CITY OF WEST SACRAMENTO

URBAN LEVEL OF FLOOD PROTECTION

ADEQUATE PROGRESS REPORT

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1.0 INTRODUCTION

The California Legislature passed five bills in 2007 to better align flood risk reduction investments, land use decisions, and statewide flood planning objectives. One of these bills, Senate Bill (SB) 5, requires cities and counties within the Sacramento and San Joaquin valleys to make findings related to an urban level of flood protection before approving certain land-use decisions. An "urban level of flood protection" is defined as the level of protection necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year using criteria developed by the California Department of Water Resources (DWR). Examples of the land use decisions affected by these requirements include the continued ability to approve discretionary permits, entitlements, and tentative maps.

State law currently requires cities and counties within the Sacramento and San Joaquin valleys to make a finding related to the urban level of flood protection no later than July 1, 2016. One of the findings a city or county can make is of "adequate progress". A city can find that the local flood management agency has made adequate progress on the construction of a flood protection system that will result in flood protection equal to or greater than the urban level of flood protection. For areas protected by State Plan of Flood Control (SPFC) levees, the urban level of flood protection must be achieved by 2025.

The City of West Sacramento (City) is within the floodplain of the Sacramento River and almost completely surrounded by floodways and levees [Figure 1]. During large flood events, the City can become an urban island that depends on the successful performance of nearly 50 miles of levees to protect against the inflow of flood waters. However, this levee system does not meet current design standards and is in need of substantial repairs to provide the required urban level of flood protection.

The West Sacramento Area Flood Control Agency (WSAFCA) is advancing a comprehensive program of activities referred to as the West Sacramento Levee Improvement Program (WSLIP) to reduce flood risk to the City. This program includes: (1) partnering with the US Army Corps of Engineers (USACE) and the Central Valley Flood Protection Board (CVFPB) on the development of a General Reevaluation Report (GRR) for the West Sacramento Project; (2) partnering with DWR in the planning, design, and construction of improvements along several high risk reaches of levee protecting the City; and (3) community outreach regarding the existing flood risk and improved emergency response planning. The primary goal of WSAFCA is to achieve at least a 200-year level of flood protection for the City as soon as possible, but no later than 2025 as required by SB 5.

Since 2007, WSAFCA and DWR have invested almost $90 million toward the planning, design, land acquisition and construction of levee improvements to reduce flood risk to the City. This includes the completion of approximately $36 million for three Early Implementation Projects (EIPs) clearly demonstrating a local commitment to funding critical flood risk reduction actions. A fourth EIP, the Southport Sacramento River Early Implementation Project, is estimated to cost $203.5 million and is scheduled for construction contract award in 2016. Once the Southport Sacramento River Early Implementation Project is complete, WSAFCA and DWR will have advanced $239.5 million toward the construction of critical features within the City's flood protection system. This report, using current policy guidance and design criteria, describes the progress that the City and WSAFCA have made toward achieving an urban level of flood protection for the City.

2.0 PURPOSE AND NEED

The purpose of this report is to ***provide the substantial evidence necessary to support a finding of adequate progress*** toward achieving an urban level of flood protection by the City. This report, and the associated finding of adequate progress, are needed in order to continue approving certain land-use decisions including the approval of discretionary permits, entitlements, and tentative maps. State law requires cities and counties within the Sacramento and San Joaquin valleys to make a finding related to the urban level of flood protection no later than July 1, 2016.

3.0 URBAN LEVEL OF FLOOD PROTECTION REQUIREMENTS

3.1. Urban Level of Flood Protection Overview

In 2007, the California Legislature passed and the Governor signed five interrelated bills to strengthen the alignment between flood risk reduction investments, land use decisions, and statewide flood planning objectives. These bills, effective January 1, 2008, collectively added or amended sections in the California Government Code, Health and Safety Code, Public Resources Code, and Water Code. Specifically, Senate Bill (SB) 5 (2007), as amended by SB 1278 (2012) and Assembly Bill (AB) 1259 (2013), requires cities and counties within the Sacramento and San Joaquin valleys to make ***findings*** related to an ***urban level of flood protection*** before approving certain ***land-use decisions***.

California Government Code Section 65007(n) states:

> *"**Urban level of flood protection**" means the level of protection that is necessary to withstand flooding that has a 1-in-200 chance of occurring in any given year using criteria consistent with, or developed by, the Department of Water Resources. "Urban level of flood protection" shall not mean shallow flooding or flooding from local drainage that meets the criteria of the national Federal Emergency Management Agency standard of flood protection.*

Based on this definition of an urban level of protection, SB 5 requires local land use agencies to make one of the following ***findings*** prior to approving certain land-use decisions (GC §65865.5, §65962, and §66474.5):

1. The existing flood management facilities protect the property to the urban level of flood protection in urban areas.
2. The city or county has imposed conditions that will protect the property to the urban level of flood protection in urban areas.
3. ***The local flood management agency has made adequate progress on the construction of a flood protection system which will result in providing an urban level of flood protection to property located within a flood hazard zone. For an urban area, the urban level of flood protection shall be achieved by 2025.***
4. The property in an undetermined risk area has met the urban level of flood protection based on substantial evidence in the record.

The ***land use decisions*** affected by these requirements include all of the following:

1. Entering into a development agreement for any property that is located within a flood hazard zone (GC §65865.5);
2. Approving a discretionary permit or other discretionary entitlement, or a ministerial permit that would result in the construction of a new residence, for a project that is located within a flood hazard zone (GC §65962); or,
3. Approving a tentative map, or a parcel map for which a tentative map was not required, for any subdivision that is located within a flood hazard zone (GC §66474.5).

SB 5 also required the California Department of Water Resources (DWR) to develop criteria that cities and counties could use to make findings related to an urban level of flood protection. DWR met this requirement through the development of two guidance documents. First, DWR developed the *Urban Level of Flood Protection Criteria* (2013) to establish the procedural criteria associated with making a finding consistent with the legislative requirements. Second, DWR incorporated by reference the *Urban Levee Design Criteria* (2012) in the *Urban Level of Flood Protection Criteria* to provide additional engineering guidance to civil engineers in situations where levees and floodwalls are used to provide an urban level of flood protection.

3.2. Deadline for Findings

SB 5 required that cities and counties amend their general plans within 24 months of adoption of the Central Valley Flood Protection Plan (CVFPP). It also required that zoning ordinances be amended within 12 months after completion of the general plans amendments. The Urban Level of Flood Protection (ULOP) requirements apply once the general plan and zoning ordinance amendments become effective, but no later than 36 months after adoption of the CVFPP.

SB 1278 (2012) extended the deadline for amending general plans by twelve months. As a result, cities and counties needed to amend their general plans within 36 months of adoption of the CVFPP – July 1, 2015. The City amended its General Plan consistent with the requirements of SB 5 through adoption of Resolution 15-43 on June 17, 2015. SB 1278 (2012) did not change the zoning ordinance timeline; therefore, zoning ordinances must be updated, and a finding related to the Urban Level of Flood Protection is required, no later than 48 months after adoption of the CVFPP – July 1, 2016.

3.3. Requirements for Finding of Adequate Progress

The *Urban Level of Flood Protection Criteria* document requires the presentation of substantial evidence to support a finding of ***adequate progress*** on the construction of a flood protection system which will result in providing an urban level of flood protection to an urban area. Such a finding by a local agency shall be based, at a minimum, on the following:

1. A report prepared by the local flood management agency demonstrating adequate progress as defined in California Government Code Section 65007(a).
2. A report prepared by a Professional Civil Engineer registered in California to document the data and analyses for demonstrating the property, development project, or subdivision will have an urban level of flood protection at the time when the flood protection system is completed.
3. A report by an Independent Panel of Experts on the review of the report prepared by the Professional Civil Engineer.

4. A response by the Professional Civil Engineer to the comments from the Independent Panel of Experts.
5. The most recent annual report prepared by the local flood management agency that was submitted to the Central Valley Flood Protection Board documenting the efforts in working toward completion of the flood protection system.
6. Any additional data and information that cities or counties use to make the finding.

California Government Code Section 65007(a) defines ***adequate progress*** as all of the following:

> *(1) The total project scope, schedule, and cost of the completed flood protection system have been developed to meet the appropriate standard of protection.*
>
> *(2) (A) Revenues that are sufficient to fund each year of the project schedule developed in paragraph (1) have been identified and, in any given year and consistent with that schedule, at least 90 percent of the revenues scheduled to be received by that year have been appropriated and are currently being expended.*
>
> *(B) Notwithstanding subparagraph (A), for any year in which state funding is not appropriated consistent with an agreement between a state agency and a local flood management agency, the Central Valley Flood Protection Board may find that the local flood management agency is making adequate progress in working toward the completion of the flood protection system.*
>
> *(3) Critical features of the flood protection system are under construction, and each critical feature is progressing as indicated by the actual expenditure of the construction budget funds.*
>
> *(4) The city or county has not been responsible for a significant delay in the completion of the system.*
>
> *(5) The local flood management agency shall provide the Department of Water Resources and the Central Valley Flood Protection Board with the information specified in this subdivision sufficient to determine substantial completion of the required flood protection. The local flood management agency shall annually report to the Central Valley Flood Protection Board on the efforts in working toward completion of the flood protection system.*

3.4. Effective Period for a Finding of Adequate Progress

In many cases, a finding adopted by a local agency can be used for subsequent land use approvals within the covered area (reference Section 5.4 for definition of covered area for this report). Setting an effective period for the finding is necessary because it is unreasonable to assume that conditions, information, and assumptions used as a basis for a finding will remain constant in perpetuity. In the specific case of an adequate progress finding, the initial finding can last no longer than 10 years; and, it can only be used beyond 2025 if the covered area is not protected by State Plan of Flood Control (SPFC) levees.

The *Urban Level of Flood Protection Criteria* document encourages local agencies to formally review the initial finding (1) when significant physical changes are experienced in the covered area, and, (2) as part of recurring review process conducted by USACE through the Periodic Inspection Program.

Further, California Government Code Section 65007(a)(5) requires the "*local flood management agency shall annually report to the Central Valley Flood Protection Board on the efforts in working toward completion of the flood protection system."* As a result, WSAFCA will prepare annual progress reports related to the finding of adequate progress. Given that the annual progress report relies heavily on demonstrating that planned funding has been secured and expended, these reports will be submitted in August of each year to summarize progress for the previous fiscal year.

4.0 FLOOD PROGRAM OVERVIEW

WSAFCA is advancing a comprehensive program of activities referred to as the WSLIP to reduce flood risk to the City. This program includes: (1) partnering with the USACE and the CVFPB on the development of a General Reevaluation Report (GRR) for the West Sacramento Project; (2) partnering with DWR in the planning, design, and construction of improvements along several high risk reaches of levee protecting the City; and (3) community outreach regarding the existing flood risk and improved emergency response planning. The primary goal of WSAFCA is to achieve at least a 200-year level of flood protection for the City as soon as possible, but no later than 2025 as required by SB 5. The 200-year flood is a flood event that has a 0.5% chance of occurring in any given year.

4.1. West Sacramento Area Flood Control Agency

WSAFCA is a Joint Powers Authority (JPA) created in 1994 through a Joint Exercise of Powers Agreement by the City, Reclamation District (RD) 900, and RD 537. WSAFCA was established to coordinate the planning and construction of flood protection facilities within the boundaries of the JPA and to help finance the local share of flood control projects. The agency was formed primarily in response to authorization of the flood protection repairs recommended in USACE's Sacramento Metropolitan Area Report. WSAFCA formed an assessment district in 1995 to fund the local cost share of these repairs.

4.2. West Sacramento Levee Improvement Program

In 2006, the City, as part of WSAFCA, in close partnership with DWR, embarked on a comprehensive evaluation of the condition of the levees protecting the City. The evaluation was necessary to determine the level of flood protection provided by the existing levee system, identify the magnitude and severity of deficiencies, and propose potential flood risk reduction measures to protect human health and safety and prevent adverse effects on property and the economy. The results of the comprehensive evaluation revealed deficiencies that required correction in order to meet new federal and state levee design standards.

In light of the identified flood risk to the City, the WSLIP) was established as a framework for planning, funding, and constructing projects to incrementally reduce flood risk in close partnership with key state and federal agencies. The primary purpose of the WSLIP is to reduce flood risk by achieving a minimum of 200-year flood protection for the City. The City's comprehensive flood management strategy has been guided by the following objectives adopted by WSAFCA in connection with the WSLIP:

- Construct levee improvements as soon as possible to reduce flood risk as quickly as possible.
- Construct improvements that are politically, socially, economically, and environmentally acceptable.
- Preserve and enhance riparian and other native habitats.
- Provide recreation and open space opportunities when compatible with flood actions
- Ensure continuing State and Federal assistance for levee repairs and maintenance.

4.2.1. Early Implementation Projects

WSAFCA partnered with DWR in the selection, development and implementation of four Early Implementation Projects (EIPs). These EIPs were intended to immediately reduce the City's flood risk while the GRR was completed by the USACE and ultimately authorized by Congress. Each EIP was developed to meet current state and federal design standards at the time of project implementation. Each EIP was reviewed by an Independent External Peer Review panel as well as by the USACE, CVFPB and DWR. All EIPs were developed to be compatible with the GRR, and, ideally, to receive federal credit toward implementation of the recommended plan. Once the GRR is authorized by Congress and receives federal appropriations, WSAFCA and the CVFPB will serve as non-federal sponsors to the USACE as they lead implementation of the remaining structural improvements necessary for the West Sacramento levee system.

4.2.2. West Sacramento General Reevaluation Report

WSAFCA and the CVFPB are serving as non-Federal sponsors to the USACE for a general reevaluation of the West Sacramento Project originally authorized for construction under Section 101(4) of the Water Resources Development Act (WRDA) of 1992. The general reevaluation was initiated through the execution of a cost-sharing agreement on March 26, 2009, and was completed on April 26, 2016, with the issuance of a ***Chief of Engineer's Report***. The recommendation made by the Chief of Engineers is supported by the West Sacramento General Reevaluation Report (GRR) Final Documentation Report, dated December 2015.

The general reevaluation was conducted to determine whether there was a Federal interest in modifying the authorized West Sacramento Project for further flood risk reduction. The reevaluation concluded that flooding in the City would have devastating economic, social, political, and demographic consequences locally, to the region, as well as to the State of California. The City's existing flood management infrastructure is at risk of not safely passing large flood flows in the Sacramento River and Yolo Bypass. Accordingly, the GRR recommends measures to improve this flood management infrastructure and achieve a 200-year level of flood protection. It is important to note that the measures recommended by the GRR were evaluated and selected in the context of other current and planned flood risk reduction measures elsewhere in the watersheds of both the Sacramento and American Rivers.

The recommended plan described in the Chief of Engineer's Report includes the following principal features intended to further reduce flood risk to the City:

- 18,500 feet of cutoff walls to address seepage and stability concerns and 14,300 feet of stone protection to address erosion problems along the Sacramento River North Levee.
- 8,400 feet of cutoff walls and slope flattening to address seepage and stability concerns on the Yolo Bypass Levee.
- 3,000 feet of stone protection to address erosion concerns on the Sacramento Bypass Training Dike.
- 550 feet of sheet pile wall with embankment fill to close gap in the levee system along the Sacramento River east of the W.G. Stone Lock.
- 30,000 feet of setback levee with cutoff walls and/or seepage berms to address seepage concerns and stone protection to address erosion problems along the Sacramento River South Levee.
- 1,100 feet of stability berm and the installation of relief wells to address seepage and stability concerns along the South Cross Levee.
- 14,600 feet of cutoff walls to address seepage concerns along the Deep Water Ship Channel (DWSC) East Levee.
- 1,000 feet of cutoff walls to address seepage concerns along the Port South Levee.
- 25,000 feet of cutoff wall to address seepage concerns and 100,000 feet of stone protection to address erosion potential along the DWSC West Levee.

These principal features along with the earthwork required to raise the levees to the height necessary to resist the 200 year flood event is estimated by USACE to have total first cost of $1.2 billion and an estimated implementation schedule of 17 years (USACE 2015).

4.2.3. Non-Structural Flood Risk Management

The City is also advancing non-structural flood risk management measures to increase flood risk awareness and improve emergency response and recovery capabilities. The City has an Emergency Operations Plan in place that, among other emergency response protocols, specifically addresses flood safety through a Flood Emergency Response Plan. To ensure adequacy, conformance with current standards, and to account for growth, the Emergency Operations Plan is reviewed annually and a comprehensive update is conducted every three years. Based on this review and revision cycle, the Flood Emergency Response Plan addresses residual flood risk as flood improvements are implemented, and as the population and built environment change within the City.

DWR awarded the City a grant in 2014 to revise the City's Flood Emergency Response Plan. It included development of a state-of-the-art Dynamic Flood Mapping Tool, which is web-based and can be accessed by any computer or smart phone. The Dynamic Flood Mapping Tool:

- Can be used in the Emergency Operations Center or in the field by incident command staff;
- Simulates levee breach scenarios at virtually any location in the West Sacramento levee system;
- Illustrates the depth of inundation over time;
- Is used in support of flood preparedness exercises; and,
- Can be used to guide real-time flood emergency response and evacuation.

The Dynamic Flood Mapping Tool allow the City's emergency responders to enter where a levee break could occur and then models where water will flow and how fast. Embedded in the tool are a number of data layers including evacuation routes, critical infrastructure, sensitive populations, and shelters.

Virtually any data layer that would be useful in an emergency situation can be added to the Dynamic Flood Mapping Tool to improve and enhance emergency response capabilities.

The City has participated in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) since 2010. The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements, thereby reducing flood risk as a result of the community's actions. CRS activities have focused on public information and increasing the general flood-risk awareness of the population.

The City actively participates in local and Operational Area (Yolo County Office of Emergency Services) disaster and emergency preparedness, planning and exercises, in coordination with DWR's Division of Flood Management, RD 900, WSAFCA and other local and regional stakeholders. All City employees have received initial SEMS/NIMS/ICS training along with regular refresher exercises. Some personnel are designated as first responders to flood emergencies. First responders receive advanced ICS training to support higher level response and planning roles.

The City has an extensive program for public information, education, and outreach regarding flood risk. In addition to all residents, businesses and property owners receiving annual flood risk notification mailers, the City and WSAFCA hold annual meetings with various community groups, including the West Sac Chamber of Commerce. During California Flood Preparedness Week, the City partners with the Washington Unified School District, WSAFCA, USACE, DWR and the Federal Emergency Management Agency (FEMA) to focus outreach to students at all grade levels in the community including through research projects and journalism articles for high school students, informational flyers for middle school, and a poster contest regarding flood preparedness for the elementary students. In 2015, the program introduced a brand new educational video game developed by WSAFCA for elementary school students that teaches how to prepare for a possible flood emergency by developing a plan, packing an emergency kit and protecting their homes with flood insurance. This public information program received national awards for outreach in 2014 and 2015.

5.0 WEST SACRAMENTO FLOOD SYSTEM DESCRIPTION

5.1. General Location & Description

The covered area is located in eastern Yolo County in the north central region of California's Central Valley. The area corresponds with the City limit. The City is comprised of 13,000 acres of mixed-use land and an estimated population of 49,000 residents. It includes industrial, commercial, and residential development with an estimated value of $4.85 billion in damageable property including 13 essential services facilities and 10 at risk population facilities. This area is also transected by critical transportation facilities including the Union Pacific Railroad (UPRR) main line as well as Interstate 80 and US Highway 50 (USACE 2015).

Levee construction in one form or fashion has been on-going in the vicinity of the City since its settlement in the middle of the 19th century by landowners seeking to protect individual property. These landowners eventually formed flood control and reclamation districts to construct a more substantial and organized system of levees. RD 900 was formed in 1911 through an act of the California State legislature and immediately embarked upon a campaign of levee construction coincident with its

legal boundary. This included levee construction along the Sacramento River and what is now the Yolo Bypass and ultimately included construction of the South Cross Levee in 1915.

The levees constructed along the Sacramento River and Yolo Bypass were adopted into the Sacramento River Flood Control Project (SRFCP) by Congress through passage of the Flood Control Act of 1917. Subsequent authorizations by Congress through the Flood Control Act of 1944 and the Water Resources Development Act of 1992 prompted additional rounds of improvement to the existing levees to provide increased flood risk reduction to the City and to the region.

5.2. Sources of Flooding

The City is within the floodplain of the Sacramento River and is almost completely surrounded by floodways and levees. It is bound by the Yolo Bypass to the west, the Sacramento Bypass to the north, and the Sacramento River to the north and east. Further, the City is bifurcated by the Sacramento River Deep Water Ship Channel (DWSC) and Barge Canal. During large flood events, the City can become an urban island that depends on the successful performance of nearly 50 miles of levees to protect against the inflow of flood waters.

A notable example of a recent large flood event was the New Year's Day Flood of 1997. Over a three day period, warm moist winds from the southwest poured more than 30 inches of rain onto portions of the watershed already covered with snow and saturated from one of the wettest Decembers on record. As a result of the high water, levees protecting the City sustained heavy damage. This damage included erosion along the left bank of the Yolo Bypass, seepage and sloughing along the left bank of the Sacramento Bypass, and sloughing along the right bank of the Sacramento River. During this event, more than 600,000 cubic feet per second of flood water flowed past the City.

5.3. West Sacramento Levee System

North Area – The North Area, representing approximately 6,100 acres, is bound by the Port North Levee to the south, the Sacramento River West–North Levee to the north and east, the Sacramento Bypass Levee to the north, and the Yolo Bypass Levee to the west (Figure 2). The North Area is protected by both SPFC and non-SPFC facilities (Figure 3).

Port Levee North – extends for approximately 4.9 miles along the northern edge of the Deep Water Ship Channel, north around the Port of West Sacramento, and then along the northern edge of the Barge Canal. It extends from its intersection with the Sacramento River west to its intersection with the Yolo Bypass/Deep Water Ship Channel. A segment of levee currently exists along the western portion of this reach from the Yolo Bypass/Deep Water Ship Channel to approximately the Port of West Sacramento's turning basin. **This is not currently a SPFC facility.**

Sacramento River West-North Levee – extends for approximately 5.5 miles along the right bank of the Sacramento River from its intersection with the Sacramento Bypass south to its intersection with the Barge Canal/Deep Water Ship Channel. North Harbor Boulevard and River Crest Drive are on the levee crown for portions of this reach. The USACE and DWR also have maintenance facilities on the levee crown within this reach. Segments of the levee fade into areas of high ground within the Bridge and Pioneer Bluff Districts near the downstream end of the reach.

Sacramento Bypass Levee – extends for approximately 1.1 miles along the southern edge of the Sacramento Bypass from its intersection with the Sacramento River west to its intersection with the Yolo Bypass. A segment of the waterside slope of the levee near the Sacramento Weir is concrete-lined to prevent erosion. An access road runs along the levee crown.

Yolo Bypass Levee – extends for approximately 3.7 miles along the eastern edge of the Yolo Bypass from its intersection with the Sacramento Bypass south to its intersection with the Deep Water Ship Channel. An access road runs along the levee crown. The majority of the waterside levee slope is covered with riprap.

South Area – The South Area, representing approximately 6,900 acres, is bound by the Port South Levee to the north, the Sacramento River West-South Levee to the east, the South Cross Levee to the south, and the DWSC East Levee and the Deep Water Ship Channel West Levee to the west (Figure 2). The South Area is protected by both SPFC and non-SPFC facilities (Figure 3).

Port South Levee – extends for approximately 4.0 miles along the southern edge of the Deep Water Ship Channel and Barge Canal. It extends from its intersection with the Sacramento River west to its intersection with the DWSC. **This is not currently a SPFC facility.**

Sacramento River West-South Levee – extends approximately 5.9 miles along the right bank of the Sacramento River from its intersection with the Barge Canal south to its intersection with the South Cross Levee. South River Road is on the levee crown for a majority of this reach.

South Cross Levee – extends for approximately 1.2 miles from its intersection with the DWSC to its intersection with the Sacramento River. This interior cross levee, extending between two State Plan of Flood Control (SPFC) levees, is owned, operated and maintained by RD 900. **This is not currently a SPFC facility.** The South Cross Levee (SCL) serves as a secondary flood risk reduction feature and would only provide flood protection to the City if a downstream levee along the Sacramento River or DWSC fails. Because no downstream levee failures in the vicinity of the SCL have occurred since its construction, the levee has never been exposed to flood water.

Deep Water Ship Channel East Levee – extends for approximately 2.8 miles along the eastern edge of the DWSC from its intersection with the Port South Levee, south to its intersection with the South Cross Levee. An access road runs along the levee crown.

Deep Water Ship Channel West Levee – extends for approximately 21.4 miles along the eastern edge of the Yolo Bypass and western edge of the DWSC. Also known as the Navigation Levee, the DWSC West Levee extends from its intersection with the Yolo Bypass Levee south to Miner Slough. An access road runs along the levee crown. **This is not currently a SPFC facility.** The USACE currently operates and maintains this levee as a component of the Federally-authorized navigation project.

5.4. Levee Protected Area

DWR developed 200-year floodplain maps in accordance with California Water Code Section 9610 for existing urban and adjacent urbanizing areas affected by the failure of SPFC facilities. WSAFCA is relying on these floodplain maps to delineate the covered area addressed by this Adequate Progress Report (Figure 4). As can be seen in the figure, all of the City is within the 200-year floodplain with the exception of a small area of high ground within the Bridge and Pioneer Bluff Districts.

5.5. Operations & Maintenance Responsibilities

USACE, DWR, RD 900, and RD 537 each maintain portions of the levee system protecting the City (Figure 5). USACE operates the DWSC West levee as a component of the Federally-authorized navigation project. DWR operates and maintains a large portion of this system including levee reaches along the left bank of the Sacramento Bypass (State Water Code 8361) and along the right bank of the Sacramento River (Maintenance Area 4). RD 900 and RD 537 both operate and maintain the remaining portions of the levee system along the Sacramento River and the Yolo Bypass. RD 900 operates and maintains the South Cross Levee.

6.0 EVIDENCE IN SUPPORT OF ADEQUATE PROGRESS FINDING

6.1. Report Prepared by the Local Flood Management Agency

This Adequate Progress Report was prepared by WSAFCA on behalf of the City and is part of the evidence supporting a finding of adequate progress. Annual updates to this report will be prepared and submitted to the CVFPB and DWR documenting WSAFCA's progress toward completion of the WSLIP and achieving the required urban level of flood protection. The following sections summarize additional evidence prepared in support of adequate progress.

6.2. Report Prepared by a Professional Civil Engineer

In July 2015, the City requested proposals from interested engineering firms to provide flood program engineering support services including (1) a comprehensive update of the flood program scope and cost, (2) supplemental data collection and technical analysis necessary for levee certification; and, (3) the evaluation and comparison of known flood risks for the selection and prioritization of future projects for implementation. In October 2015, the City selected and entered into a professional services contract with Wood Rodgers for these services as well as to support a City finding related to the urban level of protection.

The initial task order under this contract included preparation of an updated flood program scope and cost using all recent and relevant completed studies and current state and federal engineering criteria. This effort resulted is the publication of a Problem Identification Report (PIR) and an Alternatives Analysis Report (AAR). In addition, Wood Rodgers was required to recommend additional investigations in locations where further exploration and analysis could affect the flood program scope and budget. Together, the PIR and AAR serve as the "*report prepared by a Professional Civil Engineer registered in California to document the data and analyses for demonstrating the property, development project, or subdivision will have an urban level of flood protection at the time when the flood protection system is completed.*"

6.2.1. Engineer's Report Requirements

The *Urban Level of Flood Protection Criteria* document indicates that the report prepared by a Professional Civil Engineer that accompanies the Adequate Progress Report should include the following information as evidence that an urban level of flood protection exists or will exist for the area under consideration:

1. A list of the flood management facilities utilized in providing an urban level of flood protection, including, but not limited to, SPFC facilities.

2. The location of the flood management facilities utilized in providing an urban level of flood protection.

3. The entities that operate and maintain the flood management facilities utilized in providing an urban level of flood protection.

4. A list of, and consideration of, reports, evaluations, inspections, and performance history of the flood management facilities utilized in providing an urban level of flood protection since the previous finding, if any, was made.

5. The responses to the Independent Panel of Experts.

In addition, a Finding of Adequate Progress requires the local flood management agency to understand the total project scope, schedule, and cost of the completed flood protection system necessary to achieve an Urban Level of Flood Protection.

6.2.2. Problem Identification Report

Following Hurricane Katrina and the subsequent changes in levee design standards, WSAFCA embarked on a comprehensive and independent evaluation of its levee system in order to better understand the level of flood protection provided. This evaluation was documented in the West Sacramento Levee Evaluation Project, Draft Problem Identification Report, dated April 2008. Subsequent to the publication of this report: (1) DWR published a Final Urban Levee Evaluation Program Geotechnical Evaluation Report for the West Sacramento Study Area; (2) DWR published a Final Urban Levee Evaluation Program Geotechnical Evaluation Report for the South West Sacramento Deep Water Ship Channel Study Area; (3) USACE published a Final GRR for the West Sacramento Project; (4) DWR published the Urban Levee Design Criteria; and, (5) DWR published the Urban Level of Flood Protection Criteria.

The *Urban Level of Flood Protection Criteria* document indicates that the report prepared by a Professional Civil Engineer that accompanies the Adequate Progress Report should include the consideration of *"reports, evaluations, inspections, and performance history of the flood management facilities utilized in providing an urban level of flood protection since the previous finding, if any, was made."* Upon the consideration of these and other relevant studies, Wood Rodgers published the City of West Sacramento, Flood Engineering Services, Problem Identification Report (2016 PIR) in June 2016.

As required by the *Urban Level of Flood Protection Criteria* document, this 2016 PIR includes: (1) a list of the flood management facilities utilized in providing an urban level of flood protection; (2) the location of the flood management facilities utilized in providing an urban level of flood protection; (3) identification of the entities that operate and maintain the flood management facilities utilized in providing an urban level of flood protection; (4) a list and consideration of reports, evaluations, inspections, and performance history of the flood management facilities utilized in providing an urban level of flood protection; and (5) a complete description of the remaining deficiencies hindering these flood management facilities from providing an urban level of flood protection.

The criteria used in the 2016 PIR to determine whether or not existing levees require remediation is based primarily on criteria that is contained in the ULDC. Title 23 Tier II criteria and lessons learned in applying the ULDC to other projects also informed the evaluation. The ULDC provides engineering

criteria that levees must meet in order to support a ULOP Finding. The ULDC provides requirements for the design water surface elevation, levee freeboard and geometry, geotechnical issues (including seepage, stability, and seismic vulnerability), erosion, right-of-way, encroachments, penetrations, and operation and maintenance (O&M) requirements.

The analysis contained in the 2016 PIR concludes that the majority of the levee segments protecting the City do not meet ULDC criteria (Figures 6A & 6B).

6.2.3. Alternatives Analysis Report

The definition of ***adequate progress*** in California Government Code Section 65007(a) assumes that the *"total project scope, schedule, and cost of the completed flood protection system have been developed to meet the appropriate standard of protection."* Using the flood management facility deficiencies identified in the 2016 PIR, Wood Rodgers also published the City of West Sacramento, Flood Engineering Services, Alternatives Analysis Report (2016 AAR) in June 2016. This report describes the overall scope and cost of remaining flood management facility improvements necessary to achieve an urban level of flood protection. This study supersedes the previous report commissioned by WSAFCA describing the improvements necessary to achieve at least a 200-year level of protection titled, Alternatives Analysis, West Sacramento Area Flood Control Agency Levee Improvement Program, dated November 2009.

The analysis contained in the 2016 AAR concludes that an additional investment of $625.0 million is required to achieve an urban level of flood protection (Figure 7). The report also indicates that conducting additional subsurface explorations or using updated hydrologic models each have the potential to significantly reduce the estimated cost of achieving an urban level of flood protection.

6.3. Report by an Independent Panel of Experts

The *Urban Level of Flood Protection Criteria* document requires review of the Professional Civil Engineer's Report by an Independent Panel of Experts (IPE) in situations where flood management facilities are used to provide the urban level of flood protection to 500 or more residents. This review should consider the assertions made in the Professional Civil Engineer's report and determine whether an urban level of flood protection from the identified sources of flooding exists or will exist for the area under consideration based on the *Urban Levee Design Criteria*. If the panel does not concur with the assertions made in the Professional Civil Engineer's report, a report by the IPE should state the reason(s) for not concurring.

The IPE must be comprised of three or more recognized experts consistent with the procedures outlined for Type II Independent External Peer Reviews in USACE Engineering Circular (EC) 1165-2-214 dated December 15, 2012. This EC requires that each expert selected to participate in the panel meets the National Academy of Science's policy for avoiding conflicts of interest.

WSAFCA currently retains a panel of experts approved to conduct Type II Independent External Peer Reviews consistent with EC 1165-2-214. This Board of Senior Consultants (BOSC) was selected to review the design and construction work products developed for implementation of WSAFCA's four EIPs. This work currently includes the review of design work products related to the Southport Project.

Due to their familiarity with the West Sacramento flood management facilities, the existing BOSC was also selected to serve as the IPE for review of the Professional Civil Engineer's report (in this case, the 2016 PIR and 2016 AAR) developed in association with the urban level of flood protection finding. A letter from the IPE summarizing their review of the 2016 PIR and 2016 AAR is attached to this report as Attachment A.

6.4. Response by the Professional Civil Engineer to the Independent Panel of Experts

The Professional Civil Engineer provided the Draft 2016 PIR and Draft 2016 AAR to the IPE for review and comment. The IPE comments were logged and responses were developed to each comment received. The responses were provided to the IPE for review and concurrence. Both the PIR and AAR were revised for consistency with all resolved comments. The IPE closed all of their comments on both documents and did not identify any major life safety issues associated with the Professional Civil Engineers Report. The IPE comments and responses to comments from the Professional Civil Engineer are included as appendices in the 2016 PIR and 2016 AAR.

6.5. Urban Level of Protection Financial Plan

WSAFCA developed a Financial Plan that includes an implementation schedule and assumptions for the timing and amount of federal, state and local funding appropriations required to complete the WSLIP by 2025. The Financial Plan takes into account actual costs incurred and projected future costs to complete structural improvements under the EIPs and West Sacramento Project. The total program cost in the Financial Plan is based on actual costs and projected cost estimates required to complete EIP projects and the remaining improvements under the West Sacramento Project. The future cost of the West Sacramento Project was estimated using costs developed in the 2016 AAR. The Financial Plan will serve as the baseline to benchmark revenue allocations and expenditures for future annual updates to this Adequate Progress Report.

7.0 ANALYSIS IN SUPPORT OF ADEQUATE PROGRESS FINDING

7.1. Project Scope, Schedule and Cost

The scope of the 200-year program are the structural improvements associated with the Early Implementation Projects and the remaining remediation required by the 2016 AAR. WSAFCA developed a Financial Plan that includes an implementation schedule and assumptions for the timing and amount of federal, state and local funding appropriations required to complete the WSLIP structural improvements by 2025. It is assumed that construction of the EIP phase of the WSLIP is completed in 2019 and that the federally-led portion of the West Sacramento Project is initiated in 2018 and completed in 7 years in 2025. The total cost estimate to complete the WSLIP is $864.5 million and was estimated assuming that the EIPs cost $239.5 million and the remaining cost to complete the levee improvements is $625.0 million (2016 AAR).

7.2. Sources of Local Flood Program Revenue

In July 2007, West Sacramento property owners approved an annual parcel assessment dedicated for levee improvement projects. Proceeds from the assessment provide the local funding necessary to match State and Federal funding as well as provide a secure funding source for the operation and maintenance of existing flood risk reduction facilities maintained by RD 900 and RD 537. There is no

sunset provision on the Assessment and it is available to secure bonds, lines of credit, or other financing sources to capitalize WSLIP improvements. The assessment district includes a provision that allows for a maximum annual increase of 2% to account for increased program costs.

The assessment district was established as a commitment to the agency's long term responsibility to secure the resources required to achieve and maintain a 200 year level of protection. Additionally, in 2007, the City passed an ordinance requiring new development within the City to demonstrate that it provides a 200 year level of flood protection, or it must pay an in-lieu fee toward the flood system improvements underway by WSAFCA. Finally, West Sacramento Sales Tax Measures V and U were approved by the citizens of West Sacramento in November 2008. A portion of the sales tax revenue generated by Measure V has been allocated toward flood risk reduction improvements identified as necessary to achieve a 200-year level of protection. These revenue sources are in addition to the standing assessments collected by RD 900 and RD 537 for recurring operations and maintenance expenses.

7.3. History of Revenue Allocation and Expenditure

WSAFCA has used the revenue sources described above to finance flood risk reduction improvements. The local property assessments have supported the issuance of bonds in 2008, 2011 and 2015 totaling $41.2 million. A recent financial analysis showed the agency's remaining bonding capacity is approximately $10 million. In addition to bond proceeds, WSAFCA has secured $4.5 million from Measure V, and a pledge of an additional $5.5 million, for a total of $10 million. WSAFCA also receives "Pay-Go" funding from the annual land-based assessment that is not obligated to pay for debt service, O&M contributions and operation and administration of the WSAFCA JPA. The Financial Plan provides a more detailed summary of WSAFCA's local revenue sources.

Since 2007, WSAFCA, in partnership with the State of California, has expended almost $90 million toward the planning, design, land acquisition and construction of levee improvements to reduce flood risk to the City of West Sacramento. This includes the completion of approximately $36 million for the I Street Bridge, the Rivers, and CHP Academy EIPs clearly demonstrating a local commitment to funding and implementing critical flood risk reduction projects. It is estimated that the Southport Project will cost $203.5 million and WSAFCA is targeting award in 2016 and completion in 2019. In total WSAFCA and DWR will have advanced $239.5 million in critical features of the flood protection system. Funding was provided by the State of California through Proposition 1E Bond funds and locally matched with funds from WSAFCA and the City's Measure V and In-lieu fees.

7.4. Advancement of Critical Features

WSAFCA has demonstrated their ability to advance critical features of the WSLIP. The following critical features have been advanced by WSAFCA in partnership with DWR and the USACE.

1. Early Implementation Projects – WSAFCA, in a close technical and financial partnership with DWR, has engaged in levee improvements at four project sites including: (a) I-Street Bridge – construction completed in 2008; (b) CHP Academy – construction completed in 2012; (c) The Rivers – construction completed in 2012; and (4) Southport – construction contract award scheduled for 2016 and anticipated completion in 2019.

2. Sacramento River Bank Protection Project (RM 57.2 Setback Levee) – USACE, through the Sacramento River Bank Protection Project, setback approximately 2,000 feet of levee in lieu of placing rock protection on the existing riverbank. The project was completed in 2015.
3. West Sacramento Project Repairs – USACE, under the West Sacramento Project authority, repaired two locations along the Yolo Bypass Levee. These projects were completed in 2009 and 2012.
4. West Sacramento General Reevaluation Report (GRR) – USACE conducted a general reevaluation of the City of West Sacramento levee system and determined a Federal interest in approximately $1.2 billion in flood risk reduction measures. WSAFCA executed a Section 221 Memorandum of Understanding (MOU) with the USACE on July 23, 2014, allowing WSAFCA to credit most of the expenditures on the Southport Project against future implementation of the GRR. The Chief of Engineer's Report was signed on April 26, 2016.
5. South Cross Levee – USACE conditionally approved a request by WSAFCA to include this non-SPFC facility in the PL 84-99 Rehabilitation Program as a non-Federal Flood Work. Approval creates opportunity for federal emergency response and rehabilitation assistance. Conditional approval was received in April 2016.
6. Hydraulic Separation of West Sacramento Levee System – USACE approved a request to redefine the West Sacramento - Sac Yolo South Levee System by dividing it at the South Cross Levee based on an analysis of hydraulic separation commissioned by WSAFCA. Approval removes several miles of levee along the Sacramento River south of the city limit from the West Sacramento levee system. It also means that future federal eligibility determinations (levee inspections) will be based solely on levees protection the City and not the expansive rural levee system to the south. Approval was received in April 2016.

8.0 CONCLUSIONS

This report, and its supporting appendices, provides the substantial evidence necessary to support an ***Urban Level of Flood Protection Finding by the City of West Sacramento based on adequate progress*** made by WSAFCA. This adequate progress, as defined in California Government Code Section 65007(a), is on the construction of a flood protection system that will result in flood protection equal to or greater than the urban level of flood protection required for the City of West Sacramento by 2025. An Urban Level of Flood Protection Finding by the City prior to July 1, 2016, allows for the continued approval of certain land-use decisions including the approval of discretionary permits, entitlements, and tentative maps.

9.0 REFERENCES

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- West Sacramento 200-Year Flood Protection In-Lieu Fee Study, EPS, May 2007
- City of West Sacramento Sales Tax, Measure V ballot proposition, November 4, 2008 ballot for voters in the City of West Sacramento in Yolo County, California.

10.0 DOCUMENT PREPARERS

The following agencies and individuals contributed to the preparation of this plan:

West Sacramento Area Flood Control Agency:

Kenric Jameson	General Manager

City of West Sacramento:

Charline Hamilton	Director, Community Development
Greg Fabun	Flood Program Manager, Community Development
David Tilley	Principal Planner, Community Development

Consultants:

Derek Larsen	Larsen Wurzel & Associates
Eric Nagy	MBK Engineers

Figure 1: Sacramento River Flood Control Project Map

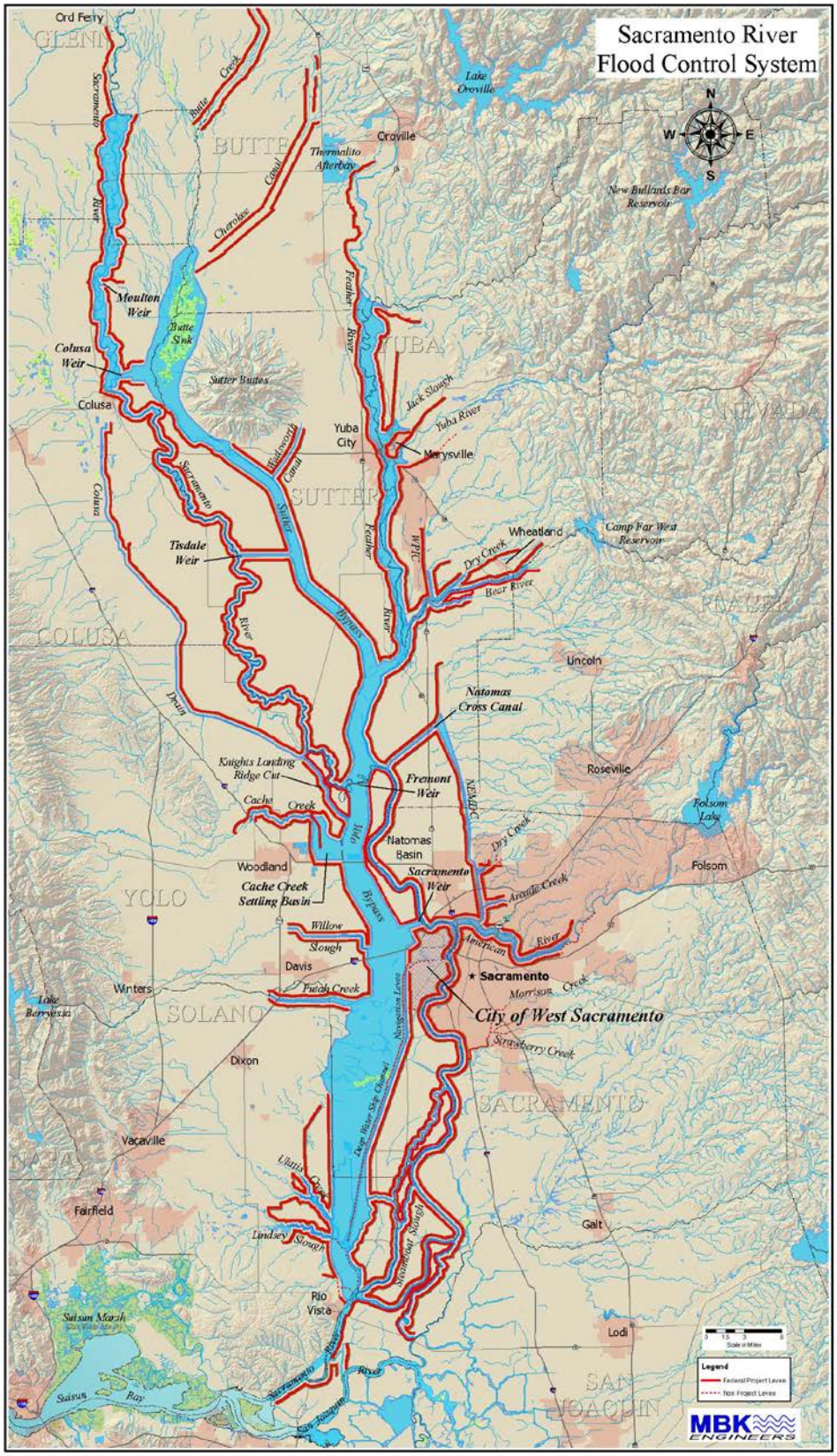


Figure 2: West Sacramento Levee System Description

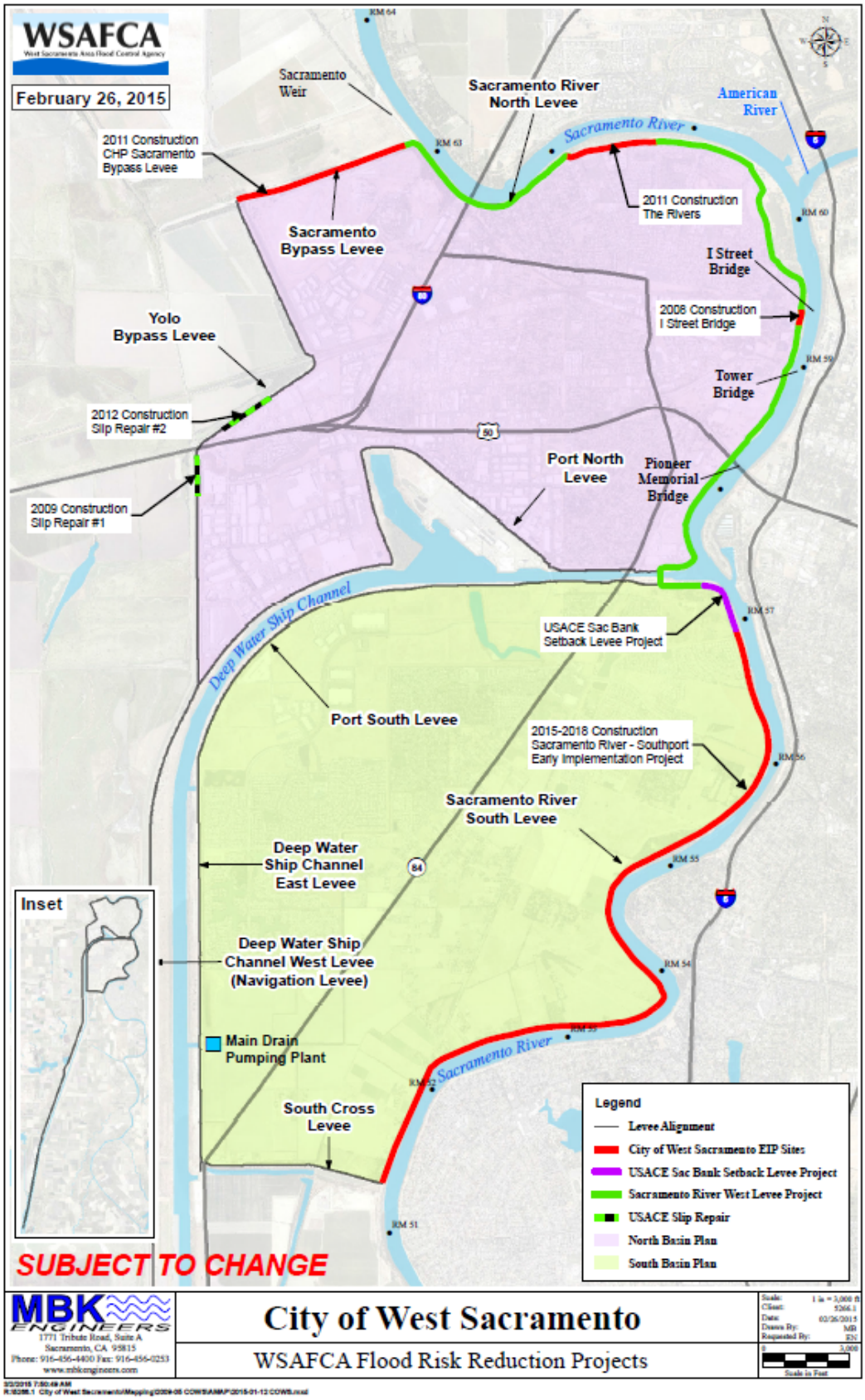


Figure 3: State Plan of Flood Control Levees

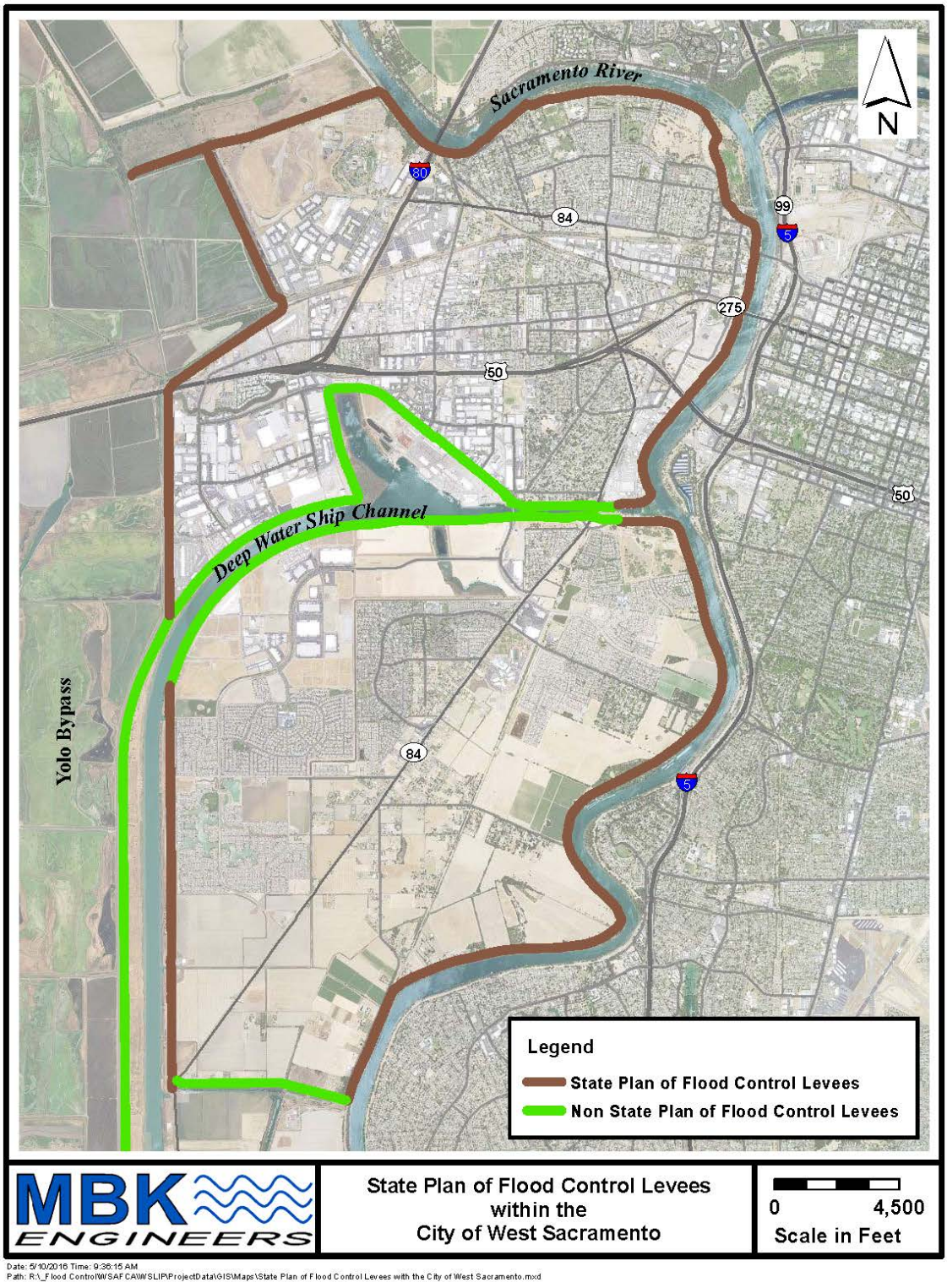


Figure 4: City of West Sacramento – Levee Protected Area (200 year flood event)

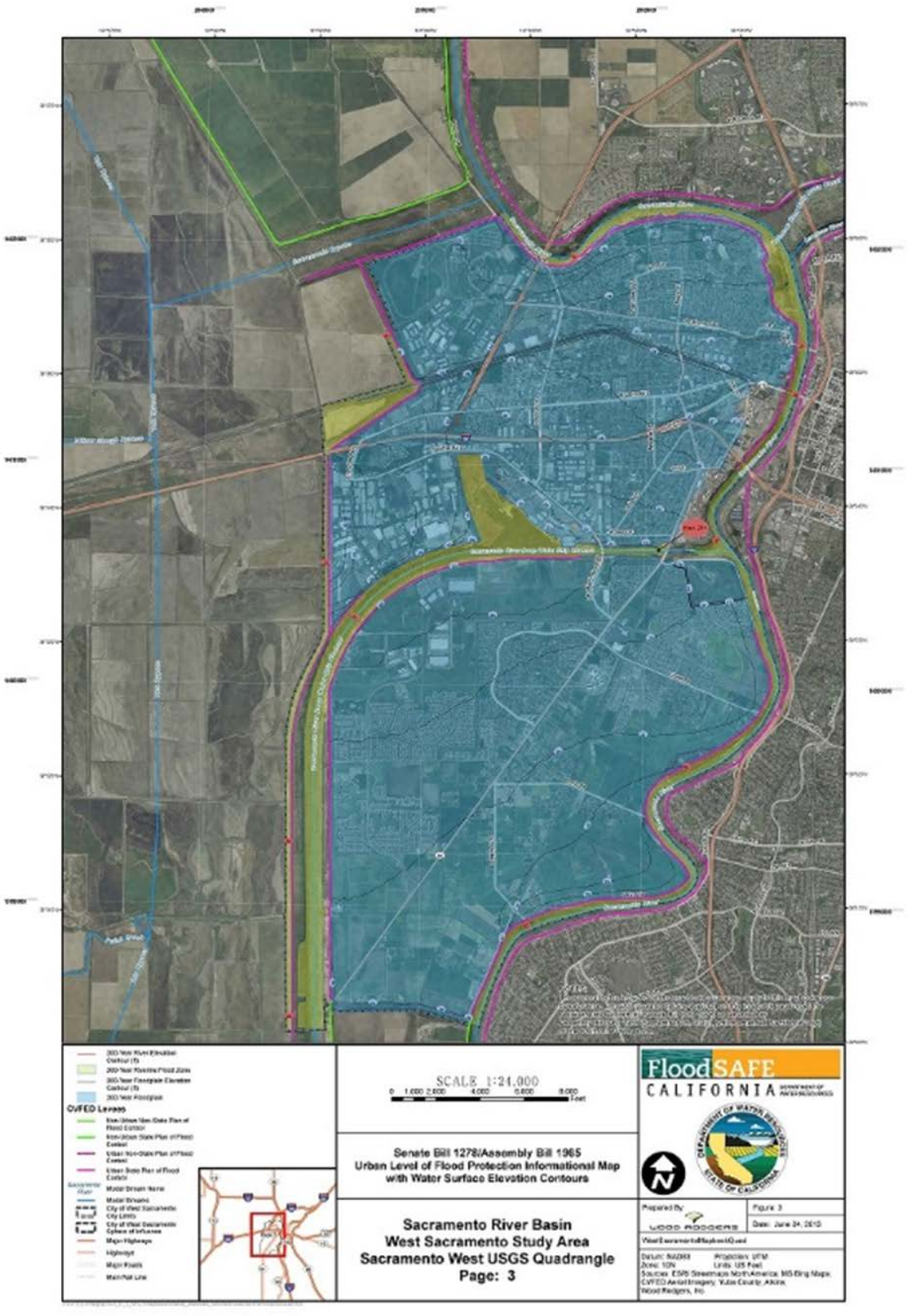


Figure 5: West Sacramento Levee System - Operations & Maintenance Responsibilities

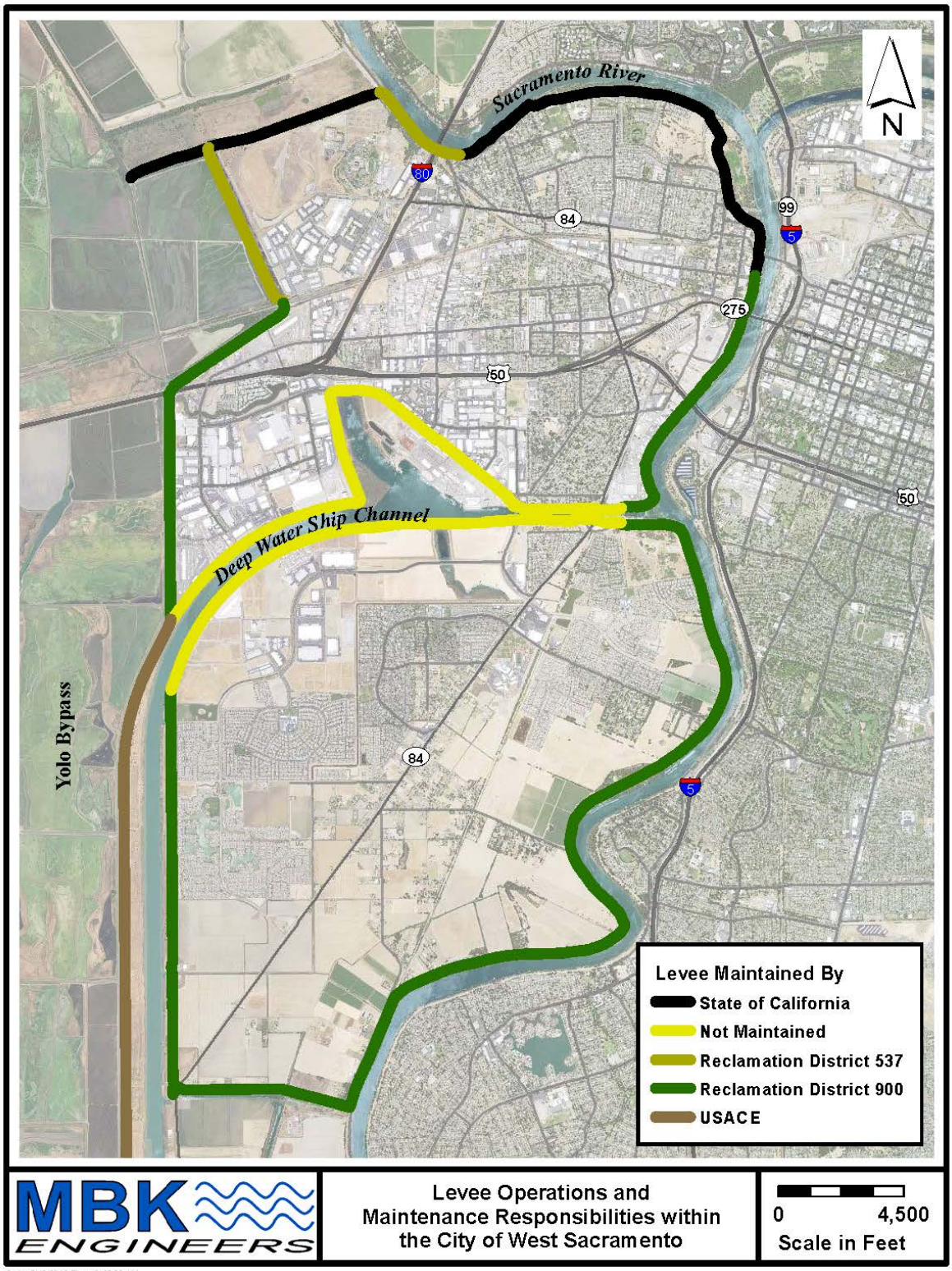


Figure 6A: Summary of Remaining Levee Deficiencies (200-year flood event)

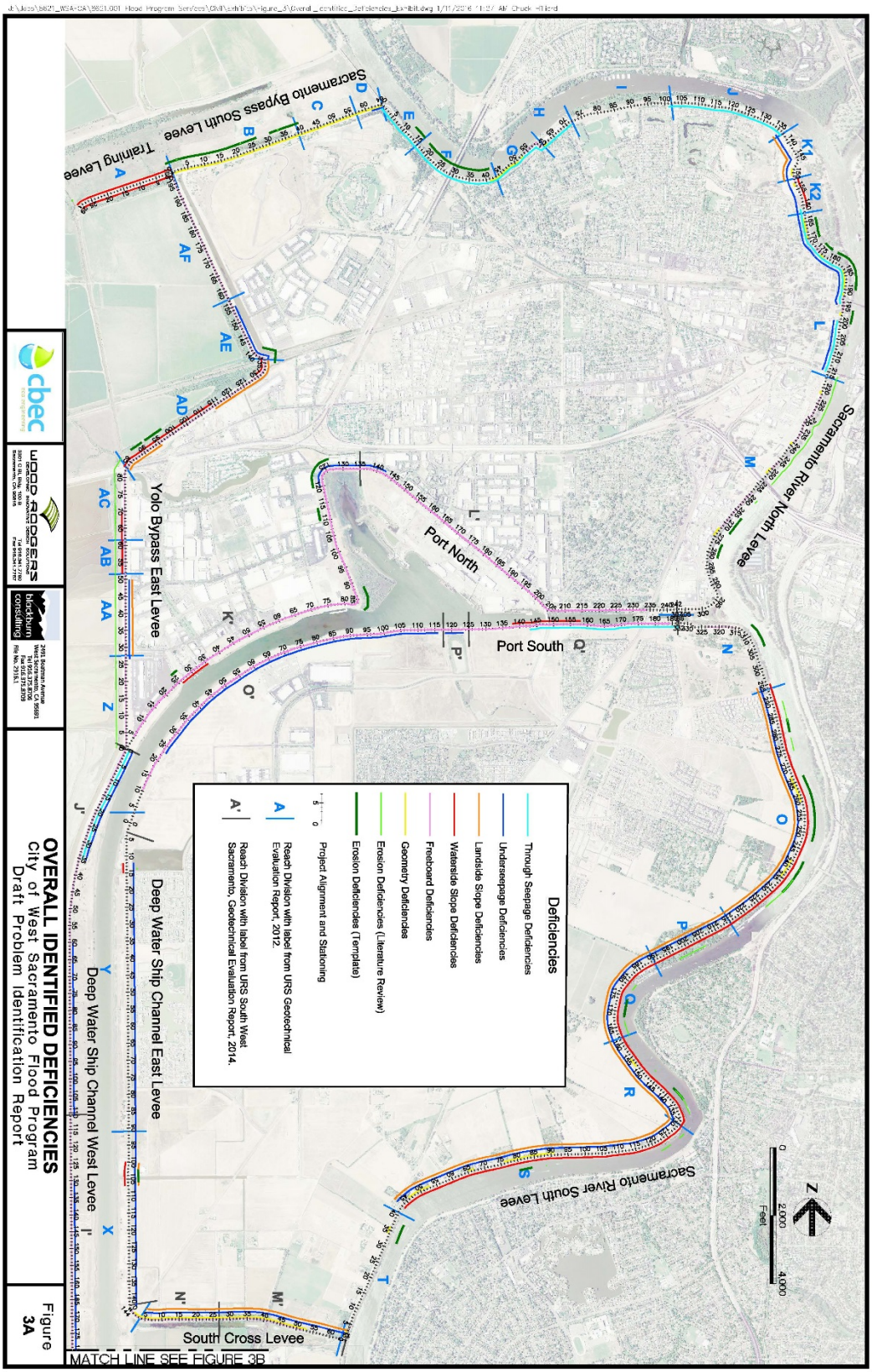


Figure 6B: Summary of Remaining Levee Deficiencies (200-year flood event)

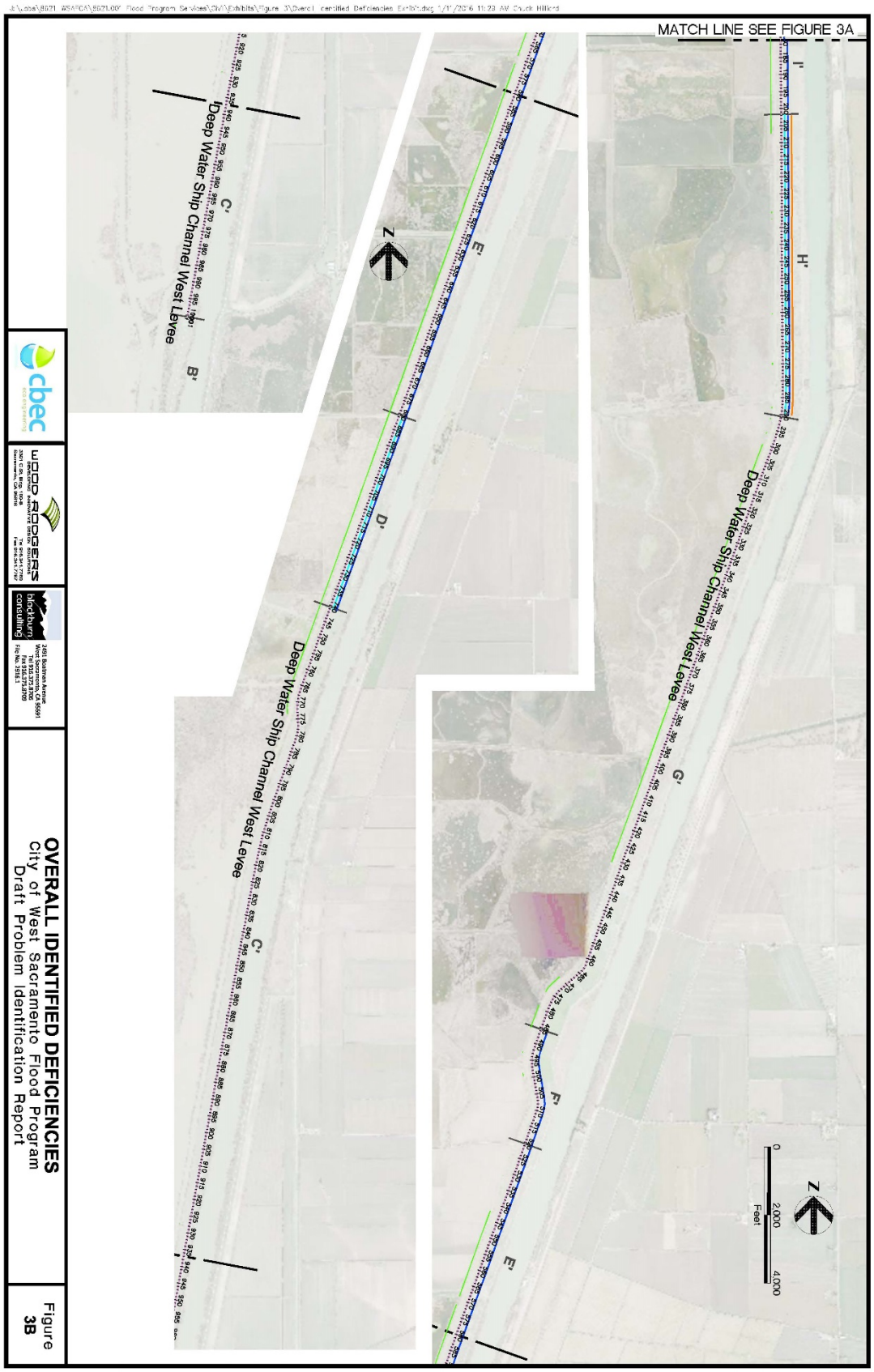


Figure 7: Summary of Remaining Levee Improvements (200-year flood event)

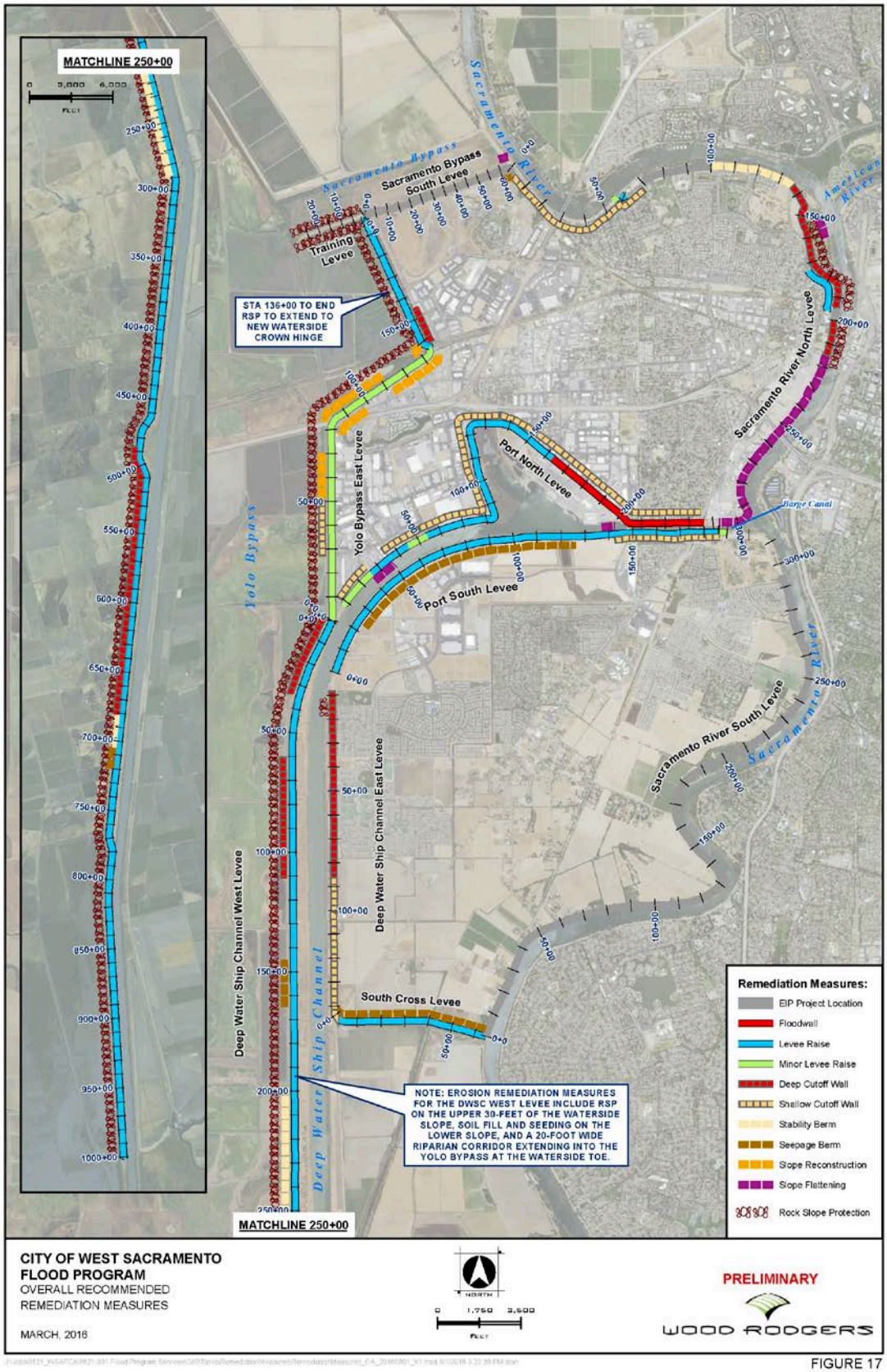


FIGURE 17

Attachment A – Letter from Independent Panel of Experts

May 27, 2016

Mr. Greg Fabun, Flood Program Manager
West Sacramento Flood Control Agency
1110 West Capitol Avenue, 2nd Floor
West Sacramento, CA 95691

Subject: City of West Sacramento, Urban Level of Flood Protection – Review Conducted by Independent Panel of Experts in Association with Finding of Adequate Progress

Dear Mr. Fabun:

The Urban Level of Flood Protection Criteria published by the California Department of Water Resources in November 2013 requires the City of West Sacramento (City) to commission an Independent Panel of Experts (IPE) to review any reports prepared by a Professional Civil Engineer registered in California which serve as evidence that an urban level of flood protection can be achieved. For flood management facilities protecting 500 residents or more, this IPE shall consist of at least three experts with different expertise, including at least one with expertise in hydrology and hydraulics, and at least two with expertise in the design and construction of facilities relevant to those under review. Finally, selection of this IPE shall be consistent with U.S. Army Corps of Engineers (USACE) Engineer Circular (EC) 1165-2-214 dated, December 15th 2012, following the procedure for Type II Independent External Peer Review to the extent applicable.

The undersigned meet these Urban Level of Flood Protection Criteria requirements for serving on an IPE and have participated as approved Type II Independent External Peer Reviewers for the West Sacramento Levee Improvement Program since 2009. At the written request of the West Sacramento Area Flood Control Agency (WSAFCA), the undersigned agreed to serve as the IPE and review the reports developed to serve as evidence that an urban level of flood protection can be achieved for the City. This review was conducted using current levee design guidance including, but not limited to, the California Department of Water Resources Urban Levee Design Criteria (ULDC) dated May 2012.

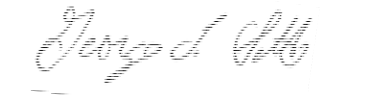
Between March 7th and May 25th 2016, the undersigned conducted a thorough review of two reports prepared by Wood Rodgers, Inc. to serve as evidence that an urban level of flood protection can be achieved for the City. The first report was the draft City of West Sacramento,

Flood Engineering Services, Problem Identification Report dated January 2016. The second report was the draft City of West Sacramento, Flood Engineering Services, Alternatives Analysis Report dated March 2016. The review of each report was documented through development of a comment, response and back-check spreadsheet. As of May 25th 2016, all IPE review comments were closed pending verification of the responses in the final published reports. The final IPE comment and response spreadsheet associated with the review of each report will be incorporated into each final report.

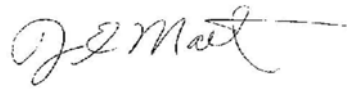
Based on a review of the Draft Problem Identification and Alternatives Analysis Reports, the undersigned, serving in the capacity of an IPE, concur that an urban level of flood protection from the identified sources of flooding ***will exist*** for the City upon implementing the improvements recommended to address the identified flood management facility deficiencies as outlined in these two reports.

West Sacramento Levee Improvement Program
Board of Senior Consultants (IPE)

Dr. David T. Williams, P.E., CFM, PH



Mr. George L. Sills, P.E.



Dr. Ray E. Martin, P.E., D.GE