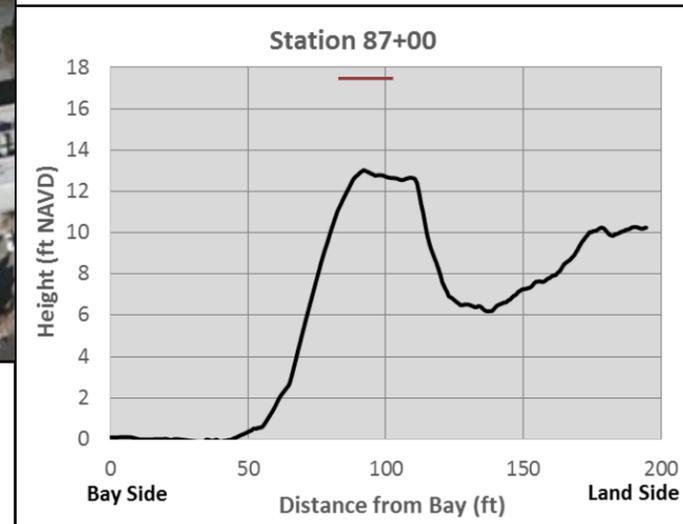
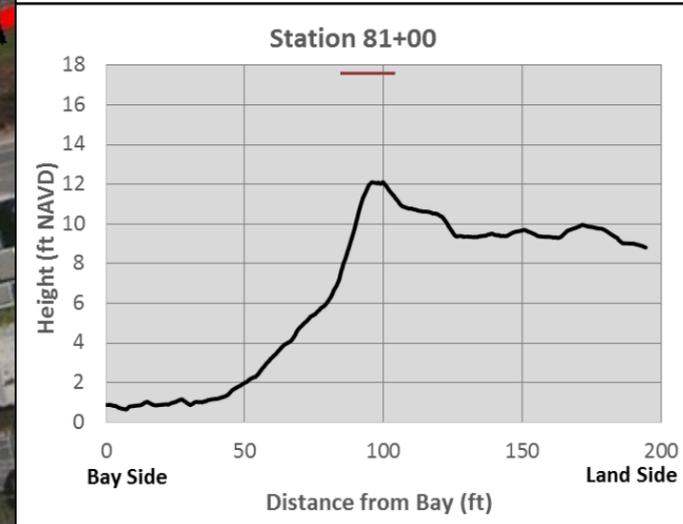
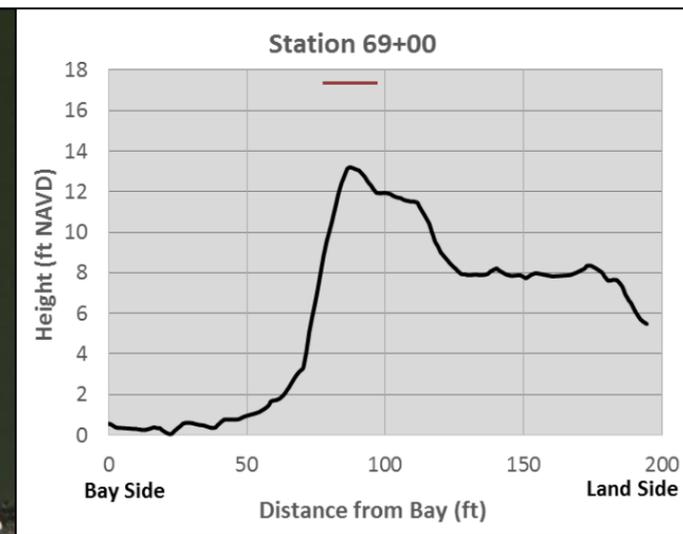
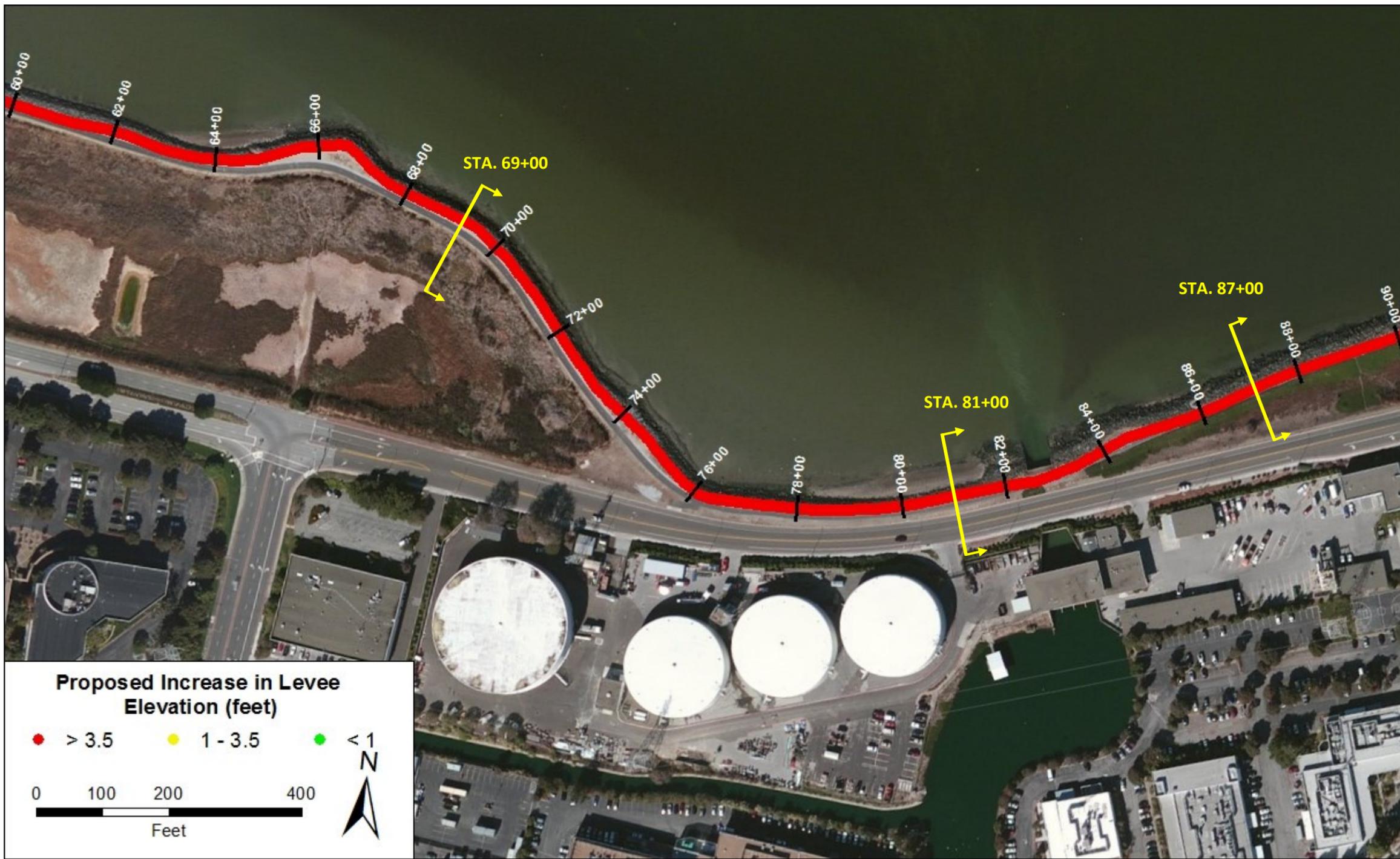
**Foster City
Proposed Levee Improvements**



Foster City
Proposed Levee Improvements

Schaaf & Wheeler
CONSULTING CIVIL ENGINEERS

Sheet 2 of 15

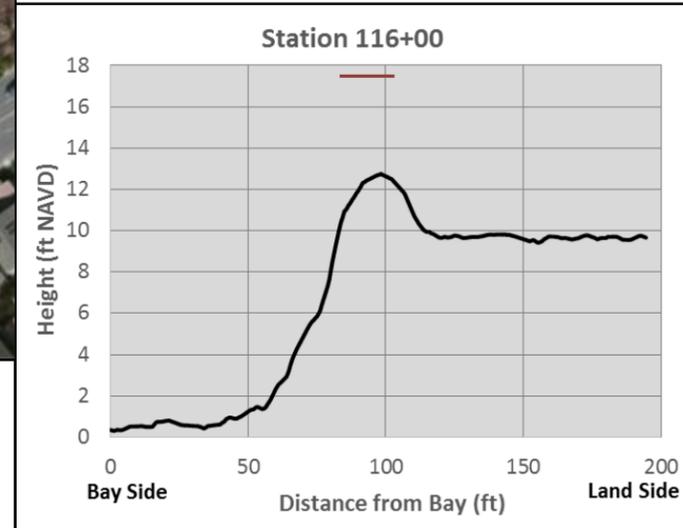
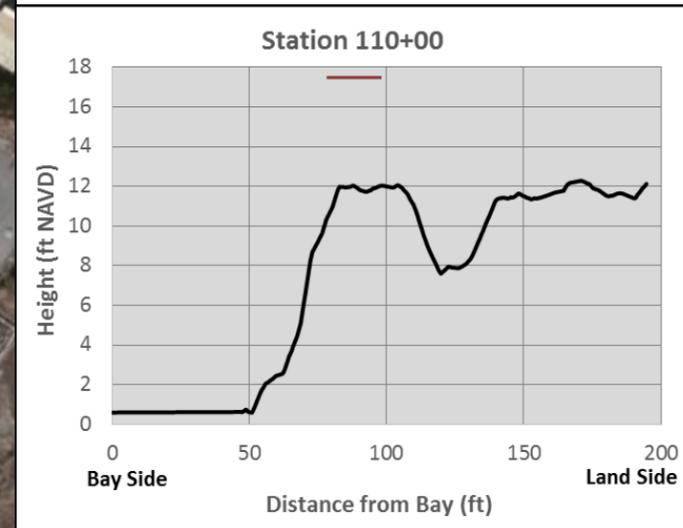
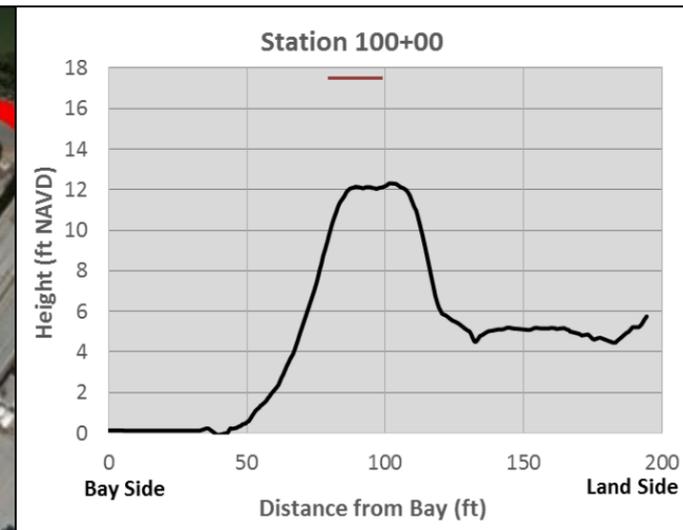
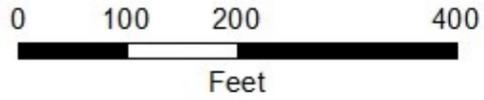


Foster City
Proposed Levee Improvements

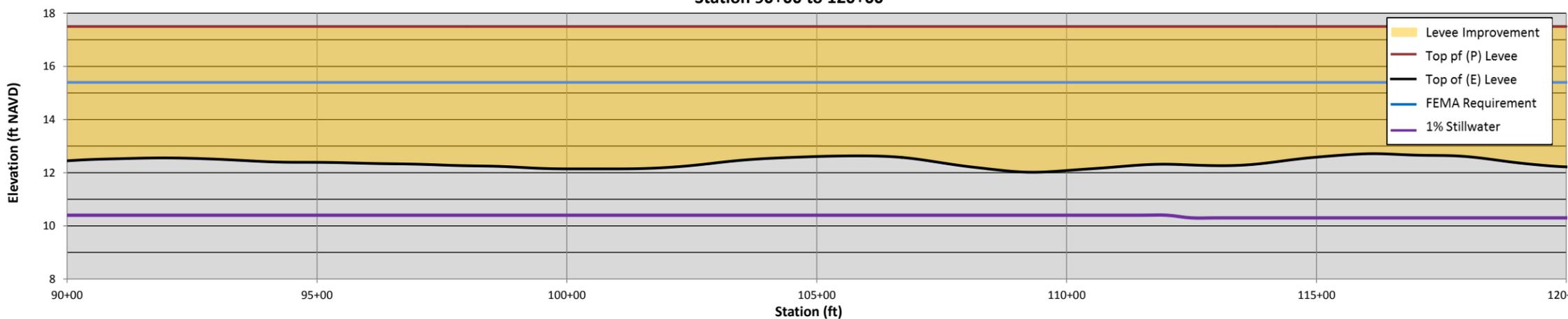
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Proposed Increase in Levee Elevation (feet)

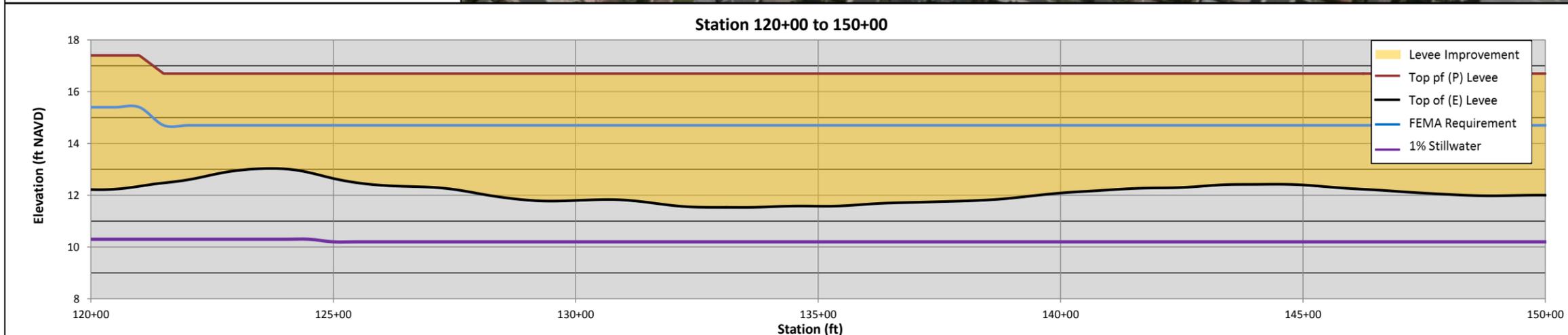
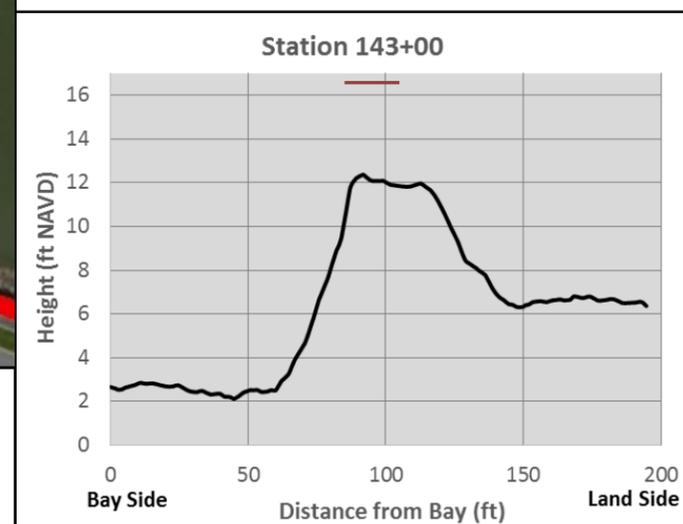
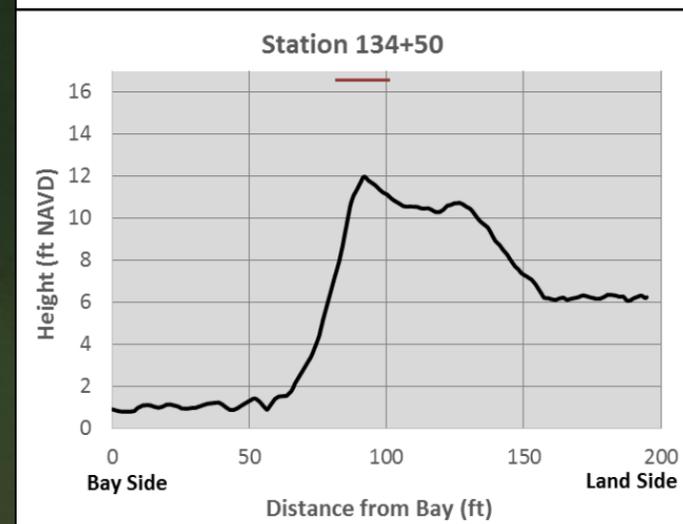
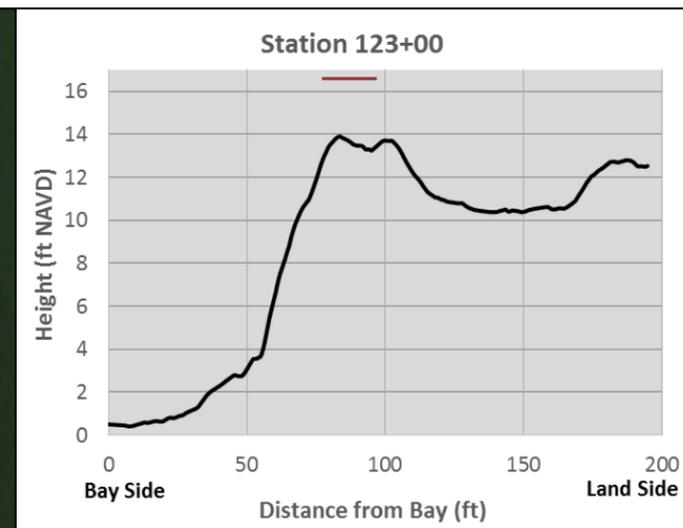
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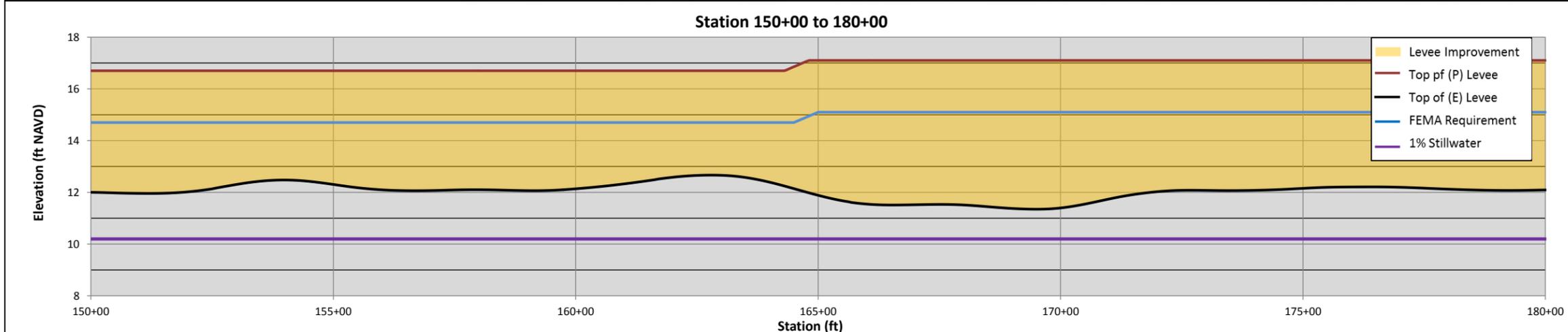
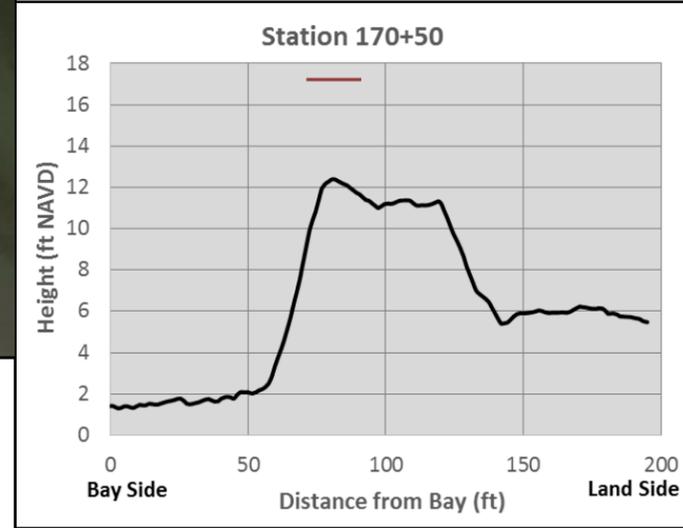
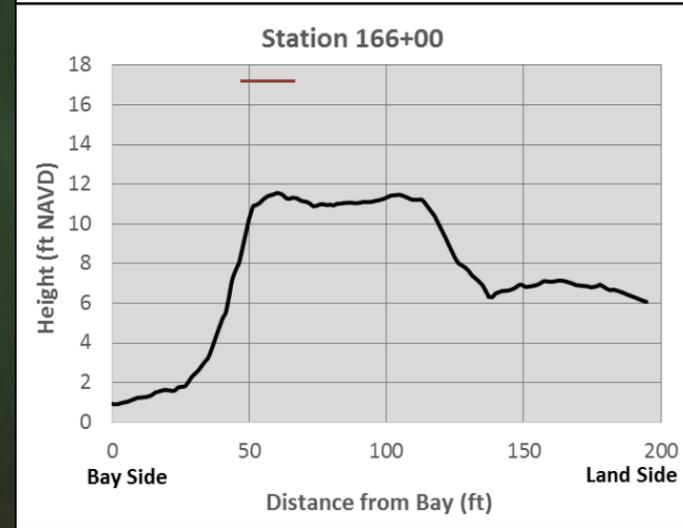
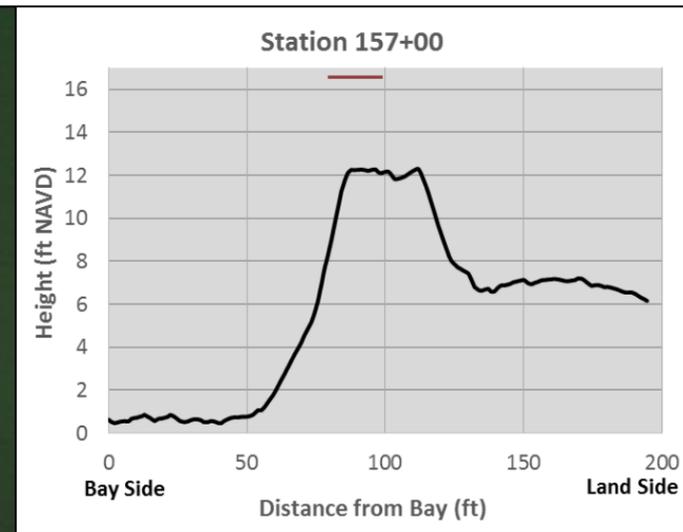


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**Foster City
Proposed Levee Improvements**

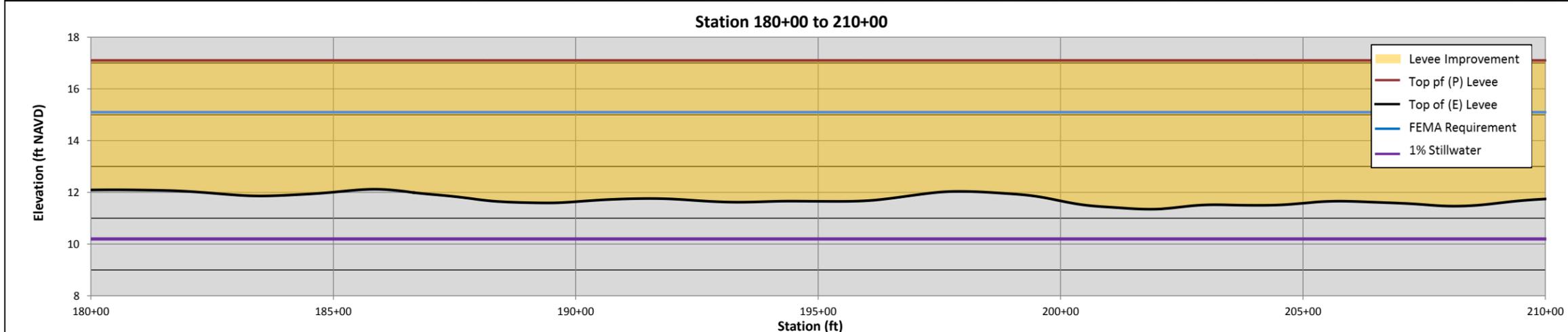
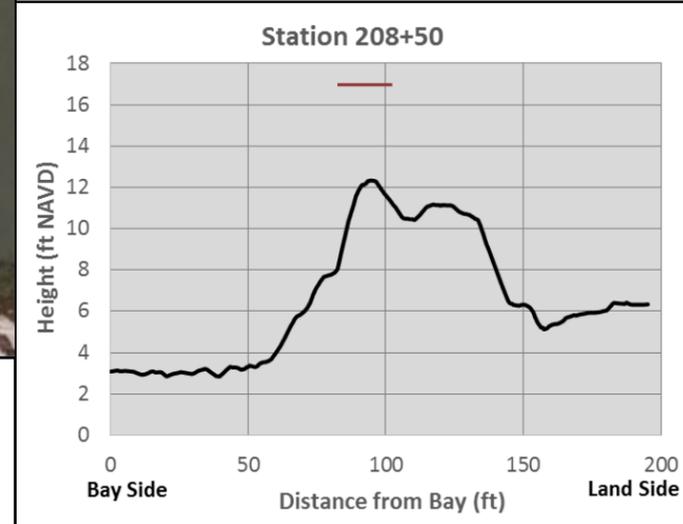
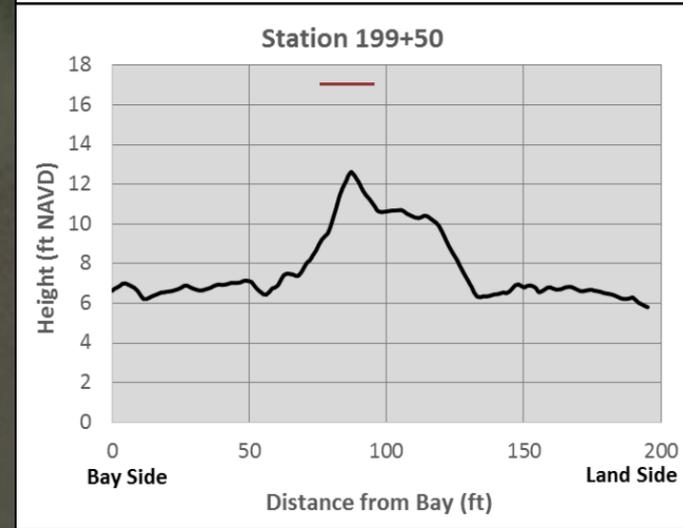
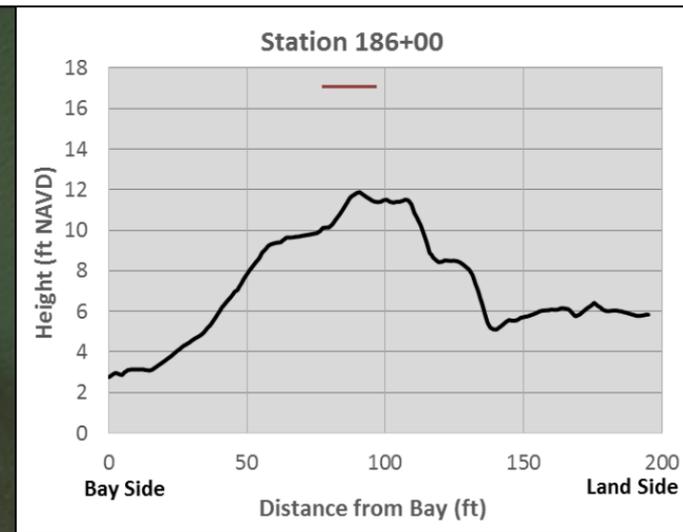




Foster City
Proposed Levee Improvements

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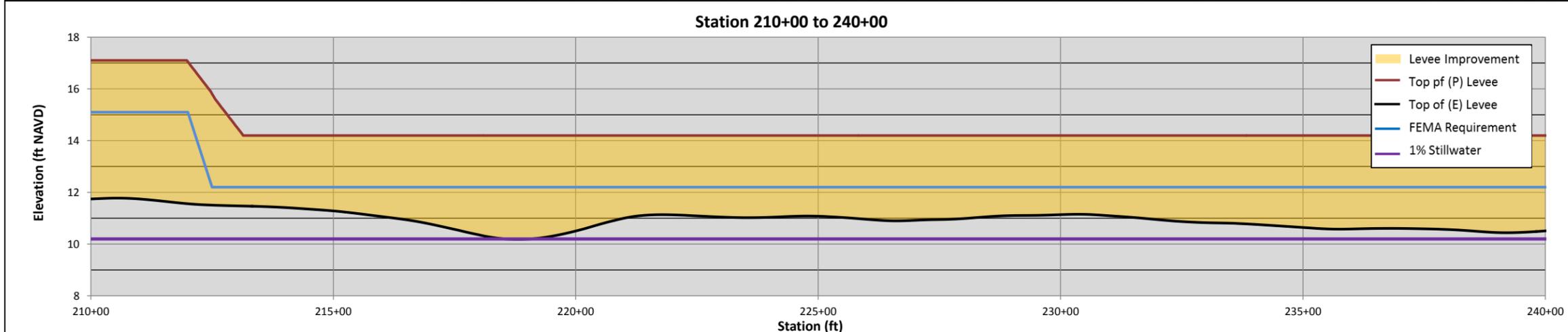
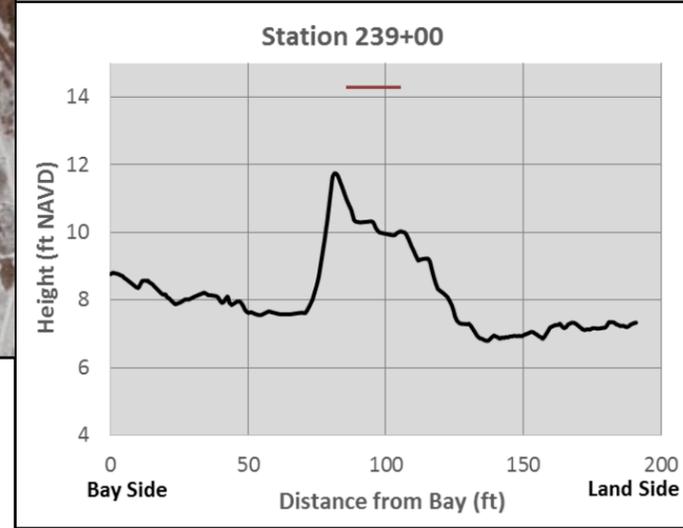
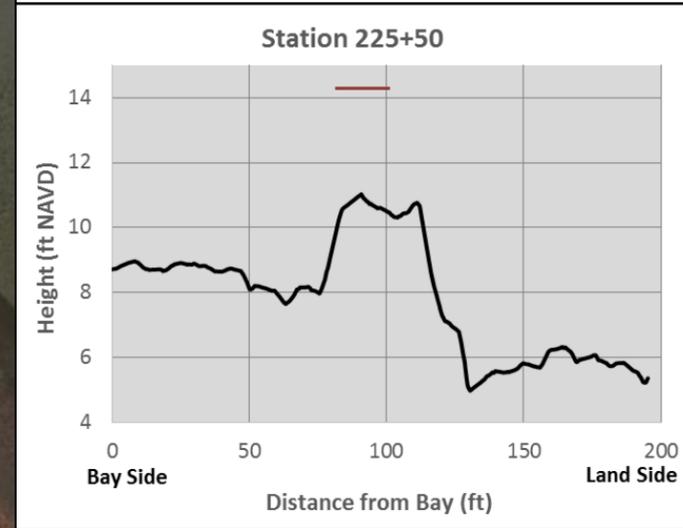
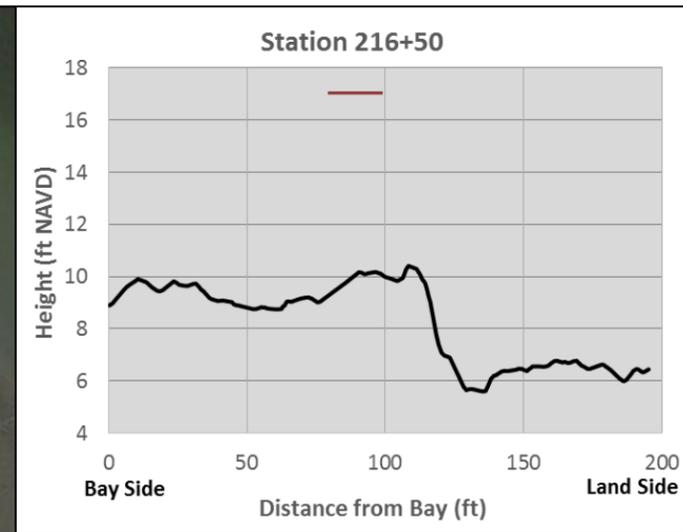
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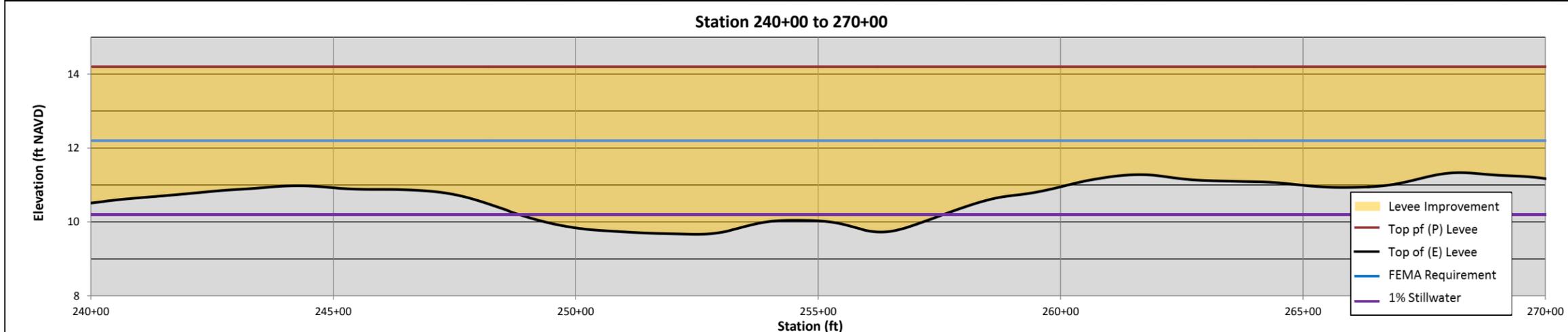
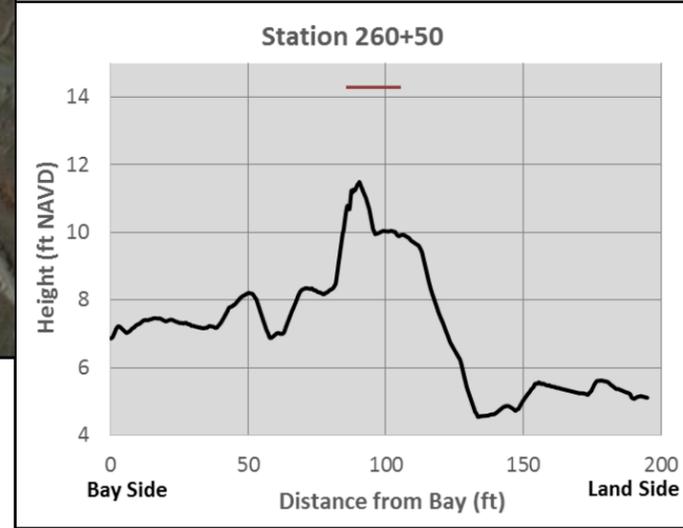
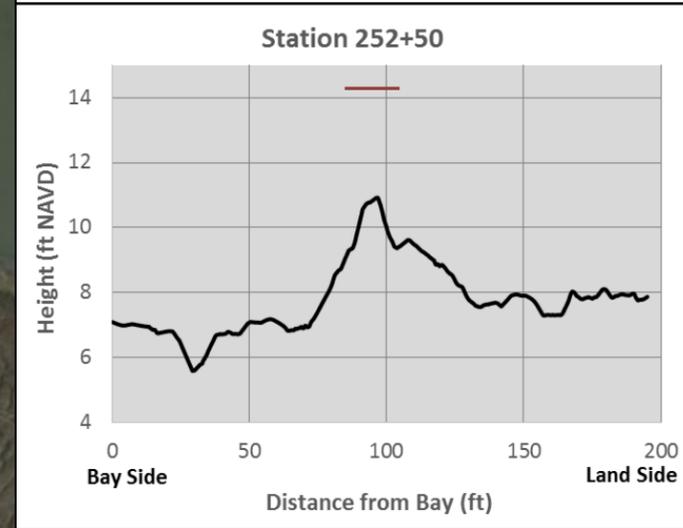
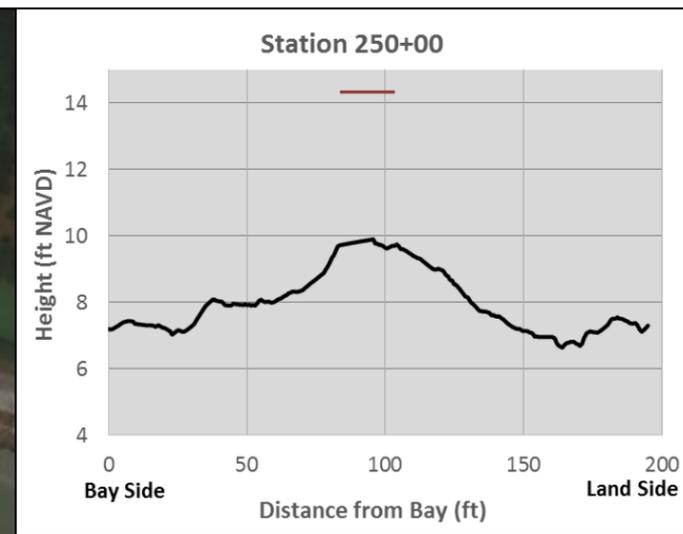
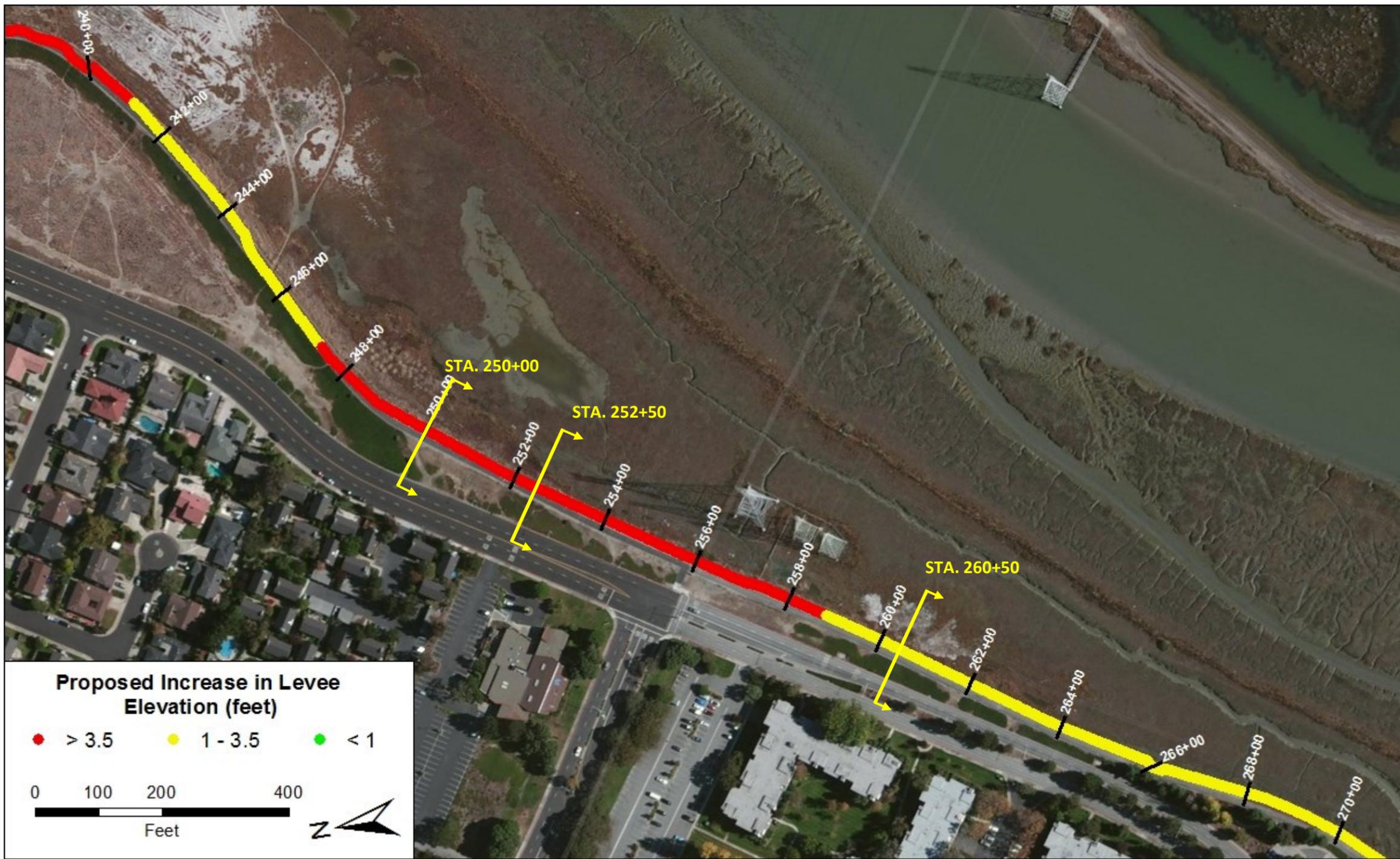


Foster City
Proposed Levee Improvements

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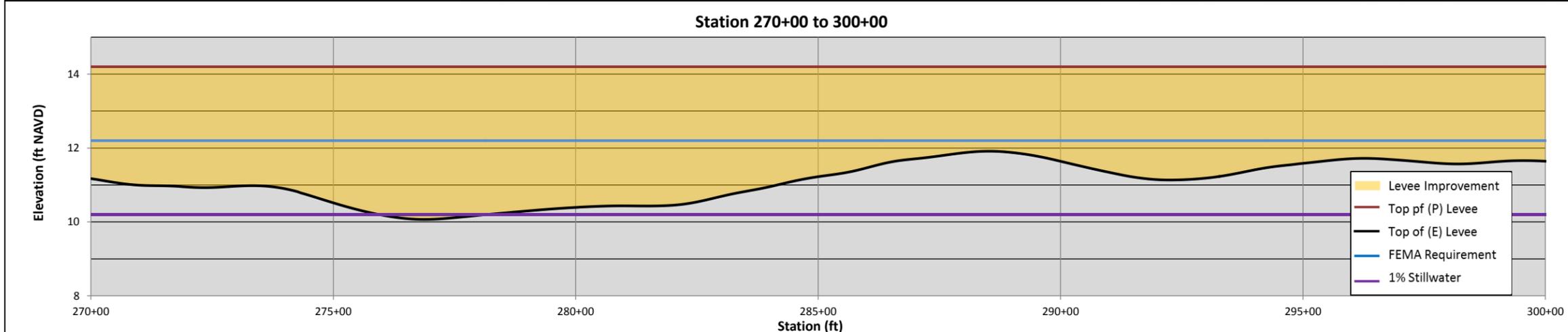
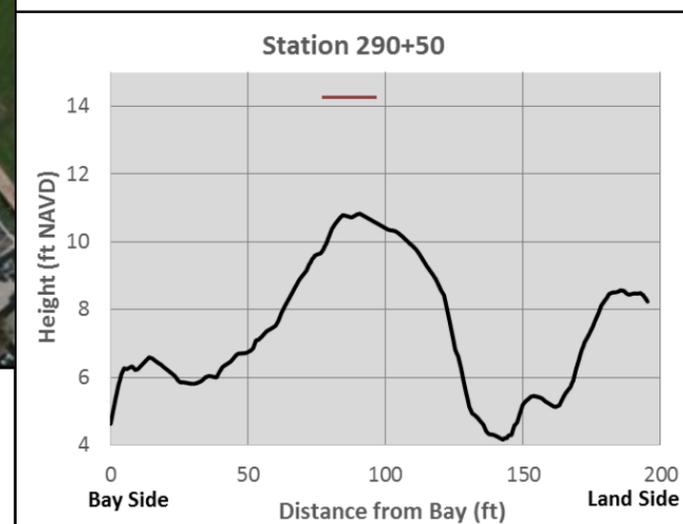
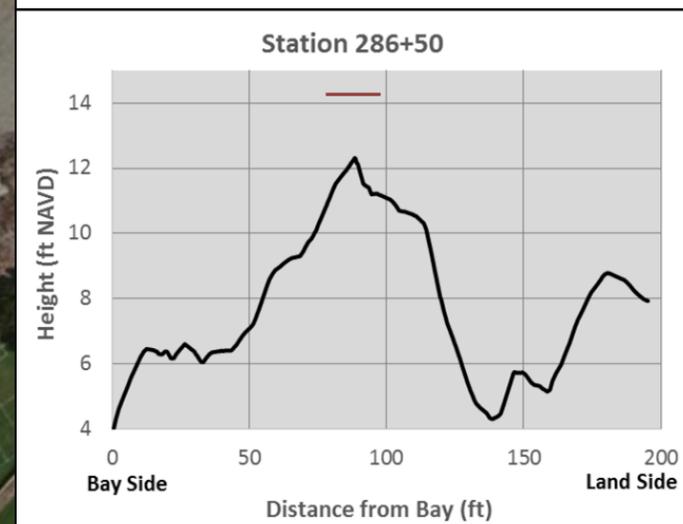
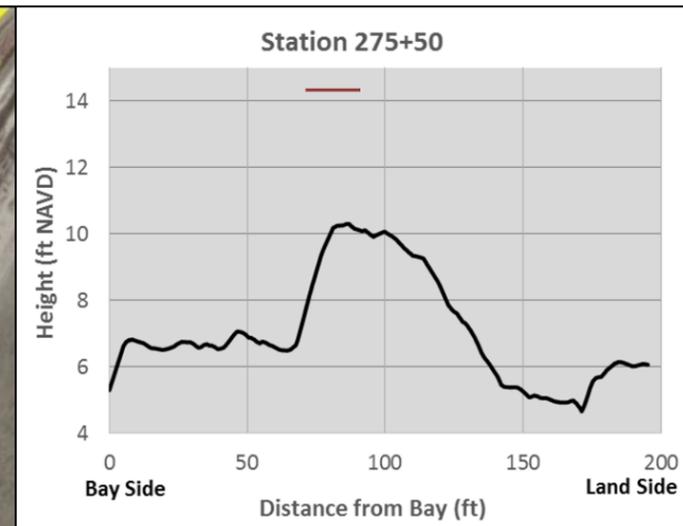
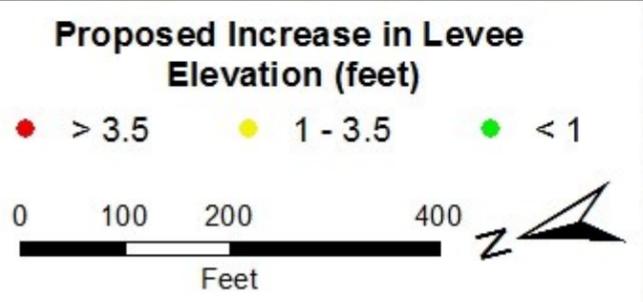
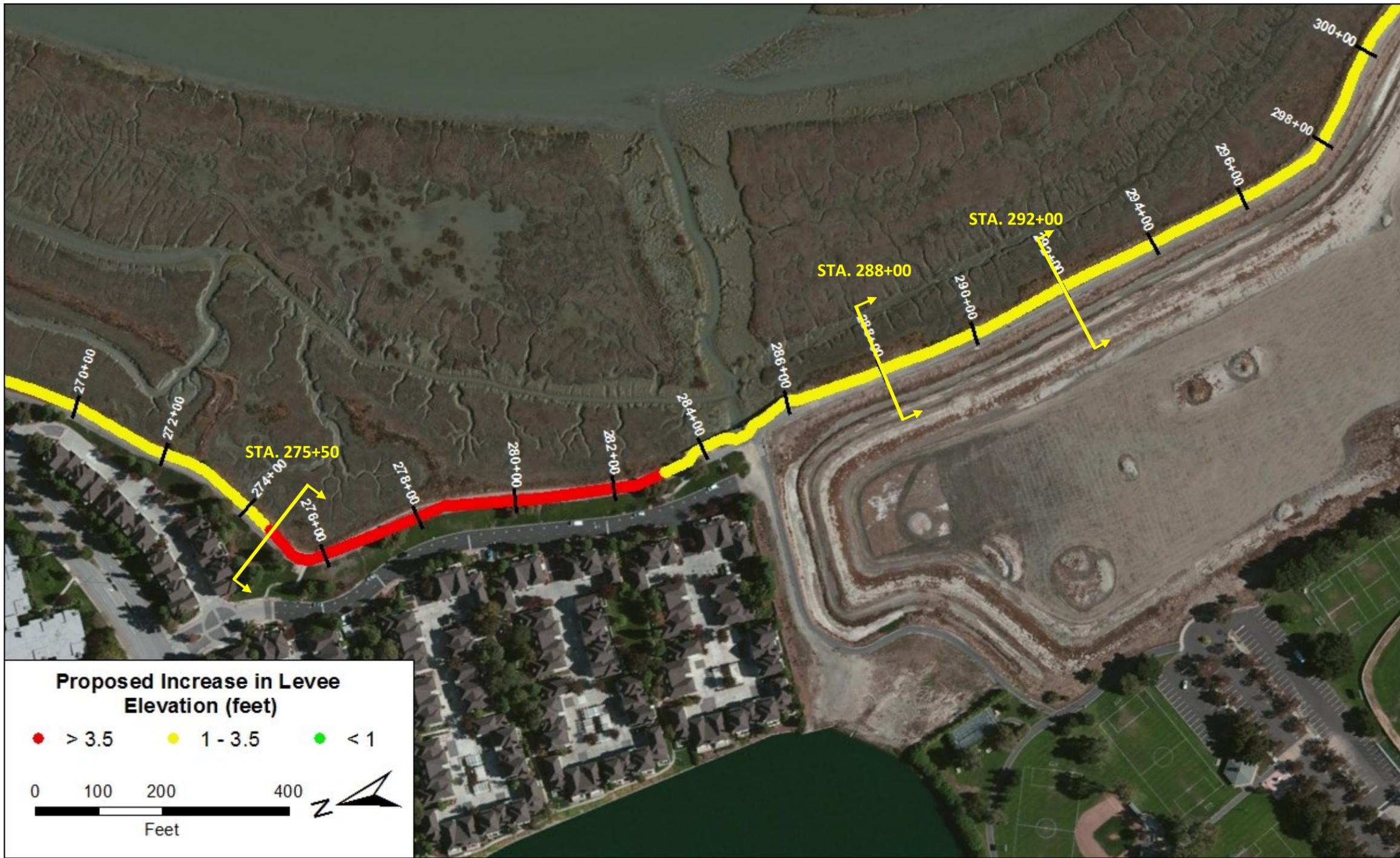
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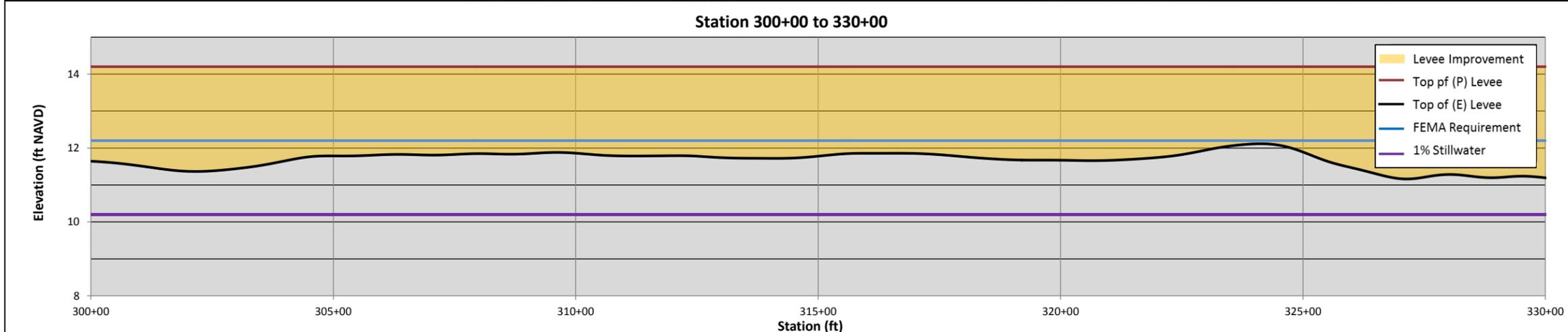
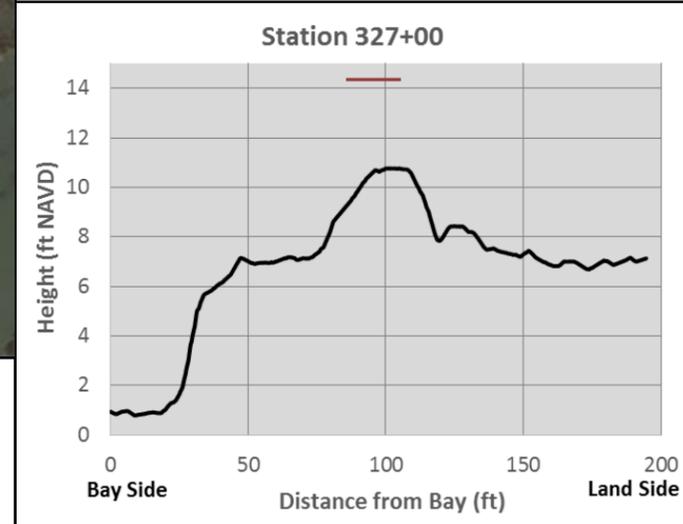
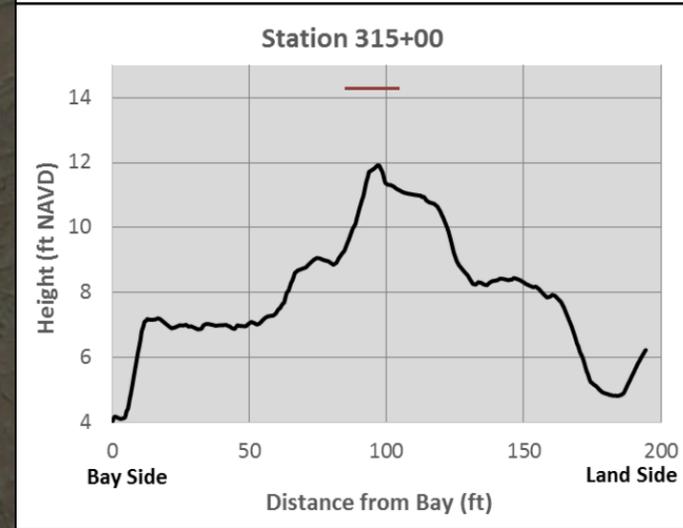
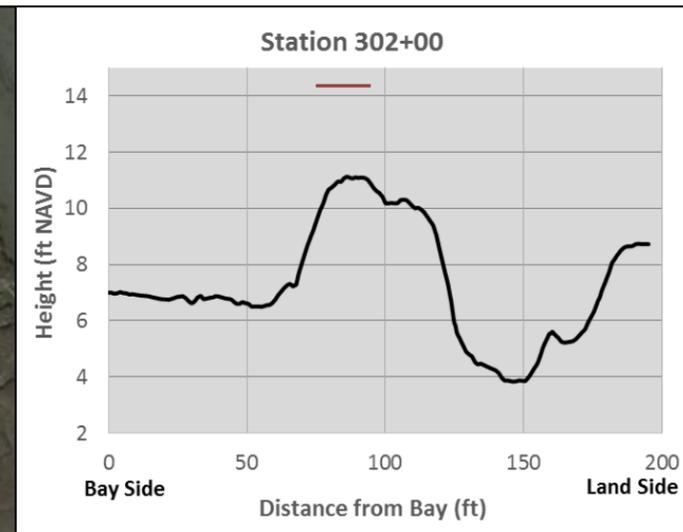
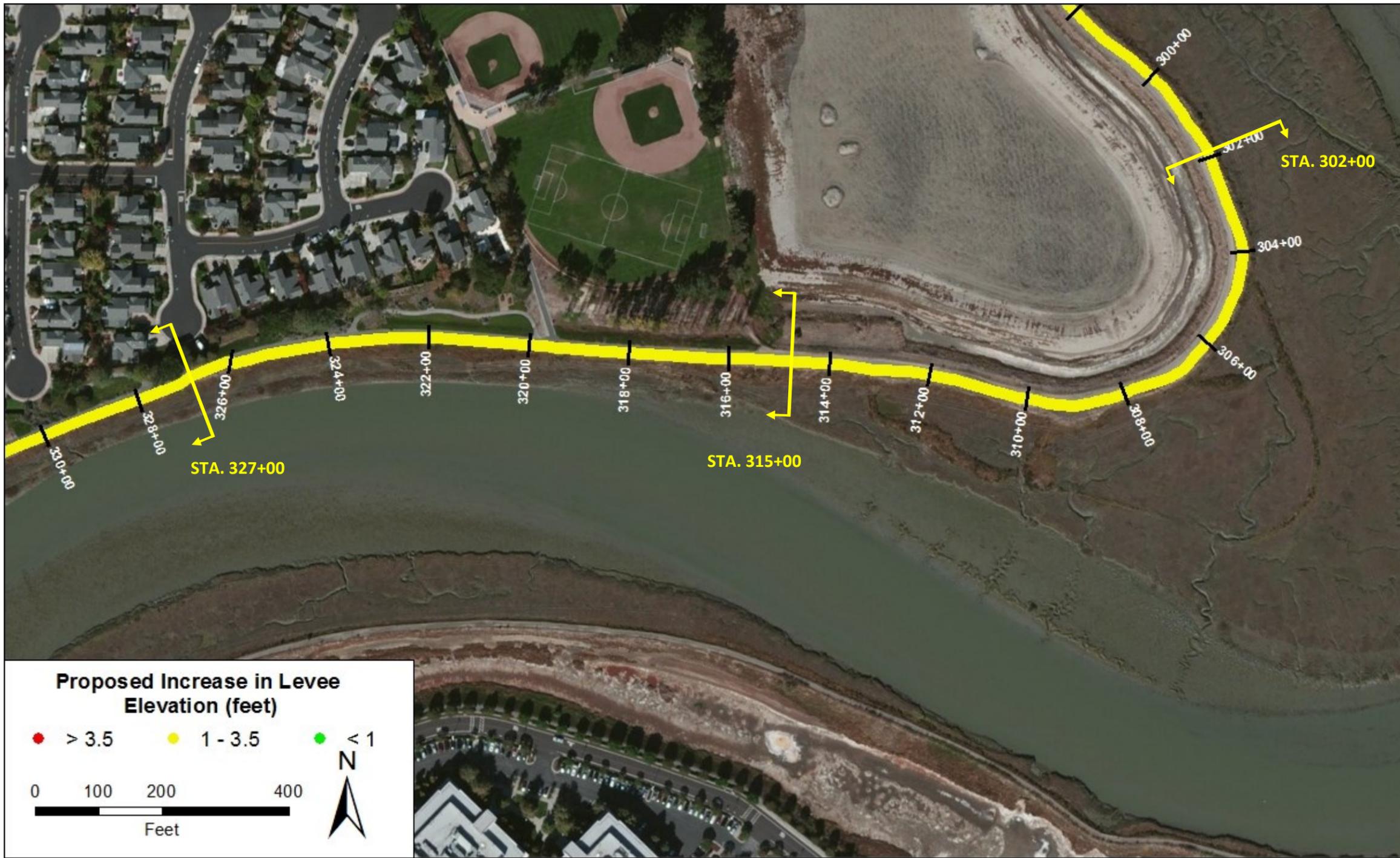
Foster City
Proposed Levee Improvements

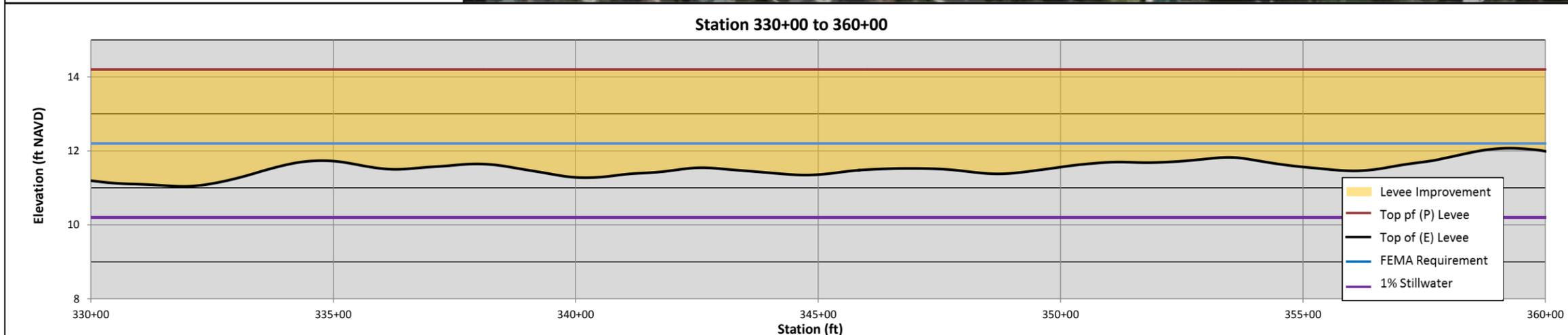
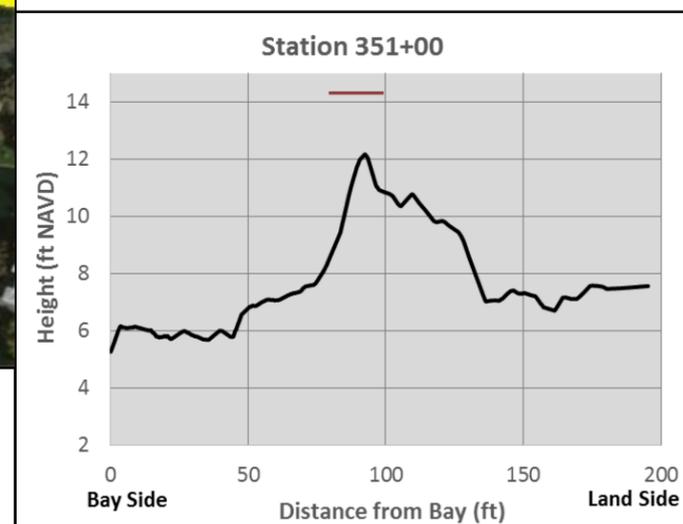
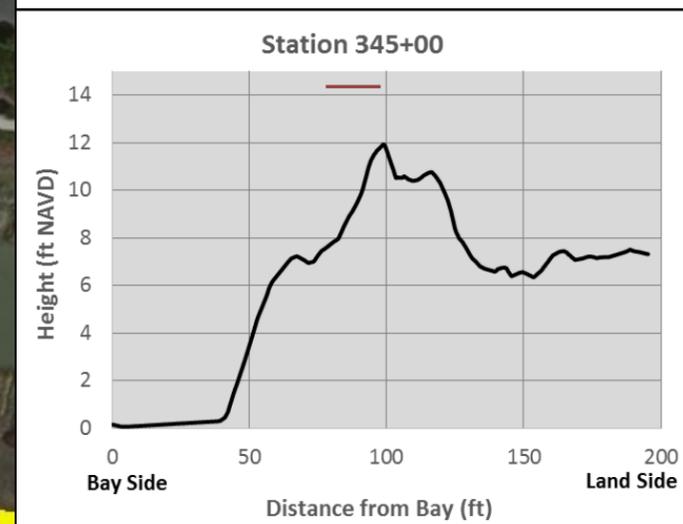
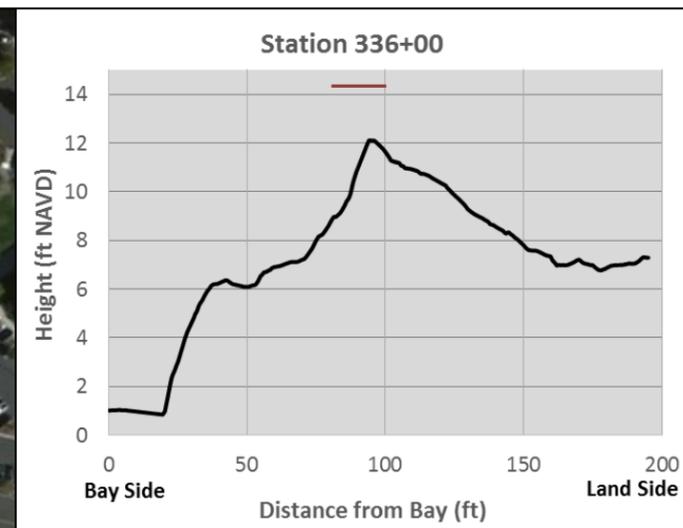
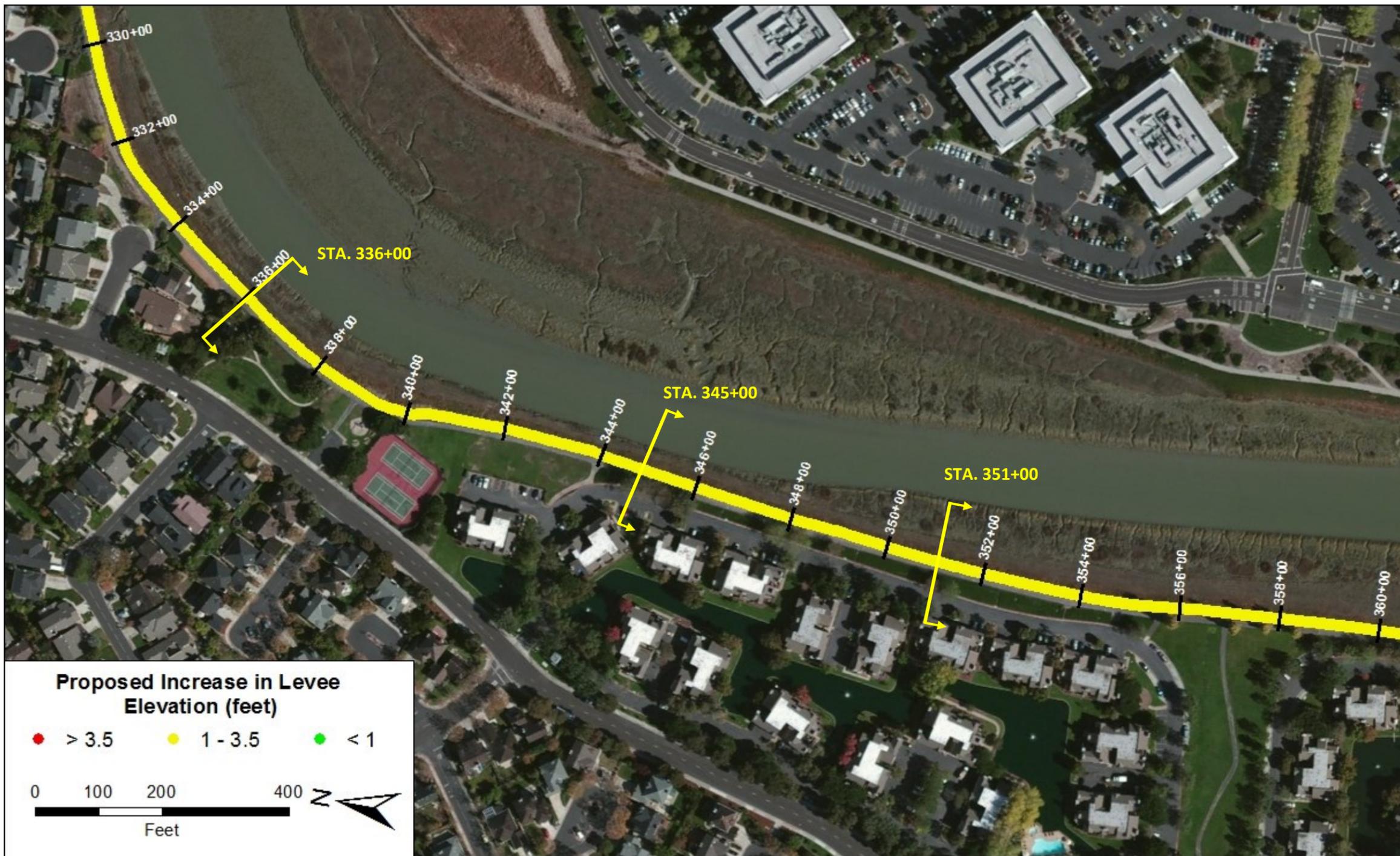
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Proposed Levee Improvements

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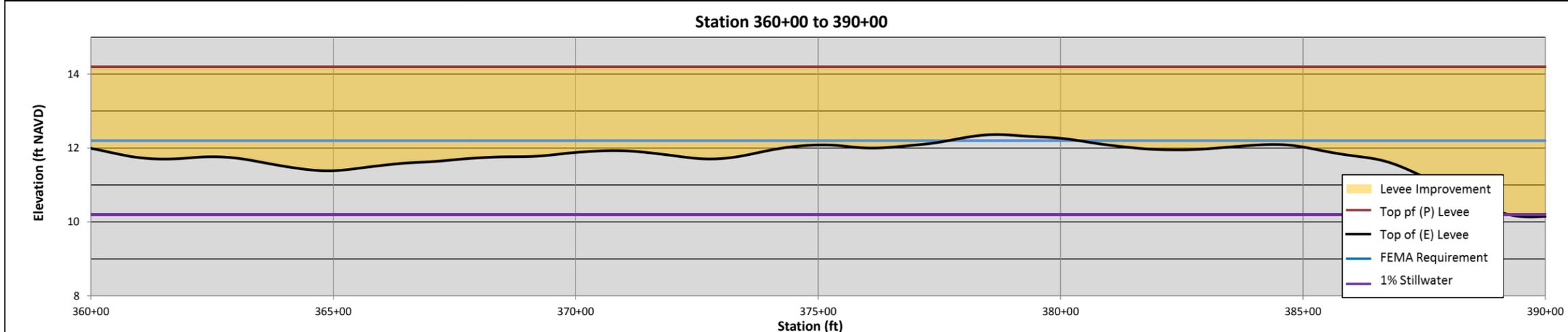
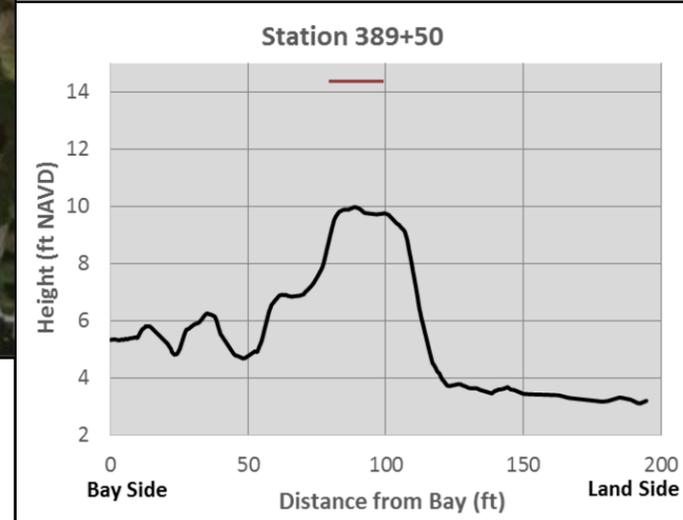
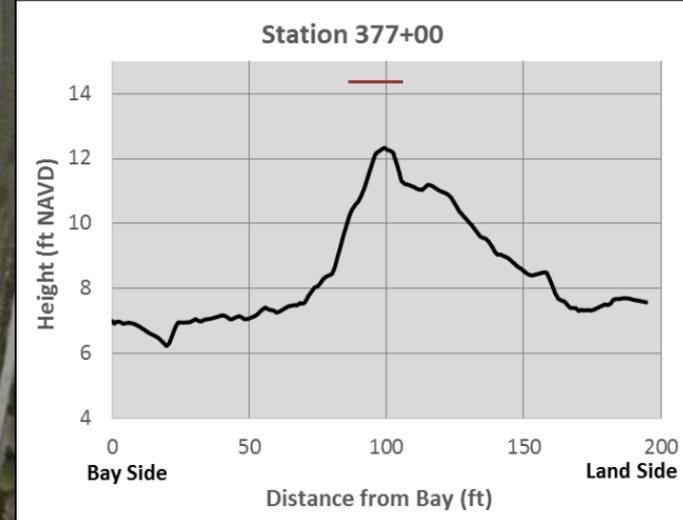
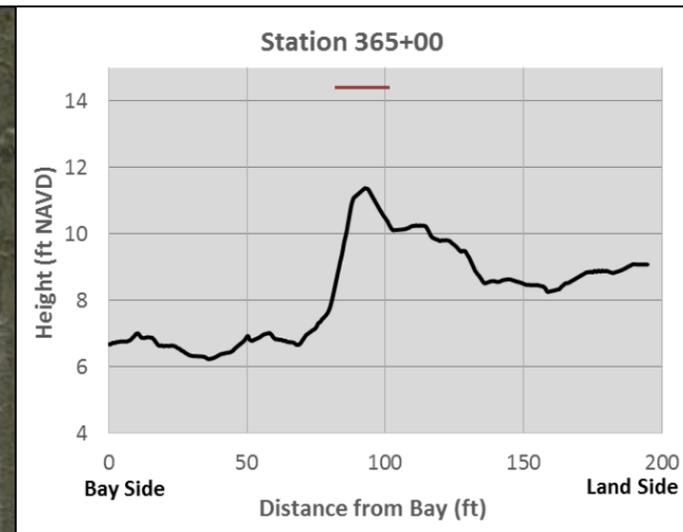
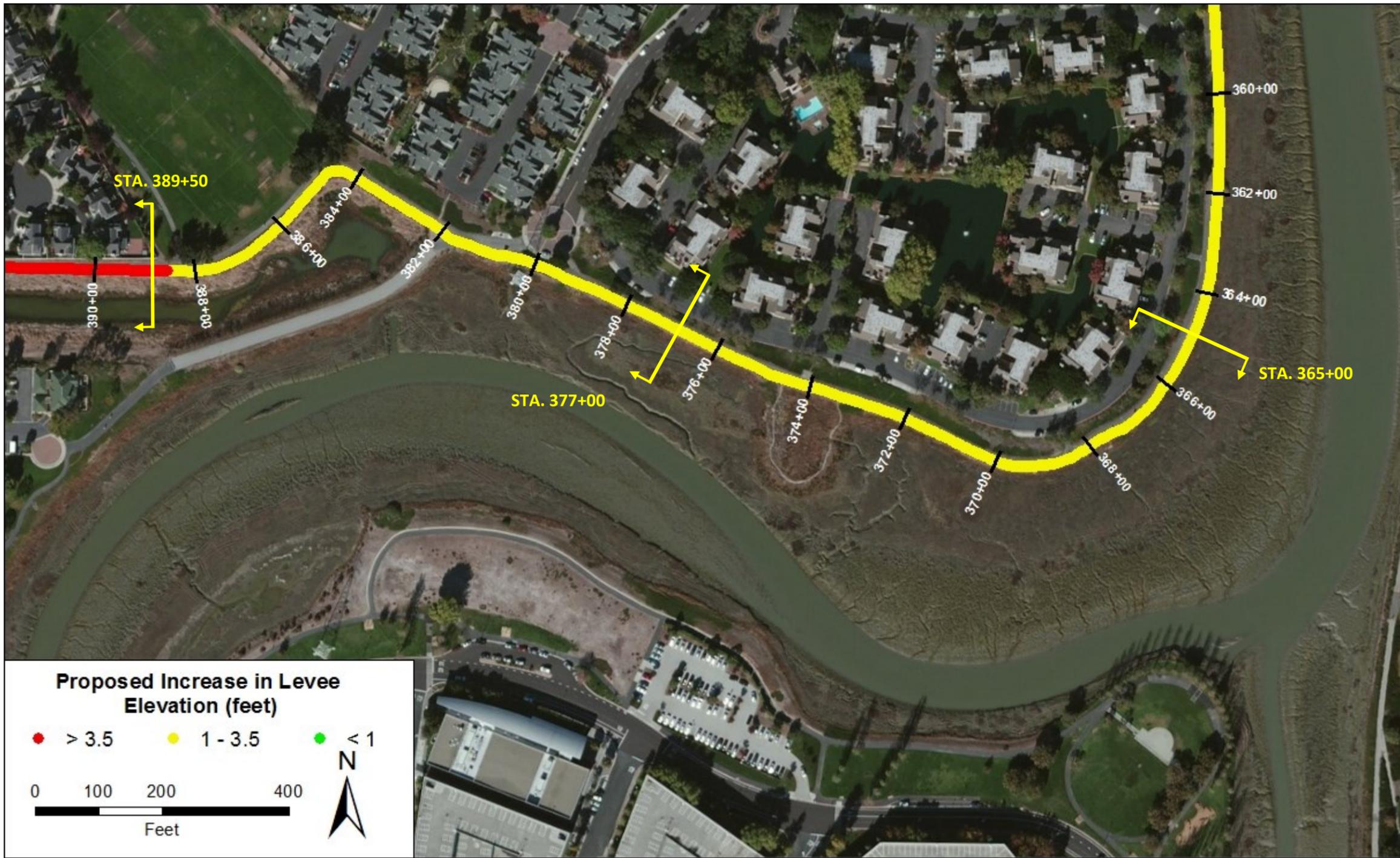




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Proposed Levee Improvements

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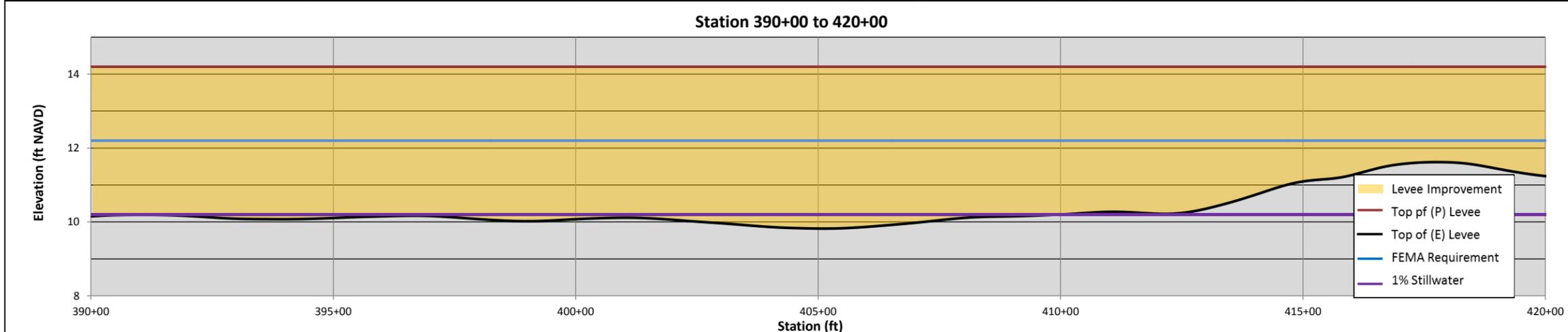
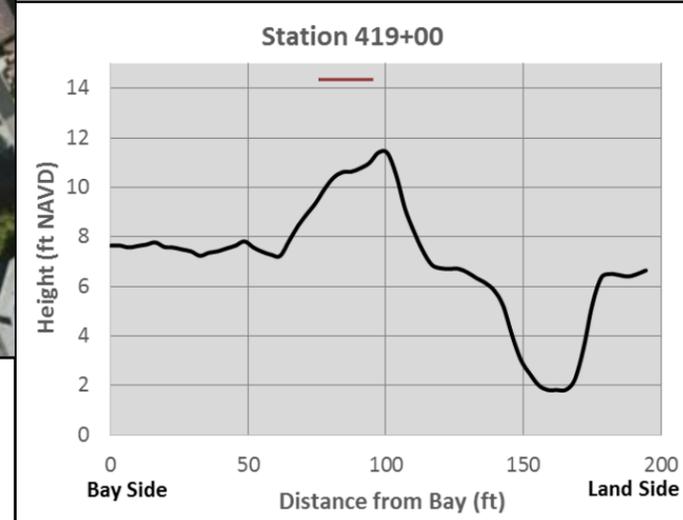
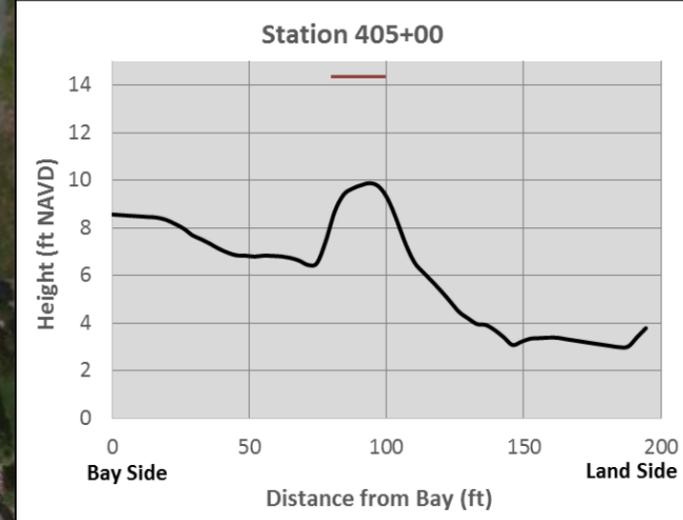
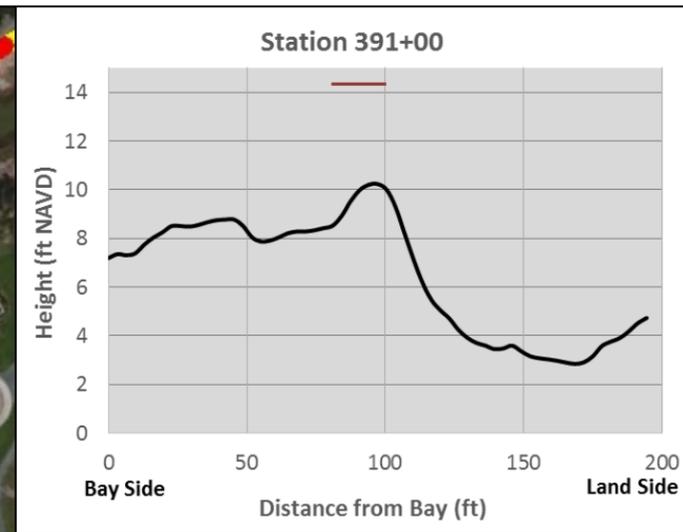
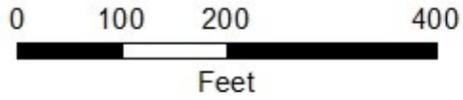
Foster City
Proposed Levee Improvements

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Proposed Increase in Levee Elevation (feet)

- > 3.5
- 1 - 3.5
- < 1



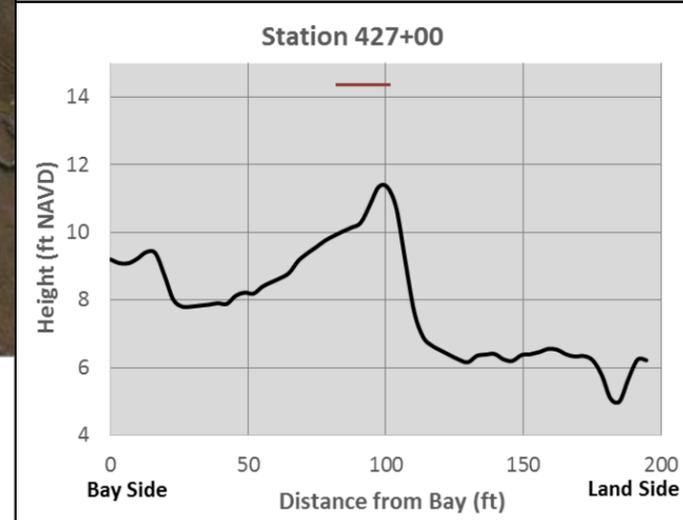
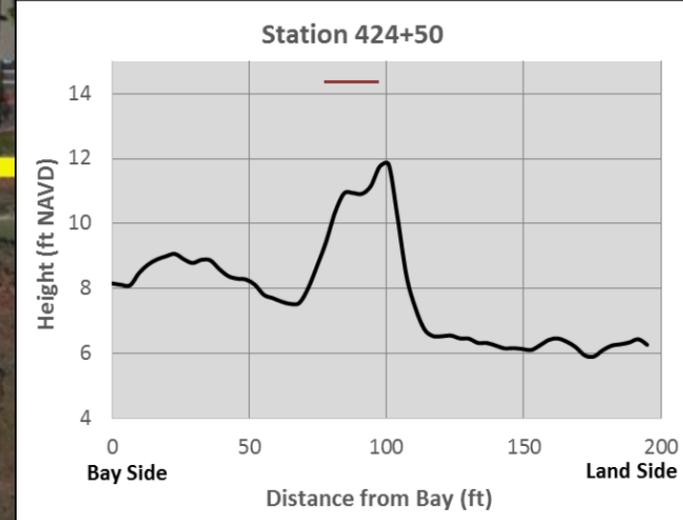
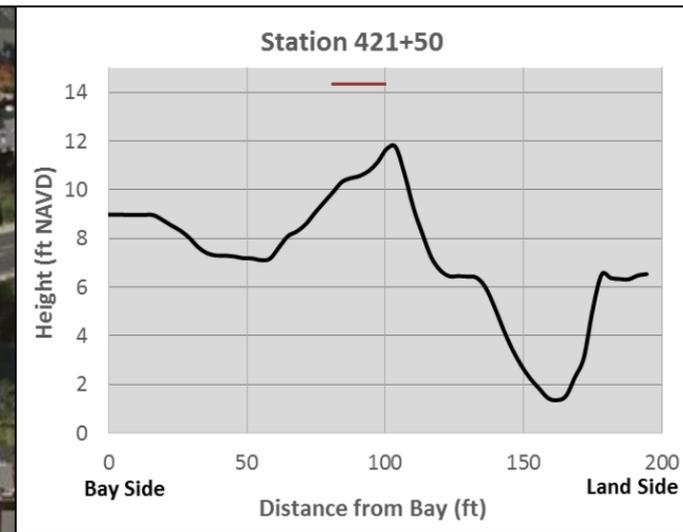
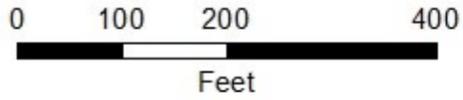
Foster City
Proposed Levee Improvements

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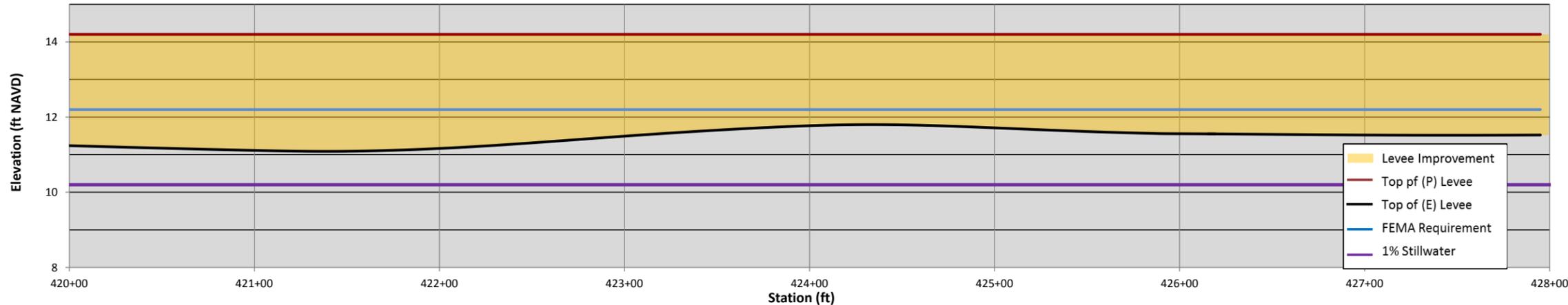
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Proposed Increase in Levee Elevation (feet)

- > 3.5
- 1 - 3.5
- < 1



Station 420+00 to 428+00



Foster City
Proposed Levee Improvements

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Attachment 2

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Foster City Local Hazard Mitigation Plan & Safety Element

Appendix F: Mitigation Strategy Worksheets

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	EMID has a single 24-inch water supply transmission main connected to SFPUC. The transmission line was installed in 1960s. The most recent conditional inspection indicated that the line is in good condition. EMID would have to rely on storage (4 tanks with 20 million gallons capacity) during breakage.						
Strategy Name*	Evaluate the condition of the pipeline on an on-going basis into the future.						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation	Policy Development		Coordination	Education/ Outreach	
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	Estero Municipal Improvement District (EMID)						
Partners*	San Francisco Public Utilities Commission (SFPUC) MidPeninsula CalWater						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	9						
Actions/ Activities	Various inspections (internal, external); monitoring/maintaining impress current/cathodic protection systems, which are recorded on the GIS; water valve replacements (CIP projects); bridge bypass project						
Staff Lead	Public Works Department						
Cost Estimate*	Medium Evaluation of the water transmission main will continue through the foreseeable future.						
Benefits (losses avoided)*	High No damage to properties (such as flood); problem would be isolated and fixed. City would be able to function; because otherwise a lack of water would mean businesses/buildings would need to be closed.						
Potential Funding Sources*	Water Enterprise Fund Emergency/Contingency Fund FEMA						
Timeline*	Current and Ongoing						
Related Policies*	Funding of a Future Capital Improvement Program (CIP) Projects – Currently, it is not identified in the CIP Program. Water System Master Plan (Management, 50 Year Plan)						

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	EMID maintains the Water Booster Pump Station, which has 4 engines and 2 electric motors (6 pumps total). A recent seismic evaluation, performed in 2013, has identified areas that will be taken care of through a CIP project.						
Strategy Name*	Project to seismically retrofit the water booster pump station building.						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation		Policy Development	Coordination	Education/ Outreach	
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	Estero Municipal Improvement District (EMID)						
Partners*	None						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	12						
Actions/ Activities	Actions are based on seismic evaluations. Improvements have been identified and are currently in the 5 Year Capital Improvement Program (CIP).						
Staff Lead	Public Works Department						
Cost Estimate*	Medium						
Benefits (losses avoided)*	Medium While in the short term, the public can still be served without the station in operation, the station would need to be returned to operation should it fail.						
Potential Funding Sources*	Water Enterprise Fund Emergency/Contingency Fund FEMA						
Timeline*	Current and Ongoing						
Related Policies*	Identified in the 5-Year CIP Program for Seismic Repairs – This CIP is planned in FY 2018-2019. Water System Master Plan (Management, 50 Year Plan)						

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	EMID maintains 4 potable water tanks; 3 of which are steel and 1 that is concrete, for a total capacity of 20 million gallons. A recent seismic evaluation, performed in 2013, has identified areas that will be addressed through a CIP project.						
Strategy Name*	Through seismic evaluation, items we can address have been identified.						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation		Policy Development	Coordination	Education/ Outreach	
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	Estero Municipal Improvement District (EMID)						
Partners*	None						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	12						
Actions/ Activities	Actions are based on seismic evaluations. Improvements have been identified and are currently in the 5 Year Capital Improvement Program (CIP).						
Staff Lead	Public Works Department						
Cost Estimate*	Medium						
Benefits (losses avoided)*	Medium						
Potential Funding Sources*	Water Enterprise Fund Emergency/Contingency Fund FEMA						
Timeline*	Current and Ongoing						
Related Policies*	Identified in the 5-Year CIP Program for Seismic Repairs – This CIP is planned in FY 2018-2019. Water System Master Plan (Management, 50 Year Plan)						

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

PRESSURE REDUCING STATIONS (VALVES 1 & 2)

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	Pressure reducing stations are required to reduce SFPUC’s supply pressure of 120 PSI to EMID system pressure of 60 PSI. Valves are maintained on a regular basis.						
Strategy Name*	Evaluate pressure reducing valves to determine alternatives.						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	Estero Municipal Improvement District (EMID)						
Partners*	None						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	8						
Actions/ Activities	Evaluation of Valves to Address Possible Seismic Issue; Project to Perform Seismic Evaluations						
Staff Lead	Public Works Department						
Cost Estimate*	Low						
Benefits (losses avoided)*	Low						
Potential Funding Sources*	Capital Improvement Program (CIP) – Water						
Timeline*	Long Term						
Related Policies*	Need to Include in the CIP Program or Operational Budget for Future Repairs The CIP has not yet been identified. It will be included after investigation and evaluation.						

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	EMID owns and operates 47 wastewater lift stations throughout Foster City. Wastewater from different neighborhoods are collected and pumped to the San Mateo Wastewater Treatment Plant. EMID has incorporated a recurring CIP project in the 5-Year CIP Program to repair high priority stations every 3-4 years.						
Strategy Name*	Lift Station Rehabilitation Program; Operational Updates						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards: Power Fail
Strategy Type	Evaluation	Program/ Operation		Policy Development	Coordination	Education/ Outreach	
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	Estero Municipal Improvement District (EMID)						
Partners*	None						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	13						
Actions/ Activities	Actions are phases of continual/recurring rehabilitation projects.						
Staff Lead	Public Works Department						
Cost Estimate*	Medium						
Benefits (losses avoided)*	High Meeting Requirements: SSO, Bay Keepers, NPDES Permit Violations/Fines						
Potential Funding Sources*	Capital Improvement Program (CIP) - Wastewater						
Timeline*	Tri-Annual						
Related Policies*	Included in the 5-Year CIP Program The next phase CIP is identified as CIP 455-626 & CIP 455-645. Both will be constructed in FY 2016-2017.						

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	The 24" HDPE force main from Lift Station #59 to San Mateo Wastewater Treatment Plant was installed around 1978-1979.						
Strategy Name*	Evaluation/Replacement of Air Release Valves (ARVs) on the Wastewater Line						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation		Policy Development	Coordination		Education/ Outreach
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	Estero Municipal Improvement District (EMID)						
Partners*	City of San Mateo						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	13						
Actions/ Activities	Actions include performing condition assessments (to detect any leaks) using SMART Ball technology or something similar.						
Staff Lead	Public Works Department						
Cost Estimate*	Medium						
Benefits (losses avoided)*	High						
Potential Funding Sources*	Capital Improvement Program (CIP) – Wastewater						
Timeline*	Within the Next 5 Years						
Related Policies*	Need to Incorporate in the 5-Year CIP Program for Future Inspection and Repairs The CIP has not yet been identified. It will be included after inspection.						

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

WASTEWATER TREATMENT PLANT (WWTP)

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	EMID owns 25% of the San Mateo Wastewater Treatment Plant (WWTP). City of San Mateo is currently undertaking a Clean Water Program CIP project to rebuild the plant.						
Strategy Name*	Complete the Clean Water Program To make improvements that will help accommodate current and future operating requirements/needs.						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation		Policy Development	Coordination		Education/ Outreach
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	City of San Mateo – 75% Estero Municipal Improvement District (EMID) – 25%						
Partners*	City of San Mateo						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	18						
Actions/ Activities	Actions are to make improvements by essentially rebuilding the plant.						
Staff Lead	Public Works Department						
Cost Estimate*	High - \$116 Million						
Benefits (losses avoided)*	High Environmental benefits, including a cleaner Bay, production of a new recycled water source, and alternative fuel sources for City vehicles.						
Potential Funding Sources*	Bonds State Revolving Funds Grant Funding Sewer Enterprise						
Timeline*	Current and Ongoing To Be Completed by 2025						
Related Policies*	Clean Water Program CIP Project The project is currently identified as CIP 455-652.						

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	The Lagoon Pump Station was constructed in XXXX. Currently, it houses 2 diesel engines/pumps. A recent seismic evaluation, performed in 2013, has identified areas that will be addressed through a CIP project.						
Strategy Name*	Seismic Evaluation						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation		Policy Development	Coordination	Education/ Outreach	
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	Estero Municipal Improvement District (EMID)						
Partners*	None						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	12						
Actions/ Activities	Actions are based on seismic evaluations. Improvements have been identified and are currently in the 5 Year Capital Improvement Program (CIP).						
Staff Lead	Public Works Department						
Cost Estimate*	Medium						
Benefits (losses avoided)*	Medium						
Potential Funding Sources*	General Fund Emergency/Contingency Fund FEMA						
Timeline*	5-Year CIP Program						
Related Policies*	Identified in the 5-Year CIP Program for Seismic Repairs This CIP is planned in FY 2018-2019.						

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

FOSTER CITY LEEVE FLOOD PROTECTION

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION								
Problem Statement*	The City of Foster City has a levee that stretches approximately 8 miles, separating the City from the Bay. The City has been notified recently by FEMA that the levee does not meet the accreditation. The City is currently developing a CIP project to raise the levee to regain accreditation. The construction project is anticipated to be complete by 2020.							
Strategy Name*	Levee Protection Planning and Improvements Project (CIP 301-657) will raise the levee to regain FEMA accreditation.							
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards	
Strategy Type	Evaluation		Program/ Operation		Policy Development		Coordination	Education/ Outreach
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives	
Responsible Agency*	City of Foster City							
Partners*	City of San Mateo Bay Conservation and Development Commission (BCDC) Federal Emergency Management Agency (FEMA) U.S. Fish & Wildlife Service U.S. Environmental Protection Agency (EPA) U.S. Army Corps of Engineers State Regional Water Control Board							
STRATEGY IMPLEMENTATION INFORMATION								
Priority (Evaluation Score)*	16							
Actions/ Activities	Actions include quarterly evaluations and inspections; as well as developing the Levee Protection Planning and Improvements Project. This CIP is currently under design and is identified as CIP 301-657.							
Staff Lead	Public Works Department							
Cost Estimate*	High - \$75 Million							
Benefits (losses avoided)*	High Many benefits, including savings on mandatory flood insurance if requirements were not met.							
Potential Funding Sources*	Assessment District and Bonds							
Timeline*	5 Years Aggressive Schedule to Complete the Project by Mid-2020							
Related Policies*	Funding Source, Design Alternatives							

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

Police Facility Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	Foster City is located on land susceptible to ground shaking during a large earthquake. After an earthquake, the police facility would serve as the communications center and base of operations. The police facility could become uninhabitable; thus, compromising the capability of the police to deliver services during a disaster. The police building was originally constructed in 1964 and remodeled in 2002. The remodeled portion of the building was built to 1998 seismic standards. The police facility has not been completely seismically retrofitted.						
Strategy Name*	Conduct an assessment of the facility and its use related to an earthquake to identify strategies that can improve the facility's resilience, such as retrofitting the facility to current standards. Consideration should be given to the feasibility of replacing the building.						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation		Program/ Operation	Policy Development		Coordination	Education/ Outreach
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	Foster City Public Works and Foster City Parks and Recreation-Facilities.						
Partners*	Foster City Planning and Building, City Manager, Police Department and City Council.						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	8						
Actions/ Activities	Present recommendation to hire seismic safety engineer, generate request for proposal, obtain necessary bids, hire engineering firm/consultants, monitor consultant's progress in developing report with recommendations, review final recommendations, and conduct facility upgrades based on consultant recommendations. Ensure the facility is retrofitted to current standards.						
Staff Lead	Foster City Public Works Engineers						
Cost Estimate*	Low						
Benefits (losses avoided)*	Allows for rational analysis of design of seismic resistant police facility/ communications and operations center.						
Potential Funding Sources*	General Operating Funds FY 2019-2020						

Police Facility Strategy Development and Implementation Worksheet

Timeline*	To be completed by June 30, 2020.
Related Policies*	General Plan: meets the objectives of the safety goals listed in the existing general plan. Two safety goals are met: S-D, Prepare to Respond to Emergencies; S-E, Provide Police Services. Additionally, the objectives of safety policies in the existing general plan are met: S-1, Use Most Current Uniform Codes; S-3, Protect the City’s Infrastructure and Emergency Facilities from Seismic and Geologic hazards. Incorporates Safety and Mitigation Goals S-A and S-B: S-A. Strong infrastructure. Preserve the quality of life by ensuring the City’s infrastructure and municipal services are capable of withstanding reasonably foreseeable risks and hazards; S-B Emergency response Maintain an effective emergency response program that anticipates the potential for disasters and ensures the ability to respond promptly, efficiently and effectively, to provide continuity of services during and after an emergency.

* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	The Recreation Center is in a vulnerable location because it is susceptible to ground shaking, and the Recreation would be the primary shelter for Foster City residents in an emergency. The Recreation Center was originally constructed in 1973, remodeled in 1998, and the Senior Wing of the building was added on in 2002. The Recreation Center will possibly need to be replaced prior to any emergency scenario.						
Strategy Name*	Recreation Center – evaluation for replacement						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation	Policy Development	Coordination	Education/ Outreach		
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	City of Foster City Public Works Department						
Partners*	Foster City Planning and Building, City Manager, City Council, and Parks and Recreation						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	8						
Actions/ Activities	Present recommendation to hire seismic safety engineer, generate request for proposal, obtain necessary bids, hire engineering firm/consultants, monitor consultant’s progress in developing report with recommendations, review final recommendations, and conduct facility upgrades based on consultant recommendations. Ensure the facility is retrofitted to current standards.						
Staff Lead	Foster City Public Works Engineers						
Cost Estimate*	Low (evaluation only)						
Benefits (losses avoided)*	Allows for rational analysis of design of seismic resistant Recreation Center / emergency shelter						
Potential Funding Sources*	General Operating Funds FY 16-17						
Timeline*	FY 16-17						

<p>Related Policies*</p>	<p>General Plan: meets the objectives of the safety goals listed in the existing general plan. Two safety goals are met: S-D, Prepare to Respond to Emergencies; S-E, Provide Police Services. Additionally, the objectives of safety policies in the existing general plan are met: S-1, Use Most Current Uniform Codes; S-3, Protect the City's Infrastructure and Emergency Facilities from Seismic and Geologic hazards. Incorporates Safety and Mitigation Goals S-A and S-B: S-A. Strong infrastructure. Preserve the quality of life by ensuring the City's infrastructure and municipal services are capable of withstanding reasonably foreseeable risks and hazards; S-B Emergency response Maintain an effective emergency response program that anticipates the potential for disasters and ensures the ability to respond promptly, efficiently and effectively, to provide continuity of services during and after an emergency.</p> <p>Sustainability Plan</p>
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* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet

Emergency Preparedness Strategy Development and Implementation Worksheet

STRATEGY DEVELOPMENT INFORMATION							
Problem Statement*	The Foster City community is susceptible to hazards such as earthquake ground shaking. A recent survey of the community indicated that individuals feel they are not educated about the hazards and would like to have additional information about preparedness.						
Strategy Name*	Develop an accessible education and outreach program encouraging community members to have family disaster plans and conduct mitigation activities in their own homes utilizing new or existing printed materials, workshops, and/or web based tools.						
Hazard(s) Addressed	Earthquake Ground Shaking	Earthquake Liquefaction	Current Flooding	Future Flooding	Wildfire	Landslide	Other Hazards
Strategy Type	Evaluation	Program/ Operation		Policy Development	Coordination		Education/ Outreach
Process/ Implementation Mechanism	Long-Range Planning	Land Use Planning	Capital Planning	Operations	Emergency & Hazards Planning	Project Planning & Design	New Initiatives
Responsible Agency*	Foster City Fire Department						
Partners*	Foster City Police Department, Community Groups, Foster City Communications Director						
STRATEGY IMPLEMENTATION INFORMATION							
Priority (Evaluation Score)*	10						
Actions/ Activities	<ol style="list-style-type: none"> 1. Conduct a needs assessment with partners 2. Develop a plan to provide preparedness materials to homeowners, businesses, schools, health care facilities 3. Create/assemble preparedness materials 						
Staff Lead	Foster City Emergency Preparedness Coordinator						
Cost Estimate*	Low						
Benefits (losses avoided)*	Building capacity and strengthening relationships with community members and improve resilience.						
Potential Funding Sources*	General fund, potential for grant funding						
Timeline*	9 months						

Emergency Preparedness Strategy Development and Implementation Worksheet

Related Policies*	Foster City Fire Department Strategic Plan , Foster City Emergency Preparedness Work Plan
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* Indicates overlap with FEMA Worksheet 6.2, Mitigation Action Implementation Worksheet



**Foster City Local Hazard Mitigation Plan & Safety Element
Appendix G: Capital Improvement Program Project
Worksheets**

CIP PROJECT DESCRIPTION FOR FIVE-YEAR FINANCIAL PLAN

LEVEE PROTECTION PLANNING AND IMPROVEMENTS PROJECT – (2015-2016)

Funding	Funding Sources	
	CIP City	Total
2015-2016	1,000,000	1,000,000
2016-2017	-	-
2017-2018	-	-
2018-2019	-	-
2019-2020	-	-
Total	1,000,000	1,000,000

Expenditures	Expenditure Categories			Total
	Estimated Project Cost	Inflation %	Inflation Escalation	
2015-2016	800,000	0%	-	800,000
2016-2017	-	3%	-	-
2017-2018	-	6%	-	-
2018-2019	-	9%	-	-
2019-2020	-	12%	-	-
Subtotal	800,000	-	-	800,000
Contingency 25%	200,000	-	-	200,000
Totals	1,000,000	-	-	1,000,000

PROJECT PRIORITY CATEGORY: APROJECT DESCRIPTION:

This project will raise the levee to meet the required elevation per Title 44 of the Code of Federal Regulations (CFR), section 65.10, to retain accreditation. Based on the FEMA coastal flood hazard study, roughly 85 percent of Foster City's levee system does not meet the required freeboard elevation. Therefore, the levee will not retain accreditation status when the Flood Insurance Rate Map (FIRM) is updated in mid-2016. Currently, land within Foster City limits is classified as Zone X, meaning mandatory flood

insurance is not required. However, when the new maps become effective in mid-2016, Foster City will be designated as a high-risk Special Flood Hazard area and property owners with federally-backed loans will be required to purchase annual flood insurance if no action is taken or if FEMA does not approve the City's request for an extension of time to raise the levels.

In December 2014, the City hired Schaaf & Wheeler to prepare a report to identify the City's flood risk and determine potential levee improvement alternatives that may be necessary to restore accreditation. The report concluded that the levee surrounding Foster City will have to be raised by 2.5 to 5.5 feet depending on the location. The report also outlined the project costs could be as high as \$75 million.

Funding request in the amount of \$1,000,000, if approved, will allow staff to prepare technical reports, review funding options, review regulatory requirements, and apply for levee seclusion mapping and Zone A99 designation. The levee seclusion mapping, if approved by FEMA, will allow Foster City to maintain Zone X designation while the City prepares for construction of the project. Inclusion of the project in the CIP plan will show FEMA that the Foster City is making a good faith effort toward meeting the requirements. Once the project is further defined, an additional funding request will be brought to the City Council for consideration.

ESTIMATED PROJECT SCHEDULE:

Technical Reports

CIP PROJECT DESCRIPTION FOR FIVE-YEAR FINANCIAL PLAN

SEISMIC IMPROVEMENTS AT WATER BOOSTER PUMP STATION (2018-2019)

Funding	Funding Sources	
	CIP Water	Total
2016-2017	-	-
2017-2018	-	-
2018-2019	70,000	70,000
2019-2020	-	-
2020-2021	-	-
Total	70,000	70,000

Expenditures	Expenditure Categories			
	Estimated Project Cost	Inflation %	Inflation Escalation	Total
2016-2017	-	0%	-	-
2017-2018	-	3%	-	-
2018-2019	66,000	6%	4,000	70,000
2019-2020	-	9%	-	-
2020-2021	-	12%	-	-
Subtotal	66,000		4,000	70,000
Contingency 0%	-		-	-
Totals	66,000		4,000	70,000

The pump station currently houses six (6) engines and pumps that are used to pump water from District's four (4) storage tanks into the distribution system during periods of peak demand and to cycle the water in the storage tanks.

The report concluded that the pump station meets the current Seismic Code. However, the report recommended reinforcing the door frame of the roll-up door to prevent deformation or drifts resulting from a seismic event that may prevent the door from opening and closing. The report also recommended installing flexible connections on the underground utilities entering the building to allow differential movement during earthquakes.

Funding is requested in the amount of \$70,000 in FY 2018-2019 for the design and construction of the project.

ESTIMATED PROJECT SCHEDULE:

Evaluation/Study Completed
Request for Proposal
Design and Construction

September 2013
FY 2018-2019
FY 2018-2019

PROJECT PRIORITY CATEGORY: BPROJECT DESCRIPTION:

A contract with G&E Engineering Systems, Inc. was executed in Summer 2012 to perform the Seismic Vulnerability Assessment of the Water Booster Pump Station located at the City's/District's Corporation Yard. The report was completed in September 2013.

CIP PROJECT DESCRIPTION FOR FIVE-YEAR FINANCIAL PLAN

SEISMIC IMPROVEMENTS AT WATER TANKS 1, 2, AND 3 (2018-2019)

Funding	Funding Sources	
	CIP Water	Total
2016-2017	-	-
2017-2018	-	-
2018-2019	300,000	300,000
2019-2020	-	-
2020-2021	-	-
Total	300,000	300,000

Expenditures	Expenditure Categories			
	Estimated Project Cost	Inflation %	Inflation Escalation	Total
2016-2017	-	0%	-	-
2017-2018	-	3%	-	-
2018-2019	283,000	6%	17,000	300,000
2019-2020	-	9%	-	-
2020-2021	-	12%	-	-
Subtotal	283,000		17,000	300,000
Contingency 0%	-		-	-
Totals	283,000		17,000	300,000

The water tanks provide emergency supply storage, as well as storage for peak use periods and firefighting needs. Water Tank Nos. 1 and 2 are the oldest of the tanks and were constructed in 1965 and 1974 respectively. Water Tank No. 3 was built in 1993. All three tanks are welded steel structures and are approximately 150 feet in diameter and 30 feet in height. The protective coating on all three tanks was replaced in 2001.

The report concluded that all three tanks meet the current code and are adequate for the 475 year minimum code level earthquake. However, the drain pipes in the older tanks, Tank Nos. 1 and 2 are connected to the floors of the tanks, and could potentially break in the event any earthquakes should occur due to the ground movement. G&E recommended that the drain pipes be installed onto the tanks' shells with flexible connections. The report also noted corrosion spots on the exterior of the tanks. Spot repairs for all three steel tanks will also be included in the project.

PROJECT PRIORITY CATEGORY: BPROJECT DESCRIPTION:

A contract with G&E Engineering Systems, Inc. was executed in Summer 2012 to perform the Seismic Vulnerability Assessment of the District's three (3) water storage tanks located at the City's/District's Corporation Yard. The report was completed in September 2013.

Funding is requested in the amount of \$300,000 in FY 2018-2019 for the design and construction of the project.

ESTIMATED PROJECT SCHEDULE:

Evaluation/Study Completed	September 2013
Request for Proposal	FY 2018-2019
Design and Construction	FY 2018-2019

CIP PROJECT DESCRIPTION FOR FIVE-YEAR FINANCIAL PLAN

SANITARY SEWER LIFT STATION IMPROVEMENTS – PHASE 6 (2019-2020)

Funding	Funding Sources	
	Wastewater	Total
2016-2017	-	-
2017-2018	-	-
2018-2019	-	-
2019-2020	500,000	500,000
2020-2021	5,500,000	5,500,000
Total	6,000,000	6,000,000

Expenditures	Expenditure Categories			Total
	Estimated Project Cost	Inflation %	Inflation Escalation	
2016-2017	-	0%	-	-
2017-2018	-	3%	-	-
2018-2019	-	6%	-	-
2019-2020	480,000	9%	43,200	523,200
2020-2021	3,900,000	12%	468,000	4,368,000
Subtotal	4,380,000		43,200	4,891,200
Contingency 25%	1,095,000		10,800	1,105,800
Totals	5,475,000		54,000	5,997,000

Lift station improvements generally include items of work such as: repairing interior wet wells; installing new pumps, motors and valves; replacing electrical control cabinets and components; installing bypass piping and connections; replacing corroded components; replacing manhole covers with lighter hatches; and installing control monitoring equipment.

Phase 4 was completed in February 2012 and included improvements to six (6) lift stations. Phase 5 will include various repairs at ten (10) lift stations. Phase 5 is anticipated to be completed in FY 2017. It is anticipated Phase 6 will begin in FY 2019-2020.

Funding of \$500,000 is requested in FY 2019-2020 to develop construction documents for Phase 6. Depending on the priority list, the amount of funding and timing will be adjusted.

ESTIMATED PROJECT SCHEDULE:

Project Report and Design	FY 2019-2020
Project Construction	FY 2020-2021
Project Closeout	FY 2022-2023

PROJECT PRIORITY CATEGORY: A

PROJECT DESCRIPTION:

This project is part of a multi-phase program started in 2000 to rehabilitate the sewer system lift stations by performing preventative maintenance and upgrades to ensure reliable operation of them. The program provides for a project to be constructed every three to four years to achieve economies of scale. Over a 25-year period, all of the District's 48-lift stations will be repaired and rehabilitated.

CIP PROJECT DESCRIPTION FOR FIVE-YEAR FINANCIAL PLAN

WASTEWATER TREATMENT PLANT MASTER PLAN IMPROVEMENTS

Funding Sources		
Funding	Bond Financing	Total
2016-2017	9,854,000	9,854,000
2017-2018	11,441,000	11,441,000
2018-2019	11,040,000	11,040,000
2019-2020	3,823,000	3,823,000
2020-2021		
Total	36,158,000	36,158,000

Expenditure Categories		
Expenditures	Estimated Project Cost	Total
2016-2017	9,854,000	9,854,000
2017-2018	11,441,000	11,441,000
2018-2019	11,040,000	11,040,000
2019-2020	3,823,000	3,823,000
2020-2021		
Subtotal	36,158,000	36,158,000
Contingency	0%	-
Totals	36,158,000	36,158,000

PROJECT PRIORITY CATEGORY: APROJECT DESCRIPTION:

Estero Municipal Improvement District (EMID) and the City of San Mateo (San Mateo) jointly own the San Mateo Wastewater Treatment Plant (WWTP) through a Joint Powers Agreement (JPA). The City of San Mateo operates the plant. As co-permit holders for the Wastewater Treatment Plant (WWTP), EMID and San Mateo are

responsible for providing efficient and reliable wastewater services to Foster City and the other communities served.

The jointly owned WWTP is an aging facility that needs improvements to continue to meet current and future flows, and permit requirements. There are numerous projects that are needed in both the near-term and long-term to rehabilitate or replace facilities that are failing and/or are at the end of their useful life.

As a result, a comprehensive 20-year Integrated Wastewater Master Plan was developed by Carollo Engineers. In October 2014, CH2M Hill was hired to provide Program Management Services to support all aspects of the implementation of the program and validate the 2014 Baseline Master Plan (BMP) developed by Carollo Engineers. The 2015 validation studies showed that the 2014 BMP had some limitations in meeting potential future regulatory requirements and providing for recycled water production. Four alternatives to the 2014 BMP were presented to both EMID's Board of Directors and San Mateo's City Councilmembers in August 2015. Both government bodies indicated support in performing additional planning, economic, and technical feasibility investigations for implementation of the Membrane Bio-Reactor (MBR) alternative, which would meet the program's goals, reduce the program length from 20 to 10 years, and reduce combined program costs by approximately \$100 million dollars.

CIP PROJECT DESCRIPTION FOR FIVE-YEAR FINANCIAL PLAN

SEISMIC IMPROVEMENTS AT LAGOON PUMP STATION (2018-2019)

Funding	Funding Sources	
	CIP City	Total
2016-2017	-	-
2017-2018	-	-
2018-2019	140,000	140,000
2019-2020	-	-
2020-2021	-	-
Total	140,000	140,000

Expenditures	Expenditure Categories			
	Estimated Project Cost	Inflation %	Inflation Escalation	Total
2016-2017	-	0%	-	-
2017-2018	-	3%	-	-
2018-2019	132,100	6%	7,900	140,000
2019-2020	-	9%	-	-
2020-2021	-	12%	-	-
Subtotal	132,100		7,900	140,000
Contingency 0%	-		-	-
Totals	132,100		7,900	140,000

The pump station houses two (2) engines/pumps used to pump lagoon water into the bay to control the water level in the interior lagoon.

The report concluded that the pump station meets the current Seismic Code. However, the report recommended the following improvements:

1. Reinforce the door frame of the roll-up door to prevent deformation or drifts resulting from a seismic event that may prevent the door from opening and closing.
2. Isolate the tidal channel walls from the building to stop and prevent differential settlement.
3. Install flexible connections onto the underground utilities entering the building to allow movement during earthquakes.

PROJECT PRIORITY CATEGORY: B

PROJECT DESCRIPTION:

A contract with G&E Engineering Systems, Inc. was executed in Summer 2012 to perform the Seismic Vulnerability Assessment of the Lagoon Pump Station located at the City's/District's Corporation Yard. The report was completed in September 2013.

Funding is requested in the amount of \$140,000 in FY 2018-2019 for the design and construction of the project.

ESTIMATED PROJECT SCHEDULE:

Evaluation/Study Completed	September 2013
Request for Proposal and Design	FY 2018-2019
Construction	FY 2019-2020

CIP PROJECT DESCRIPTION FOR FIVE-YEAR FINANCIAL PLAN

LEVEE PROTECTION PLANNING AND IMPROVEMENTS PROJECT (2015-2016)

Funding	Funding Sources	
	CIP City	Total
2016-2017	1,500,000	1,500,000
2017-2018	1,500,000	1,500,000
2018-2019	-	-
2019-2020	-	-
2020-2021	-	-
Total	3,000,000	3,000,000

Expenditures	Expenditure Categories			
	Estimated Project Cost	Inflation %	Inflation Escalation	Total
2016-2017	1,200,000	0%	-	1,200,000
2017-2018	1,165,000	3%	35,000	1,200,000
2018-2019	-	6%	-	-
2019-2020	-	9%	-	-
2020-2021	-	12%	-	-
Subtotal	2,365,000		35,000	2,400,000
Contingency 25%	591,300		8,800	600,100
Totals	2,956,300		43,800	3,000,100

City's limits is classified as Zone X, which means that mandatory flood insurance is not required. However, when the new map becomes effective in mid-2016, Foster City will be designated as a high-risk Special Flood Hazard area and property owners with federally-backed loans will be required to purchase annual flood insurance if no action is taken or if FEMA does not approve the City's request for an extension of time to raise the levels.

In December 2014, the City hired Schaaf & Wheeler to prepare a report to identify the City's flood risks and determine potential levee improvement alternatives that may be necessary with respect to restoring accreditation. The report concluded that the levee surrounding Foster City will have to be raised from between 2.5 to 5.5 feet depending on the location in the city in order to receive accreditation by FEMA. The report also outlined that the project's costs could be as high as \$75 million dollars.

PROJECT PRIORITY CATEGORY: APROJECT DESCRIPTION:

This project will raise the levee to meet the required elevation per Title 44 of the Code of Federal Regulations (CFR), section 65.10, to retain accreditation. Based on the FEMA coastal flood hazard study, roughly 85 percent of Foster City's levee system does not meet the required freeboard elevation. Therefore, the levee will not retain accreditation status when the Flood Insurance Rate Map (FIRM) is updated in mid-2016. Currently, land within Foster

Funding in the amount of \$1,391,465 has been approved for consulting services including preliminary engineering, regulatory permitting, environmental impact report (EIR) preparation, municipal financial advisory, assessment engineering and exploration of funding options.

To date, FEMA has approved the levee seclusion mapping allowing Foster City to maintain a Zone X designation while the City prepares for construction of the project. Additionally, engineering analysis identifying different types of levee improvements, geotechnical investigation, topographical survey, regulatory permitting, preparation of the EIR, and public outreach efforts are underway. In the coming months,

more public outreach efforts and analysis for funding options will be performed. It is anticipated that by Fall 2016, a final Technical Memorandum (TM) outlining the basis of design with recommended levee height, improvement types, and cost estimates will be presented to the City Council for consideration.

Additional funding requests will allow continuation of the engineering design work using the information presented in the TM and preparation of plans and specifications suitable for construction. Based on the outcome of the assessment engineering and direction provided by the City Council on the funding mechanism, an additional budget amendment will be required to fund the construction.

ESTIMATED PROJECT SCHEDULE:

Design	FY 2016-2017
Construction	FY 2017-2020



FEMA

September 16, 2016

Jenelle Masterson
Emergency Preparedness Coordinator
City of Foster City
1040 East Hillsdale Boulevard
Foster City, California 94404

Dear Ms. Masterson:

We have completed our review of the *Foster City Local Hazard Mitigation Plan and Safety Element* and have determined that this plan is eligible for final approval pending its adoption by the City of Foster City.

Formal adoption documentation must be submitted to the regional office by the jurisdiction within one calendar year of the date of this letter, or the entire plan must be updated and resubmitted for review. We will approve the plan upon receipt of the documentation of formal adoption.

If you have any questions regarding the planning or review processes, please contact Alison Kearns, Lead Community Planner, at (510) 627-7125 or by email at alison.kearns@fema.dhs.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey D. Lusk".

Jeffrey D. Lusk
Division Director
Mitigation Division
FEMA Region IX

cc: Marcia Sully, State Hazard Mitigation Officer, California Governor's Office of
Emergency Services
Jose Lara, Chief of Hazard Mitigation Planning, California Governor's Office of
Emergency Services

APPENDIX A: LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA’s evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan’s strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: Foster City	Title of Plan: Foster City Local Hazard Mitigation Plan & Safety Element	Date of Plan: March 15, 2016
Local Point of Contact: Jenelle Masterson	Address: 1040 E. Hillsdale Blvd. Foster City, CA 94404	
Title: Emergency Preparedness Coordinator		
Agency: City of Foster City		
Phone Number: 650-522-7960	E-Mail: jmasterson@fostercity.org	

State Reviewer: Victoria LaMar-Haas Wendy Boemecke	Title: Sr. Emergency Services Coordinator Emergency Services Coordinator	Date:
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FEMA Reviewer: Alison Kearns	Title: Lead Community Planner	Date: September 16, 2016
Date Received in FEMA Region <i>(insert #)</i>	August 23, 2016	
Plan Not Approved		
Plan Approvable Pending Adoption	September 16, 2016	
Plan Approved	October 20, 2016	

**SECTION 1:
REGULATION CHECKLIST**

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been ‘Met’ or ‘Not Met.’ The ‘Required Revisions’ summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is ‘Not Met.’ Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST	Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)			
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	3 Pages 15-17	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	3.2 Page 15; Appendix A	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	3.3 Page 17 ; Appendix B; Appendix C; Appendix D	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	4.1 Page 25, 6.4 Page 65, Appendix E	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	10.4 Page 140	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	10 Pages 140-141	X	
ELEMENT A: REQUIRED REVISIONS			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	6 Pages 46-85	X	

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	5.4; 6.3.1; 6.3.3; 6.4.3; 6.5.1; 6.6.2; 6.7.1; 6.7.3; 6.8.1; 6.8.3; 6.9.1; 6.10.1; 6.11.1; 6.12.1	X		
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	7 Pages 86-110	X		
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	8.1.2 Page 111-112	X		
<u>ELEMENT B: REQUIRED REVISIONS</u>				
ELEMENT C. MITIGATION STRATEGY				
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	8 Page 110-126 9.6 Page 138-139	X		
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	8.1.2; 9.4; 9.6 Page 112	X		
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	9.2 Page 127	X		
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	4.2 Pages 25-39 7.3.2 Page 96 9.5 Pages 132-138	X		
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	9.4 Page 127-128; 9.6 Pages 138-139; Appendix F; Appendix G	X		
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	9.6 Page 138-139	X		
<u>ELEMENT C: REQUIRED REVISIONS</u>				
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	4.2; 5.3	X		

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR 201.6 Local Mitigation Plans)				
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	4.2		X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	4.2		X	
<u>ELEMENT D: REQUIRED REVISIONS</u>				
ELEMENT E. PLAN ADOPTION				
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))			X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Not Applicable			
<u>ELEMENT E: REQUIRED REVISIONS</u>				
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)				
F1.				
F2.				
<u>ELEMENT F: REQUIRED REVISIONS</u>				

SECTION 2: PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- 1) The City did a great job in identifying its stakeholders and including them during the planning process, as well as in the public comment portion of the process.

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

- 1) With the challenge of doing a risk assessment in a very small, planned community, the City should be commended for its efforts in ensuring that a comprehensive range of risks to the City and the area were considered.

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- 1) The City presented the information for this section in a clear and easy to follow format. This should make monitoring and updating progress a straightforward process in the future.

Element D: Plan Update, Evaluation, and Implementation (Plan Updates Only)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- 1) The City provided a clear and concise plan to monitor the status of the plan and ensure that the updates are made on an annual basis.

B. Resources for Implementing Your Approved Plan

GRANT NAME	AGENCY	PURPOSE	CONTACT
Pre-Disaster Mitigation Program (PDM)	U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA)	To provide funding for States, and communities for cost-effective hazard mitigation activities which complement a comprehensive hazard mitigation program and reduce injuries, loss of life, and damage and deconstruction of property.	FEMA 500 C. Street, SW Washington, DC 20472 Phone: (202)646-4621 www.fema.gov
Hazard Mitigation Grant Program	U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA)	To prevent future losses of lives and property due to disasters; to implement State and local hazard mitigation plans; to enable mitigation measures to be implemented during immediate recovery from disasters; and to provide funding for previously identified mitigation measures to benefit the disaster area.	FEMA 500 C. Street, SW Washington, DC 20472 Phone: (202)646-4621 www.fema.gov
Flood Mitigation Assistance Program (FMA)	U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA)	To help states and communities plan and carry out activities designed to reduce the risk of flood damage to structures insurable under NFIP.	FEMA 500 C. Street, SW Washington, DC 20472 Phone: (202)646-4621 www.fema.gov
Emergency Management Performance Grants (EMPG)	U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA)	To encourage the development of comprehensive emergency management at the State and local level and to improve emergency management planning, preparedness, mitigation, response and recovery capabilities.	FEMA 500 C. Street, SW Washington, DC 20472 Phone: (202)646-4621 www.fema.gov
Community Development Grant Program (CDBG)	U.S. Department of Housing and Urban Development	To develop viable urban communities by providing decent housing and a suitable living environment. Principally for low-to-moderate income individuals.	HUD 451 7 th Street, SW Washington, DC 20410-7000 Phone: (202) 708-3587 www.hud.gov
Public Assistance Program (PA)	U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA)	To provide supplemental assistance to States, local governments, and certain nonprofit organizations to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President. Under Section 406, Public Assistance funds may be used to mitigate the impact of future disasters.	FEMA 500 C. Street, SW Washington, DC 20472 Phone: (202)646-4621 www.fema.gov
Flood control	U.S. Department of	To assist in the repairs and	USACE

Works/Emergency Rehabilitation	Defense, Army Corps of Engineers	restoration of public works damaged by flood, extraordinary wind, wave or water action.	20 Massachusetts Avenue, NW Washington, DC 20314 Phone: (202) 761-0001 www.usace.army.mil
Emergency Watershed Protection	U.S. Department of Agriculture, Natural Resource Conservation Service	To provide emergency technical and financial assistance to install or repair structures that reduce runoff and prevent soil erosion to safeguard life and property.	NRCS PO Box 2890 Washington, DC 20013 Phone: (202) 720-3527 www.nrcs.usda.gov
Watershed Protection and Flood Prevention	U.S. Department of Agriculture, Natural Resource Conservation Service	To provide technical and financial assistance in planning and executing works of improvement to protect, develop, and use of land and water resources in small watersheds.	NRCS PO Box 2890 Washington, DC 20013 Phone: (202) 720-3527 www.nrcs.usda.gov
Land and Water Conservation Fund Grants	U.S. Department of the Interior, National Park Service	To acquire and develop outdoor recreation areas and facilities for the general public, to meet current and future needs.	NPS PO Box 37217 Washington, DC 20013-7127 Phone: (202) 565-1200 www.nps.gov
Disaster Mitigation and Technical Assistance Grants	US Department of commerce, Economic Development Administration	To help States and localities to develop and/or implement a variety of disaster mitigation strategies.	EDA Herbert C. Hoover Building Washington, DC 20230 Phone: (800) 345-1222 www.eda.gov
Pre-Disaster Mitigation Loan Program	US Small Business Administration	To make low-interest, fixed rate loans eligible for small businesses for the purpose of implementing mitigation measures to protect business property from damage that may be caused by future disasters.	SBA 1110 Vermont Avenue, NW, 9 th Floor Washington, DC 20005 Phone: (202) 606-4000 www.sba.gov
Watershed Surveys and Planning	U.S. Department of Agriculture, Natural Resource Conservation Service	To provide planning assistance to Federal, state and local agencies for the development or coordination of water and related land resources and programs in watersheds and river basins.	NRCS PO Box 2890 Washington, DC 20013 Phone: (202) 720-3527 www.nrcs.usda.gov
Clean Water Act Section 319 Grants	US Environmental Protection Agency	To implement non-point source programs, including support for the non-structural watershed resource restoration activities.	EPA Ariel Rios Building 1200 Pennsylvania Avenue, NW Washington, DC 20460 Phone: (202) 272-0167 www.epa.gov
National Earthquake	U.S. Department of	To mitigate earthquake losses that	FEMA

Hazards Reduction Program (NEHERP)	Homeland Security, Federal Emergency Management Agency (FEMA)	can occur in many parts of the nation, providing earth science data and assessments essential for warning of imminent damaging earthquakes, land-use planning, engineering design, and emergency preparedness decisions.	500 C. Street, SW Washington, DC 20472 Phone: (202)646-4621 www.fema.gov
Assistance to Firefighters Grant	U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA)	Competitively awarded project grants to provide direct assistance, on a competitive basis, to fire departments for the purpose of protecting the health and safety of the public and firefighting personnel against fire and fire-related hazards.	FEMA 500 C. Street, SW Washington, DC 20472 Phone: (202)646-4621 www.fema.gov
Fire Management Assistance Grants	U.S. Department of Homeland Security, Federal Emergency Management Agency (FEMA)	To provide project grants and the provision of specialized services for the mitigation, management, and control of fires that threatens such destruction as would constitute a major disaster.	FEMA 500 C. Street, SW Washington, DC 20472 Phone: (202)646-4621 www.fema.gov
Emergency Streambank and Shoreline Protection	U.S. Department of Defense, Army Corps of Engineers	To prevent erosion damages to public facilities by the emergency construction or repair of streambank and shoreline protection works.	USACE 20 Massachusetts Avenue, NW Washington, DC 20314 Phone: (202) 761-0001 www.usace.army.mil
Small Flood Control Projects	U.S. Department of Defense, Army Corps of Engineers	To reduce flood damages through small flood control projects not specifically authorized by Congress.	USACE 20 Massachusetts Avenue, NW Washington, DC 20314 Phone: (202) 761-0001 www.usace.army.mil
Rural Fire Assistance (RFA)	Fish and Wildlife Service	To implement the National Fire Plan by increasing firefighter safety and enhancing the knowledge and fire protection capability of rural and volunteer fire departments by providing basic wild land firefighting supplies and equipment.	US Department of Health and Human Services 200 Independence Avenue, SW Washington, DC 20201 HHH Building Grants.gov www.grants.gov
“Good Practices” Manual Providing Guidance for Reducing the Risk of Floods Using Natural-Resource Based Techniques	US Department of Health and Human Services Agency for International Development	The Office of Foreign Disaster Assistance has a mandate to save lives, alleviate suffering and reduce the social and economic impacts of disasters. While the disasters that OFDA responds to result from a variety of causes, flooding is the most frequent hazard eliciting a response from OFDA in an average year. Responding to natural	US Department of Health and Human Services Office of the Assistant Secretary for Pre4paredness and Response 395 E. St., SW Suite 1075 Washington, DC 20201 Phone: (202) 245-0961

		disasters is OFDA's primary role, but OFDA also provides support to vulnerable communities in developing strategies to mitigate the effects of recurrent natural disasters.	
Extension Integrated Pest management Coordination and Support	National Institute of Food and Agriculture (USDA)	To support research on pest management where facilities and practices safeguard and prevent environmental impacts. Routine renovation, rehabilitation, or revitalization of physical facilities, including the acquisition and installation of equipment, where such activity is limited in scope and intensity.	Phone: (202) 401-5048 www.nifa.usda.gov

RESOLUTION NO. 2016-85

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF FOSTER CITY APPROVING AN AMENDMENT TO THE FOSTER CITY GENERAL PLAN TO ADOPT THE LOCAL HAZARD MITIGATION PLAN/SAFETY ELEMENT- GP-15-001

CITY OF FOSTER CITY

WHEREAS, the City recognizes the threat that natural hazards pose to people and property within Foster City; and

WHEREAS, the City of Foster City has prepared a combined "Local Hazard Mitigation Plan/Safety Element" as an update to the City's General Plan Safety Element in accordance with Section 65302(g) of the California Government Code, combined with an update of the City's Local Hazard Mitigation Plan in accordance with the Disaster Mitigation Act of 2000, referred to as the "Project"; and

WHEREAS, the Local Hazard Mitigation Plan/Safety Element identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Foster City from the impacts of future hazards and disasters; and

WHEREAS, the Planning Commission has reviewed the Draft Local Hazard Mitigation Plan/Safety Element at a Planning Commission meetings on January 21, 2016 and October 20, 2016; and

WHEREAS, the City Council has reviewed the Draft Local Hazard Mitigation Plan/Safety Element at a previous City Council meeting on March 7, 2016; and

WHEREAS, the City of Foster City, in accordance with the requirements of the California Environmental Quality Act ("CEQA"), the State CEQA Guidelines adopted by the Secretary of Resources, and the City of Foster City Environmental Review Guidelines, has prepared a Negative Declaration, which analyzes the environmental impacts of the proposed Project (EA-16-001); and

WHEREAS, a Notice of Intention to Adopt a Negative Declaration for the Project was prepared and circulated for the required 30-day public review period; and

WHEREAS, the Draft Local Hazard Mitigation Plan/Safety Element has been reviewed by the California Geological Survey, as required by Section 65302(g) of the California Government Code, by the California Office of Emergency Services and by the Federal Emergency Management Agency as required by the Disaster Mitigation Act of 2000; and

WHEREAS, the Federal Emergency Management Agency, Region IX, notified the City in a letter dated September 16, 2016 that the Local Hazard Mitigation Plan/Safety Element is eligible for final approval pending its adoption by the City of Foster City; and

WHEREAS, copies of the Negative Declaration and Local Hazard Mitigation Plan/Safety Element and other documents and materials which constitute the record of the proceedings upon which this decision is based are available for public review from the custodian of these records, the Community Development Department, at City Hall, 610 Foster City Boulevard, Foster City; and

WHEREAS, a Notice of Public Hearing was duly posted, published and mailed for consideration of the Local Hazard Mitigation Plan/Safety Element and Draft Negative Declaration at the Planning Commission meeting of October 20, 2016, and on said date the Public Hearing was opened, held and closed; and

WHEREAS, the Planning Commission considered the Draft Initial Study and Negative Declaration at the Planning Commission Meeting of October 20, 2016 and on said date, adopted Resolution P-24-16 recommending City Council approval; and

WHEREAS, the Planning Commission reviewed and considered the Local Hazard Mitigation Plan/Safety Element on October 20, 2016 and recommended approval by the City Council by adoption of Resolution P-25-16; and

WHEREAS, a Notice of Public Hearing was duly posted, published and mailed for consideration of the Local Hazard Mitigation Plan/Safety Element and Draft Negative Declaration at the City Council meeting of November 21, 2016 and on said date the Public Hearing was opened, held and closed; and

NOW, THEREFORE, BE IT RESOLVED, the City Council, based on facts and analysis in the Staff Reports, written and oral testimony and exhibits presented, does hereby approve an amendment to the City of Foster City General Plan to adopt the Local Hazard Mitigation Plan/Safety Element as set forth in Exhibit A.

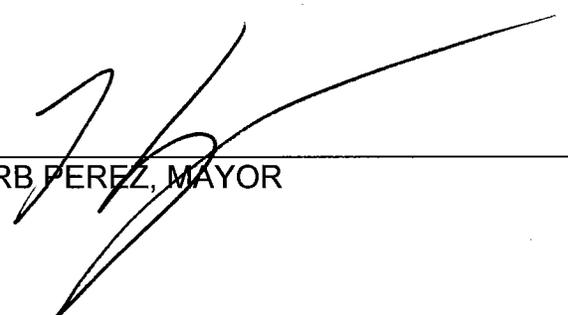
PASSED AND ADOPTED as a resolution of the City Council of the City of Foster City at the regular meeting held on the 21st day of November, 2016, by the following vote:

AYES: Councilmembers Bronitsky, Hindi, Mahanpour, Pollard and Mayor Perez

NOES: None

ABSENT: None

ABSTAIN: None



HERB PEREZ, MAYOR

ATTEST:



DORIS L. PALMER, CITY CLERK
BY PRISCILLA TAM, DEPUTY CITY CLERK



FEMA

November 23, 2016

Jenelle Masterson
Emergency Preparedness Coordinator
City of Foster City
1040 East Hillsdale Boulevard
Foster City, California 94404

Dear Ms. Masterson:

We have completed our final review of the *Foster City Local Hazard Mitigation Plan and Safety Element*, officially adopted by the City of Foster City on October 20, 2016 and found the plan to be in conformance with Title 44 Code of Federal Regulations (CFR) Part 201.6 *Local Mitigation Plans*.

The approval of this plan ensures the City of Foster City's continued eligibility for project grants under FEMA's Hazard Mitigation Assistance programs, including the Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program. All requests for funding, however, will be evaluated individually according to the specific eligibility, and other requirements of the particular program under which applications are submitted.

Also, approved hazard mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Additional information regarding the CRS can be found at <https://www.fema.gov/national-flood-insurance-program-community-rating-system> or through your local floodplain manager.

FEMA's approval of the *Foster City Local Hazard Mitigation Plan and Safety Element* is for a period of five years, effective starting the date of this letter. Prior to November 23, 2021, the City of Foster City is required to review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit it for approval in order to continue to be eligible for mitigation project grant funding. The enclosed plan review tool provides additional recommendations to incorporate into the plan when the City of Foster City undertakes its identified plan maintenance process.

If you have any questions regarding the planning or review processes, please contact Alison Kearns, Lead Community Planner, at (510) 627-7125 or by email at alison.kearns@fema.dhs.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeffrey D. Lusk".

Jeffrey D. Lusk
Division Director
Mitigation Division
FEMA Region IX

Enclosure

cc: Jose Lara, Chief of Hazard Mitigation Planning, California Governor's Office of Emergency Services