

Appendix C

LMA-Specific Hazards and Projects

1 Overview to Appendix C

This appendix contains information for each city and local maintaining agency (LMA) within the Regions. The LMAs consist of many Reclamation Districts (RD) and the San Joaquin County Flood Control and Water Conservation District (SJCFCWCD). The information is arranged separately for the Lower San Joaquin Region and for the Delta South Region. The appendix includes general descriptions, hazards, and potential projects for each entity city, RD, and the unincorporated county.

ULE and NULE Ratings

DWR's Urban Levee Evaluations (ULE) and the Non-Urban Levee Evaluations (NULE) are the basis for several of the levee ratings for individual areas in the two regions. Please refer to Table 1 for the definition of these ratings for the remainder of this appendix.

Table 1 - ULE and NULE Ratings

NULE Ratings	
Hazard Level A	Low likelihood of either levee failure or the need to flood-fight to prevent levee failure
Hazard Level B	Moderate likelihood of levee failure or the need to flood-fight to prevent levee failure.
Hazard Level C	High likelihood of levee failure or the need to flood-fight to prevent levee failure.
Lacking Data (LD)	Lacking sufficient to be able to assign a hazard level
ULE Ratings	
M	Meets ULDC Criteria (Urban Levee Design Criteria)
MG	Marginally Meets ULDC Criteria
DNM	Does Not Meet ULDC Criteria

The Overall Hazard Levels in the table are a composite of the seepage, stability, and erosion concerns identified in the ULE/NULE evaluations. Information on individual hazards (penetrations, instability, etc.) can be obtained from DWR. It should be noted that the ULE and NULE evaluations cover only SPFC levees and other closely associated non-project levees, not all non-project levees within the regions. In addition, DWR's Flood Control System Status Report (DWR, 2011) provides an overview of ULE and NULE ratings for various levees (see http://www.water.ca.gov/cvfmp/docs/FCSSRDDec2011_FullDocument.pdf). In addition, the following sections include problems identified by representatives of each City, RD, and the SJCFCWCD.

DWR Levee Inspection Summary Table Ratings

- **Acceptable (A)** – No immediate work required, other than routine maintenance. The flood protection project will function as designed and intended with a high degree of reliability, and necessary cyclical maintenance is being performed adequately.

- **Minimally Acceptable (M)** – One or more deficient conditions exist in the flood protection project that needs to be improved or corrected. However, the project will essentially function as designed with a lesser degree of reliability than what the project could provide. For instances where “M” are given, the levee segment would have received an “A” rating if it weren’t for very small portions of levee that received a rating of “U”.
- **Unacceptable (U)** – One or more deficient conditions exist that may prevent the project from functioning as designed, intended, or required.

Project Implementation Tiers

Each project identified for each city and RD have been placed in one of three tiers to identify the likely time of implementation:

- Tier 1 – These are projects that will likely be implemented in the next five years. These generally are ready to implement when funding becomes available. This tier also includes the most critical projects necessary to reduce the risk of flooding, such as improving critical erosion sites or other problems that have the highest chance of failure during the next high water.
- Tier 2 – These are projects that are likely to be implemented in the 6 year to 12 year timeframe. These are projects that are important to implement, but that still need time to develop designs, obtain funding, and complete other logistics. These projects are important, but not as critical in timing as the Tier 1 projects. It is expected that most Tier 2 projects will be implemented when funding becomes available.
- Tier 3 – These are projects that need substantially more time to develop and implement because of their complexity, cost, or other factors. Generally, Tier 3 projects would be beneficial to overall flood and ecosystem management, but are not critical for near-term flood management. Some Tier 3 projects may never be implemented based on future evaluations or unavailability of adequate funding.

City and RD Descriptions

The remainder of this Appendix is organized by jurisdiction. Separate sections are used to first show information for the Cities, RDs, and portions of San Joaquin County in the Lower San Joaquin Region. Then, information is shown for the Delta South Region in a separate section.

2 Lower San Joaquin River Region

The Lower San Joaquin Region lies east of the San Joaquin River. The cities of Stockton, Lathrop, and Manteca lie primarily in the Lower San Joaquin Region. Several RDs lie within portions of the cities and other RDs lie in unincorporated areas of San Joaquin County.

2.1 Cities

The cities of Stockton, Lathrop, and Manteca are described below. The City of Lathrop is in both Regions, but is described only once below for the Lower San Joaquin Region.

2.1.1 City of Stockton/San Joaquin County

General Area Information

The City of Stockton is the largest metropolitan area within the Lower San Joaquin River Region and has a population of nearly 300,000 people. Stockton is primarily located east of the San Joaquin River and is traversed by Bear Creek, Calaveras River, Mosher Slough, French Camp Slough, and many other secondary tributaries. A small portion of the city, RD 403 and the City's wastewater ponds on RD 524 are on the western side of the San Joaquin River.

The primary hazard for the City of Stockton is potential failure of levees that protect nearly the entire city from flood waters. These levees are along not only portions of the city boundary, but traverse through the city along tributaries. Other levees surround Delta tracts that lie within the city limits.

Additionally, the restrictions associated with SB5 imposed on land use agencies like the City of Stockton threaten the economies of cities in the Central Valley. The current levees protecting Stockton likely do not meet ULDC standards, and therefore the City of Stockton will not be able to issue new building permits in urban and urbanizing areas where the 200-year flood depths exceed three feet. Without the necessary flood risk management projects, the economy of Stockton is in jeopardy. Property owners already pay several layers of assessments related to flood management. There will likely be little incentive for property owners to accept another assessment to achieve 200-year ULOP once 100-year level of protection relieves the requirement for flood insurance.

The City of Stockton encompasses and/or borders several RDs within the region. A general overview of the flood hazards & risks identified from larger planning documents (i.e. CVFPB, LSJRFS, etc.) for the Stockton Metropolitan Area as a whole is included in this section first, followed by a discussion of hazards identified in local studies/plans each of the RD's located within/around the City. Although Stockton includes a portion of RD 524, the discussion of RD 524 as a whole is included within the discussion for the Delta South Region.

Many pockets of unincorporated San Joaquin County are surrounded by, or adjacent to, incorporated areas of the city. In addition, 10 RDs are located totally, or partially, within the city limits. These include:

- RD 17 – northern portion
- RD 403
- RD 404
- RD 544 – wastewater treatment ponds on northeast side of RD. Note, RD 544 is in the Delta South Region
- RD 828
- RD 1608
- RD 1614
- RD 2042
- RD 2074
- RD 2126

Note that descriptions for each of these RDs can be found later under their own headings.

FEMA Accreditation Status

SJAFCA is currently in the process of providing the necessary documentation to FEMA in order to regain and maintain the accredited status of these levees.

Urban Levee Evaluation Program Findings

Many of the levees protecting Stockton are being evaluated as part of the DWRs Urban Levee Evaluation (ULE) program. This program is evaluating levees in urban areas to determine freeboard, geometric, and geotechnical deficiencies for a 200-year flood event.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the ULE/NULE evaluations. Figure 1 shows the Overall Hazard Level of levees in the Stockton area.

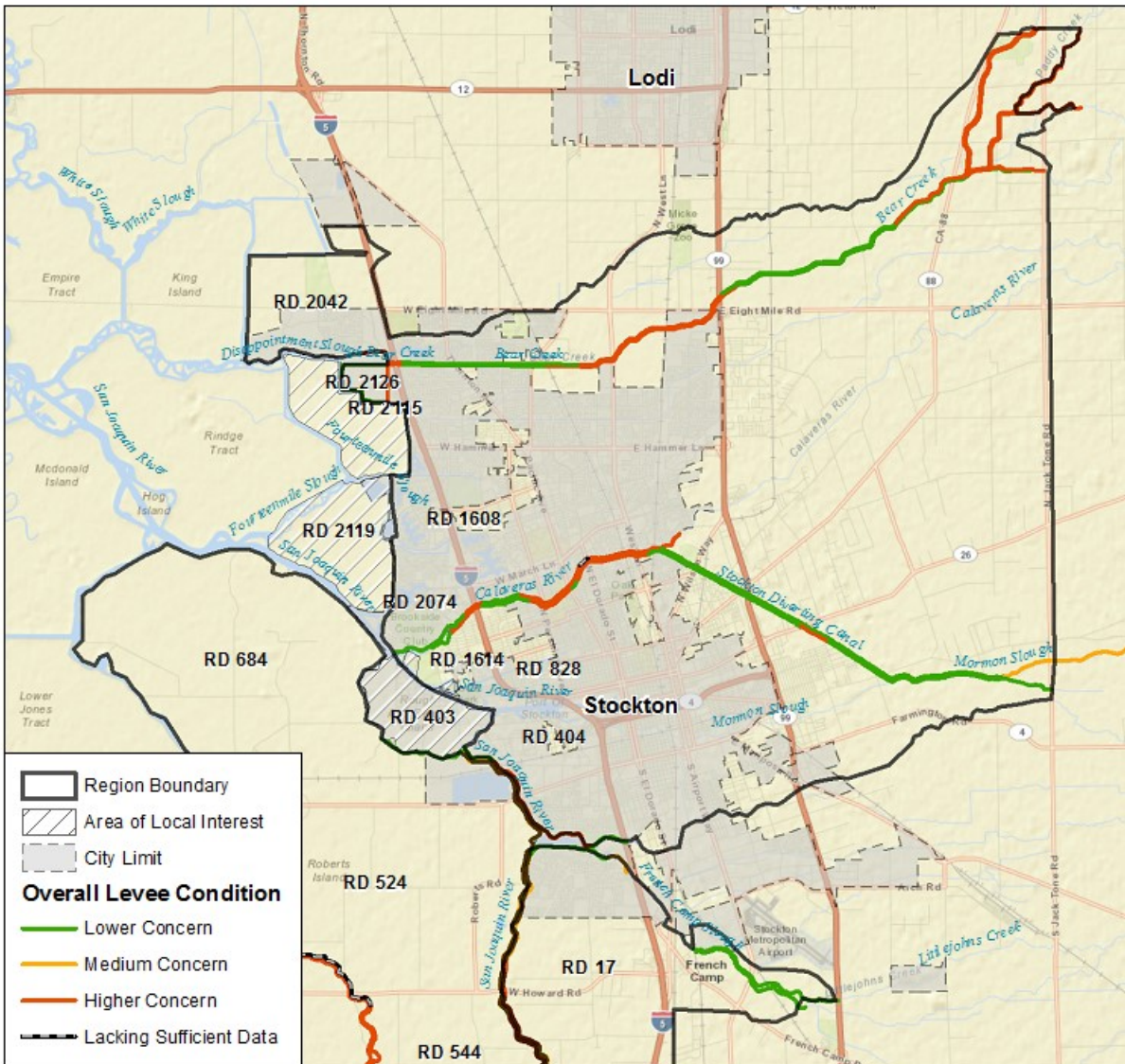


Figure 1 – CVFPP Overall Levee Conditions -Stockton

Details of these evaluations for levees in and around Stockton can be found in DWR's ULE information. ULE provides separate ratings for freeboard, geometry, seepage, and stability to arrive at the overall ratings. Details of these evaluations for levees in and around Stockton are presented in Table 2 - ULE Results – City of Stockton and Surrounding Areas. The abbreviated definitions in the table are those in Table 1 earlier in this appendix. It should be noted that independent geotechnical review by team member ENGEO does not concur with all of DWR rating in the table. The reaches marked with an "*" indicate where ENGEO's believes that a reach does not meet the ULDC criteria.

Table 2 - ULE Results – City of Stockton and Surrounding Areas

ULE RESULTS - CITY OF STOCKTON AND SURROUNDING AREAS							
RD #	Name	Reach ID	Freeboard	Geometry	Seepage	Stability	Overall
-	Bear Creek Right Bank	A	DNM	M	M	M	DNM
		B	M	M	M	M	M
		C	M	M	M	M	M
		D	DNM	M	M	M	DNM
		E	DNM	M	M	M	DNM
		F	M	DNM	M	M	M
		G	M	DNM	M	M	M
		H	DNM	DNM	M	M	DNM
		I	DNM	DNM	M	M	DNM
-	Bear Creek Left Bank	J	M	M	DNM*	DNM*	DNM
		K	M	M	M	M	M
		L	M	M	M	M	M
		M	M	M	DNM*	M	DNM
		N	DNM	M	M	M	DNM
		O	M	MG	M	M	M
		P	M	MG	M	M	M
		Q	DNM	DNM	M	M	DNM
-	Paddy Creek W.	R	DNM	DNM	M	M	DNM
-	Paddy Creek E.	S	DNM	DNM	M	M	DNM

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

Table 2 – ULE Results – City of Stockton and Surrounding Areas (Cont.)

ULE RESULTS - CITY OF STOCKTON AND SURROUNDING AREAS							
RD #	Name	Reach ID	Freeboard	Geometry	Seepage	Stability	Overall
-	Middle Paddy Creek South	T	DNM	M	M	M	DNM
-	South Paddy Creek North	U	DNM	DNM	M	M	DNM
-	South Paddy Creek South	V	M	MG	M	M	M
-	Calaveras River Right Bank	A	M	M	M	M	M
		B	M	M	M	M	M
		C	M	DNM	M	M	M
		D	M	DNM	DNM*	M	DNM
		E	M	M	M	M	M
		F	DNM	M	M	M	DNM
		G	DNM	M	M	M	DNM
		H	DNM	M	M	M	DNM
		H1	M	M	M	M	DNM
		H2	M	M	M	M	M
		H3	M	M	LD	LD	LD
		J	M	DNM	M	M	DNM

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

Table 2 – ULE Results – City of Stockton and Surrounding Areas (Cont.)

ULE RESULTS - CITY OF STOCKTON AND SURROUNDING AREAS							
RD #	Name	Reach ID	Freeboard	Geometry	Seepage	Stability	Overall
-	Calaveras River Left Bank	K	M	M	M	M	M
		L	M	DNM	DNM*	MG	DNM
		M	M	MG	M	M	M
		N	DNM	DNM	DNM*	M	DNM
		O	M	M	M	M	M
		P	DNM	M	M	M	DNM
		Q	M	M	DNM*	M	DNM
		R	M	M	DNM*	M	DNM
		S	M	M	M	M	M
		T	-	-	-	-	-
-	Diverting Canal North	U	-	-	-	-	-
		V	-	-	-	-	-

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

Table 2 – ULE Results – City of Stockton and Surrounding Areas (Cont.)

ULE RESULTS - CITY OF STOCKTON AND SURROUNDING AREAS							
RD #	Name	Reach ID	Freeboard	Geometry	Seepage	Stability	Overall
-	Diverting Canal South	W	M	M	M	M	M
		X	M	M	M	M	M
		Y	M	M	M	M	M
		Z	M	M	M	M	M
		AA	M	M	M	M	M
		AB	DNM	M	M	M	M
		AC	M	M	DNM*	M	DNM
		AD	M	M	M	M	M
		AE	M	M	M	DNM*	DNM
		AF	M	M	M	M	M
		AG	M	M	M	M	M
		AH	M	M	M	M	M
-	Mormon Slough Left Bank	AI	M	M	M	M	M

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

Table 2 – ULE Results – City of Stockton and Surrounding Areas (Cont.)

ULE RESULTS - CITY OF STOCKTON AND SURROUNDING AREAS							
RD #	Name	Reach ID	Freeboard	Geometry	Seepage	Stability	Overall
17	Mossdale	A	M	M	MG	M	MG
		B	M	M	M	M	M
		C	M	M	M	M	M
		D	M	M	MG	M	MG
		Other ULE reaches are included in the City of Lathrop Section					
404	Boggs Tract	A	M	M	M	M	M
		B1	M	DNM	DNM*	M	DNM
		C	M	DNM	DNM	M	DNM
		D1	M	DNM	DNM	M	DNM
		D2	M	DNM	DNM	M	DNM
		E	M	DNM	DNM	M	DNM
		F	M	M	M	M	M

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

Table 2 – NULE Results – City of Stockton and Surrounding Areas

NULE RESULTS - CITY OF STOCKTON AND SURROUNDING AREAS								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
-	Diverting Canal Right Bank	-	1	A	A	A	A	A
-	Mormon Slough Right Bank	-	1	A	A	A	A	A
2126	Atlas Tract	NA	5004	A	A	A	A	A
		NA	5005	A	A	A	A	A

PL84-99 Status

PL 84-99 provides guidelines that levee must meet in order to be eligible for disaster assistance in the event of a levee failure. The Bear Creek and Mormon Slough levees protecting portions of the City of Stockton are in various stages within the PL 84-99 program (i.e. Active and Inactive), and their status changes depending on inspection results and progress of ongoing levee work. A levee segment that is currently rated as Active in the PL 84-99 program can become inactive based on the next USACE inspection.

The levees along the south banks of Bear Creek, Calaveras River, Stockton Diverting Canal and Mormon Slough are all currently inactive in the PL 84-99 program. In addition, the north bank of the Calaveras River are currently inactive.

Those levees identified as “Conditionally Active” are those that were reinstated after the last USACE inspection, but still have deficiencies that need to be corrected. For example, some levees were found unacceptable based on the USACE’s 2010 Periodic Inspection. These levees were then reinstated into the PL 84-99 program following the County’s correction of some of the most critically unacceptable items. Once these deficiencies were corrected, a re-inspection request was sent by the CVFPB to USACE dated October 17, 2012. While some levees were reinstated into the program, they still have remaining unacceptable items that need to be corrected before the next USACE inspection in order to remain active in the program.

The SJCFWCWD has prepared an LOI and is preparing a SWIF to correct the remaining deficiencies on the levees and bring levees to active status in the PL 84-99 program.

O&M Ratings

Maintenance of levees in and around Stockton is performed by individual RDs and SJCFWCWD. The City of Stockton does not maintain levees in the Region.

RD 17 and 404 were the only specific LMA's within the City of Stockton included in DWR's 2012 Local Maintaining Agency Annual Report. Project levees along Bear Creek, Mormon Slough, and the Calaveras River are lumped into a composite rating for SJCFWCWD in the 2012 LMA report.

A rating of Minimally Acceptable* was given for RD 17 due to small portions of unacceptable erosion and encroachment issues. RD 404 was given an Unacceptable rating due to many issues, the largest being crown roadway, erosion, tree trimming/thinning, and vegetation. Animal control, encroachments, and slope stability were also cited as issues, but were not as prevalent.

It should be noted, however, that RD 404 is in the process of re-establishing 100-year flood protection. It is in the process of finishing the first of two seepage related projects by the installation of 1,600 lineal feet of cut-off wall just upstream of Highway 4.

Table 3 - LMA Ratings for the City of Stockton & Surrounding Areas

CITY OF STOCKTON LMA Ratings			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
-	San Joaquin County Flood Control & Water Conservation District	Minimally Acceptable	Minimally Acceptable
17	Mossdale	Acceptable	Minimally Acceptable*
404	Boggs Tract	Minimally Acceptable	Unacceptable

Risks Associated With Deficiencies

The deficiencies identified for each RD, and in the City of Stockton as a whole represent areas where flood control systems have a higher likelihood of failure. Since nearly the entire City of Stockton is within areas protected by levees, that means that nearly the entire population of the City, as well as all the infrastructure within the City is potentially at risk in the event of a flood system failure.

Hospitals, police and fire stations, boat launch facilities, airports, and the City of Stockton's water and wastewater treatment plants are located in areas protected by levees. Services provided by these institutions may be vulnerable to being shut down in the event of a flood.

In addition to the critical infrastructure noted above, Interstate 5 and Highway 99 traverse the City. If Interstate 5 was rendered unusable due to a flood control system failure, this would result in a significant disruption to one of the primary north-south transport routes in the State of California. According to the State of California Department of Transportation's Annual Average Daily Traffic for 2010, approximately 224,000 vehicles used Interstate 5 to traverse the City; approximately 52,000 of which were trucks. According to the Delta Risk Management System (DRMS) report, a closure of Interstate 5 would result in an estimated cost of \$3,000,000 per day in business losses.

Furthermore, the Stockton Ship Channel is a significant commercial marine transportation route and is used extensively by recreational boaters, as well as by marine contractors that perform levee maintenance, flood fight response and other construction activities. Reclamation Districts 403 and 404 are adjacent to the Stockton Ship Channel and provide nautical access to the Port of Stockton. According to the DRMS report, approximately 2,900,000 million metric tons of cargo is shipped from the Port of Stockton each year.

The Stockton Regional Waste Water Treatment Plant is located on RD 404 with its ponds on RD 524. The ponds on RD 524 are within the FEMA 100-yr floodplain. If levees along RD 524 levees broke, water could mix directly into the sewage water at the treatment plant and then traverse into the channel to Clifton Court Forebay. This would leave many areas in central and southern California without fresh drinking water.

Flooding of western Stockton would also potentially disrupt water service to thousands of customers in the City of Stockton metropolitan area due to an interruption to the City of Stockton's water infrastructure facilities on Bishop Tract (RD 2042). The City currently pumps water from the San Joaquin River on RD 2029 and conveys it across RD 2029, RD 2044, and RD 2042 to its water treatment plant.

Pacific Gas and Electric Company (PG&E) operates and maintains a high-voltage electrical transmission line and an electrical substation within Bishop Tract. In addition, the Western Area Power Administration (WAPA) operates and maintains several high-voltage electrical transmission lines that traverse Bishop Tract. These lines carry power that supply approximately 10% of the summer electrical demand for all of California according to the Delta Protection Commission's Economic Sustainability Plan for the Sacramento-San Joaquin Delta. If these lines were to be out of service due to a flood, it would have impacts beyond the Region.

Finally, in order to fully appreciate the hazards associated with identified system deficiencies, breach floodplains prepared as part of the LSJRFS for deficient segments were reviewed. The breach floodplains were compared against land uses in each respective floodplain. The land use categories used are outlined below:

- Urban: Areas with high population densities such as areas within Stockton and surrounding areas.
- Veg/Graze: Lands used predominantly for natural vegetation and grazing purposes.
- Farmland: Land used predominantly for farming.

The right bank of Bear Creek near the UPRR (Index Point BR2) was found to have minor freeboard deficiencies in the LSJRFS, and a high overall concern in the 2012 CVFPP. In the event of a breach at this location, floodwaters would back up behind the railroad and the east levee of Pixley Slough as illustrated in Figure 2.

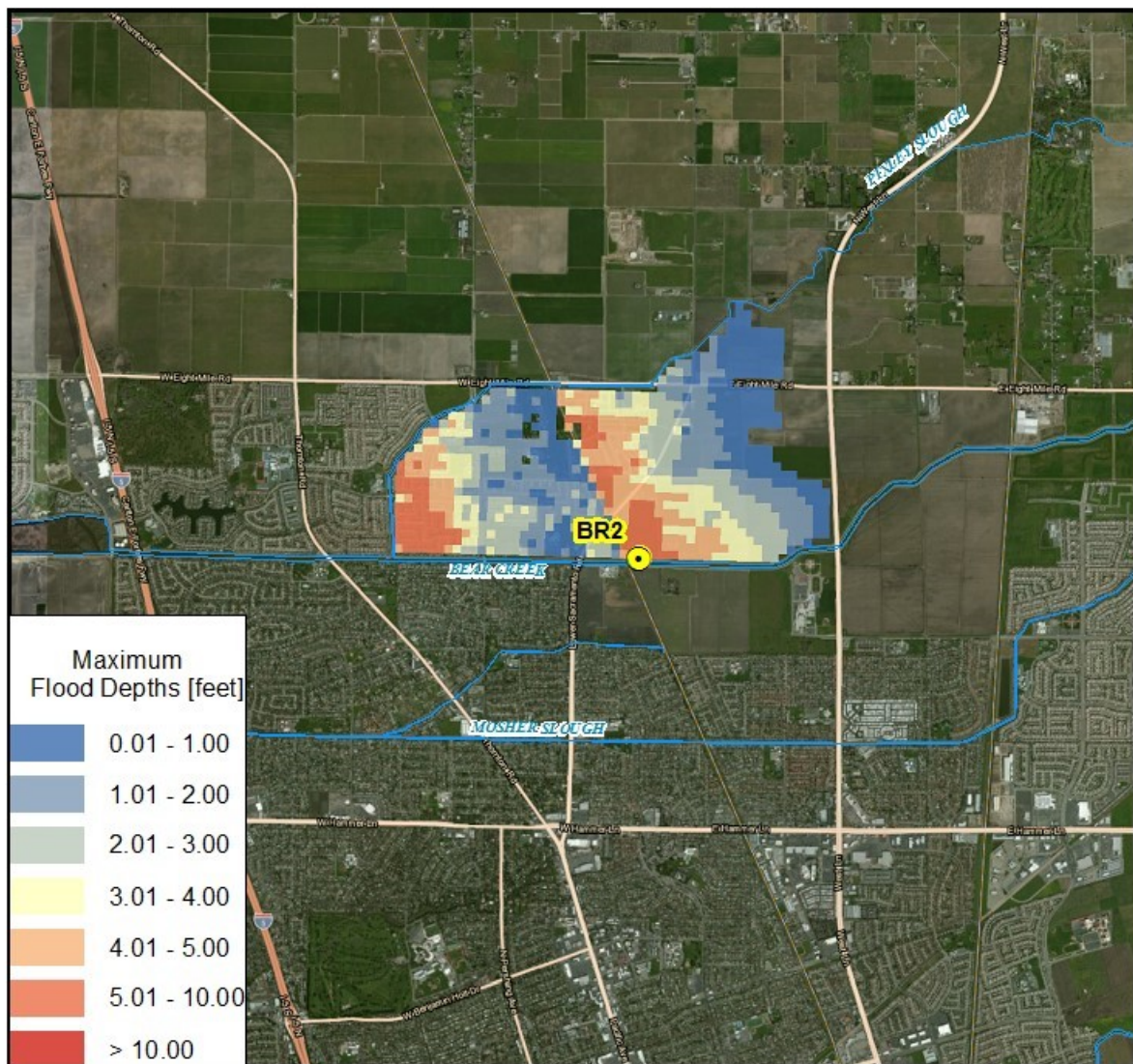


Figure 2 – 200 Year Inundation Map for Levee Breach Scenario at Index Point BR2

The breach shown above would result in the flooding of nearly 1,300 acres of land. The majority of the land affected would be important farmland and urban areas, with a small portion of natural vegetation/grazing land also lying within the flood plain. Table 4 describes the affected number of parcels and area of each land use type.

Table 4 – BR2 Breach Floodplain

Areas within BR2 Breach Floodplain				
Land Use	Parcels	Parcel Percentage	Area (acres)	Area Percentage
Urban	1870	71%	483	37%
Veg/Graze	613	23%	102	8%
Farmland	160	6%	706	55%
Total	2643	100%	1291	100%

The left bank of Bear Creek just downstream of Highway 99 (Index Point BL2) was found to have moderate freeboard deficiencies and geometry deficiencies in the LSJRFS, and a high overall concern in the 2012 CVFPP. In the event of a breach at this location, floodwaters would inundate approximately 1,400 acres of land between Bear Creek and Mosher Slough as illustrated in Figure 3.

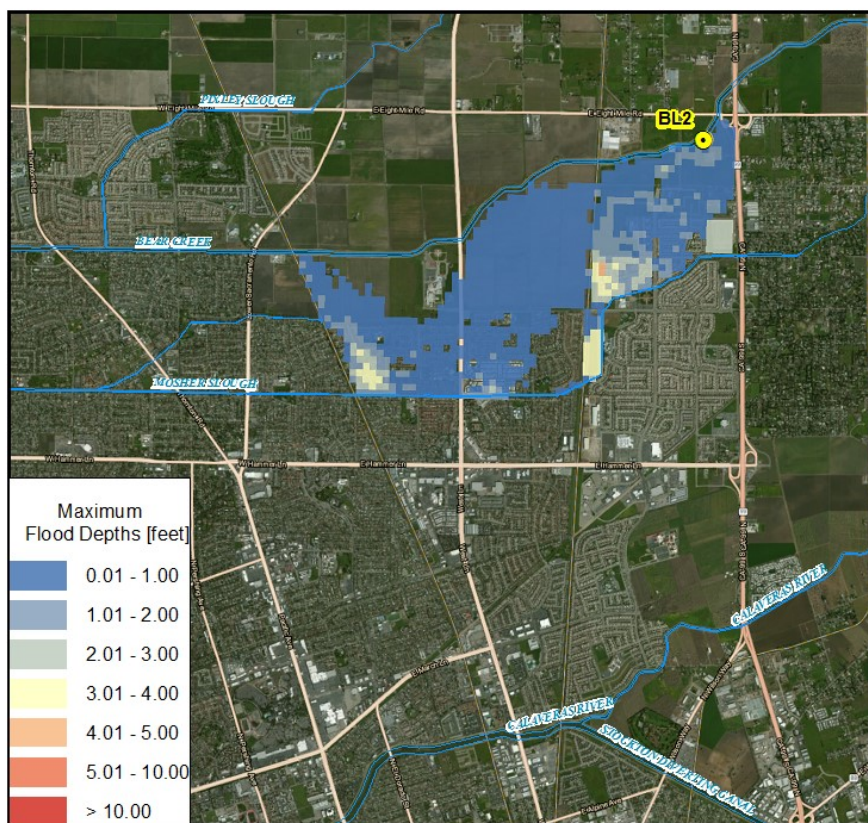


Figure 3 – 200 Year Inundation Map for Levee Breach Scenario at Index Point BL2

The figure shows that most of this affected acreage would be less than one foot deep. The majority of the land affected would be farmland and urban areas, with a small portion of natural

vegetation/grazing land also lying within the floodplain. Table 5 describes the affected number of parcels and area of each land use type.

Table 5 – BL2 Breach Floodplain

Areas within BL2 Breach Floodplain				
Land Use	Parcels	Parcel Percentage	Area (acres)	Area Percentage
Urban	2641	88%	597	41%
Veg/Graze	183	6%	36	2%
Farmland	168	6%	834	57%
Total	2992	100%	1467	100%

The right bank of Bear Creek just downstream of Highway 99 (Index Point BR3) was found to have moderate freeboard deficiencies and geometry deficiencies in the LSJRFS, and a high overall concern in the 2012 CVFPP. In the event of a breach at this location, floodwaters would inundate approximately 1,800 acres of land between Bear Creek and Pixley Slough as illustrated in Figure 4.

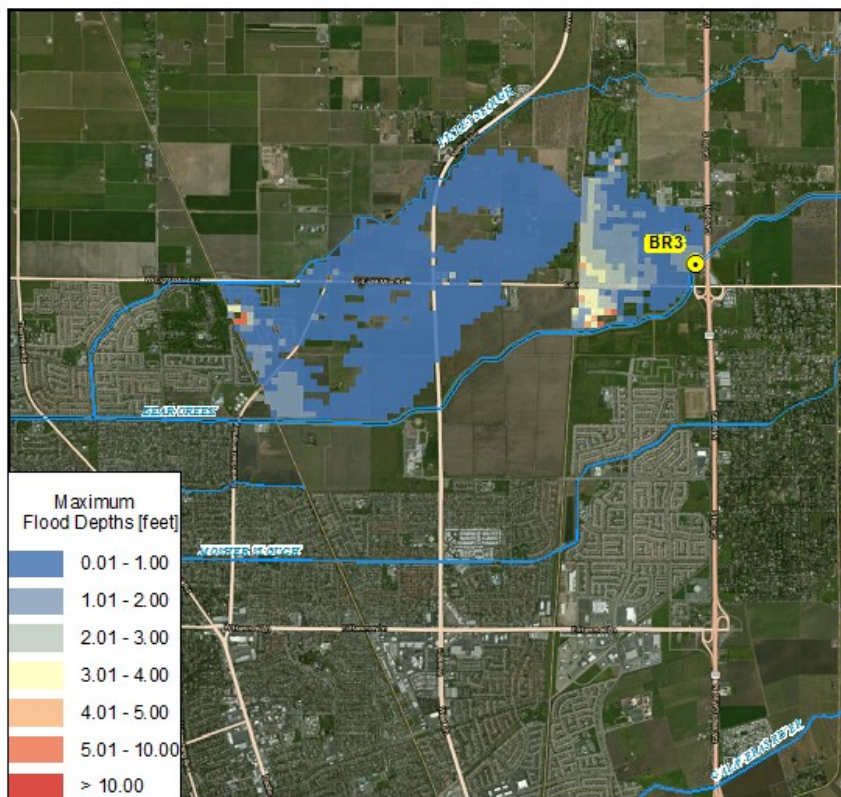


Figure 4 – 200 Year Inundation Map for Levee Breach Scenario at Index Point BR3

The figure shows that most of this affected acreage would be less than one foot deep. A large majority of the land affected would be important farmland and urban area. Table 6 shows the affected number of parcels and area of each land use type.

Table 6 – BR3 Breach Floodplain

Areas within BR3 Breach Floodplain				
Land Use	Parcels	Parcel Percentage	Area (acres)	Area Percentage
Urban	359	30%	260	14%
Veg/Graze	557	46%	85	5%
Farmland	295	24%	1527	82%
Total	1211	100%	1872	100%

The right bank of the Lower Calaveras River just downstream of the confluence with the Stockton Diverting Canal (Index Point CR2) was found to have geotechnical deficiencies in the LSJRFS, and a high overall concern in the 2012 CVFPP. In the event of a breach at this location, floodwaters would inundate approximately 2,600 acres of land between the Calaveras River and Mosher Slough as illustrated in Figure 5.

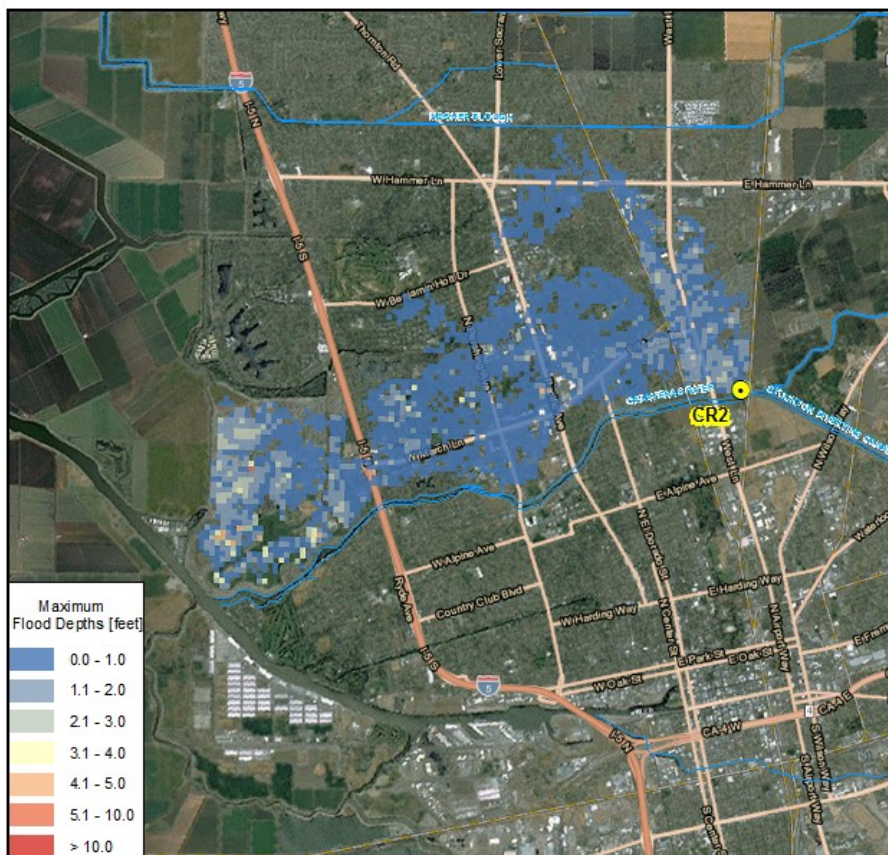


Figure 5 – 200 Year Inundation Map for Levee Breach Scenario at Index Point CR2

The figure shows flood depths of one foot or less for most of the affected area, with significantly higher depths east of the levee along RD2074. Virtually all of the land affected would be urban, with one percent of the affected acreage being farmland. The table below describes the affected number of parcels and area of each land use type.

Table 7 – CR2 Breach Floodplain

Areas within CR2 Breach Floodplain				
Land Use	Parcels	Parcel Percentage	Area (acres)	Area Percentage
Urban	9670	100%	2575	99%
Veg/Graze	2	0%	0	0%
Farmland	2	0%	17	1%
Total	9674	100%	2592	100%

The left bank of the Lower Calaveras River just downstream of the confluence with the Stockton Diverting Canal (Index Point CL2) was found to have geotechnical deficiencies in the LSJRFS, and a high overall concern in the 2012 CVFPP. In the event of a breach at this location, floodwaters would inundate approximately 1,300 acres of land.

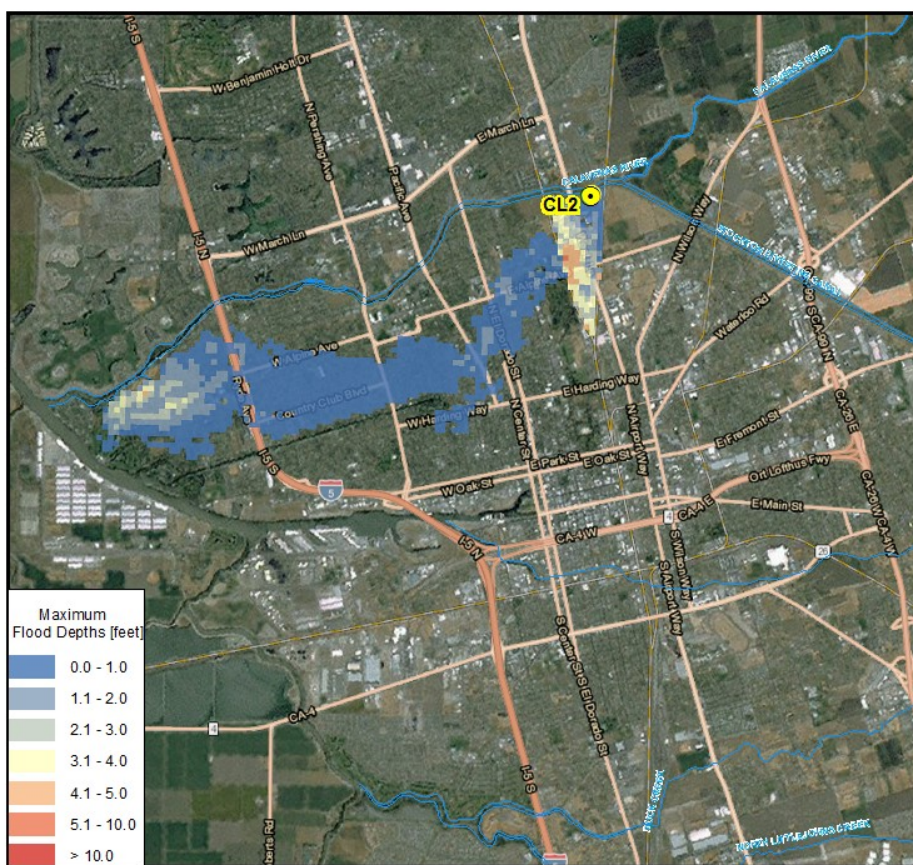


Figure 6 – 200 Year Inundation Map for Levee Breach Scenario at Index Point CL2

Figure 6 shows that most flood depths less than 1-foot deep, with areas of deeper ponding behind the levees along RD 1614 and between the railroads. All of the land in this breach floodplain is urban land. The table below describes the affected number of parcels and area of each land use type.

Table 8 – CL2 Breach Floodplain

Areas within CL2 Breach Floodplain				
Land Use	Parcels	Parcel Percentage	Area (acres)	Area Percentage
Urban	6166	100%	1301	100%
Total	6168	100%	1301	100%

The right bank of the Stockton Diverting Canal (Index Point SR1) was found to have geometry deficiencies in the LSJRFS. In the event of a breach at this location, floodwaters would inundate approximately 2,000 acres of land.

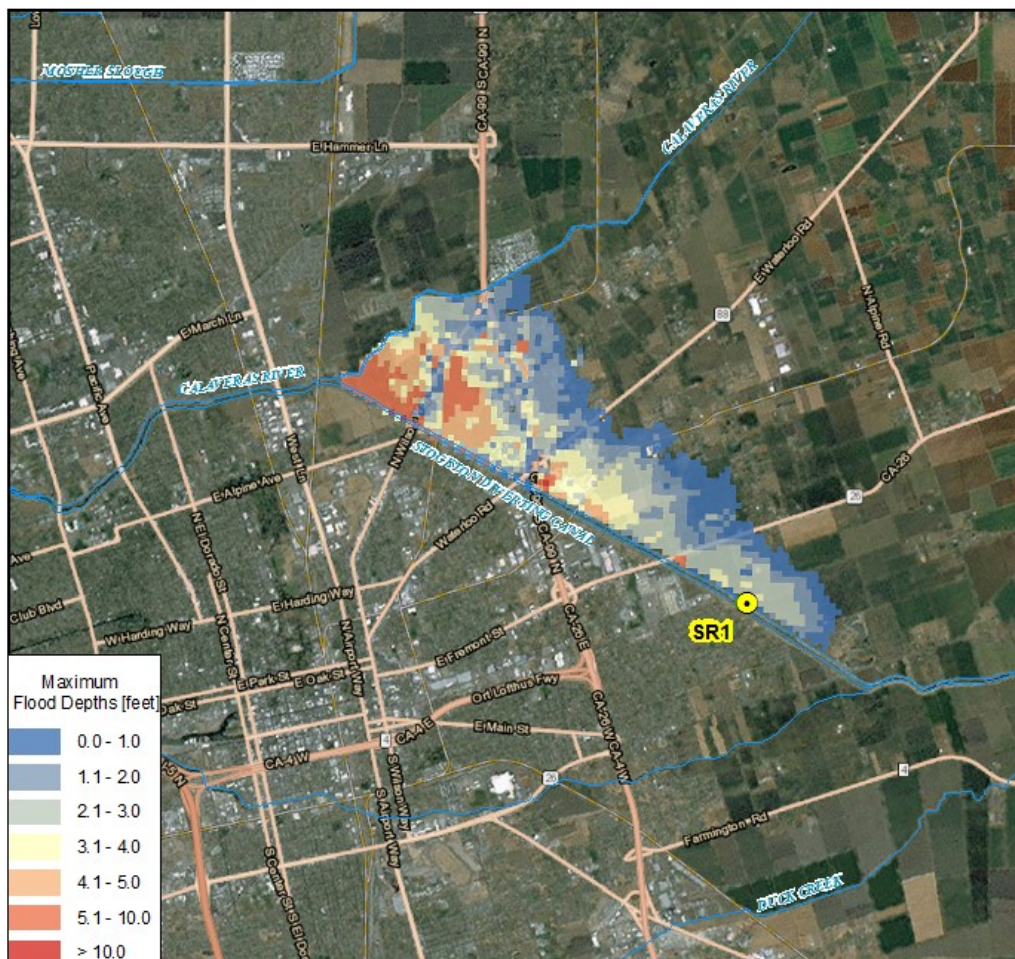


Figure 7 – 200 Year Inundation Map for Levee Breach Scenario at Index Point SR1

The majority of the land affected by a breach in this location would be farmland of statewide importance, as well as a significant amount of urban area. Table 9 describes the affected number of parcels and area of each land use type.

Table 9 – SR1 Breach Floodplain

Areas within SR1 Breach Floodplain				
Land Use	Parcels	Parcel Percentage	Area (acres)	Area Percentage
Urban	483	65%	715	37%
Veg/Graze	50	7%	85	4%
Farmland	207	28%	1148	59%
Total	740	100%	1948	100%

The left bank of the Stockton Diverting (Index Point SL1) was found to have an overall high level of concern in the 2012 CVFPP. In the event of a breach at along this reach, floodwaters would inundate approximately 9,500 acres of land.

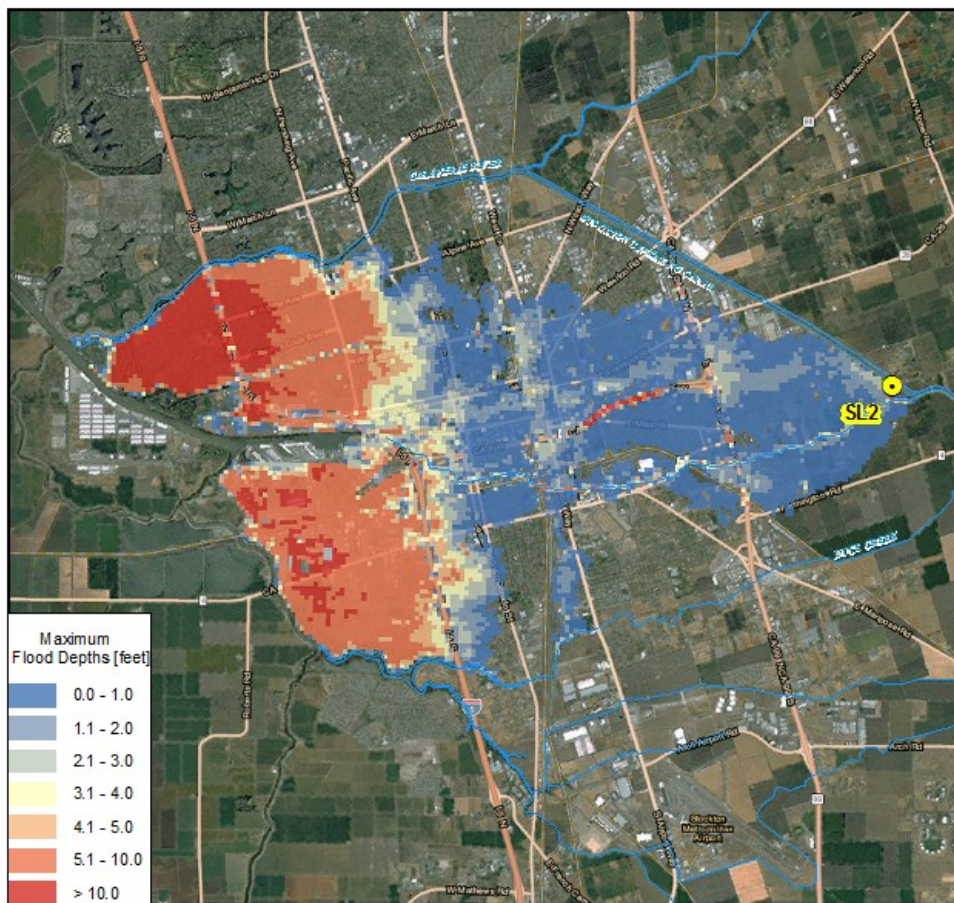


Figure 8 - 200 Year Inundation Map for Levee Breach Scenario at Index Point SL2

The majority of the land affected by a breach in this location would be urban land. Table 10 shows the affected number of parcels and area of each land use type.

Table 10 – SL2 Breach Floodplain

Areas within SL2 Breach Floodplain				
Land Use	Parcels	Parcel Percentage	Area (acres)	Area Percentage
Urban	30891	99%	8749	92%
Veg/Graze	57	0%	32	0%
Farmland	293	1%	733	8%
Total	31241	100%	9515	100%

Primary Concerns

Based on the information above and discussions with stakeholders in the Region, the list below was developed to present some of the primary concerns of the City of Stockton and the RDs within the City:

- Some levees are highly encroached which may threaten future levee accreditation & ULDC certification
- Some levees may not meet ULDC criteria, which may make a ULOP finding difficult after July 2016
- The local economy will be impacted if some development cannot be permitted after July 2016 pursuant to SB5
- Flow on the main stem of the San Joaquin River needs to be reduced or routed through a bypass before affecting urban properties
- Deficiencies along the Lower Calaveras River threaten a large urban area
- Many levees don't meet USACE ETL 1110-2-571 vegetation standards
- Many levees protecting Stockton are inactive in the PL 84-99 program
- The levees along the Smith Canal are no longer FEMA accredited
- The Wisconsin pump station needs to be improved
- Some Flood Contingency Maps need to be prepared
- Funding for updating the Flood Contingency Maps developed by San Joaquin County Office of Emergency Services (OES) is no longer available
- Need to improve the flood alert system
- Stability, seepage, and sedimentation issues along Fourteen Mile Slough
- Erosion and seepage concerns along levees around RD 2119
- Seepage, erosion, and interior drainage issues on RD 404
- The City of Stockton Wastewater Treatment Ponds are not protected from a 100-year flood event, which could impact water quality in the Delta in the event of a breach of levees around RD404 or RD 524

- Need to explore recreational opportunities along flood channels (i.e. bike path along Calaveras River and Mormon Channel)
- Water recreation (i.e. jet skis, water skiing, etc.) causes excessive erosion on levees within the City
- The ability of the dryland levee along the west side of RD2074 to protect the City of Stockton in the event of a flood of RD 2119 is unknown.

City of Stockton/County Projects

Potential projects identified through the RFMP process are described below

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Raise Duck Creek Levees	San Joaquin County	TBD	Flood Management	TBD	Design	\$22,000	1
Raise Little Johns Levees	San Joaquin County	TBD	Flood Management	TBD	Planning	\$460K	1
Replace Bridge on Bear Cr. (1.3 mi u/s of HW 99)	San Joaquin County	TBD	Flood Management	TBD	Conceptual	\$600K	2
Replace Bridge on Mormon Slough (2 mi u/s of Diverting Canal)	San Joaquin County	TBD	Flood Management	TBD	Conceptual	\$600K	2
Bear Creek System PL 84-99 Improvements	San Joaquin County, Stockton	TBD	Flood Management	TBD	Preparing SWIF	\$37M	1,2
Calaveras System PL 84-99 Improvements	San Joaquin County, Stockton	TBD	Flood Management	TBD	Preparing SWIF	\$24M	1,2
Restore Mormon Channel	City of Stockton	TBD	Flood Management	Ecosystem Restoration	Conceptual	\$50M	3
Repair Mormon Slough Bank	San Joaquin County	TBD	Flood Management	TBD	Conceptual	\$13.5M	2
WWTP Floodwall	City of Stockton	TBD	Flood Management	TBD	Conceptual	\$1.5M	3

Raise WW Pond Dikes	City of Stockton	TBD	Flood Management	TBD	Conceptual	\$2M	2
200-year Floodplain Maps & master plan, BA 1	San Joaquin County	TBD	Flood Management	TBD	Conceptual	\$2.1M	1
Plan for Stockton 200-year ULOP	City of Stockton	TBD	Flood Management	TBD	Conceptual	\$200K	1
200-year ULDC Analysis	City of Stockton	TBD	Flood Management	TBD	Conceptual	\$5M	2
Smith Canal Gate	City of Stockton	TBD	Flood Management	TBD	Conceptual	\$36M	1
USACE TSP (master plan)	San Joaquin County, Stockton	TBD	Flood Management	TBD	Feasibility Study	\$1.027B (not including Smith Canal Gate)	3

2.1.2 City of Lathrop

The City of Lathrop is located in both the Lower San Joaquin and the Delta South regions, is bisected by the San Joaquin River, and is bordered by Paradise Cut and the San Joaquin River. Upcoming developments include the River Islands development – an 11,000 home master-planned community on RD 2062. The City is bordered on its west side by levees and therefore shares similar flood risks with Stockton. Due to the high risk associated with a system failure, it is imperative that the levees around Lathrop provide 200-yr protection and are in good condition.

FEMA Accreditation

Figure 9 presents the status of FEMA accreditation for the levees protecting Lathrop.

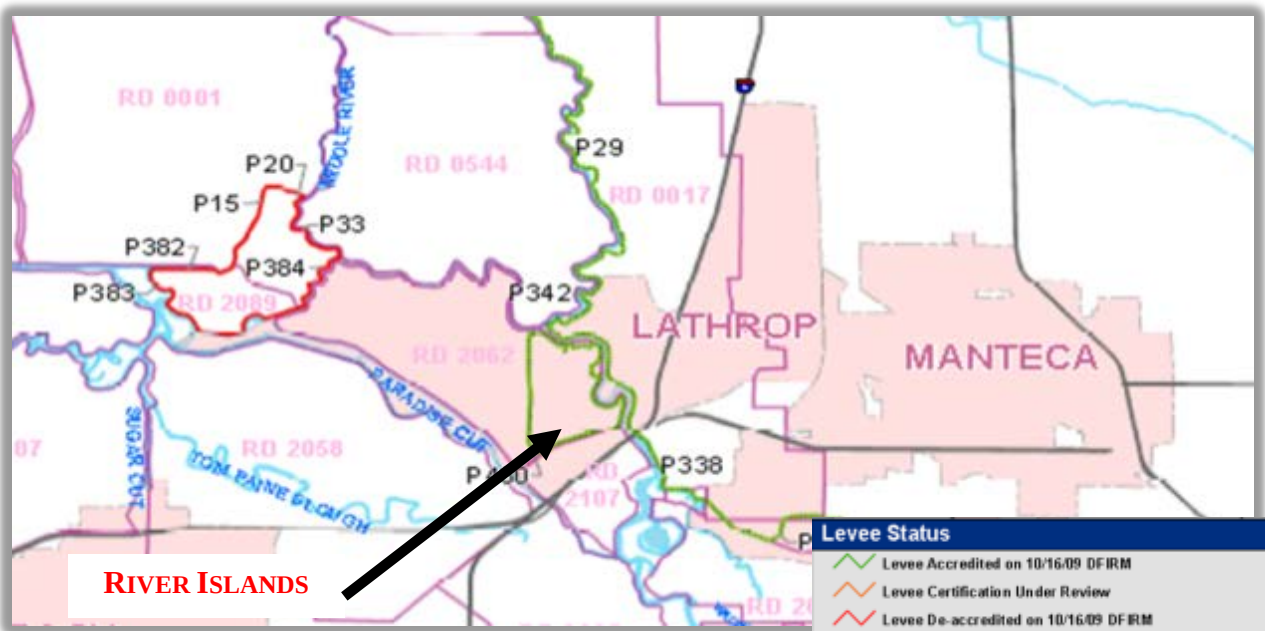


Figure 9 - Lathrop Area Levee Accreditation Status

The western portion of Lathrop is within the FEMA 100-year flood zone and the remainder of the City is within a Shaded Zone X flood zone. The ultimate goal for the City is to be fully developed, so the primary focus for the City will likely be to implement the necessary projects to remove the City from the FEMA 100-year flood, and to meet ULDC criteria. This will likely have to be done in partnership with RD 17, and RD 2062. Furthermore, the City of Lathrop is counting on future development to fuel growth of its economy. Without the necessary flood risk management projects, the economy of Lathrop is in jeopardy.

River Islands recently completed more than \$70 million in levee upgrades (and other improvements for development) to remove a portion of the City of Lathrop from the 100-year floodplain in 2006. These levees were designed and built to be approximately 300-feet wide to provide an increased level of flood protection. Construction of new homes began in late 2013.

Additional work by River Islands will include:

- Improve the existing levees along Old River

- Construct setback levee northeast of Paradise Cut between the railroad and I-5 on RD 2062
- Remove sediment just downstream from the Paradise weir to allow increase flow capacity of Paradise Cut to nearer the design flow
- Setback the levee along RD 2062 along Paradise Cut

It should be noted that the RD 2062 levees are anticipated to be improved as development occurs. All urban development on RD 2062 should only occur behind levees that meet the 200-year ULOP standard. It is further anticipated that prior to a phase being urbanized, the levees for that area will remain rural.

LSJRFS Preliminary Findings

As noted previously, levees along the right bank of the San Joaquin River in RD 17 also provide flood protection for a portion of the City of Lathrop. The RD 17 levees providing flood protection for the City of Lathrop were evaluated as part of the LSJRFS. A preliminary screening analysis was performed during the early stages of the LSJRFS which evaluated freeboard and geotechnical deficiencies. Levee geometry was evaluated, and didn't indicate any deficiencies along RD 17. The results of the preliminary screening analysis are shown in Figure 10 and Figure 11.

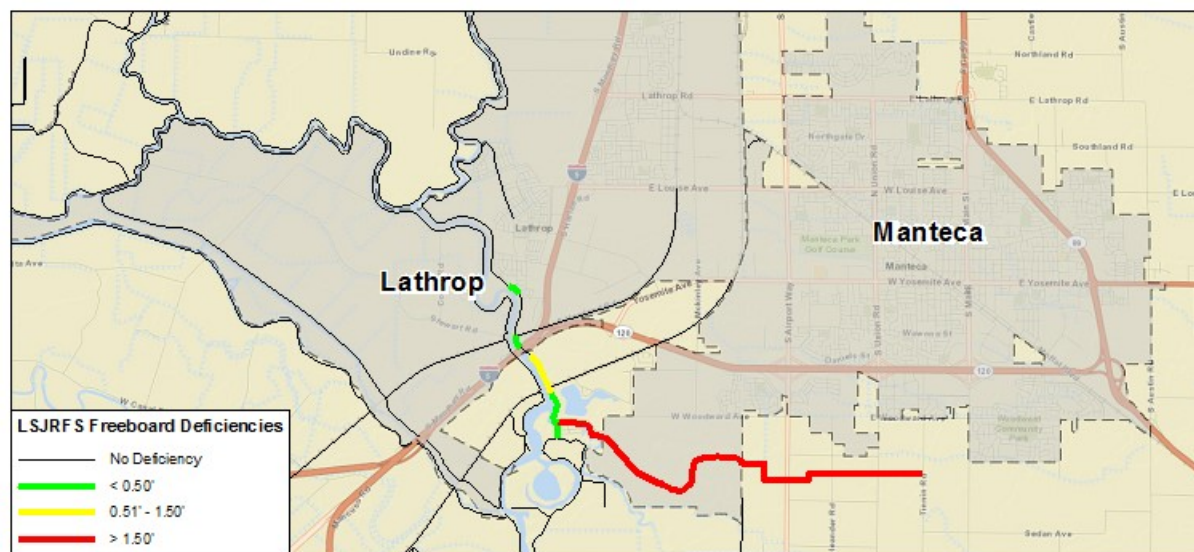


Figure 10 - RD 17 Freeboard Deficiencies



Figure 11 - RD 17 Geotechnical Deficiencies

The LSJRFS generally indicates that the levees along the west side of RD 17 have minor freeboard deficiencies and significant seepage issues. The dryland levee south of RD 17 has significant freeboard deficiencies.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the ULE/NULE evaluations. Figure 12 presents the Overall Hazard Level of levees in the Lathrop area.

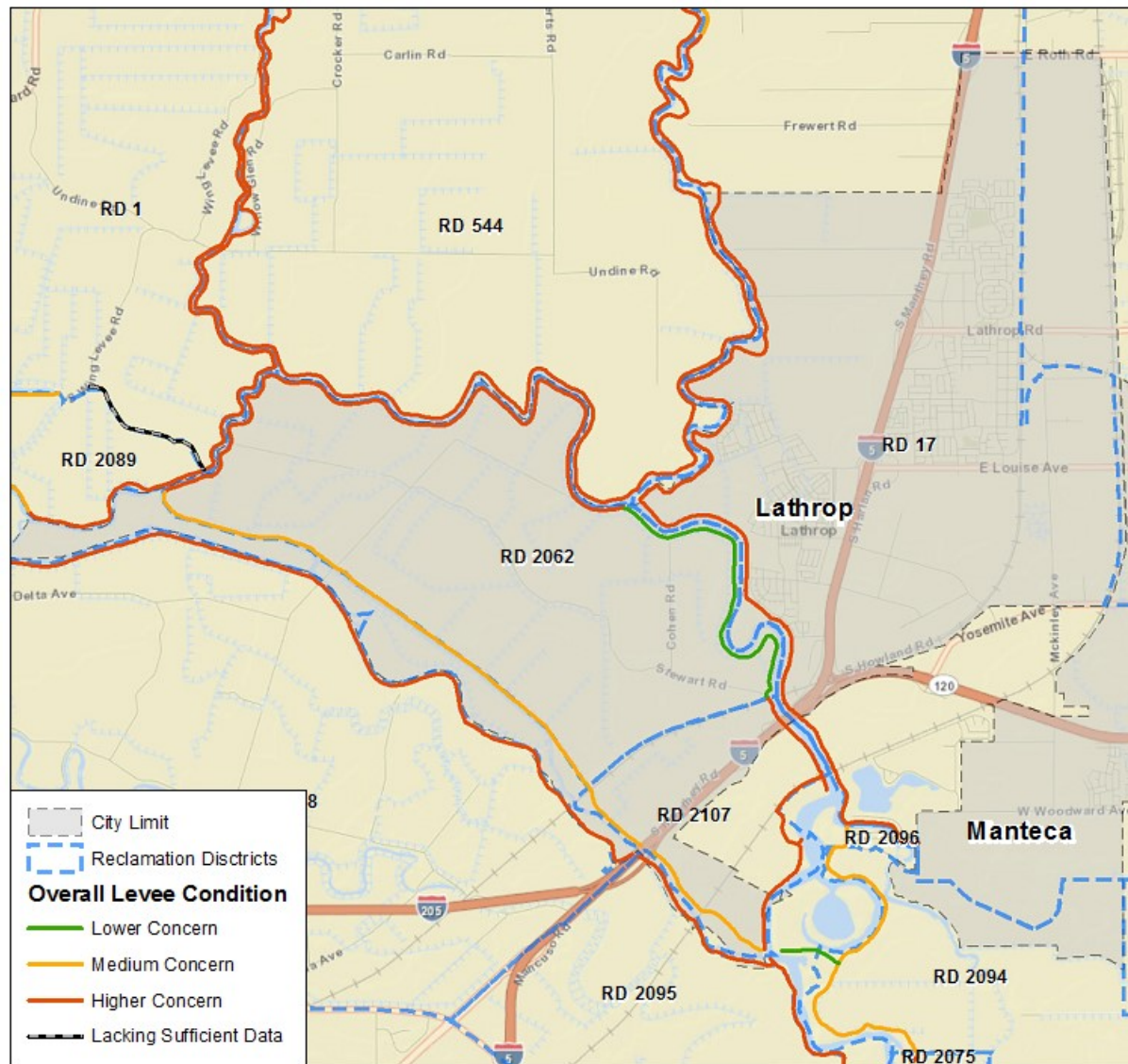


Figure 12 - CVFPP Overall Levee Conditions Lathrop

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the ULE/NULE evaluations. Details of these evaluations for levees in and around Lathrop are presented in Table 11.

Table 11 - ULE Results - City of Lathrop

ULE RESULTS - CITY OF LATHROP							
RD #	Name	Reach ID	Freeboard	Geometry	Seepage	Stability	Overall
17	Mossdale	A	Included in the City of Stockton Section				
		B					
		C					
		D					
		E	M	M	MG	M	MG
		F	M	M	DNM*	M	DNM
		G	M	M	DNM*	M	DNM
		H	M	M	MG	M	MG
		I	M	M	DNM	M	DNM
		J	M	M	DNM	M	DNM
		K	M	M	DNM*	DNM	DNM
		L	DNM	M	MG	M	DNM
		M1	DNM	MG	M	M	DNM
		N1	DNM	M	MG	M	DNM

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

Table 11 – Cont.

NULE RESULTS - CITY OF LATHROP								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2062	Stewart	1	193	A*	A	A*	A	A
		2	336	B	A	A	A	B
		3	256	C	C	C	B	C
2107	Mossdale Island	1	208	C	B*	C	A	C
		2	259	B	B	B	A	B

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

The information in the table above provide an indication of the nature of deficiencies used by DWR to determine the overall levee hazard level. This can be used as a measure of the overall reliability of each levee segment.

Flood System Repair

The Flood System Repair Project has identified the number of past critical and serious performance incidents for RD 2062. These were primarily related to seepage and erosion as shown in Table 12.

Table 12 - FSRP Results - City of Lathrup

FSRP RESULTS - CITY OF LATHROP									
RD #	Name	Seepage Critical	Seepage Serious	Stability Critical	Stability Serious	Erosion Critical	Erosion Serious	Freeboard Critical	Freeboard Serious
2062	Stewart	2	6	-	-	-	2	-	-

PL84-99 Status

The levees protecting RD 2062 and RD 2107 are inactive in the PL 84-99 program; the RD 17 levees have requested re-inspection.

Both RD 2062 and RD 2107 feel they were inadequately notified of their PL 84-99 status. Nevertheless, both districts are correcting deficiencies and will be requesting reinstatement in 2014 or request that a SWIF be entered into.

O&M Ratings

Maintenance of levees in Lathrop is performed by the individual RDs. The 2012 LMA report cited vegetation and encroachment issues for RD 17; rutting, erosion, and vegetation were noted for RD 2062; and slope stability was a concern for RD 2107. Table 13 provides a summary of the overall maintenance rating for each RD within the City of Lathrop.

Table 13 - City of Lathrop O&M Ratings

CITY OF LATHROP O&M RATINGS			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2014
17	Mossdale	Acceptable	Minimally Acceptable*
2062	Stewart	Unacceptable	Minimally Acceptable
2107	Mossdale Island	Acceptable	Minimally Acceptable

A rating of “Minimally Acceptable*” was given for RD 17 due to small portions of unacceptable erosion and encroachment issues. RD2062 received a U rating due to vegetation, encroachment, and depressions/rutting issues.

As stated above, RD 2062 has corrected, and will continue to correct deficiencies as identified by DWR and USACE.

Risks Associated With Deficiencies

The deficiencies identified above represent areas where flood control systems have a higher likelihood of failure. Since nearly the entire City of Lathrop is completely protected by levee systems that means the entire population of the City, as well as the entire infrastructure within the City is potentially at risk in the event of a flood system failure.

A review of infrastructure at risk within the City of Lathrop indicates a fire station and police station, community buildings, schools, wastewater treatment facilities, pump stations, and domestic water wells. In addition to this infrastructure, major “big-box” stores, and industrial facilities impacted by a flood could have a significant impact on the local economy. Additionally, the I-5 and State Route 120, as well as two UPRR railroads, water infrastructure, and telecommunication networks traverse the City, and are at risk due to a system failure. Risks associated with outages of these facilities are similar to the risks described for the City of Stockton.

The City of Lathrop is contained within FEMA 100-yr and Shaded Zone X floodplains, meaning that the entire population and assets are within the 100-yr floodplain, or are outside the 100-yr floodplain due to levees. Table 14 shows the acreage and number of parcels for different land use types within the FEMA 100-yr floodplain, and Shaded Zone X areas.

Table 14 - Property at Risk in the City of Lathrop

PROPERTY AT RISK IN THE CITY OF LATHROP							
100 Year Flood Zone				Shaded Zone X			
Land Use	Parcels	Area (acres)	Area Percentage	Land Use	Parcels	Area (acres)	Area Percentage
Urban	17	44	1%	Urban	5922	3318	52%
Veg/Graze	44	146	3%	Veg/Graze	159	157	2%
Farmland	203	4270	96%	Farmland	444	2936	46%
Total	264	4460	100%	Total	6525	6411	100%

Primary Concerns

Based on the information above and discussions with stakeholders in the Region, the list below was developed to present some of the primary concerns of the City of Lathrop and the RDs within the City of Lathrop:

- Address FSRP seepage and erosion issues
- Reinstate levees around RD 2062 and RD 2107 active in the PL 84-99 program
- Some levees may not meet ULDC criteria, which may make a ULOP finding difficult after July 2016
- The local economy will be impacted if some development cannot be permitted after July 2016 pursuant to SB5
- Flows on the main stem of the San Joaquin River may threaten levees protecting Lathrop. Some options to reduce this flow were suggested including a combination of one or more of the following:
 - Increasing the capacity of Paradise Cut
 - Raising/strengthening levees surrounding Lathrop
 - Transitory storage upstream on the San Joaquin River (outside RFMP boundary)
 - Reservoir re-operation
- A Flood Contingency Map is needed for RD 2062 & RD 2107 (currently in-progress)

Lathrop Projects

The projects for Lathrop are shown separately in this Appendix for RDs 17, 2062, and 2107. Following is a summary of these projects:

- Improve RD 17 levees to 200-year ULOP
- Walthall Levee Extension
- Improve RD 2062 levees to 200-year ULOP

2.1.3 City of Manteca

General Area Information

The City of Manteca is located east of the City of Lathrop and is the second largest metropolitan area within the Lower San Joaquin River Region with a population of approximately 70,000. Manteca is not directly bordered by levees, although the levees on the west side of RD 17 along the San Joaquin River, and the dryland levee on the south end of RD 17 provide flood protection for the City. The dryland levee along the south boundary of RD 2094 is not intended to hold floodwaters from the south (upstream), instead it is intended to contain flows on RD 2094 and RD 2096 in the event of a levee breach of levees along RD 2094, RD 2096, or RD 17.

Therefore, the City of Manteca has a vested interest in the integrity of the RD 2094 and RD 17 levees. Additionally, the City of Manteca shares similar concerns to other metropolitan areas in the Regions regarding SB5. The City does not directly control levee improvements made by the RDs, but land use decisions at the City are dependent upon these districts to make progress toward completing necessary upgrades to meet ULDC criteria. To complicate matters, the 200-year inundation maps prepared by DWR in July 2013 did not include the City of Manteca, so it is difficult to predict what area(s) within the City are within the 200 year floodplain with depths of flooding greater than 3 feet and therefore subject to SB5.

2012 CVFPP:

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the ULE/NULE evaluations. Figure 13 presents the Overall Hazard Level of levees in the Lathrop area.

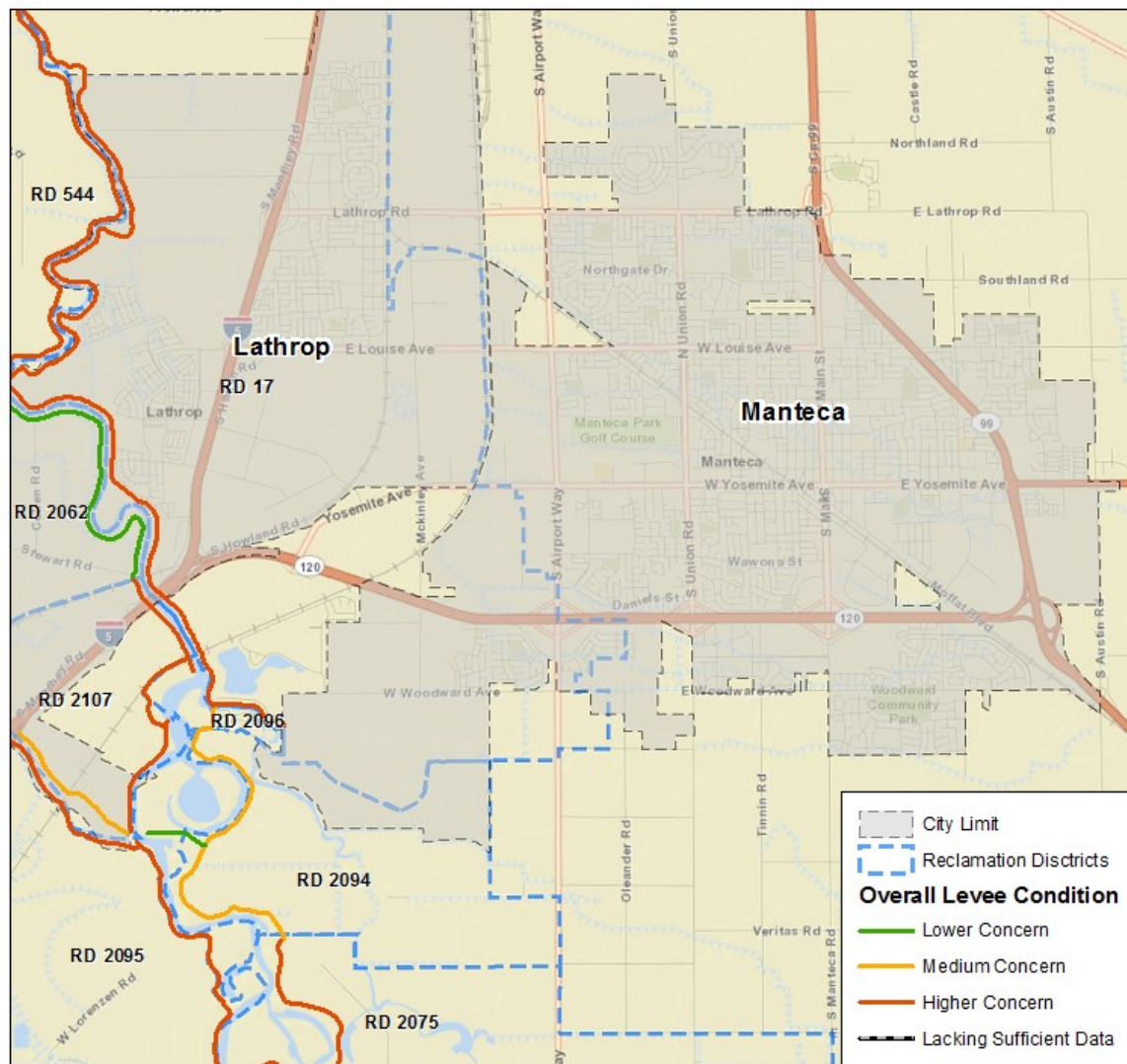


Figure 13 - CVFPP Overall Levee Conditions - Manteca

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for levees near Manteca are presented in Table 15.

Table 15 - NULE Results for the City of Manteca

NULE RESULTS - CITY OF MANTECA								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2094	Walthall	1	201	B*	A*	B*	A*	B
		2	337	-	-	-	A	A
2096	Weatherbee Lake	1	203	B	B	B	A	B

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

O&M Ratings

Maintenance of levees in and around Manteca are performed by the individual RDs. Table 16 provides a summary of the overall maintenance rating for each RD within the City of Manteca (RD 17 included with Lathrop). As noted below, RD 2096 received a U rating. This was due to major encroachment and animal control issues.

Table 16 - City of Manteca O&M Ratings

CITY OF MANTECA O&M RATINGS			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
2094	Walthall	Acceptable	Acceptable
2096	Weatherbee Lake	Acceptable	Unacceptable

Risks Associated With Deficiencies

The deficiencies identified above represent areas where flood control systems have a higher likelihood of failure. The western portion of the City of Manteca is within a FEMA Shaded Zone X floodzone. This is primarily due to flood protection provided by RD 17 levees.

Levee breach floodplains are not available for the Manteca area, but the portion of the City within the Lower San Joaquin River Region is contained within FEMA 100-yr and FEMA Shaded Zone X floodplains, meaning that the population in these areas are either within the 100-yr floodplain, or are outside the 100-yr floodplain due to levees. Table 17 presents the acreage and number of parcels for different land use types within the FEMA 100-yr floodplain, and Shaded Zone X areas.

Table 17 - Property at Risk in the City of Manteca

PROPERTY AT RISK IN THE CITY OF MANTECA (WITHIN REGION)							
100 Year Flood Zone				Protected by Levees			
Land Use	Parcels	Area (acres)	Area Percentage	Land Use	Parcels	Area (acres)	Area Percentage
Urban	15	1	0%	Urban	1186	433	24%
Veg/Graze	2	2	0%	Veg/Graze	58	86	5%
Farmland	38	433	99%	Farmland	137	1273	71%
Total	55	436	100%	Total	1381	1791	100%

Primary Concerns

Based on the information above and discussions with stakeholders in the Region, the list below was developed to present some of the primary concerns of the City of Manteca and the adjacent RDs:

- Some levees may not meet ULDC criteria, which may make a ULOP finding difficult after July 2016
- The local economy may be impacted if some development cannot be permitted after July 2016 pursuant to SB5
- Flows on the main stem of the San Joaquin River may threaten levees protecting Manteca. Some options to reduce this flow were suggested including a combination of one or more of the following:
 - Increasing the capacity of Paradise Cut
 - Raising/strengthening levees surrounding Lathrop
 - Transitory storage upstream on the San Joaquin River (outside RFMP boundary)
 - Reservoir re-operation
- The non-project cross levees are on the north and south boundary of RD 2094 are lower than and less reliable than the project levees along the San Joaquin River.

Several feet of silt build-up in the San Joaquin River has impacted the capacity of the San Joaquin River.

Manteca Projects

Projects for Manteca are covered by those for RD 17.

2.2 Reclamation Districts

Following are descriptions, hazards, and potential projects for the RDs within the Lower San Joaquin Region. Since RD representatives know the hazards for their individual areas better than anyone, potential projects are very focused on correcting problems with existing levees and other facilities. In most cases, there is little opportunity for projects other than fixing levees in place.

2.2.1 RD 17 Mossdale

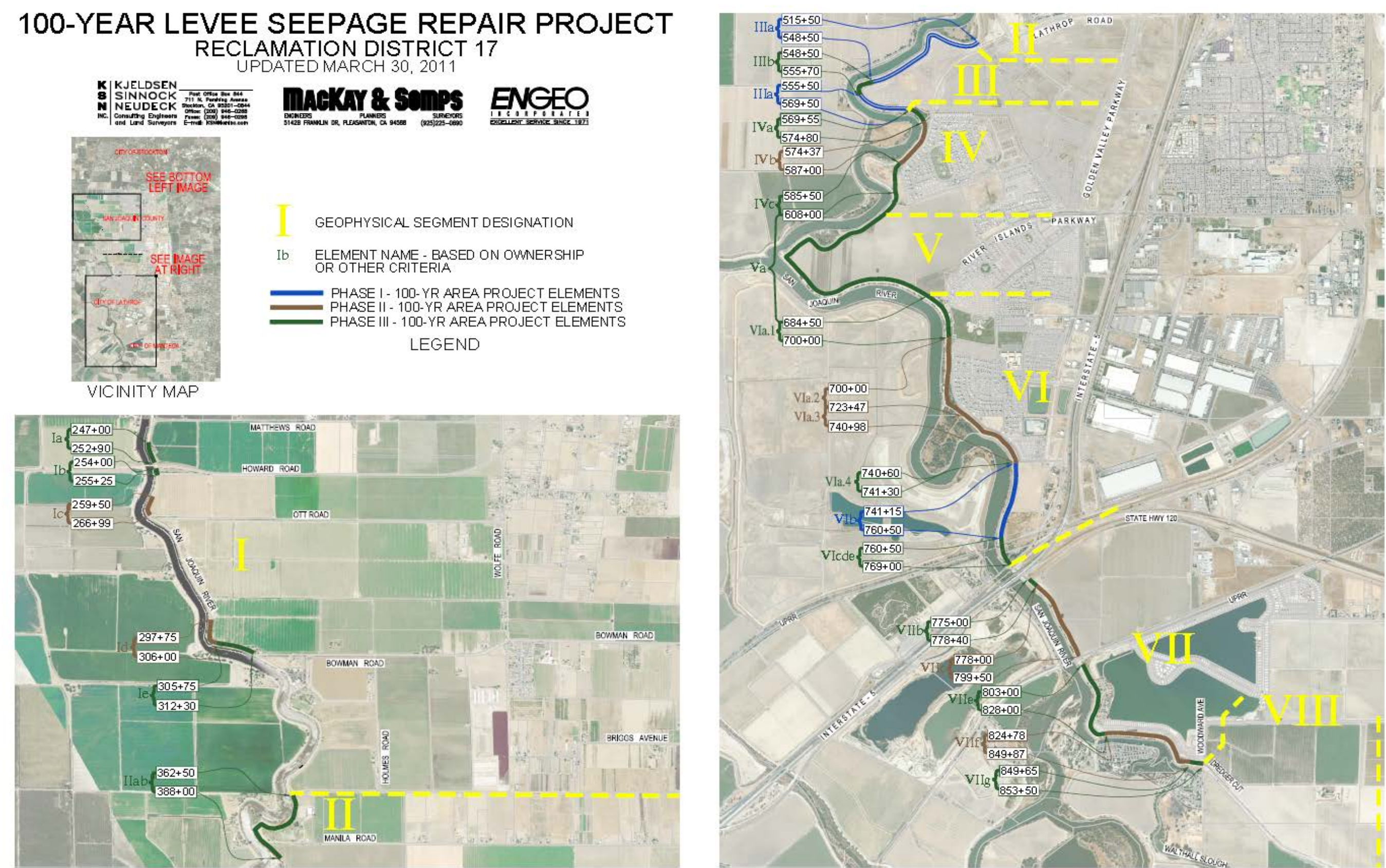
RD 17 encompasses approximately 11,221 acres and is responsible for O&M for approximately 16.2 miles of project levee, and 2.8 miles of non-project levee. Of these lengths, only about 4.25 miles of project levee, and 6.0 miles of non-project levee are within the City of Lathrop. Approximately 42,000 people currently rely on the RD 17 levees for flood protection. RD 17 levees are important to areas of Stockton, Lathrop, and Manteca.

The levees along RD 17 are prone to seepage during high water events. To address these deficiencies, RD 17 embarked on a plan to remediate seepage problems on their levees under the State's Early Implementation Program (EIP). The first two phases of this project have been completed and has included seepage berms and through seepage improvements. The work for these projects is shown on Figure 14.

Phase III will include a setback levee downstream from Old River, slurry walls, and seepage berms along the right bank of the San Joaquin River (see Figure 15). RD 17 had intended to seek Federal credit via the LSJRFS, but may not be possible since RD 17 200-year levee improvements have been removed from the USACE tentative selected plan.

RD 17 is conducting a ULDC analysis of the levee to determine areas that need further work to bring the District up to 200-year ULOP, Phase IV.

Figure 14 – Phase I and II



LEVEE SEEPAGE REPAIR PROJECT - PHASE III
RECLAMATION DISTRICT 17
UPDATED OCTOBER 9, 2013

K S N KJELDSEN
SINNOCK
NEUDECK
INC. Consulting Engineers
and Land Surveyors
Post Office Box 846
711 N. Pershing Avenue
Stockton, CA 95207-0846
Phone: (209) 946-0288
Fax: (209) 946-0286
E-mail: ksn@ksninc.com

Mackay & Soms
ENGINEERS PLANNERS SURVEYORS
51425 FRANKLIN DR., FRESNO, CA 94388 (925) 225-0990

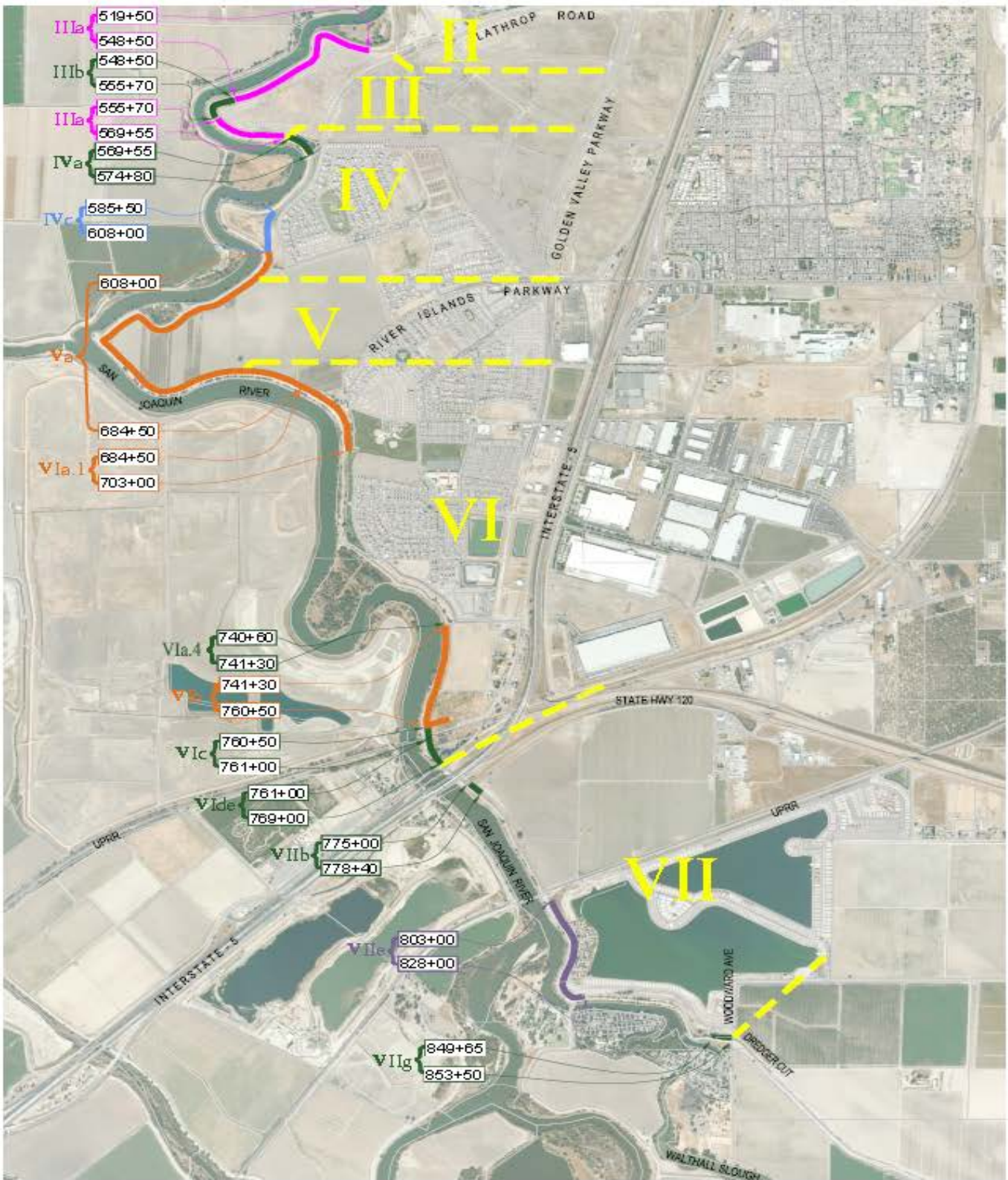
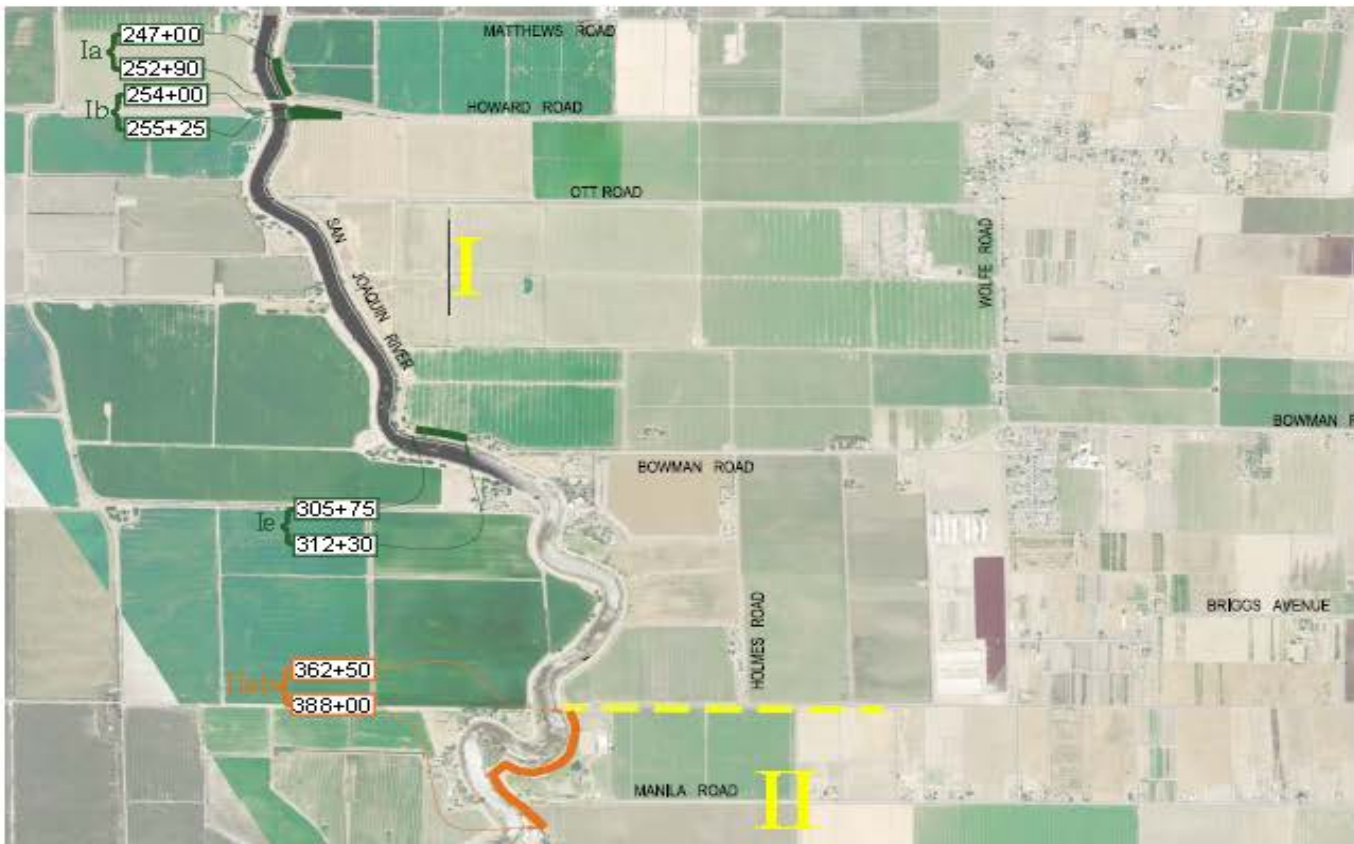
ENGEO
INCORPORATED
504-111-5010 504-111-5011 504-111-5012



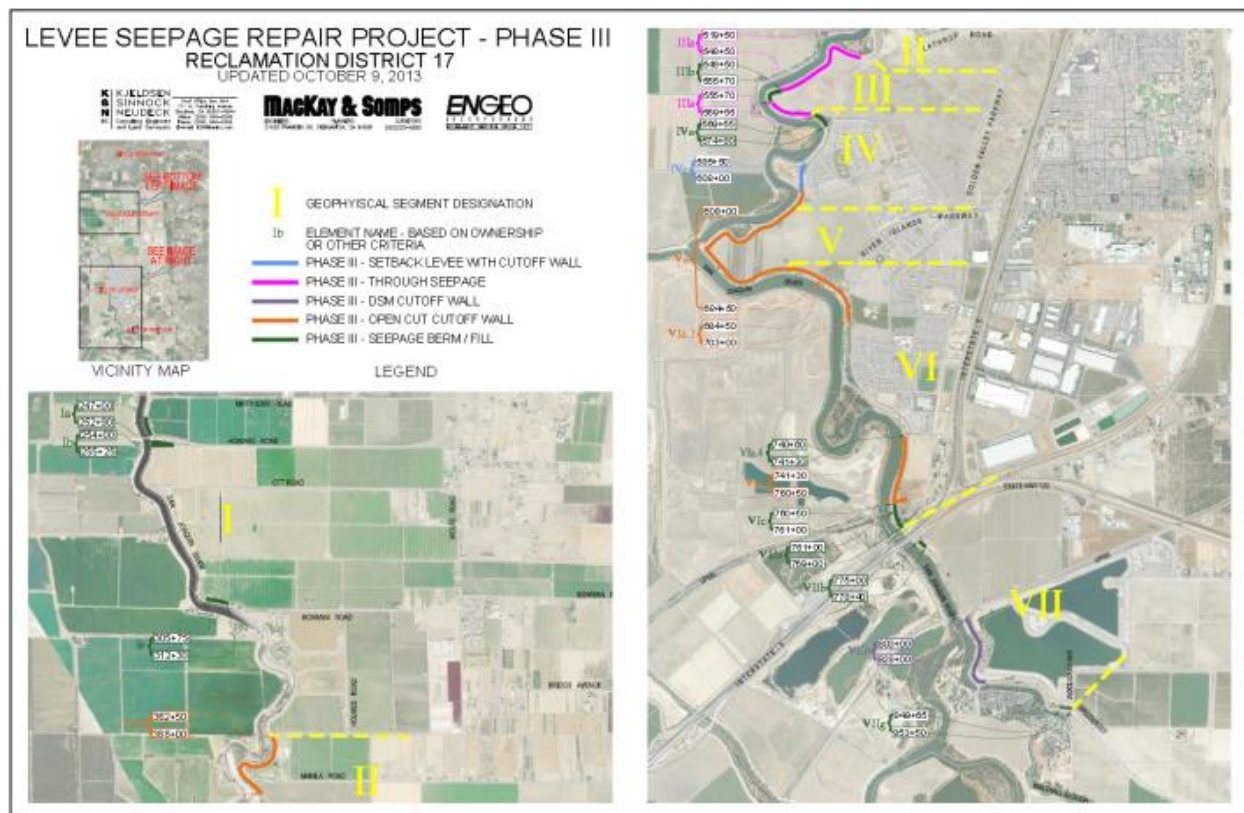
VICINITY MAP

- I** GEOPHYSICAL SEGMENT DESIGNATION
- Ib** ELEMENT NAME - BASED ON OWNERSHIP OR OTHER CRITERIA
- PHASE III - SETBACK LEVEE WITH CUTOFF WALL
 - PHASE III - THROUGH SEEPAGE
 - PHASE III - DSM CUTOFF WALL
 - PHASE III - OPEN CUT CUTOFF WALL
 - PHASE III - SEEPAGE BERM / FILL

LEGEND



Phases 1 & 2 are complete. Funding is available for Phase III, but awaiting permits.



Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost
RD 17, LSJRFS, SSIA	RD 17, DWR, USACE	DWR, USACE	Flood Management	Ecosystem Benefits	Already Funded waiting permits	\$332M Total, \$36M Remaining (Ph. III)

Since Phases I and II are complete, and Phase III is funded and waiting construction, these projects are not included in the potential projects for RD 17. Potential future projects are described below.

RD 17 Projects**Walthall Levee Extension**

The south boundary of RD 17 consists of a dryland levee known as the Walthall Levee. This levee protects the District in the event of levee failures along the right bank of the San Joaquin River, upstream (south) of the District. The current levee is susceptible to being flanked during a flood event upstream of the District. Extending this levee easterly will help protect the District from future flood events entering from RD 2094.

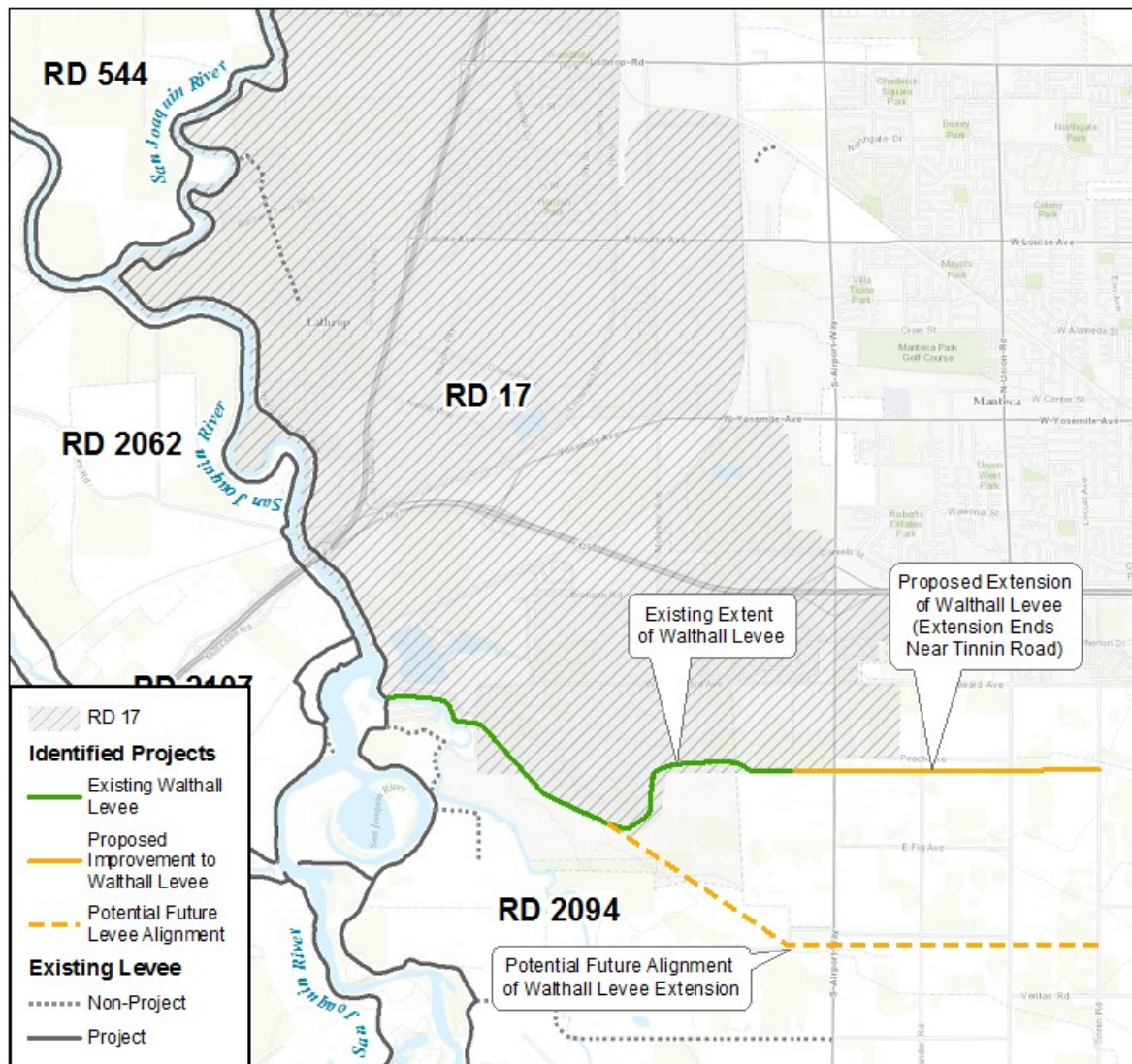


Figure 16 - Walthall Levee Extension

Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
RD 17, CVFPP	RD 17, DWR, USACE	DWR, USACE	Flood Management	TBD	Planning	\$18M (CVFPP)	2

Levee Improvements to 200-Year ULOP – Phase IV

Based on the ongoing ULDC analysis, the District will improve levees to 200-year ULOP. While reaches of levee are expected to already meet ULDC criteria, substantial work can be anticipated.

Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
RD 17, CVFPP	RD 17, DWR, USACE	DWR	Flood Management	TBD	Planning	\$150M (RD 17)	2

2.2.2 RD 403 Rough and Ready Island

RD 403 is not within either the Lower San Joaquin Region or the Delta South Region as defined by DWR. However, the District is of local interest and is closely associated with the Lower San Joaquin Region. RD 403 participated in the RFMP process. RD 403 encompasses approximately 1,451 acres and is responsible for O&M for approximately 5.5 miles of non-project levee. The levees are PL 84-99 inactive.

The levee around RD 403 is a non-project levee and is accredited by FEMA as providing protection against a 100-yr flood event. The long-term plan for RD 403 is to maintain this accreditation, but not to seek 200-year ULOP. One of the drivers for this decision is the fact that RD 403 does not have any residents. Additionally, as a condition of the Navy's transfer of land in RD 403 to the Port of Stockton, conditions were set forth prohibiting any future development of residences, schools, or hospitals.

RD 403 has experienced minor seepage along Burns Cutoff, and focuses annual routine O&M activities on riprap projects (\$25K/yr), rodent control, and weed control. Total annual O&M expenditures are range from \$25K - \$100K, and are funded by the port. There are currently no flood project assessments.

RD 403 recently completed bridge improvements for Dagget Road that will improve emergency access. The bridge improvement for Navy Drive is at the 60 percent design stage. The USACE annually removes sediment from various reaches of the ship channel. Dredging of the San Joaquin River to accommodate larger ships is also planned.

RD 403 Projects

No projects are currently planned for RD 403. The bridge improvements are nearing completion. Dredging by the USACE is part of annual sediment maintenance (approximately 200,000 cubic yards annually) along the ship channel. The District's ongoing work on levees, such as erosion protection along the San Joaquin River, is part of its routine annual maintenance.

2.2.3 RD 404 Boggs Tract

RD 404 encompasses approximately 2,130 acres and is responsible for O&M for approximately 4.75 miles of project levee and 0.65 miles of non-project levee.

All levees along RD 404 have an expired PAL and will be remapped into the floodzone with the next FEMA map revision (date currently unknown). RD 404 recently completed a 1600-foot long, \$1.1M slurry wall project starting at Hwy 4 and extending upstream. A future project is a 1200-foot long cutoff wall along French Camp Slough, just upstream of the San Joaquin River to address seepage issues. Another future project is the placement of approximately 7,000-feet of rock slope protection to address erosion on the waterside slope. Completion of these three projects, and after submitting a Letter of Map Revision (LOMR), RD 404 will meet FEMA 100-year flood protection standards. RD 404 will then pursue reaccreditation with the U.S. Army Corps of Engineers (USACE) requirements to be active in the PL 84-99 Program for the project levee (except maybe addressing penetrations). The ultimate goal of RD 404 is to seek 200-year ULOP. RD 404 currently has approximately 5000 residents and is 60-65% developed. RD 404 recently passed a Prop 218 election and brings in approximately \$500K in annual assessments.

The RD 404 levee system not only protects residents, but also schools, industrial facilities, the Port of Stockton, and very importantly the Stockton wastewater treatment plan. The District has a Flood Contingency Map that was last updated in April 2013. Figure 17 shows the identified flood system hazards.

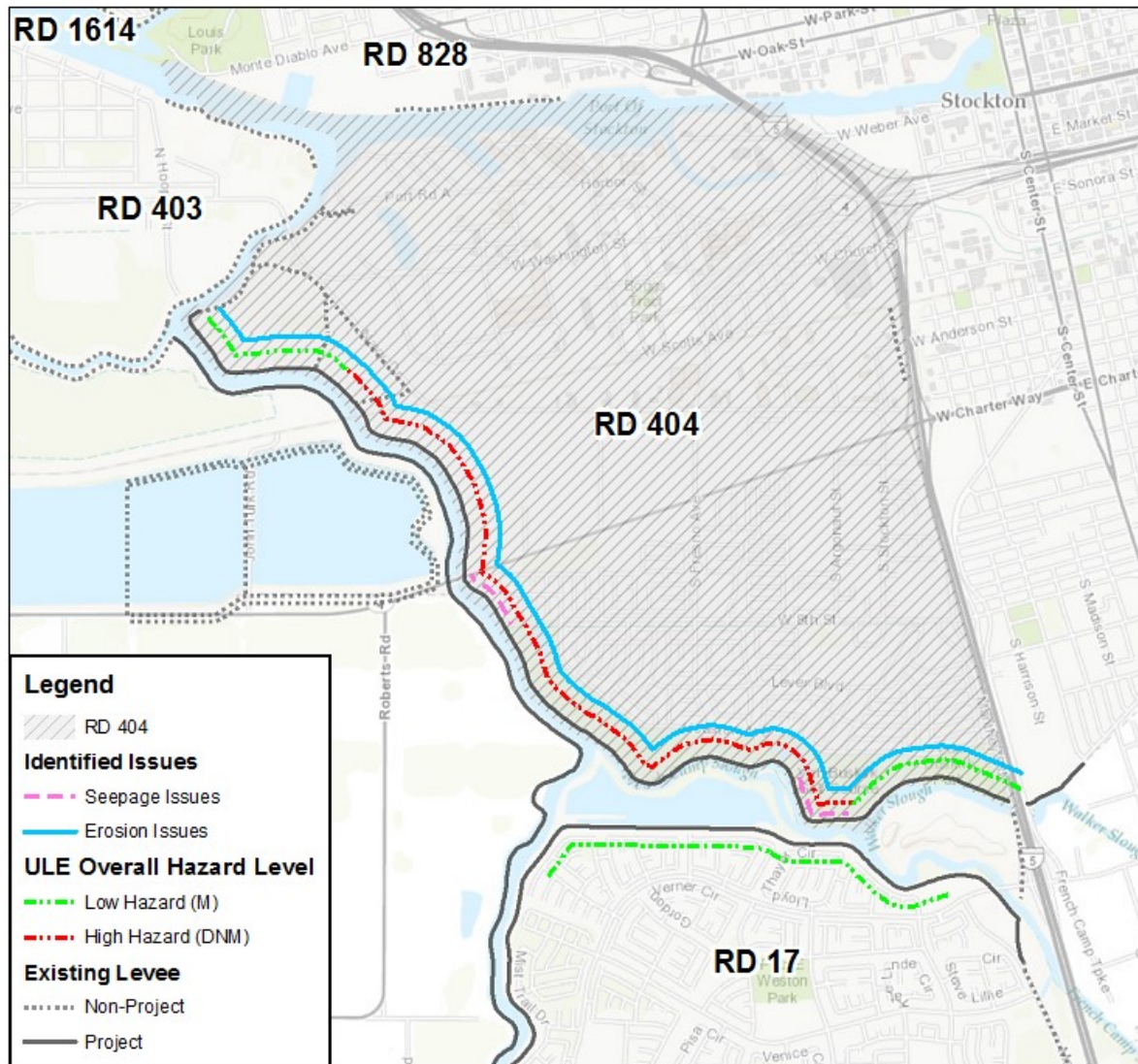


Figure 17 - RD 404 Flood System Hazards

RD 404 Projects***Cut-off Wall along French Camp Slough***

The right bank of French Camp Slough is prone to seepage. The District has identified the need for a cutoff wall along the right bank of French Camp Slough, just downstream of Walker Slough. The proposed cutoff wall would extend along French Camp Slough for approximately 1,200 feet. The approximate project limits are shown in Figure 18.



Figure 18 - Cut-off Wall along French Camp Slough

Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
RD 404	RD 404	TBD	Flood Management	TBD	Planning	\$1.1M	1

Erosion Protection along RD 404 Levees

This project is aimed at addressing erosion issues along RD 404 levees. It will include the placement of approximately 7,000 feet of 18-inch minus riprap at various locations along the right bank of the San Joaquin River, French Camp Slough, and Walker Slough, all at elevations above USACE jurisdiction.

The projects have been broken down into three priority levels. Priority 1 contains approximately 2,430 lineal feet of riprap, with an estimated cost of \$215,000. Priority 2 contains approximately 4,200 lineal feet of riprap, and is estimated to cost \$336,200. Priority 3 contains approximately 350 lineal feet of riprap, with an estimated cost of \$28,250. Thus, the project will have a total cost of approximately \$579,500. The priorities indicate the orders of the projects (Priority 1 first) – but all will be completed within the next few years and included in the RFMP Tier 1 projects. The approximate location of the project and priority areas is shown in Figure 19.



Figure 19 - Erosion Protection along RD 404 Levees

Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
RD 404	RD 404	TBD	Flood Management	TBD	Planning	\$600,000	1

RD 404 Interior Drainage and Pump Station Improvements

An interior drainage analysis was performed in May 2010 for RD 404 to determine if the existing capacities of the pump stations, together with temporary detention storage within streets, ditches, and ponds, are sufficient to manage the expected runoff from a 24-hour, 100-year storm. The six drainage sheds identified can be seen in Figure 20.

The results of the analysis indicate that only Eighth Street Drainage Shed (red) and Navy Drive West Drainage Shed (purple) will have flooding less than one foot deep during a 100-year flood event. The Highway 4 North Drainage Shed, Mormon Slough Drainage Shed, Port of Stockton Drainage Shed, and Unincorporated Boggs Tract Drainage Shed had pumping system deficiencies.

The figure below shows the pump stations that require upgrades to convey the 100-year storm flows. Additionally, the unincorporated Boggs Tract drainage shed does not have a pump station, and is therefore subject to significant flooding. A pump station should be added to this drainage shed to limit flood depths during a 100-year flood event.

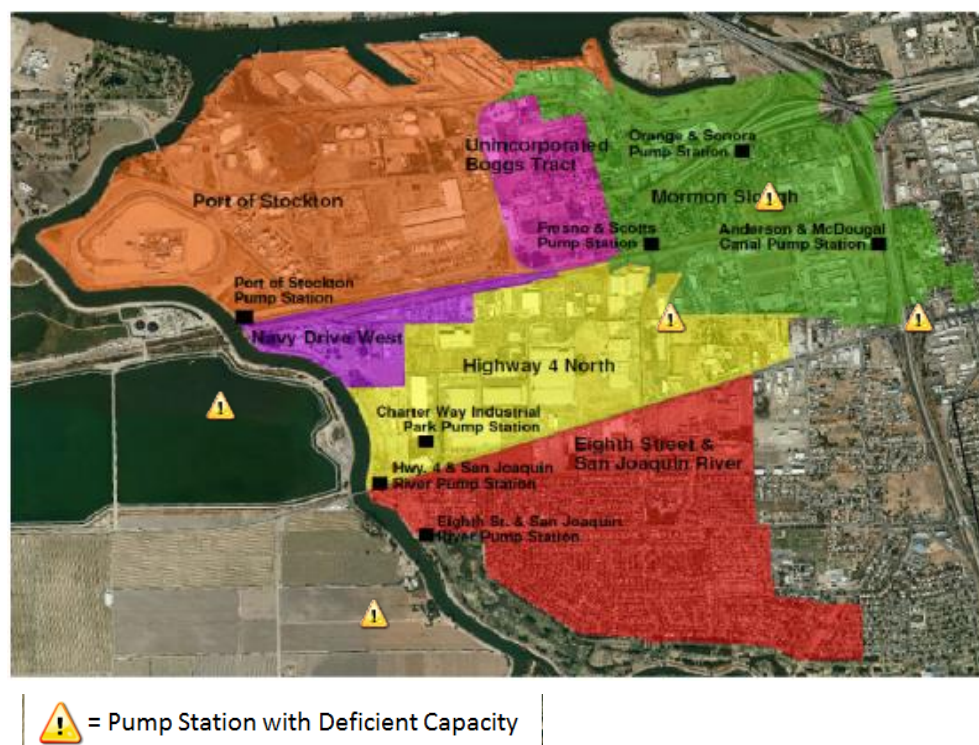


Figure 20 – RD 404 Interior Drainage

Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
RD 404	RD 404	TBD	Flood Management	TBD	Planning	\$2.4M (Port) \$100K x3 for others	1

Resolve Levee Penetration Issues

Many levee penetrations need remediation, especially in areas north of Highway 4.

Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
RD 404	RD 404	TBD	Flood Management	TBD	Planning	\$2M	2

2.2.4 RD 828 Weber Tract

RD 828 encompasses approximately 1,131 acres and is responsible for O&M for approximately 1.8 miles of non-project levee along Smith Canal.

Flood system challenges identified for RD 828 include highly-encroached levees along Smith Canal, non-accredited levees along Smith Canal, and lack of a 5-year plan.

RD 828 Project

The Smith Canal project is the sole project currently contemplated for RD 828 (see City of Stockton Projects for a description).

2.2.5 RD 1608 Lincoln Village West

RD 1608 encompasses approximately 566 acres and is responsible for O&M for approximately 3.6 miles of non-project levee.

Seepage

RD1608 is one of the initial Reclamation Districts to be evaluated under the DWR Urban Levee Evaluation (ULE) program. Preliminary levee through and under seepage and stability analyses have been completed based on historic and recently acquired geotechnical data. Per RD 1608, approximately 92% of their levees were found to be in good condition and meet current ULDC and USACE stability and seepage criteria. However, a small segment of levee adjacent to the Grupe Park area (initially estimated up to 1,500 feet long; now thought to be closer to 800 feet) did not meet seepage and stability criteria. A boring at the Southwest corner of Grupe Park contained a layer of peat soil. Considering the historic geomorphology of the area, the analyses showed that a peat layer likely extends along this reach in the levee foundation. Considering the reduced strength and higher seepage rate of peat soil, the preliminary calculations show that the

stability and seepage values fall a little below the factors of safety required by criteria in this segment.

RD1608 representatives requested DWR perform additional explorations, lab testing, and analyses in order to better define the spatial extent of the peat problem and thus the resulting size and cost of any required levee remediation project. Due to funding constraints, DWR was unable to perform the locally requested additional exploration and lab testing effort. Considering DWR's inability to fund the effort, the RD1608 Board recently approved \$20,000 to obtain additional exploration & lab testing information. This will be provided to DWR / Kleinfelder to enhance the final ULE Program analysis of the RD1608 levees. Additional explorations were completed in December 2013, but the results of these explorations are currently unavailable. It is anticipated that the additional information will help to significantly reduce the length of RD1608 levee that may not meet ULDC & USACE levee stability / seepage criteria.

Sedimentation

Additionally, sedimentation has significantly impacted the navigability of Fourteen Mile Slough. RD1608 approved a Sediment Removal Project from Village Marina to the Feather River Road Bridge. This project would allow for continuity of operations for levee maintenance, minor repair, major rehabilitation, and emergency flood fight activities in this reach. It will also resolve the very limited landside levee access issue along the SW Levee portion of this reach.

Design, environmental studies, and required permit activities are currently ongoing. When this project was initiated, the USACE was indicating it would qualify for inclusion in the CALFED Levee Integrity Program. Based on this understanding, RD1608 passed a Prop 218 election in 2010 that included sufficient funds to cover the RD1608 portion of the cost (approximately \$1,000,000).

After several years of positive input regarding inclusion in the CALFED Levee Integrity Program, the USACE, late in 2011, notified the District that the project did not meet criteria for inclusion in the CALFED program. The RD1608 Board of Trustees believes this project needs to move forward. However, the District's limited fiscal resources will likely be insufficient to move the project into construction.

RD 1608 Projects

Fourteen Mile Slough Slurry Wall Project

The recommended remediation for seepage at was to construct a 50-foot deep, 3-foot wide soil-bentonite slurry wall through the crown of the levee (from elevation +11.0 feet, NAVD 88 to elevation -40.0 feet, NAVD). Assuming the 50 foot deep slurry wall might extend over as much as a 800-foot segment of the levee, the resulting project cost could be as much as \$1,500,000 and the District could provide only a limited amount of the required cost for project implementation.

Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
RD 1608	RD 1608 / DWR	DWR	Flood Management	TBD	Pre-Design	\$1.5M	1

Figure 21 shows the location of the Fourteen Mile Slough Slurry Wall project.

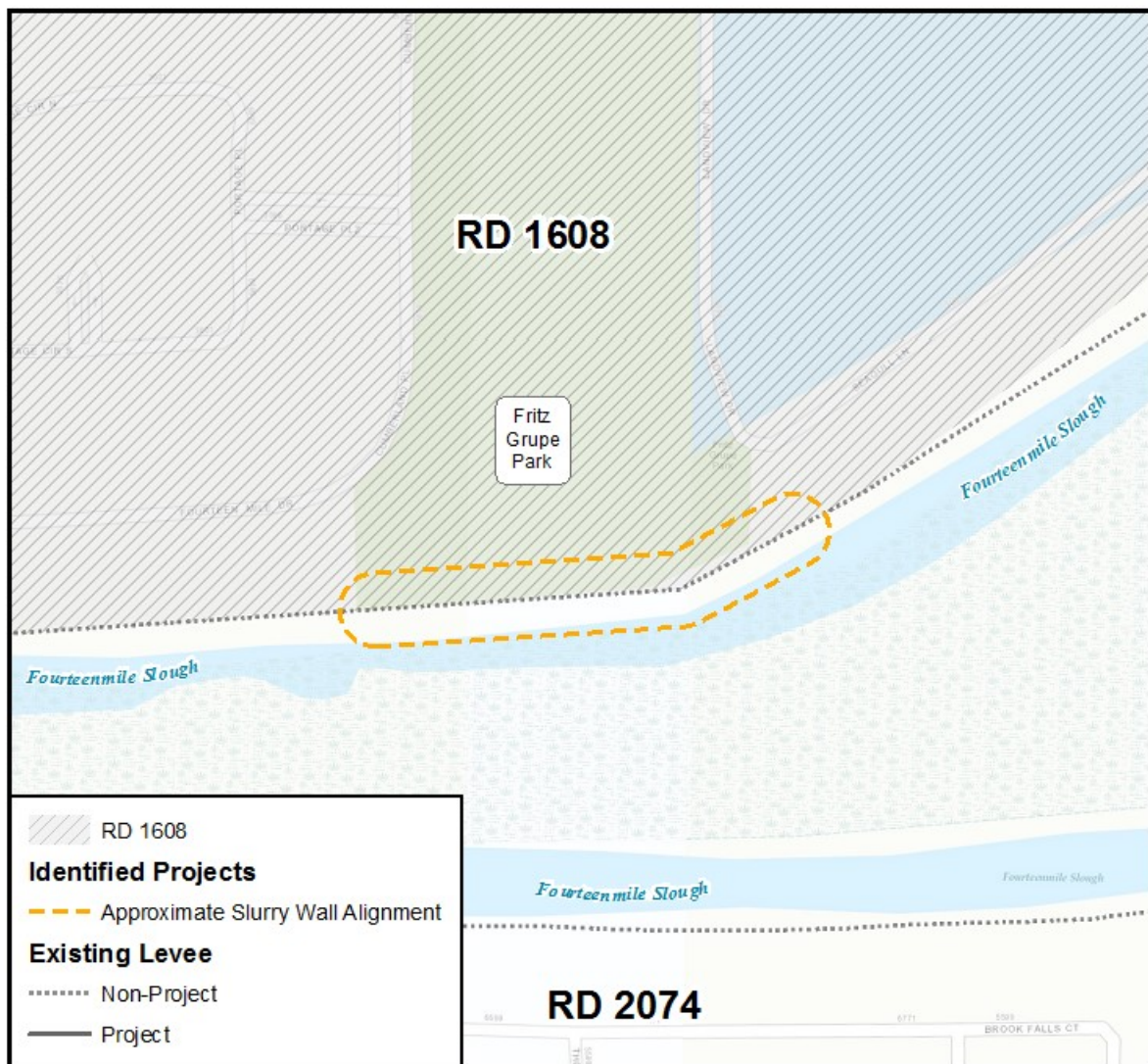


Figure 21 – Fourteen Mile Slough Slurry Wall Project

Fourteen Mile Slough Sediment Removal Project

To ensure water side levee access along the entire reach of Fourteen Mile Slough for which RD1608 has flood control jurisdictional responsibility, RD 1608 has approved the design and construction of a Sediment Removal Project from Village Marina to the Feather River Drive Bridge. This project will allow for continuity of operations for levee maintenance, minor repair, major rehabilitation, and emergency flood fight activities in this reach. It will also resolve the very limited landside levee access issue along the SW Levee portion of this reach.

Design, environmental studies, and required permit activities are currently ongoing. When this project was initiated, the USACE was indicating it would qualify for inclusion in the CALFED Levee Integrity Program. Based on this understanding, RD1608 passed a Prop 218 election in 2010 that included sufficient funds to cover the RD1608 portion of the cost (approximately \$1,000,000). After several years of positive input regarding inclusion in the CALFED Levee Integrity Program, the USACE, late in 2011, notified the District that the project did not meet criteria for inclusion in the CALFED program.

The RD1608 Board of Trustees believes this project needs to move forward. However, the District's limited fiscal resources will likely be insufficient to move the project into construction. The total estimated project cost (design, environmental studies and permits, and construction) is currently estimated to be approximately \$2,500,000. The District would provide between \$1,000,000 to \$1,500,000 of the required cost; the remainder would need to come from the DWR / State of California.

Figure 22 shows the location of the Fourteen Mile Slough Sediment Removal project.

Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
RD 1608	RD 1608	DWR	Flood Management	TBD	Design/ Permitting	\$2.5M	1

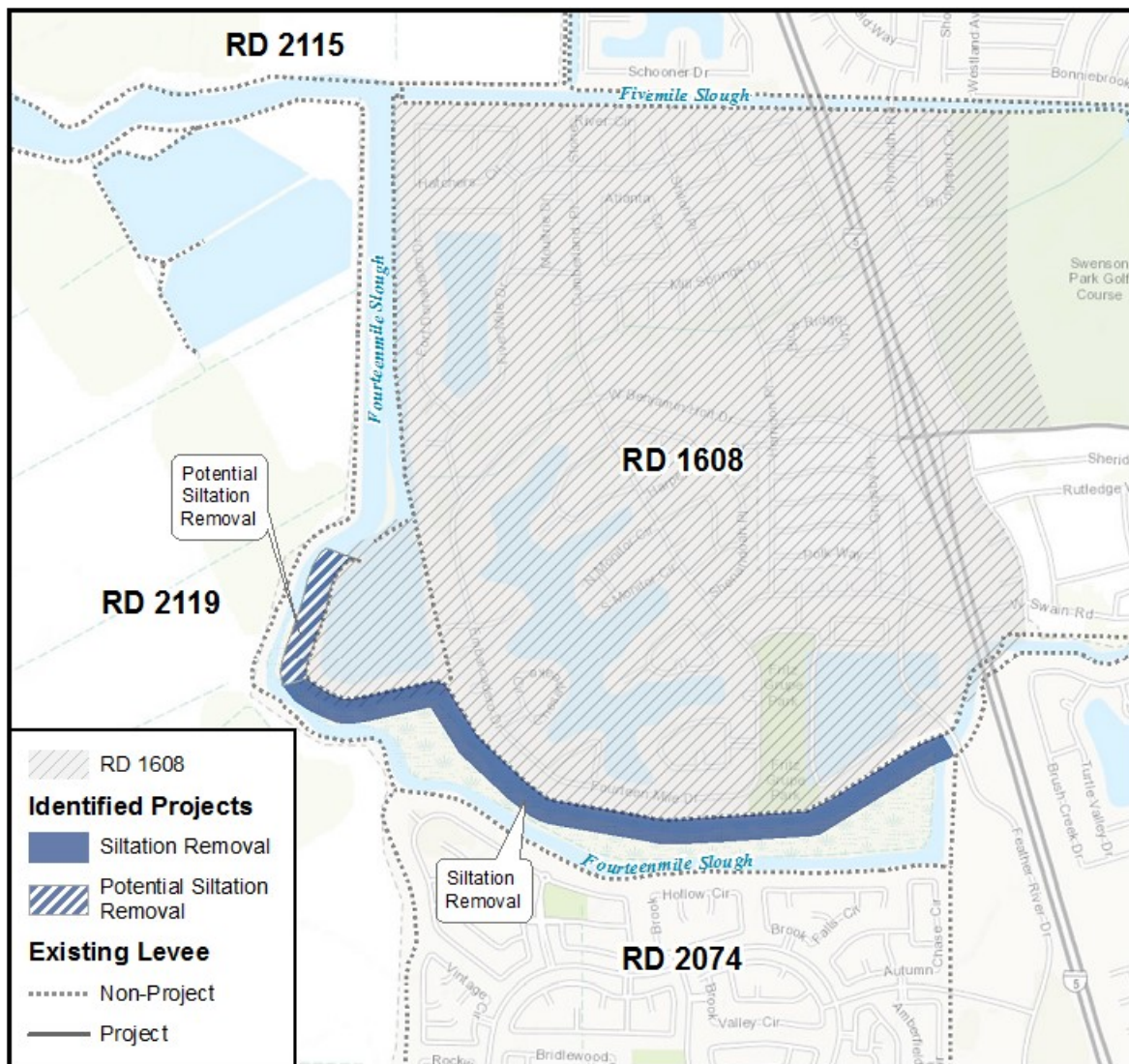


Figure 22 – RD 1608 Sediment Removal Project

2.2.6 RD 1614 Smith Tract

RD 1614 encompasses approximately 1,600 acres and is responsible for O&M for approximately 2.8 miles of non-project levee along Smith Canal. The SJCFCWCD provides O&M for the approximate 3.2 miles of project levee along the Calaveras River that protects RD 1614.

Stormwater runoff within RD 1614 is collected and conveyed via an extensive network of inlets and pipes owned and operated by the City of Stockton and the SJCFCWCD. The Wisconsin Pump Station provides storm drainage pumping for runoff from a drainage shed of nearly 700 acres – the largest drainage shed within RD 1614. It is currently sized with two pumps with a combined pumping capacity of approximately 10,000 gallons per minute (gpm) that discharge stormwater runoff into the Calaveras River. In order to provide 100-year protection, this capacity needs to be increased to approximately 30,000 gpm. As a result, these areas are expected to be mapped as a Special Flood Hazard Area (SFHA) by the Federal Emergency Management Agency (FEMA), and flood insurance requirements for property owners will be affected.

RD 1614 is in the process of designing and obtaining funding for the replacement of the Wisconsin Pump Station to provide protection from interior drainage from a 100-year storm event, which results in residual flooding of a portion of the approximately 1,700 parcels. To further complicate the situation, the existing pump station structure is severely antiquated and in danger of collapse. The sheet pile sump is reinforced with wood timber whalers that have rotted. The steel sheet piles themselves have rotted and are collapsing inward. The pump station cannot simply be upgraded – the entire pump station needs to be replaced. The District has completed much of the preliminary planning work for this project. The environmental assessment and CEQA compliance process is nearly complete. Surveying, mapping, and utility research has also been performed, and 30% design level of design drawings has been prepared.

RD 1614 is currently actively pursuing various funding mechanisms to assist with financing the Wisconsin Pump Station Replacement Project. RD 1614 is cooperating with the Stockton East Water District (SEWD) to apply for a Stormwater Flood Management Grant with DWR through its Integrated Regional Water Management grant program. It is expected that this grant would provide for a 50% cost share. In order to procure its 50% local share, RD 1614 also successfully passed a Proposition 218 measure in July of 2013 to fund this project in cooperation with SJAFCA.

Additional flood system challenges for RD 1614 include highly-encroached levees along Smith Canal and the left bank of the Calaveras River, and de-accredited levees along Smith Canal. Levees along the Calaveras River are accredited by FEMA.

Figure 23 shows the extent of RD 1614. Figure 24 shows the approximate extent of flooding due to deficiencies in the existing pump station.

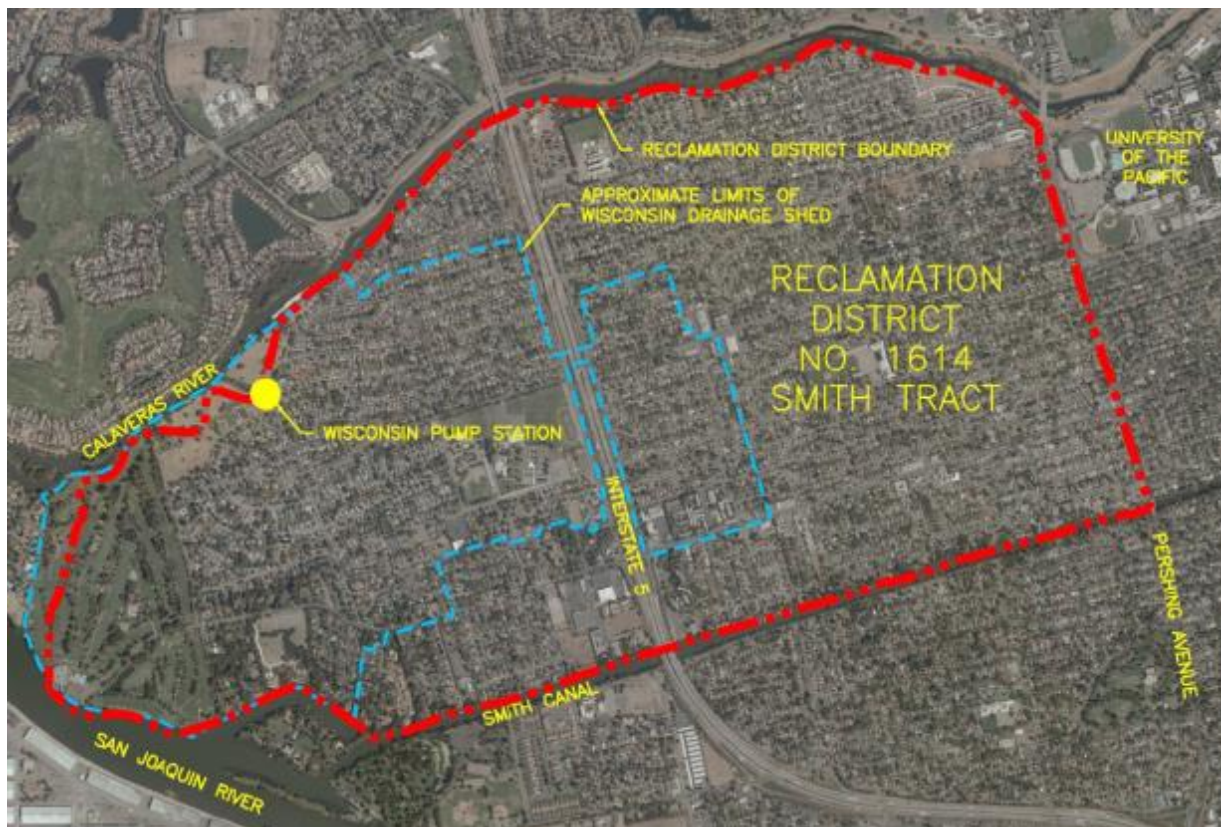


Figure 23 – RD 1614

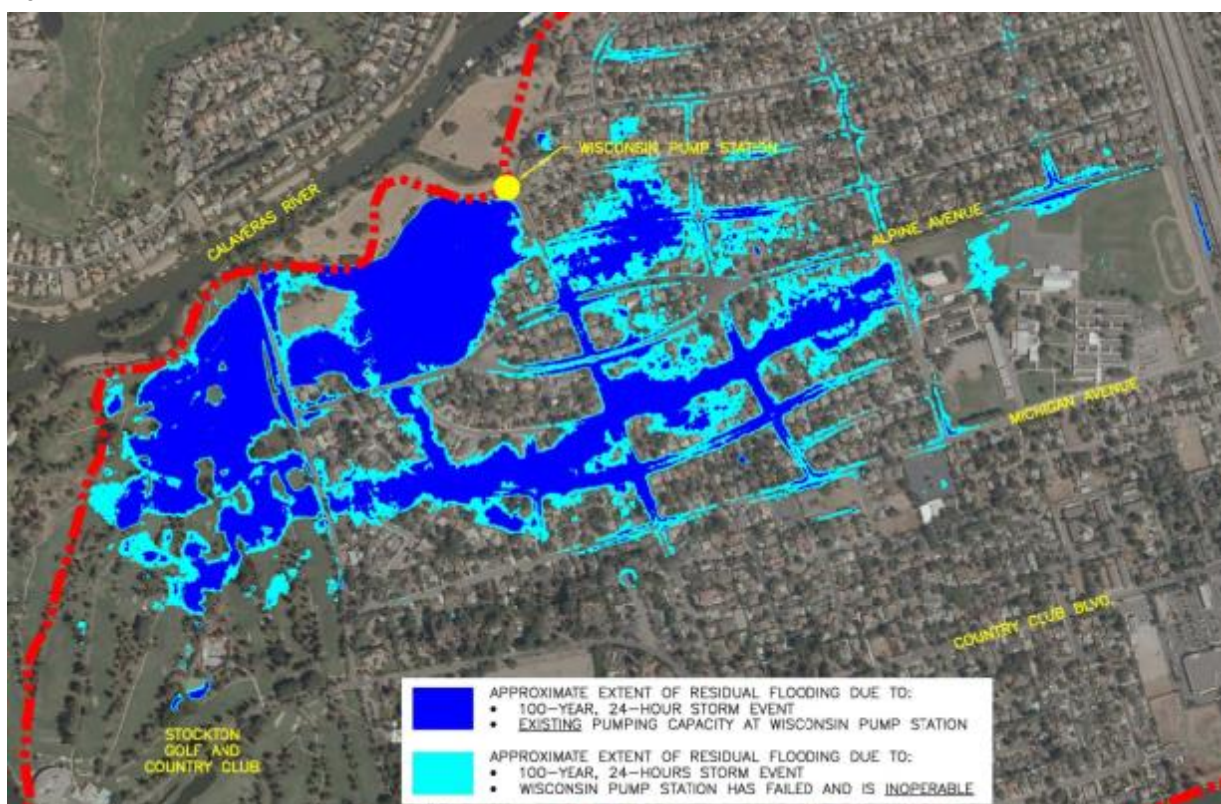


Figure 24 - Approximate Extent of Residual Flooding Due to Pump Station Deficiencies

RD 1614 Projects***Replace Wisconsin Pump Station***

Upon receiving assurances that the project will be adequately funded, the design process will continue with the goal of preparing a final set of construction documents including plans and specifications.

Project Identified By:	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
RD 1614	RD 1614	DWR	Flood Management	TBD	Pre-Design	\$2.4M	1

Smith Canal Project

The Smith Canal project (see City of Stockton Projects for a description) benefits both RD 1614 and RD 828.

2.2.7 RD 2042 Bishop Tract

RD 2042 encompasses approximately 3,100 acres and is responsible for O&M for approximately 8.0 miles of non-project levee. The levees around RD 2042 are accredited by FEMA. There were no significant flood system deficiencies identified by the District. As development takes place in the District, RD 2042 will pursue 200-year protection in accordance with the ULDC. It is noted that RD 2042 did not participate in DWR's ULE program. RD 2042 will fund future geotechnical evaluation of its levees.

RD 2042 Projects

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
ULDC Analysis	RD 2042	TBD	Flood Management	TBD	Conceptual	\$1.5M	1

2.2.8 RD 2064 River Junction

RD 2064 is bordered by the San Joaquin River to the west, by the Stanislaus River to the south, RD 2075 to the north, and by unincorporated San Joaquin County to the east. The District levee system consists of 12 miles of project levee that protects more than 5,888 acres of prime farmland, containing several residences, farm worker dwellings, barns, packing shed areas, and a winery.

There is not much existing information available for the RD 2064 levees. These levees have not been studied by any of the State, or Federal plans, and have not been evaluated in detail on a local level.

Some information was obtained during the initial small group meetings with stakeholders at the beginning of the RFMP process. According to the District engineer, many of the levees are too narrow to facilitate all-weather access. Additionally, vegetation, rodent, and erosion issues are the main concern for the District.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the NULE evaluations. RD 2064 was found to have generally moderate risk of failure due in most part to seepage and erosion concerns. Figure 25 presents the Overall Hazard Level of levees around RD 2064.

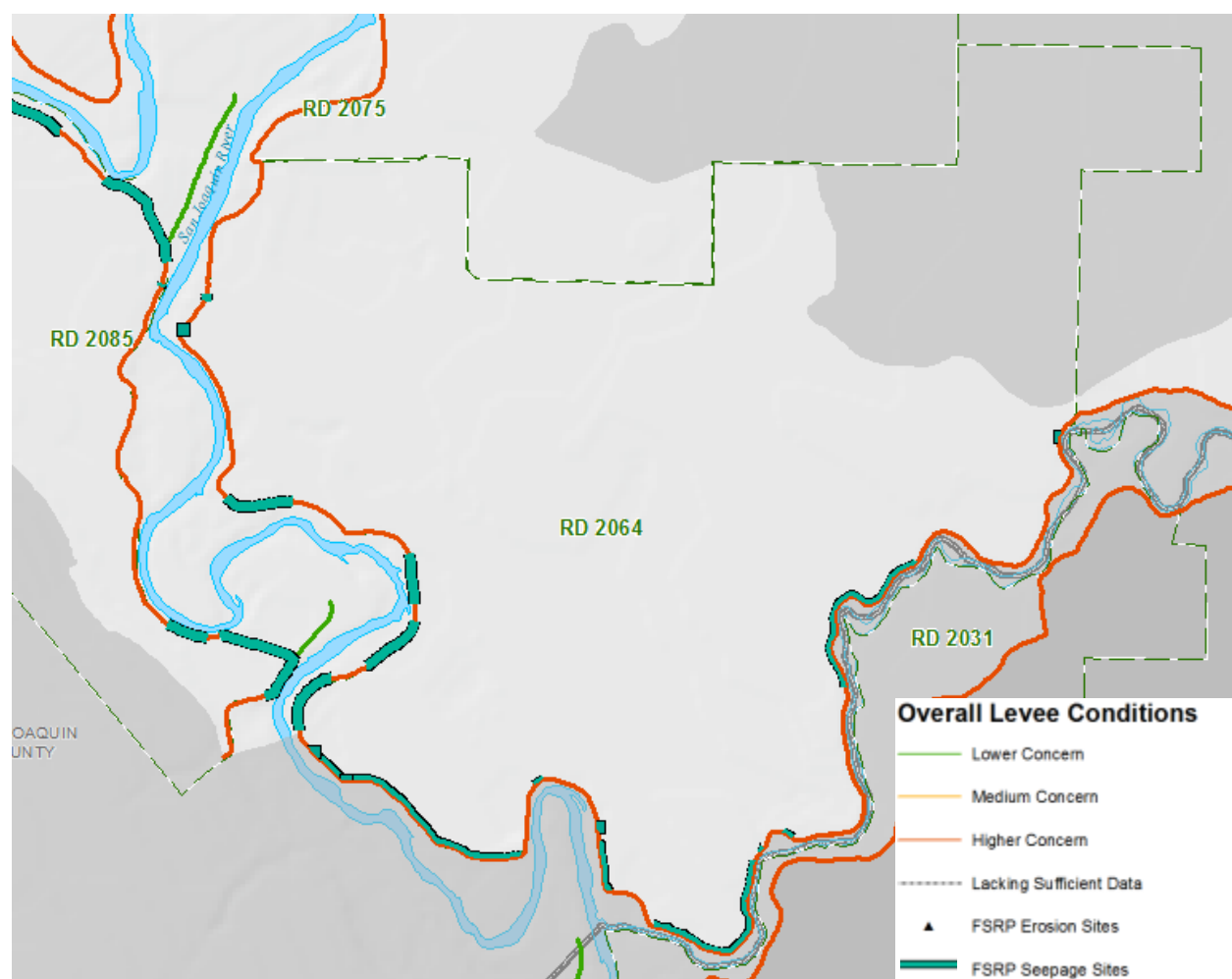


Figure 25 - CVFPP Overall Levee Conditions RD 2064

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for levees around RD 2064 are presented in Table 18.

Table 18 - NULE Results for RD 2064

NULE RESULTS – RD 2064								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2064	River Junction	-	195	C	A*	C	C	C
		-	257	C	A*	C	A	C

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

FSRP

RD 2064 was grouped with RD's 2075 and 2094 for this data. It is reported that the group has had four critical and 15 serious seepage events in the past, as well as one critical stability issue.

Table 19 - FSRP Results for RD 2064

FSRP RESULTS – RD 2064									
RD #	Name	Seepage Critical	Seepage Serious	Stability Critical	Stability Serious	Erosion Critical	Erosion Serious	Freeboard Critical	Freeboard Serious
2064	River Junction McMullen Walthall	4	15	1	-	-	-	-	-
2075									
2094									

O&M Inspections

Maintenance of levees is performed by RD 2064. An Acceptable rating was given to RD 2064, with crown surface/depressions/rutting being the only problem cited. Additionally, seepage issues were reported within the report during high flows in San Joaquin and Stanislaus Rivers, as well as rodent and encroachment issues, but were not included in the report. Table 20 provides a summary of the overall maintenance rating for the District.

Table 20 - O&M Results for RD 2064

O&M INSPECTION RESULTS – RD 2064			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
2064	River Junction	Unacceptable	Acceptable

Risks Associated With Deficiencies

The Delta Risk Management Strategy (DRMS) Phase 1 report estimates the total assets within the District as a whole to be approximately \$37.1 million. The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately \$3.7 million. Therefore, the total value of land and assets is estimated to be approximately \$40.8 million.

RD 2064 provides multiple types of habitat and harbors a variety of species that would be severely impacted by flooding. If these impacts required mitigation, the current cost to replace those habitat values would range from \$65,000 to \$145,000 per acre.

Primary Concerns

Based on the information above and discussions with stakeholders in the Region, the list below was developed to present some of the primary concerns of RD 2064:

- The levee crown widths are too narrow for all weather access
- Historical bank erosion at the boundary with RD 2075
- Erosion maintenance is an expensive ongoing problem that is complicated by the requirement for permits to place rock on the riverside of the levees.
- Bank sloughing add to sedimentation in the San Joaquin River which is not addressed by State or Federal agencies.
- There was a breakout upstream of the Airport Way Bridge during the 1997 flood. Subsequently repairs were made with additional piers and shoulder berms that may make the situation worse in the RD. However, hydraulic studies by San Joaquin County indicate that the earthquake retrofits to the bridge have no measurable impact on river hydraulics including water stage, water velocity, and sediment transport.

RD 2064 Projects

Projects identified include addressing PL84-99 deficiencies, erosion protection, seepage repairs, and installing an all-weather road along District levees. These projects are described in more detail below.

Address PL84-99 Deficiencies

The District would like to bring any portions of levee below the PL 84-99 standard.

Erosion Protection

The District noted erosion repairs are an expensive on-going part of their annual O&M. A specific problem area is at the northern boundary of the District near RD 2075. These erosion sites are in need of repair.

Seepage Repairs

Critical seepage sites have been identified by DWRs Flood System Repair Project (FSRP) along District levees. Seepage repairs need to be made at these sites along RD 2064 levees adjacent to both the San Joaquin and Stanislaus River.

Install All-Weather Road

The project levee along the San Joaquin River and Stanislaus River is too narrow and lacks an all-weather access road. The levee crown should be widened and an all-weather road installed to ensure travel along the levee is possible during a flood fight.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Address PL84-99 Deficiencies	RD 2064	TBD	Flood Management	TBD	Conceptual	\$800k	1
Erosion Protection	RD 2064	TBD	Flood Management	TBD	Conceptual	\$300K (Study & Plans) \$5.1M (Improvements)	3
Seepage Repairs*	RD 2064	TBD	Flood Management	TBD	Conceptual	\$625K (Study & Plans) \$45M (Improvements)	3
Install All-Weather Road	RD 2064	TBD	Flood Management	TBD	Conceptual	\$1M	1

*Project identified in FSRP

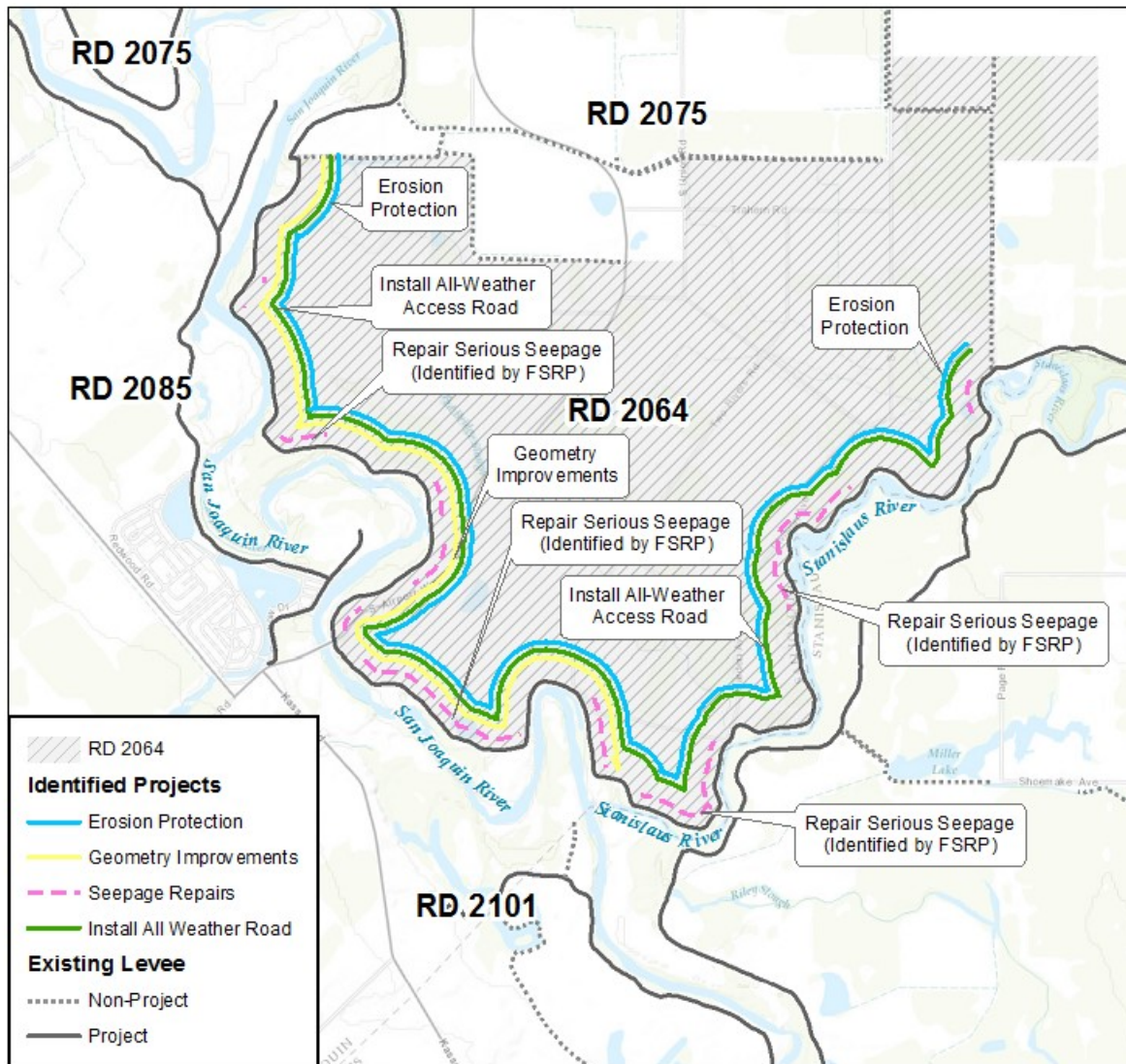


Figure 26 - RD 2064 Projects

2.2.9 RD 2074 Sargent Barnhart Tract

RD 2074 encompasses approximately 1,186 acres and is responsible for O&M for approximately 1.4 miles of project levee and 6.6 miles of non-project levee. The levees around RD 2074 are accredited by FEMA. RD 2074 is nearly 100% developed (2850 lots; 7500 population) and has a project levee along the Calaveras River, and non-project levee along the SJR, North and South Buckley Coves, Ten Mile Levee and Fourteen Mile Slough.

The non-project levee along Fourteen Mile Slough is “double-wide” starting at a point 1300 feet west of the eastern RD boundary. PG&E owns a section of the north-south levee along the east end of Fourteen Mile Slough and is considered a potential weak point in the system. The GIS map of RD 2074 included some levees along the east boundary of the RD, also known as Smith’s Levee, which has been degraded and are no longer a part of the flood protection system.

There is a dryland levee (10-mile Levee) on the west side of RD 2074 that protects RD 2074 (and Stockton) in the event RD 2119 floods. This levee has never been loaded or studied, so it is unclear whether this would protect RD 2074 in the event of a flood of RD 2119. A long fetch across RD 2119 producing wind/wave action is a concern for 10-mile levee. Some of this levee (west slope) is on RD 2119. RD 2074 would like to have the west face of this levee protected with rip rap but does not have the financial resources to attempt this \$5,000,000 project. This project is an important goal for the District to accomplish. The District places some rock for erosion protection as general maintenance.

RD 2074 believe their levees meet ULDC, although at this time they are only interested in pursuing 200-year ULOP if it is economical. The levee along the Calaveras River and Fourteen Mile Slough are adjacent to existing homes with a 10-foot setback from the levee toe to homeowner improvements. In the 1996/1997 floods, there was some seepage along the Calaveras River and Fourteen Mile Slough.

Annual assessments are \$650K. RD 2074 has a 5-yr plan, and is currently placing erosion protection along the Calaveras and San Joaquin Rivers.

RD 2074 Projects

Identified projects include improvements to Fourteen Mile Slough, dryland levee improvements, erosion protection, and seepage repairs. These projects are described in more detail below, and are shown on Figure 27.

Fourteen Mile Slough Levee Improvements

This project is important to RD 2074, but will likely be completed as part of the western Delta defense for larger areas of Stockton.

Dryland Levee Improvements

Ten Mile Levee, the dryland levee on the west side of RD 2074 that protects RD 2074 (and Stockton) in the event RD 2119 floods, has never been loaded or studied, so it is unclear whether this would protect RD 2074 in the event of a flood of RD 2119. A long fetch across RD 2119 producing wind/wave action against Ten Mile levee is a concern.

Erosion Protection

The District would also like to have the west face of the Ten Mile dryland levee protected with riprap but does not have the financial resources.

Seepage Repairs

The District would like to evaluate seepage along the Calaveras River and Fourteen Mile Slough and make repairs that are necessary to avoid future seepage occurrences.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Dryland Levee Imp.	RD 2074	TBD	Flood Management	Emergency Response	Conceptual	\$250K (Study & Plans) \$18.8M Imp.	1
Erosion Protection	RD 2074	TBD	Flood Management	TBD	Conceptual	\$5M	1
Seepage Repairs	RD 2074	TBD	Flood Management	TBD	Conceptual	\$100K (Study & Plans) \$7.5M Imp.	2

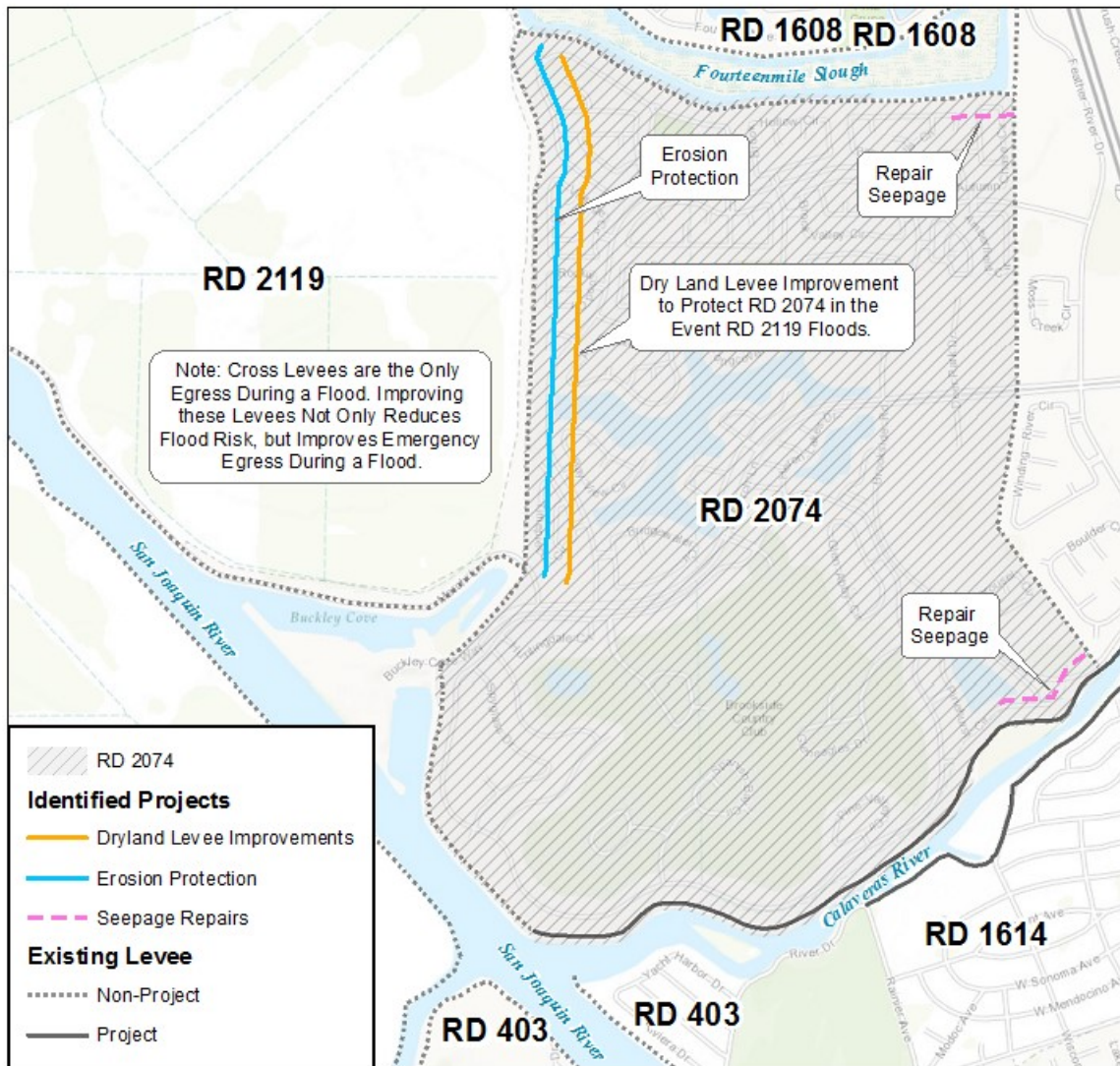


Figure 27 - RD 2074 Projects

2.2.10 RD 2075 McMullin Ranch

RD 2075 bordered by the San Joaquin River to the west, by RD 2064 to the south, RD 2094 to the north, and unincorporated San Joaquin County to the east. The District encompasses an area of approximately 6,000 acres and is protected by approximately 7.5 miles of project levee.

There is not much existing information available for the RD 2075 levees. There are, however, inspection reports performed by DWR, the latest having been done in fall of 2012. Also, a Periodic Inspection Report prepared for the U.S. Army Corps of Engineers was prepared in April 2010.

Some information was obtained during the initial small group meetings with stakeholders at the beginning of the RFMP process. According to the District engineer, many of the levees are too narrow to facilitate all-weather access, and have steep slopes. The primary risk of flooding for the District is from seepage along the San Joaquin River due to the sandy soils RD 2075 is built upon. The stakeholders for RD 2075 feel sedimentation in the river has significantly decreased its capacity. Additionally, vegetation, rodent, and erosion issues are a main concern for the District.

Several levee breaches have occurred on the RD 2075 levee system. In 1950 there was a levee breach at approximate levee mile 5.5. Another break in 1952, 300 feet wide, occurred at approximate levee mile 5.25. In 1955, a 300-foot-wide levee breach occurred at about levee mile 4.0. In 1997 a 1,000-foot-wide levee breach occurred at approximate levee mile 4.75.

RD 2075 has a Flood Contingency Map, last updated April 2011. The District's annual assessment is approximately \$60,000.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the NULE evaluations. RD 2075 was found to have generally moderate risk of failure due in most part to seepage and erosion concerns. Figure 28 presents the Overall Hazard Level of levees around RD 2075.

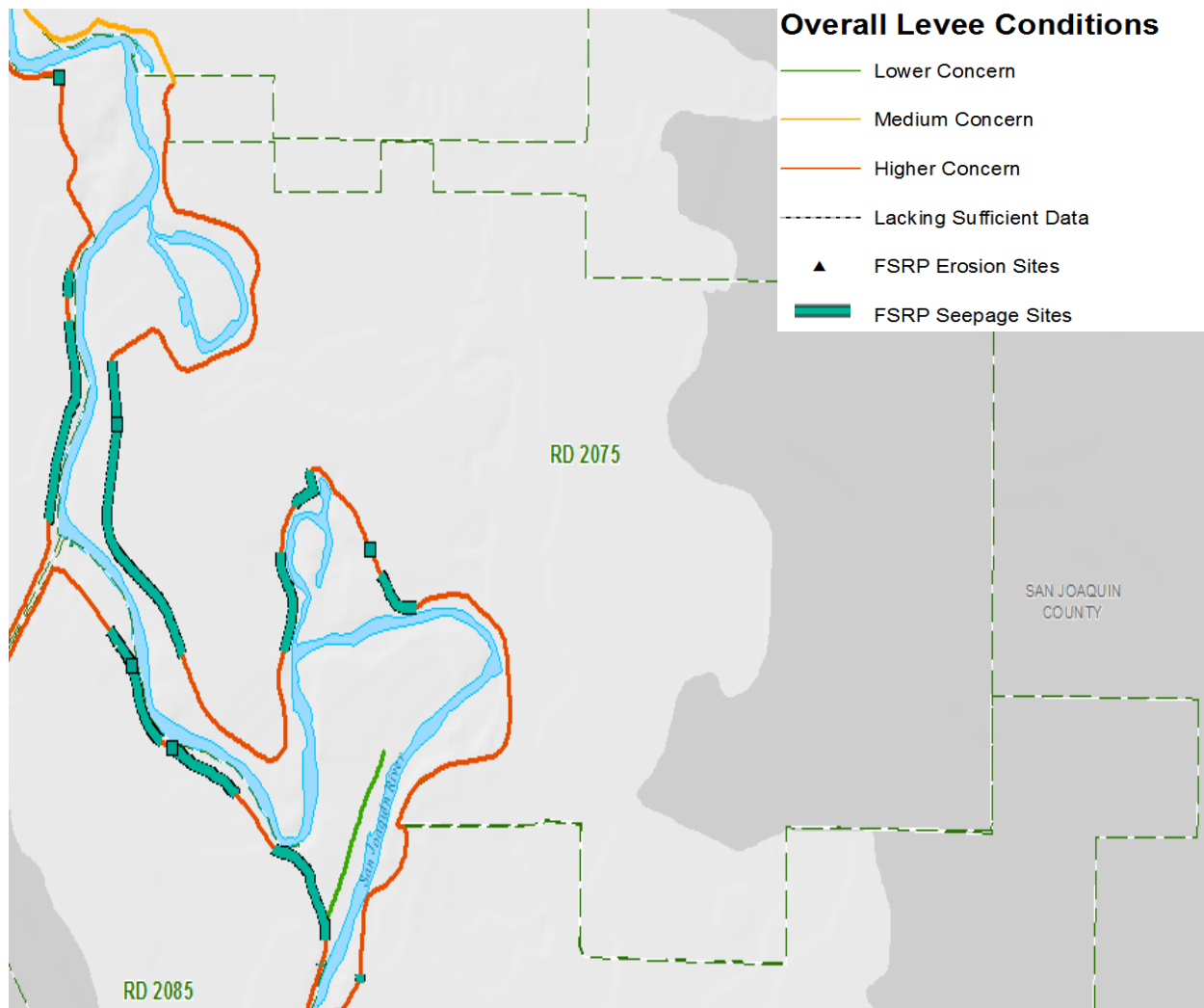


Figure 28 - CVFPP Overall Levee Conditions RD 2075

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for levees around RD 2075 are presented in Table 21.

Table 21 - NULE Results for RD 2075

NULE RESULTS – RD 2075								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2075	McMullin	1	196	C	A*	C	A*	C

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

FSRP

RD 2075 was grouped with RD's 2064 and 2094 for this data. It is reported that the group has had four critical and 15 serious seepage events in the past, as well as one critical stability issue.

Table 22 - FSRP Results for RD 2075

FSRP RESULTS – RD 2075									
RD #	Name	Seepage Critical	Seepage Serious	Stability Critical	Stability Serious	Erosion Critical	Erosion Serious	Freeboard Critical	Freeboard Serious
2064 2075 2094	River Junction McMullen Walthall	4	15	1	-	-	-	-	-

O&M Inspections

Maintenance of levees is performed by RD 2075. An Unacceptable rating was given to RD 2075, due to serious vegetation issues. Table 23 provides a summary of the overall maintenance rating for the District.

Table 23 - O&M Results for RD 2075

O&M INSPECTION RESULTS – RD 2075			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
2075	McMullin	Minimally Acceptable	Unacceptable

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 2075:

- The project levees along the San Joaquin River are generally too steep and too narrow.
- The reach of the San Joaquin River adjacent to RD 2075 is supposed to pass 52,000 cfs however, it is doubtful that that capacity remains because of siltation.

- Vegetation management, erosion control, and rodent control are ongoing maintenance issues.
- The RD supports dredging of the San Joaquin River with fill placed on the levees.

The RD supports decreasing flow in the San Joaquin River via upstream storage, dam reoperation, and widening of Paradise Cut.

RD 2075 Projects

Identified projects include addressing correcting PL84-99 deficiencies, erosion protection, seepage repairs, and restoring design capacity of the San Joaquin River. These projects are shown on Figure 29 and described in more detail below.

Geometry Improvements

The District would like to upgrade levee segments that fail to meet the PL 84-99 Standard to the standard.

Erosion Protection

The District noted erosion repairs are an expensive on-going part of their annual O&M. Specific problem areas were not identified, as District staff believes that the whole levee along the San Joaquin River is in need of protective rock placement.

Seepage Repairs

Critical seepage sites have been identified by the FSRP along District levees. Identified seepage concern sites are in need of repair.

Restore Design Capacity to San Joaquin River

The District needs this silt buildup in the San Joaquin River to be removed to restore the design capacity and reduce the hydraulic load on its levees. This is a regional project that would benefit several RDs.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Geometry Improvements	RD 2075	TBD	Flood Management	TBD	Conceptual	\$656K (Study & Plans) \$31.5M (Improvements)	3
Erosion Protection	RD 2075	TBD	Flood Management	TBD	Conceptual	\$4.5M	3
Seepage Repairs*	RD 2075	TBD	Flood Management	TBD	Conceptual	\$20.3M	3
Restore Design Capacity of the SJ River	RD 2075	TBD	Flood Management	TBD	Conceptual	TBD	3

*Project derived from issues identified in FSRP

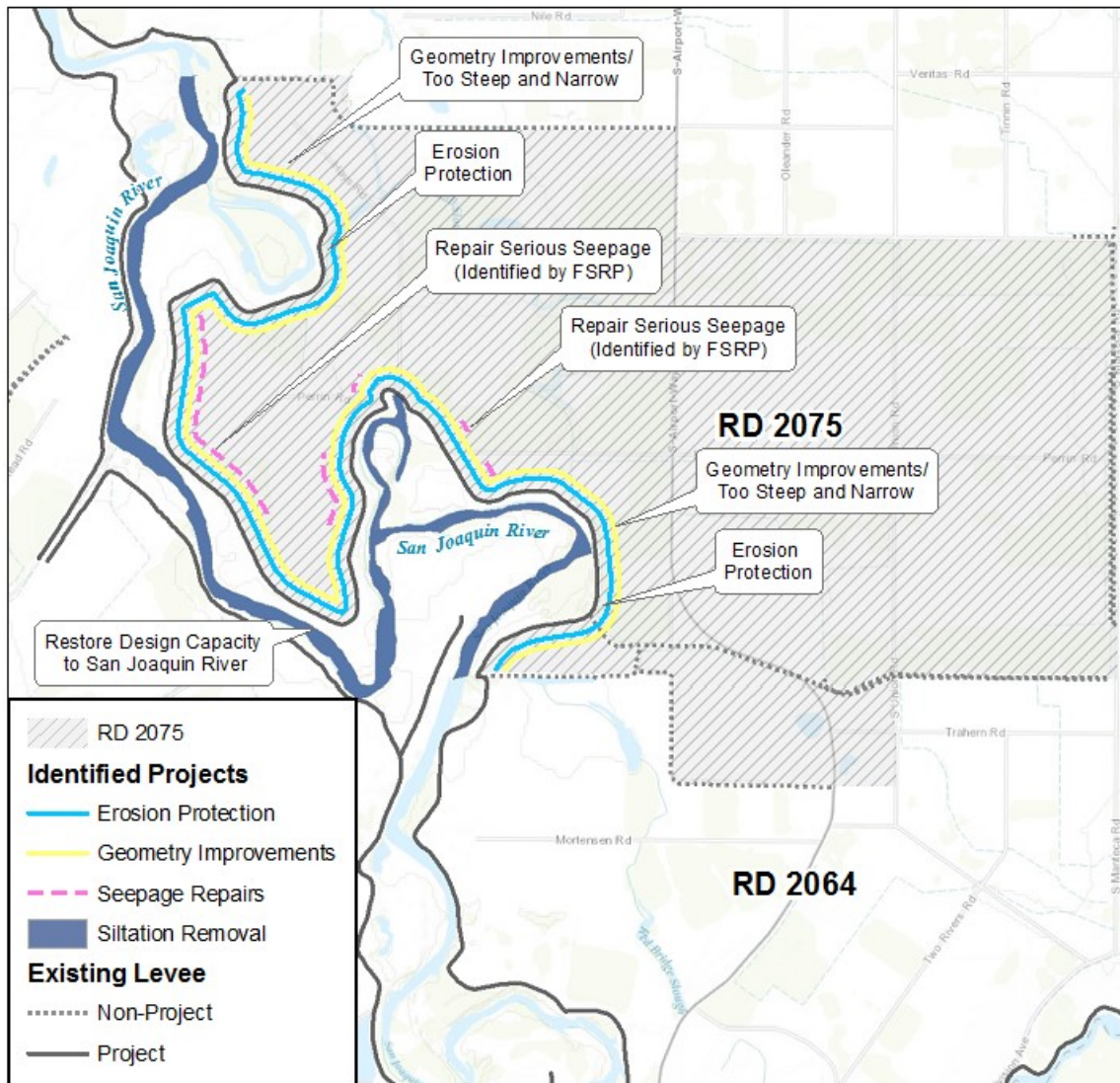


Figure 29 - RD 2075 Projects

2.2.11 RD 2094 Walthall

The District is partially within the City of Manteca, with the portion within the City being primarily developed land. The majority of RD 2094 is agricultural land use and lies outside of city limits. According to District staff the project levees are generally in good condition.

RD 2094 Projects

Identified projects within RD 2094 include dryland levee improvements, seepage repairs, geometry improvements, slope stability repairs, and restoring design capacity to the San Joaquin River adjacent to the District. These projects are shown in Figure 30 and described in more detail below.

Dryland Levee Improvements

The dryland Levee located on the south boundary of RD 2094 is lower and less reliable than the levees along the San Joaquin River and was overtopped in 1997 when RD 2075 flooded. This levee was originally constructed to protect RD 2075 in the event of a failure of a levee downstream (north) on the San Joaquin River. Furthermore, this cross levee is one of only two means of egress during a flood event. This project would improve this levee to protect RD 2094 from flooding in RD 2075, and would improve public safety.

Seepage Repairs

The levee along the San Joaquin River is shown to have a moderate likelihood of failure due to seepage. A study should be conducted along this levee to determine the most appropriate seepage repair method, followed by implementation of the recommended action.

Geometry Improvements

The existing levee needs a larger cross section. The land-side slope of the levee along the San Joaquin River is currently steeper than 3:1. Levee geometry improvements would increase the stability of the levee, and bring it up to current standards.

Slope Stability Repairs

A slope stability repair site has been identified by the FSRP on the western side of the District along the San Joaquin River. Identified stability concern sites are in need of repair.

Restore Design Capacity to San Joaquin River

The San Joaquin River adjacent to RD 2094 has approximately siltation buildup of 8 to 12 feet since 1955. This decreases the overall capacity of the river, and places increased hydraulic load on the levees on the west side of RD 2094. Dredging the river along RD 2094 could help restore the original design capacity, and reduce the risk of flooding to RD 2094. This is a regional project that would benefit several RDs.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Dryland Levee Improvements	RD 2094	TBD	Flood Management	TBD	Conceptual	\$281K (Study & Plans) \$13.5M (Improvements)	3
Geometry Improvements	RD 2094	TBD	Flood Management	TBD	Conceptual	\$188K (Study & Plans) \$9M (Improvements)	3
Seepage and Slope Stability Repairs*	RD 2094	TBD	Flood Management	TBD	Conceptual	\$156K (Study & Plans) \$11.3M	3

						(Improvements)	
Restore Design Capacity to SJR	RD 2094	Region	Flood Management	TBD	Conceptual	TBD	3

*Project derived from issues identified in FSRP

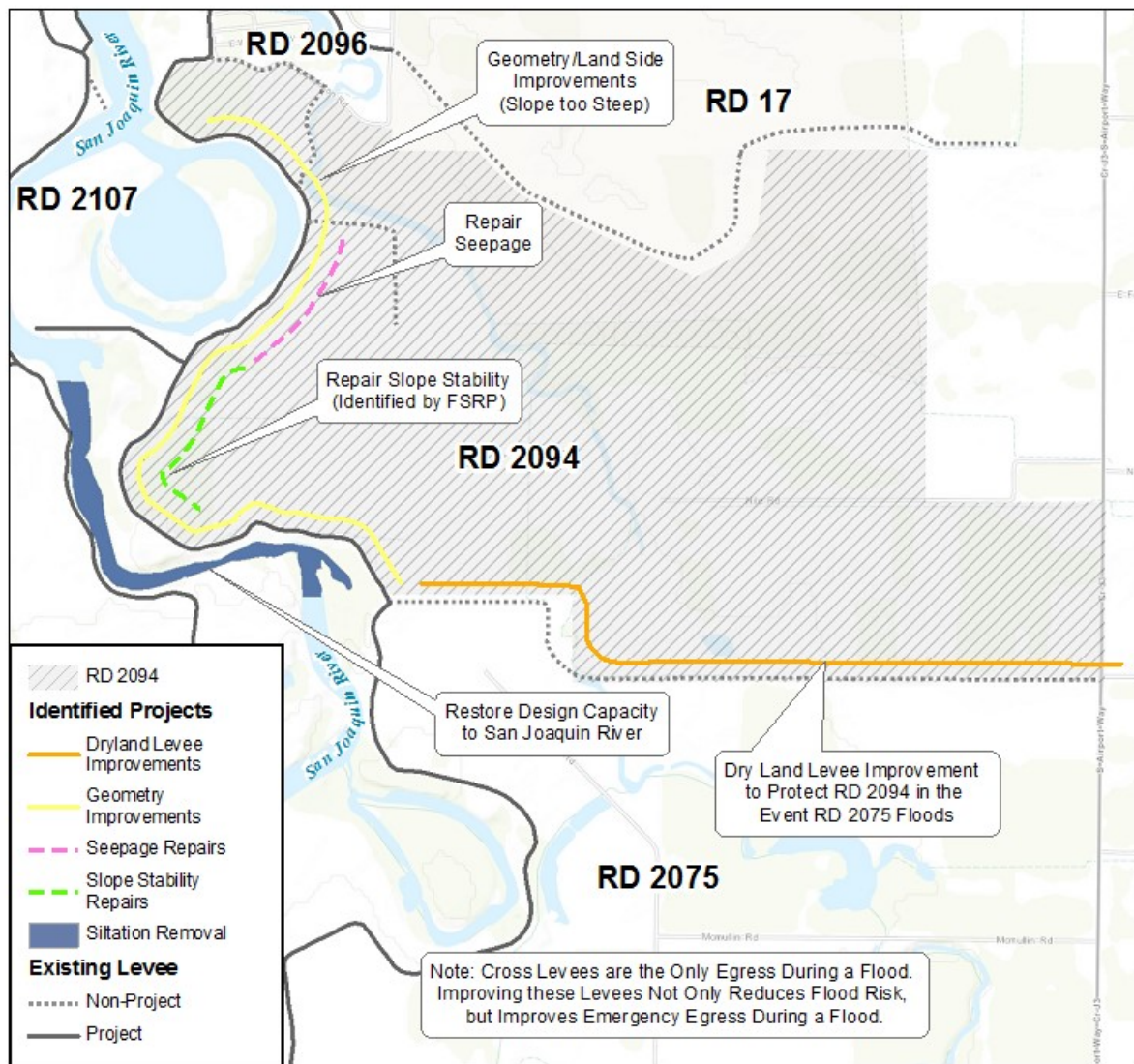


Figure 30 - RD 2094 Projects

2.2.12 RD 2096 Weatherbee Island

RD 2096 is Weatherbee Island, consisting of houses and a mobile home park. The District received assistance from RD 17 during the 1997 flood with electrical work at the pump station located at the northwest corner of the District. The District also received partial help from the Hazard Mitigation Grant funds after the 1997 flood. The RD has no five-year plan.

RD 2096 Projects

Specific projects were not identified by this District.

Geotechnical Assessment

The RFMP Team recommends a geotechnical assessment be done for the levees around this District.

Upgrade Pump Station Electrical

The pump station electrical components are antiquated and in need of upgrade.

Restore Channel Capacity

Walthall Slough leading to the pump station has lost capacity due to sedimentation and bank sloughing. A project is needed to remove the sediment.

Raise/Flood Proof Homes & Protect Utilities

Discussions with District representatives indicate that they would be interested in raising/flood proofing about 60 permanent homes above flood level. The remainder of residences are mobile homes. District representatives indicate that the mobile homes could be moved when flood threat increases.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Geotechnical Assessment	RD 2096	TBD	Flood Management	TBD	Conceptual	\$50K	1
Upgrade Pump Station Electrical	RD 2096	TBD	Flood Management	TBD	Conceptual	\$200K	2
Restore Channel Capacity	RD 2096	TBD	Flood Management	TBD	Conceptual	\$400K	2
Raise Homes & Protect Utilities	RD 2096	TBD	Flood Management	TBD	Conceptual	\$7M	2

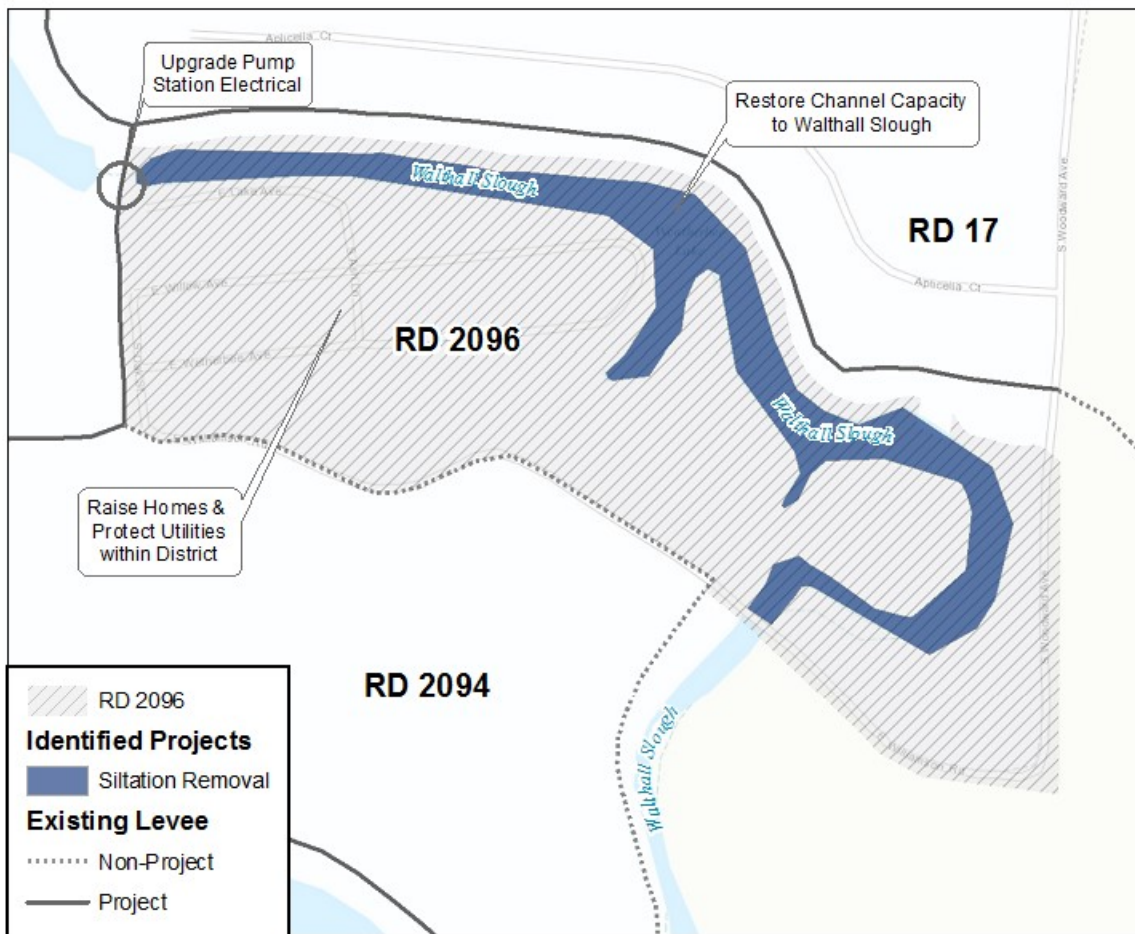


Figure 31 - RD 2096 Projects

2.2.13 RD 2115 Shima Tract

RD 2115 is surrounded by 6.8 miles of non-project levees. RD 2115 encompasses approximately 1,806 acres and is responsible for levee O&M. The majority of the levees around the District are not accredited by FEMA. The exceptions are segments P375, P378 and P379 at the southeast side of the District adjacent to Five Mile Slough. All levees currently meet HMP standards due to a DWR Delta Special Projects grant to upgrade the levees.

The interim goal is for RD 2115 to meet PL 84-99 standards while it remains rural, but will pursue 200-year protection when development is planned. A development agreement is currently in place for future development. A CLOMR exists for RD 2115, but will be re-evaluated when development starts and ULDC requirements are pursued.

The City of Stockton is currently preparing a general plan amendment that may influence how development occurs on RD 2115. If RD 2115 is slated for development in the general plan, the eastern levee (part of the USACE TSP) may not need to be reconstructed to 200-year ULOP since a 200-year ULOP levee will need to be constructed around RD 2115. The order of development could also determine how this levee is reconstructed.

The levee along Fourteen Mile Slough broke and flooded RD 2115 in 1983. There is some concern of flood risk for RD 2115 if the adjacent RD 2037 flooded. Stumps from Walnut Trees previously removed are being removed since the decaying remains weaken these levees.

O&M is performed by the sole land owner, but typically consists of rock placement (\$25K - \$100K per year). RD 2115 has 5-yr plan. The Five Mile Slough levee at the southeast corner of the RD may eventually be degraded to provide 3 feet of freeboard (currently provides 8 feet +).

Other than these issues, the levees along RD 2115 are well maintained.

RD 2115 Projects

Projects planned for RD 2115 are shown in Figure 32 and described below.

Address PL84-99 Deficiencies

Once all levees meet or exceed HMP criteria, the District will bring any segments that do not meet the PL 84-99 Standard up to six inches above the PL84-99 Standard.

Erosion Protection

Water skiing in Mosher Slough and Fourteen Mile Slough causes excessive wave action, which causes significant erosion on these levees. Adding rock slope protection over existing riprap to portions of the waterside slope of the levee will mitigate these erosive forces. Additionally, existing broken concrete along the western boundary of the District needs to be removed and replaced with riprap.

Flood Contingency Mapping

A Flood Contingency Map (FCM) does not exist for RD 2115. A FCM should be prepared to improve emergency response and reduce damage to crops / farm equipment in the event of flood.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Address PL84-99 Deficiencies	RD 2115	TBD	Flood Management	TBD	Conceptual	\$3.4M	2
Erosion Protection	RD 2115	TBD	Flood Management	TBD	Conceptual	\$1.3M	3
ULDC Analysis	RD 2115	TBD	Flood Management	TBD	Conceptual	\$1.5	2
Flood Contingency Mapping	RD 2115	RD 2126	Flood Management	TBD	Conceptual	\$20K	1

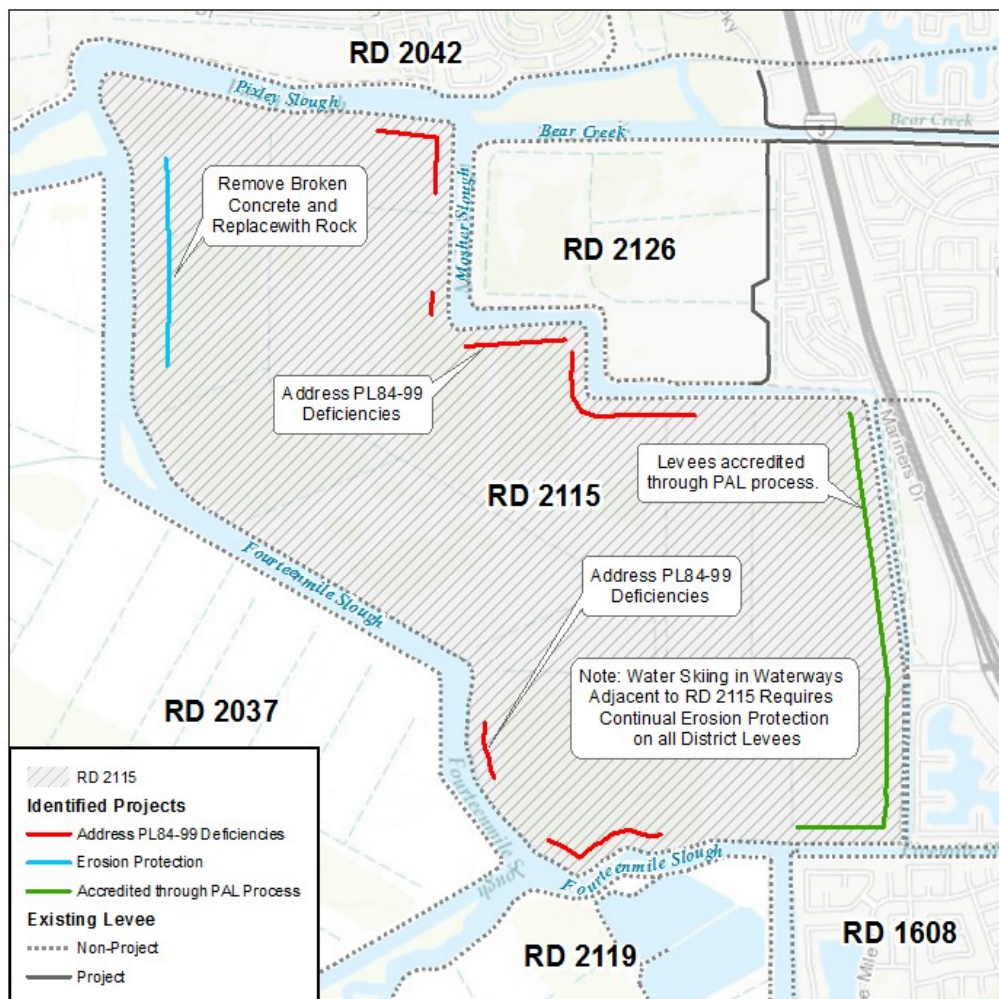


Figure 32 - RD 2115 Projects

2.2.14 RD 2119 Wright-Elmwood Tract

RD 2119 is surrounded by a non-project levee. RD 2119 has a \$2M grant to upgrade the levee to meet HMP standards. Installing all-weather roads is part of the HMP project. The long-term plan for RD 2119 is to upgrade the levee to meet PL 84-99 standards. RD 2119 is a rural district, but if development ever does occur, the levees will need to be completely overhauled. This is not currently planned or projected to occur.

Over time, the levee crest has crept over rock on the waterside slope of the levee, essentially making the levee have a rock core. Rodent holes in the levee expose the rock core to water during high-water events.

RD 2119 generates approximately \$250K - \$300K in annual assessments, and does a significant amount of rock/erosion placement. Two recent Proposition 218 elections have been passed to raise assessments to pay down an estimated \$2M in debt.

It should also be noted that RD 1608 has an interest in RD 2119 levees, so RD 1608 pays RD 2119 approximately \$30K per year to maintain the levee along Fourteen Mile Slough. This levee currently performs well, according to the District engineer. RD 2074 also contributes \$30K per year to RD 2119 for levee enhancements.

Assets at risk in RD 2119 include a City sewer pump station near along Fourteen Mile Slough. The levee here has been improved, but not to 100-yr standards. Some habitat mitigation has been funded on RD 2119 for the Brookside development. Finally, the Ten Mile Levee along the eastern boundary of the District is part of the western defense levee system for the City of Stockton. A failure of this dryland levee in the event of a flood on RD 2119 threatens the City of Stockton.

RD 2119 Projects

RD 2119 is a rural District outside the City of Stockton and is surrounded by non-project levees. The District also plans to protect and maintain the habitat mitigation areas on the south side of the District. The District referred to a site on the north side of the District that experienced severe seepage during the 1997 event as a possible project. The District also identified a need to protect the City of Stockton's sewer lift station and transmission line that are within the District. These projects are shown in Figure 33 and described in more detail below.

Address PL84-99 Deficiencies

The District will upgrade its levees to meet the PL 84-99 standard.

Protection of Habitat Mitigation Areas

The District contains a habitat mitigation area for RD 2074. The District intends to maintain this area. This may be a mitigation area for other areas in the Regions.

Seepage Repairs

Repair areas of levee seepage.

Protection of City Sewer Lift Station and Transmission Lines

A sewer pump station is located at the northeast corner of the District, and a transmission line traverses the east boundary of the RD 2119. It is important to the District these facilities are adequately protected during a flood. To ensure this, an all-weather road needs to be added to this levee.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Address PL84-99 Deficiencies	RD 2119	TBD	Flood Management	TBD	Conceptual	\$2M	2
Protect Habitat Mitigation Area	RD 2119	TBD	Flood Management	TBD	Conceptual	n/a	1
Seepage Repairs	RD 2119	TBD	Flood Management	TBD	Conceptual	\$62.5K (Study & Plans) \$4.5M (Imp.)	2

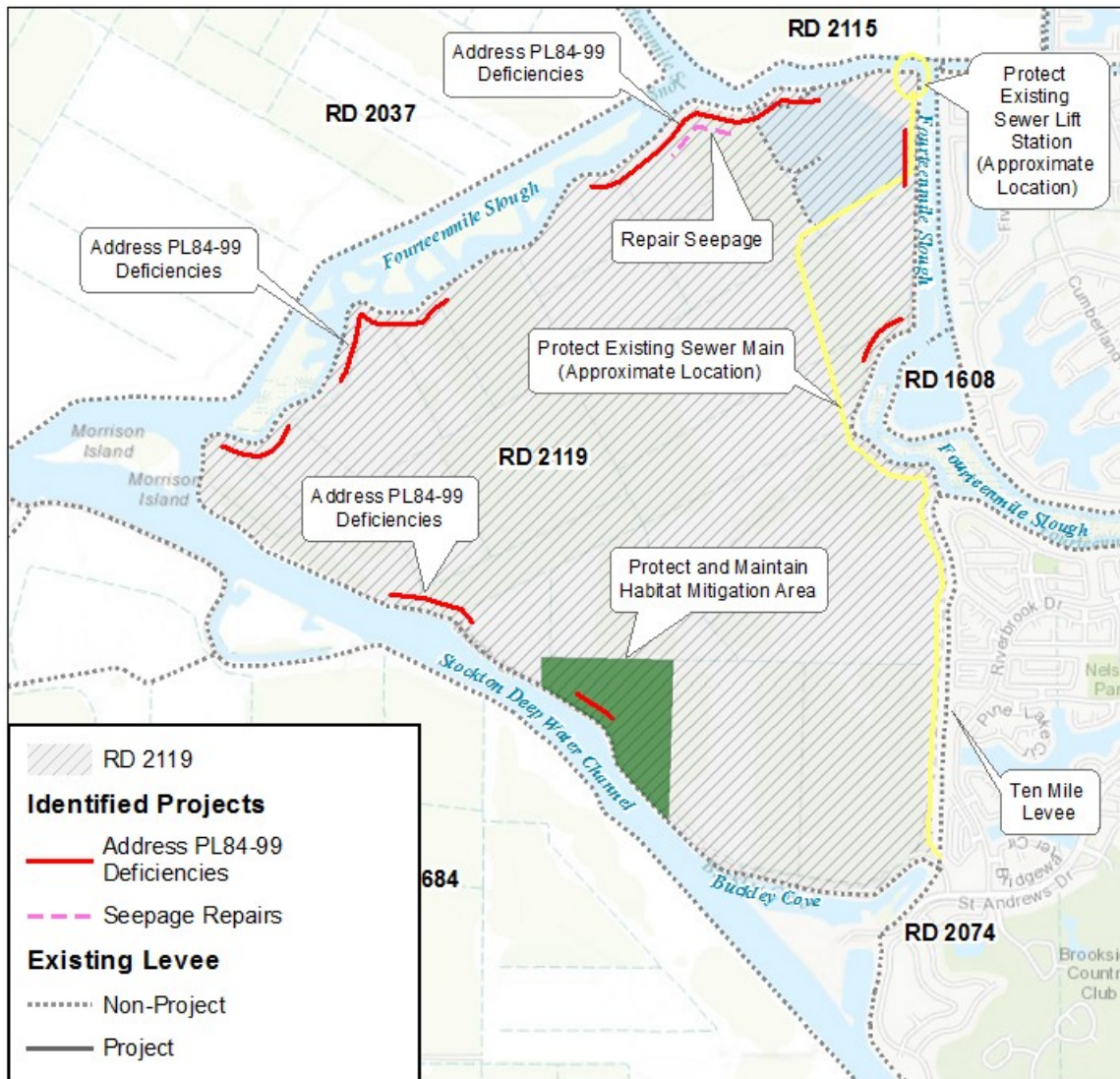


Figure 33 - RD 2119 Projects

2.2.15 RD 2126 Atlas Tract

RD 2126 is surrounded on the north, west, and south by non-project levees, and along the east by a dryland project levee. The District encompasses an area of 360 acres, and is responsible for O&M for approximately 0.81 miles of project levee along its eastern boundary, and approximately 2.27 miles of non-project levee. The project levee has been realigned and jogs west at Otto Drive to accommodate a future road extension.

The RD 2126 levees are currently accredited by FEMA, and are presumed to provide 300-year flood protection, according to the District. The ultimate goal for RD 2126 is to be fully developed. If upgrades are required to the District levees to meet ULDC criteria, these upgrades will be the developer's responsibility.

Flood system challenges identified for RD 2126 include continued placement of riprap to address erosion caused by wave action in the adjacent waterways. Additionally, a permanent power supply for the only pump station on the District is needed. Finally, RD 2126 does not have a flood contingency map which puts the District at increased risk in the event of a flood event requiring evacuation.

RD 2126 Projects

The projects the District identified included: creating a flood contingency map and providing a permanent power source for the interior drainage pump within the District. These projects are described in more detail below.

Flood Contingency Mapping

A Flood Contingency Map (FCM) does not exist for RD 2126. A FCM should be prepared to improve emergency response and reduce damage to crops / farm equipment in the event of flood.

New Pump Station and Permanent Power Source

The interior drainage pump station within RD 2126 does not currently have a permanent power source. The District would like to provide a permanent power source for an upgraded pump station if development on this District ever occurs.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Flood Contingency Mapping	RD 2126	RD 2115	Flood Management	TBD	Conceptual	\$20K	1
Permanent Power Source for Pump	RD 2126	TBD	Flood Management	TBD	Conceptual	\$1M	2
ULDC Analysis	RD 2126	TBD	Flood Management	TBD	Conceptual	\$1M	1

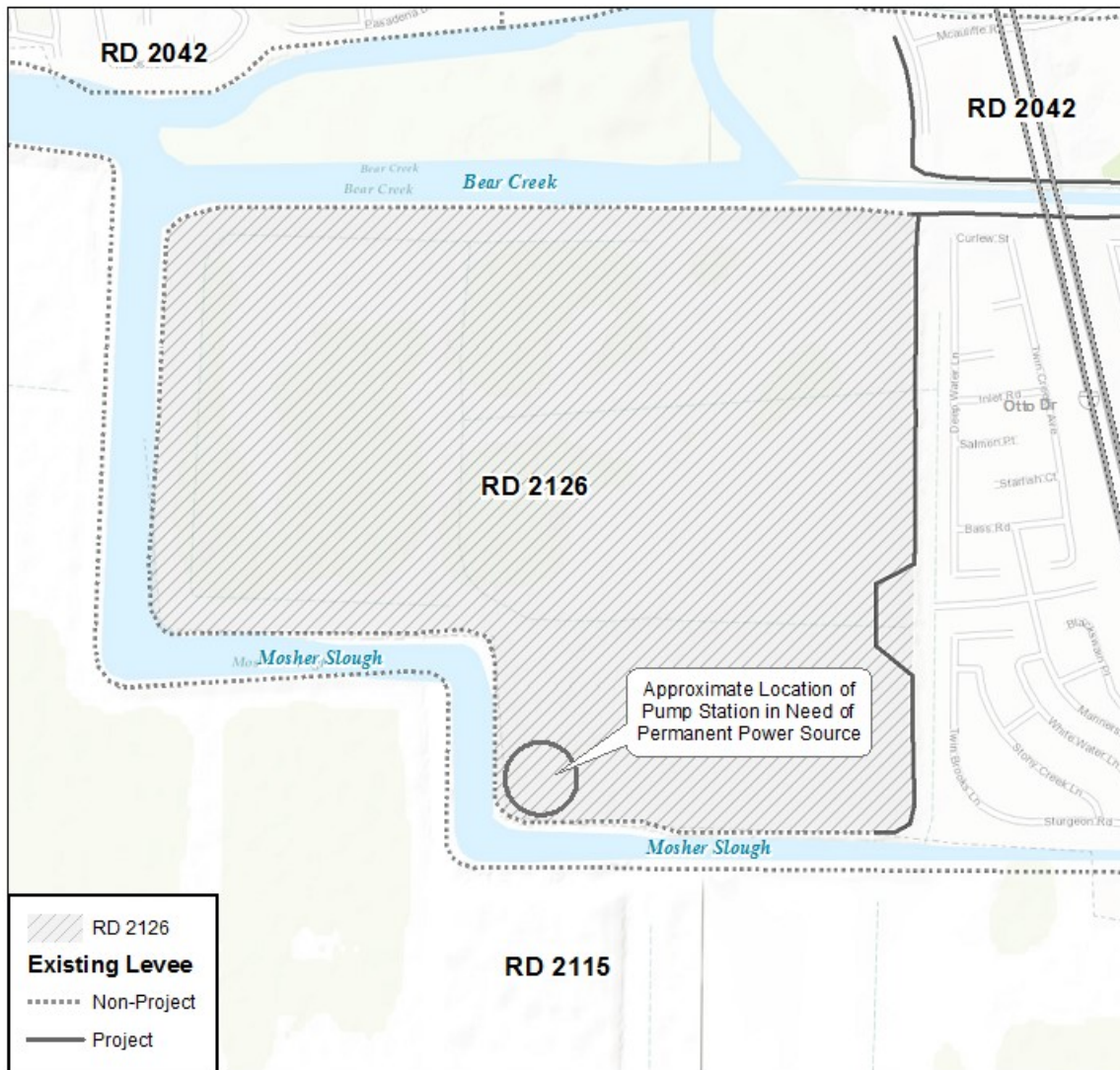


Figure 34 - RD 2126 Project

3 Delta South Region

The Delta South Region lies west of the San Joaquin River. A portion of the City Lathrop is within the Delta South Region.

3.1 Cities

For the City of Lathrop, see the description in Section 2.1.2 for the Lower San Joaquin Region. See the description of RD 2062 below for the portion of Lathrop that is in the Delta South Region.

3.2 Reclamation Districts

Rural areas make up the majority of the Delta South Region. These areas are mostly reclaimed lands that are used for farming and other agricultural purposes.

During the meetings with stakeholders, it became clear that the Reclamation Districts in the Delta South Region have very similar needs. Routine O&M activities such as vegetation control, rodent control, and erosion repairs are very common. Most of these RD's have long-term goals of meeting and maintaining PL 84-99 standards.

These RDs also face a common challenge in implementing necessary improvements and performing regular O&M - environmental permitting and funding. The projects included for the rural reclamation districts are generally local-level projects identified by District representatives during the RFMP process.

3.2.1 *RD 1 Union Island East*

RD 1 is protected by approximately by 13.0 miles of non-project levee; 1.4 miles of a dry levee which serves as the boundary between RD 2089 and RD 1; 1.1 miles of project levee; and another 4.4 miles of an interior dry levee which as the boundary between RD 1 and RD 2. The District is bordered by RD 2 to the west, RD 2089 to the south, and Middle River to the north and east. All exterior levees will soon meet PL 84-99 standards.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the NULE evaluations. Figure 35 presents the Overall Hazard Level of levees around RD1.



Figure 35 - CVFPP Overall Levee Conditions RD 1

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for levees around RD 1 are presented in Table 24.

Table 24 - NULE Results for RD1

NULE RESULTS – RD1								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
1	Union Island	1	185	B*	LD (A/B)	B*	C	C
		NA	5010	C	A*	C	B	C
		NA	5012	LD (B/C)	LD (A/B)	LD (B/C)	A	LD (B/C)

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

The table indicates the higher levels of concern of the levees around RD 1 are related to erosion and seepage.

O&M Ratings

Maintenance of levees around RD1 is performed by the District. The table below provides a summary of the overall maintenance rating for the levee. As shown in the table, RD1 was given a rating of M*, which was due to unacceptable erosion survey results. If these unacceptable portions are repaired, the District would earn an A rating.

Table 25 - O&M Results for RD1

O&M RESULTS – RD1			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
1	Union Island	Acceptable	Minimally Acceptable*

Risks Associated With Deficiencies

The RD 1 levee system protects more than 11,354 acres of prime farmland, containing 11 pump stations, approximately 41 residences and farm worker dwellings, 3 large barns and another 4 large shops or packing shed areas.

A failure or breach of the RD 1 levee system could result in flooding of the District to depths of approximately 7 feet on average. Costs associated with such an event have been calculated using actual costs from the 2004 Jones Tract Flood. The estimated cost of a flood event resulting from a single levee failure would be approximately \$22.6M.

The Delta Risk Management Strategy (DRMS) Phase 1 report estimates the total assets within Union Island as a whole to be \$141 million. Prorating that figure based on acreage, RD 1 is estimated to be around \$66,846,000 and does not include the value of the land.

The Public Policy Institute (PPIC) estimates the land value of Union Island as a whole to be \$80,673,000, and the asset value as a whole to be \$156,763,000. Prorating those figures based on acreage, RD 1 is estimated to have a land value of \$38,270,000 and an asset value of \$74,366,000. Recent land sales of similar properties and soil types in the region indicate the current land values are approximately \$96 million.

The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately \$9.6 million. Therefore, the total estimated value of land and assets is approximately \$105.6 million.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 1:

- The primary flood threat for RD 1 is from Old River, and from the flooding of RD 2089 and the need to improve the dryland levees between the two districts.
- Improve wing levee road dryland levee in RD 1 and improve dryland levee between RD 1 and RD 2, to protect District from the flooding of adjacent Districts.
- The dryland levee between RD 1 and RD 2 has been lowered significantly from DWR construction traffic on a low flow barrier removal project in Middle River.
- Improve levee erosion protection with supplemental rock slope protection on all of the RD 1 project and non-project levees where needed.
- Improve levee crown with all-weather road where needed.
- Increase the levee crown widths where necessary and identify areas that would benefit from setback levees.
- RD 1's goal is to achieve and maintain compliance with PL 84-99 levee standards on all District levees.
- Implement an aggressive vegetation control plan.
- Implement an aggressive rodent control and damage repair plan.
- Update the Flood Contingency Map (FCM) for the Union Island Flood Control System to bring it up to current mapping standards. The current FCM for Union Island Flood Control System was created in August 2008.
- The dryland levee on the west side of RD1 from Middle River to the Grant Line Canal has been lowered significantly due to DWR construction traffic, related to the low flow barriers in Middle River and Grant Line Canal and needs to be repaired.

RD 1 Projects

As noted by stakeholders, the primary flood threat for RD 1 is from Old River and the dryland levee it shares with RD 2089. Identified projects include improvement of dryland levees, erosion protection, seepage repairs, installing an all-weather road along District levees, slope stability repairs, updating the flood contingency map for the District, identifying areas that would benefit from setback levees, and raising siphons and pipes. These projects are shown in Figure 36 and described in more detail below.

Dryland Levee Improvements

Improving these dryland levees to PL 84-99 standards would provide increased flood protection to RD 1 in the event neighboring Districts flood.

Erosion Protection

A serious erosion protection site has been identified by the FSRP on the south-eastern side of the District. The District reported that the levees along Old River and Middle River are in need of additional erosion protection.

Seepage Repairs

A serious seepage site has been identified by the FSRP on the south-eastern side of the District adjacent to RD 2062. The NULE program also identified needed seepage repairs along Middle River. Repair of both seepage sites is important to the District.

Improve Levee Crown Width and Add All Weather Access Road

The levees surrounding the District are narrow and are often impassable when wet. Widening levee crowns and adding an all-weather access road will improve O&M operations, emergency access, and egress in the event of a flood.

Slope Stability Repairs

A serious slope stability site has been identified by the FSRP on the eastern side of the District adjacent to RD 544. Identified stability concern sites are in need of repair.

Flood Contingency Mapping

The current flood contingency map for RD 1 needs to be updated.

Identify Areas that Would Benefit from Setback Levees

The District expressed interest in identifying areas where setback levees would be feasible/beneficial.

Pipe Raising Project

The District would like to raise all siphons and pipes which cross through the levee at an elevation that is above the adjacent waterway base flood elevation.

Middle River Siltation Study

The District believes that Middle River needs to be dredged to restore flow capacity. A study of the problem and solutions should be conducted.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Dryland Levee Improvements	RD 1	RD 2	Flood Management	TBD	Conceptual	\$1.25M (Study & Plans) \$32M	3
Erosion Protection (Middle River)*	RD 1	TBD	Flood Management	TBD	Conceptual	\$12K (Study & Plans) \$2.3M (Local Est.)	1
Erosion Protection (Old River)*	RD 1	TBD	Flood Management	TBD	Conceptual	\$4K (Study & Plans) \$750K	1
Installing All-Weather Road	RD 1	TBD	Flood Management	TBD	Conceptual	\$2M	2
Seepage and Slope Stability Repairs (Middle River)*	RD 1	TBD	Flood Management	TBD	Conceptual	\$156K (Study) \$11.3M	1
Seepage and Slope Stability Repairs (Old River)*	RD 1	TBD	Flood Management	TBD	Conceptual	\$440K (Study) \$31.5M	1
Flood Contingency Mapping	RD 1	TBD	Flood Management	TBD	Conceptual	\$20k	1
Identify Areas that would benefit from Setback Levees	RD 1	TBD	Flood Management	Ecosystem Restoration	Conceptual	\$50,000	1
Pipe Raising Project	RD1	TBD	Flood Management	TBD	Conceptual	\$286,000	1
Middle River Siltation Study	System	TBD	Flood Management	Ecosystem Restoration	Conceptual	\$300K	2

*Project derived from issues identified in FSRP

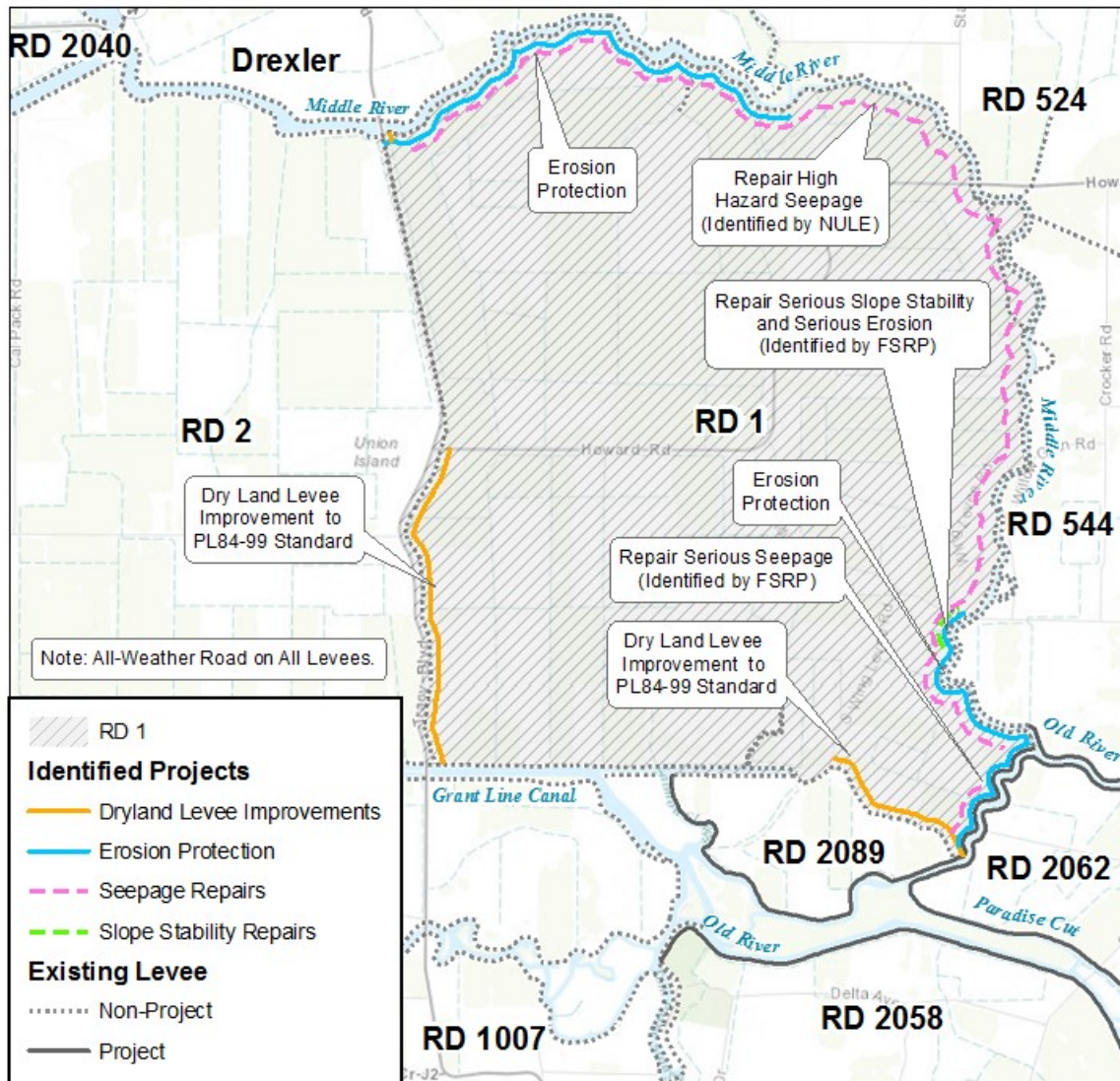


Figure 36 - RD 1 Projects

3.2.2 RD 2 Union Island West

RD 2 is located along the south bank of Middle River in the Delta South Region. The District encompasses an area of approximately 12,580 acres and is protected by approximately 16.2 miles of non-project levee and another 4.4 miles of an interior dry levee which serves as the boundary between RD 1 and RD 2. The District is bordered by North Canal and Middle River on the north, Old River on the west, Grant Line Canal on the south.

2012 CVFPP and O&M Inspections

The 2012 CVFPP did not include an evaluation of the levees around RD 2. Additionally, the levees around RD 2 are not regularly inspected by DWR or USACE.

Risks Associated With Deficiencies

The RD 2 levee system protects over 12,580 acres of prime farmland, containing 17 pump stations, around 23 residences and farm worker dwellings, 3 large barns and another 3 large shops or packing shed areas.

A failure or breach of the District's levee system could result in flooding of the District to depths of approximately 13 feet on average. Costs associated with such an event have been calculated using actual costs from the 2004 Jones Tract Flood. The estimated cost of a flood event resulting from a single levee failure would be approximately \$27.2M.

The Delta Risk Management Strategy (DRMS) Phase 1 report estimates the total assets within Union Island as a whole to be \$141 million. Prorating that figure based on acreage, RD 2 is estimated to be around \$74,063,000, and does not include the value of the land.

The Public Policy Institute (PPIC) estimates the land value of Union Island as a whole to be \$80,673,000, and the asset value as a whole to be \$156,763,000. Prorating those figures based on acreage, RD 2 is estimated to have a land value of \$42,402,500 and an asset value of \$82,397,000. Recent land sales of similar properties and soil types in the region indicate the current land values are approximately \$110 million.

The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately \$11 million. Therefore, the total estimated value of land and assets is approximately \$121 million.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 2:

- 1) Improve levee erosion protection with supplemental rock slope protection on all of the RD 2 non-project levees where needed. Specific sites discussed - North Canal and Grant Line Canal.
- 2) Improving the dryland levee between RD and RD 2 to protect District from the flooding from adjacent Districts may be needed in the distant future.
- 3) Implement an aggressive vegetation control plan.

- 4) Implement an aggressive rodent control and damage repair plan.
- 5) Design and construct seepage control berms or cut-off walls where needed. North levee along Victoria Canal and west levee along Old River were discussed.
- 6) Improve levee crown with 20 foot wide all-weather road and wider turnouts where needed.
- 7) Increase the levee crown widths where necessary and identify areas that would benefit from setback levees.
- 8) The long-term goal is to maintain levees in compliance with PL 84-99 levee standards on all District levees.
- 9) Update the Flood Contingency Map (FCM) for the Union Island Flood Control System to bring it up to current mapping standards. The current FCM for Union Island Flood Control System was created in August 2008.
- 10) Locate and remove abandoned floodgates and pipes through levee foundation.
- 11) Improve levee access ramps by flattening slopes and widening roadway.
- 12) Develop existing/historical conditions GIS mapping of RD 2 that will be accessible in the field using tablets.
- 13) Remove encroachments on the levee section that hinder inspection, maintenance and improvement projects.

RD 2 Projects

RD 2 projects are shown on Figure 37 and described in more detail below.

Address PL84-99 Deficiencies

Altogether, a total of 4,000 feet, or 5 percent, of the RD 2 levee does not meet the PL 84-99 Standard. The District will bring any remaining portions of levee up to PL 84-99 Standard plus six inches.

Improve Dryland Levees

Improving this dryland levee between RD 2 and RD 1 to PL 84-99 standards would provide increased flood protection to RD 2 in the event neighboring Districts flood.

Erosion Protection

The District identified rock slope protection needs along North Canal and Grant Line Canal. Adding rock slope protection to the waterside slope of these levees will mitigate these erosive forces. This will be implemented by placing "launchable" rock on the existing slope.

Geometry Improvements

The existing slopes where the erosion protection will be placed are very steep and will eventually need to be laid back. This may especially be needed if the Paradise Cut expansion occurs.

Seepage Repairs

The District has had seepage issues along North Canal/Victoria Canal and Old River. Seepage berms and/or cutoff walls have been identified by the District as needed improvements to address these issues. Seepage is generally along many short reaches.

Install All-Weather Road

The levees surrounding the District are narrow, and are often impassable when wet. Widening Levee crown and adding all weather access road in identified areas will help improve O&M operations, emergency access, and egress in the event of a flood. Many improvements have already been made, so additional work would be in the distant future.

Address Penetrations & Encroachments

The District has issues with penetrations through their levees. Locating and removing abandoned floodgates and pipes throughout District levees was identified as a project for RD 2. Additionally, the District expressed interest in addressing encroachments that hinder routine inspection and O&M.

Flood Contingency Mapping

The current flood contingency map for RD 2 needs to be updated.

Identify Areas that Would Benefit from Setback Levees

The District expressed interest in identifying areas where setback levees would be feasible/beneficial.

Study Siltation Removal of Middle River

Investigate siltation removal on Middle River as part of the study of the Paradise Cut expansion. The study is the same one as that identified for RD 1 (cost included with RD1).

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Address PL84-99 Deficiencies	RD 2	TBD	Flood Management	TBD	Conceptual	\$541,000	1
Improve Dryland Levees	RD 2	RD 1	Flood Management	TBD	Conceptual	\$538K (Study & Plans) \$25.8M (Imp.)	3
Erosion Protection	RD 2	TBD	Flood Management	TBD	Conceptual	\$28.2K (Study & Plans) \$5.6M – 10.1M (Imp.)	1
Geometry Improvements	RD 2 with Paradise Cut Expansion	TBD	Flood Management	Ecosystem	Conceptual	\$30M	3
All-Weather Roads	RD 2	TBD	Flood Management	TBD	Conceptual	\$1M	2
Seepage Repairs	RD 2	TBD	Flood Management	TBD	Conceptual	\$5-10M (Study & Plans) \$77M (Imp.)	2
Address Penetrations & Encroachments	RD 2	TBD	Flood Management	TBD	Conceptual	\$1M	2
Flood Contingency Mapping	RD 2	TBD	Flood Management	TBD	Conceptual	\$20K	1
Identify Areas that Would Benefit from Setback Levees	RD 2	TBD	Flood Management	Ecosystem Restoration	Conceptual	\$50K	2

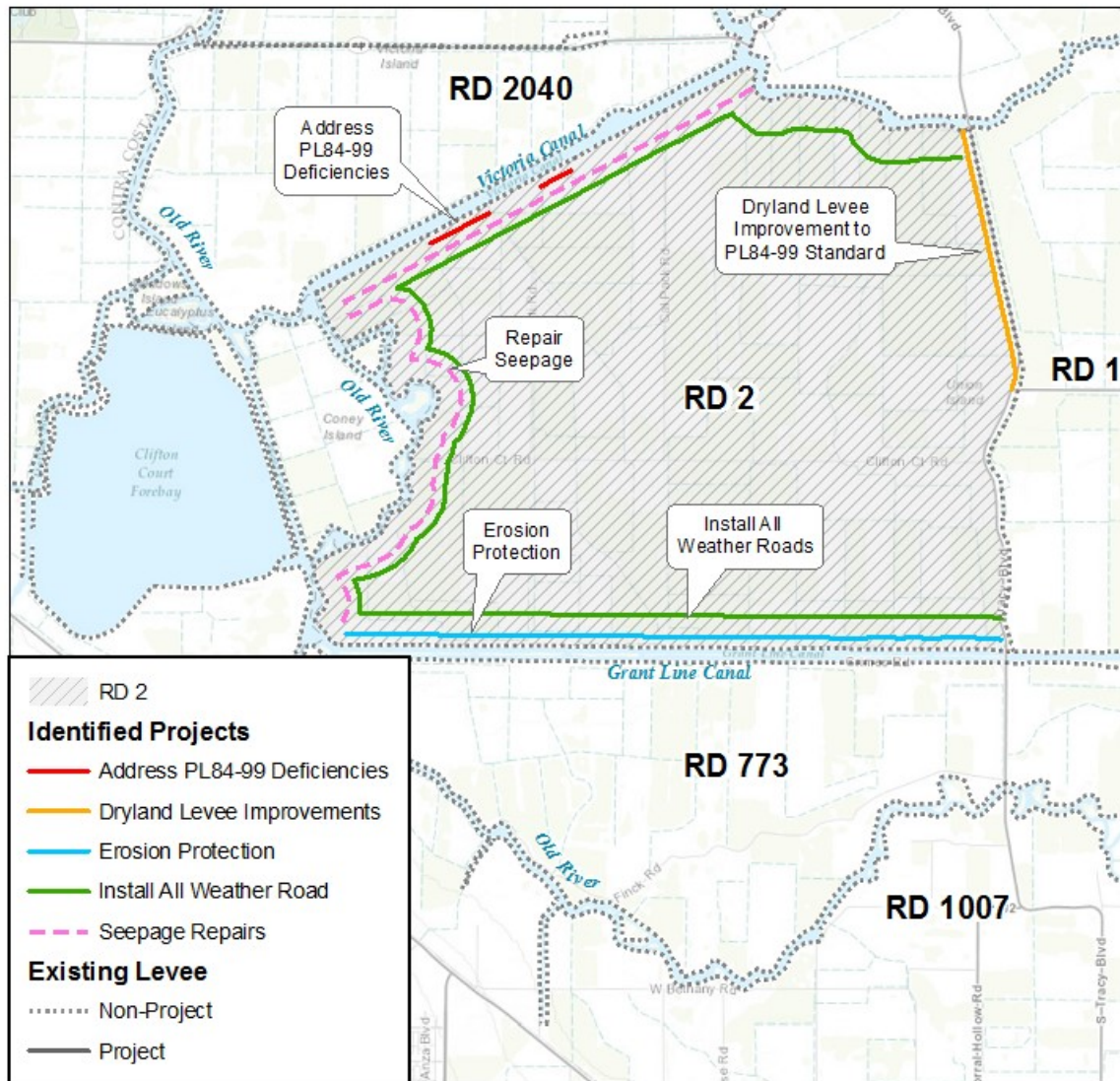


Figure 37 - RD 2 Projects

3.2.3 RD 524 Middle Roberts Island

RD 524 is responsible for maintaining the levees that provide flood protection for primarily agricultural land, infrastructure, and residences. The District is located along the west bank of the San Joaquin River in the Delta South Region. The District encompasses an area of 11,950 acres and is bordered by 18.8 miles of levees. Only the 6.2 miles of levee located along the San Joaquin River are project levees.

The entire 99,388 foot length of levee along the perimeter of RD 524 currently meets HMP standards. However, approximately 4,068 feet of the levee system does not meet PL 84-99 standards. This deficiency is due to approximately 4,000 feet of deficient geometry, and 68 feet of deficient crown elevations.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the NULE evaluations. Figure 38 shows the Overall Hazard Level of levees around RD 524.

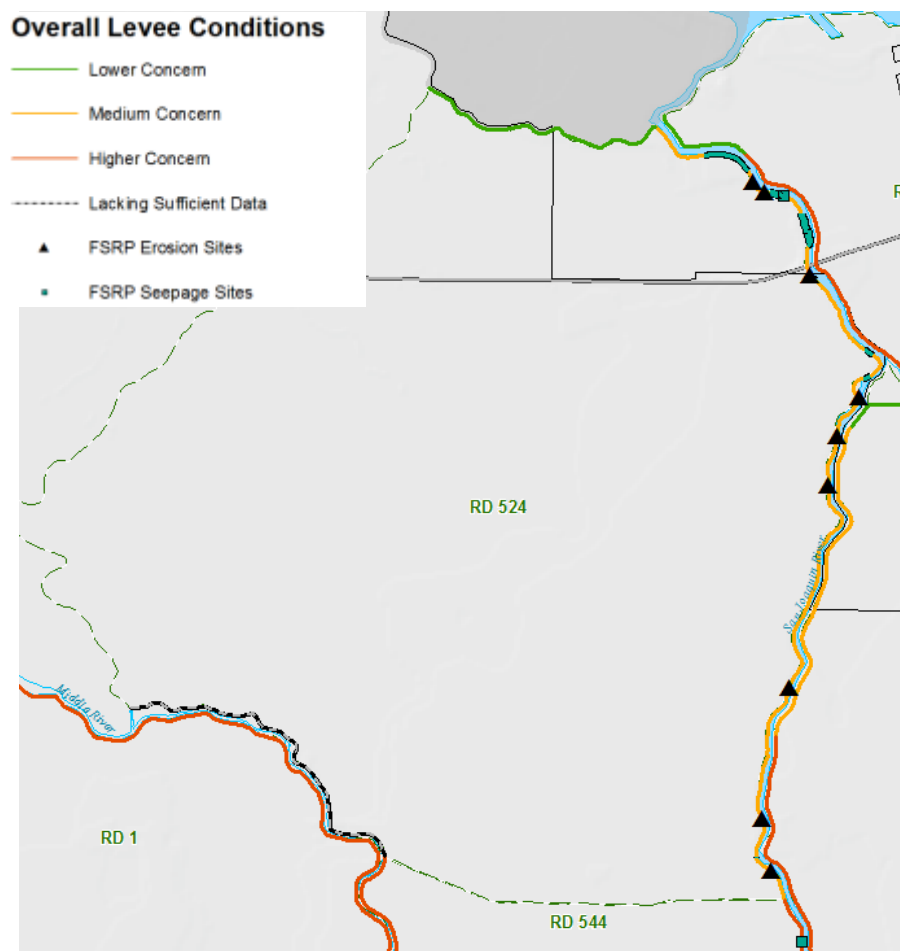


Figure 38 - CVFPP Overall Levee Conditions RD 524

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for levees around RD 524 are presented in Table 26.

Table 26 - NULE Results for RD 524

NULE RESULTS – RD 524								
RD #	RD Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
524	Middle Roberts Island	1	188	B*	A*	B*	B	B
		NA	5007	A	A	A	A	A
		NA	5009	LD (A/B)	A	LD (A/B)	A	LD (A/B)

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

FSRP

RD 524 and RD 544 were grouped together for the FSRP. It was found that numerous seepage incidents have occurred in these districts in the past, along with some less numerous erosion issues. The results of the FSRP are shown in Table 27.

Table 27 - FSRP Results for RD 524

FSRP RESULTS – RD 524									
RD #	Name	Seepage Critical	Seepage Serious	Stability Critical	Stability Serious	Erosion Critical	Erosion Serious	Freeboard Critical	Freeboard Serious
524 544	Middle Roberts Island & Upper Roberts Island	12	9	-	-	3	1	-	-

O&M Ratings

Maintenance of levees around RD 524 is performed by the District. RD 524 was given a rating of Unacceptable, which was due to vegetation, tree trimming/thinning, and erosion/bank caving. Other issues include encroachments, animal control, and slope stability. Table 28 shows a summary of the overall maintenance rating for the levee.

Table 28 - O&M Results for RD 524

O&M RESULTS – RD 524			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
524	Middle Roberts Island	Unacceptable	Unacceptable

Risks Associated With Deficiencies

RD 524 levee system protects over 11,950 acres of prime farmland, 95 residences, and non-residential, agriculture related structures. A failure or breach of the RD 524 levee system could result in flooding of the District to depths of approximately 7.5 feet on average north of Mueller Road. Costs associated with such an event have been calculated using actual costs from the 2004 Jones Tract Flood. The estimated cost of a flood event resulting from a single levee failure would be approximately \$16,500,900.

The Public Policy Institute lists the asset value and land value of Lower Roberts Island, Middle Roberts Island, and Upper Roberts Island as one total value. However, recent land sales of similar properties and soil types in the region indicate the current land values within the District total approximately \$83,650,000. The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately \$8,365,000. Therefore, the total estimated value of land and assets is approximately \$92,015,000.

Additionally, a portion of City of Stockton's Regional Wastewater Treatment facility is located in the northeast region RD 524 and is a vital facility for serving the city. The facility receives partially treated water from the primary and secondary portion of the plant, located on RD 404, and then provides tertiary treatment before being pumped in the San Joaquin River. In 2006, the San Joaquin County OES raised concerns about the City of Stockton headworks not having the capacity to treat surface flooding that would infiltrate the wastewater sewer lines and ultimately enter the plant. To address this concern a new headworks and bypass system were recommended. Additionally, protecting the WWTP from surface floodwater via a floodwall around the perimeter of the facility was discussed.

If flooding of RD 524 were to occur, floodwaters would impact and damage the treatment ponds. Flooding would adversely affect not only water quality but would also impact the ability to treat

wastewater for the City of Stockton. The DRMS report does not have an estimated economic cost for the closure of the wastewater treatment facility, but the entire City of Stockton population and population of incorporated San Joaquin County would be affected if the plant were to be impacted.

Furthermore, State Highway Route 4 is an east-west route that crosses through RD 524. If flooding at RD 524 were to occur, an important interregional corridor linking San Joaquin County with Contra Costa County and the rest of the Bay Area would be rendered unusable. According to the State of California Department of Transportation's Annual Average Daily Traffic data for 2010, approximately 18,800 vehicles per day utilized State Route 4 across Middle Roberts Island, 2,396 of which were trucks. According to the DRMS report, a closure of State Highway Route 4 would result in an estimated economic closure cost of \$500,000 per day.

The Burlington Northern Santa Fe Railroad (BNSF) is an east-west route that also crosses through RD 524. If flooding at RD 524 were to occur, a major railroad used for the transportation of freight would be rendered unusable. According to the DRMS report, data for 2005 shows a disruption of the BNSF railroad would result in an estimate economic closure cost of approximately \$23.5 million per month.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 524:

- The District's goal is to achieve and maintain compliance with PL 84-99 levee standards on all District levees.
- Provide improved levee height and reduce seepage into the City of Stockton waste water treatment ponds.
- The WWTP headworks also need upgrading to accommodate storm flows in the sewer system.
- Survey, evaluate and improve the levees along the southerly, westerly, and northerly District boundaries of RD 524 to meet current flood system requirements.
- Reinstall a railroad crossing road over the railroad tracks on the levee crown near the Waste Water Treatment Plant ponds.
- Improve levee erosion protection on all of the RD 524 levees.
- Increase the levee crown widths.
- Identify and address levee seepage issues District wide.
- Implement an aggressive vegetation control plan and implementation for the Burns Cutoff surrounding area.
- Update the Flood Contingency Map (FCM) for the Roberts Island Flood Control System to bring it up to current mapping standards.

RD 524 Projects

Identified projects include addressing PL84-99 deficiencies, erosion protection, seepage repairs, flood contingency mapping, upgrading the WWTP headworks, and reinstalling railroad crossing next WWTP ponds. These projects are shown on Figure 39 and described in more detail below.

Address PL84-99 Deficiencies

Since the entire levee meets or exceeds the HMP criteria, the District will bring any remaining portions of levee below the PL 84-99 Standard to six inches overbuild above the PL 84-99 Standard. This work will likely be divided into several phases or projects, depending on the funding available.

Erosion Protection

The District needs rip rap placement along the west bank of San Joaquin River. A serious erosion site adjacent to the WWTP ponds has been identified by DWR in the FSRP. These areas all need placement of erosion protection to ensure these levees continue to protect the District.

Seepage Repairs

A critical seepage site has been identified by the FSRP on the north-eastern side of the District adjacent to the WWTP ponds. Identified seepage concern sites are in need of repair.

Flood Contingency Mapping

RD 524's Flood Contingency Map (FCM) is not up to date. The FCM should be updated to improve emergency response and reduce risk to people in the event of flood.

Protect Stockton Waste Water Treatment Ponds

The levees protecting the ponds are too low and have seepage issues. Increasing levee height and reducing seepage into the wastewater ponds was suggested as a potential project. This project is not a responsibility of the District.

Address Penetration Problems

Levee penetrations along the San Joaquin River need to be resolve. These are in the area of the Stockton WWTP facilities.

Railroad Crossing Reinstallation on Levee Crown near WWTP Ponds

The Burlington Northern Santa Fe Railroad Company has railroad tracks that cross the San Joaquin River and impact the levee on the northeastern boundary of the District. These tracks also bisect the City of Stockton's Wastewater Treatment Ponds. Currently there is no road over the railroad which impairs levee inspections and patrols. This lack of access also obstructs emergency levee repairs. A railroad crossing over the BNSF tracks on the levee crown is needed so the District can fulfill its responsibilities effectively, especially during a high water event.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Address PL84-99 Deficiencies	RD 524	TBD	Flood Management	TBD	Conceptual	\$860,000	1
Erosion Protection*	RD 524	TBD	Flood Management	TBD	Conceptual	\$3.7M	1
Seepage Repairs*	RD 524	TBD	Flood Management	TBD	Conceptual	\$5M	1
Flood Contingency Mapping	RD 524	TBD	Flood Management	TBD	Conceptual	\$20K	1
Protect Stockton WWTP	San Joaquin County OES / RD 404	Stockton	Flood Management	TBD	Conceptual	\$2M	2
Address Penetrations	RD 524	Stockton	Flood Management	TBD	Conceptual	\$5M	2
Railroad Crossing Reinstallation	RD 524	TBD	Flood Management	TBD	Conceptual	\$400K	2

*Project derived from issues identified in FSRP

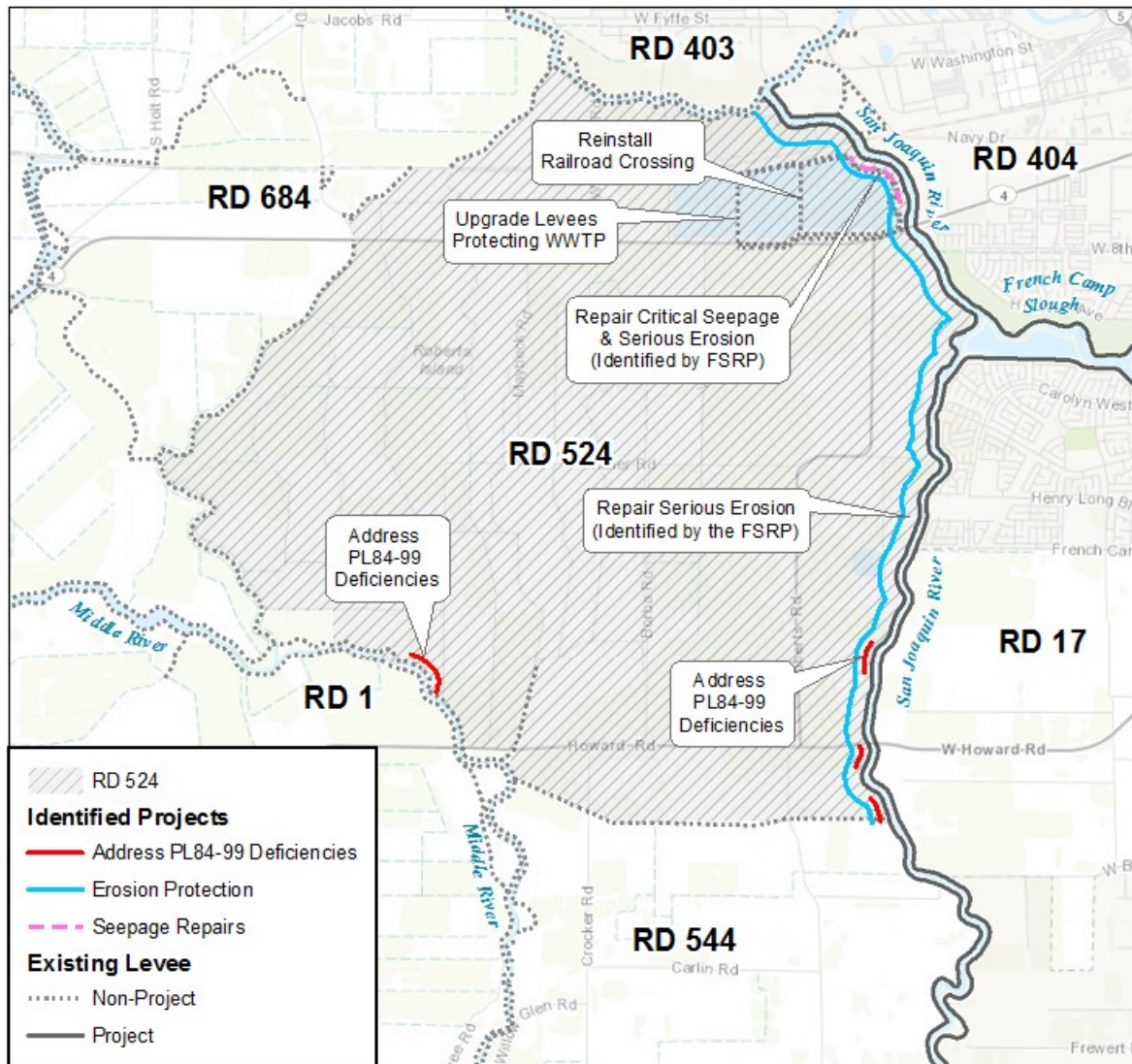


Figure 39 - RD 524 Projects

3.2.4 RD 544 Upper Roberts Island

RD 544 is located on the north bank of Old River and along the west bank of the San Joaquin River. The District is primarily rural and is protected by both project and non-project levees. The long-term goal is to bring District levees up to PL84-99 Standards. The District encompasses an area of 7,574 acres and is bordered by 17.78 miles of levee. The 7.18 miles of levee located along Middle River and the northern dryland levee are non-project levees, and 10.60 miles of levee along Old River and the San Joaquin River are project levees. RD 544 is bordered by Middle River to the west, Old River to the south, the San Joaquin River to the east, and a dryland levee to the north.

All the levee system around RD 544 meets HMP standards, while only 79.5% of the levee system meets PL 84-99 standards. This deficiency is due to crown elevation and geometric cross section deficiencies. The figure below provides a graphical depiction of the deficiencies identified on RD 544.

The levees surrounding the District are often impassable when wet. Adding an all-weather access road in identified areas will help improve O&M operations, emergency access, and egress in the event of a flood. This work is underway with a grant from DWR's Delta Special Projects Program.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the NULE evaluations. Figure 40 shows the Overall Hazard Level of levees around RD544.

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for RD 544 levees are presented in Table 29.

Table 29 - NULE Results for RD 544

NULE RESULTS – RD 544								
RD #	RD Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
544	Upper Roberts Island	1	189	C	A*	B	B	C
		2	334	C	A*	C	B	C
		NA	5008	C	A*	C	B	C

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

As shown in the table, the levees around RD 544 are an overall high level of concern, primarily due to seepage issues.

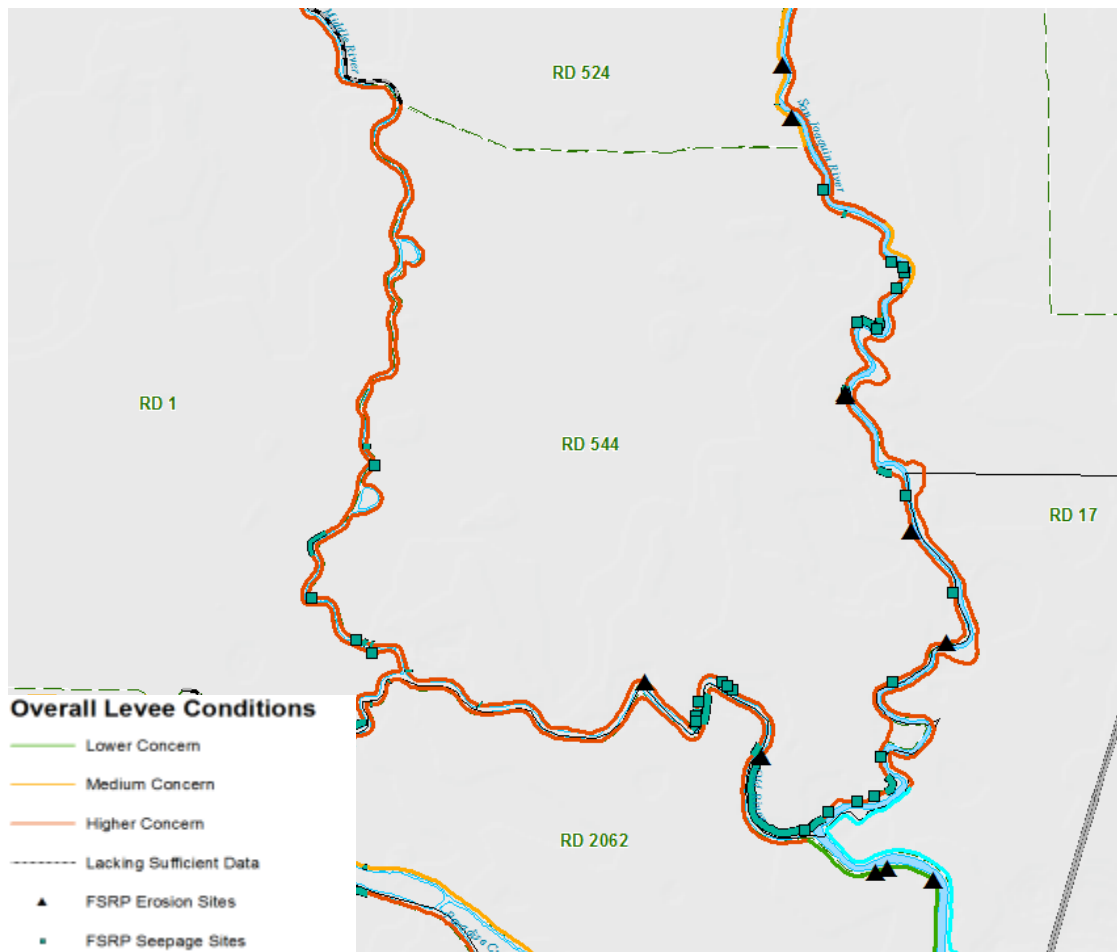


Figure 40 - CVFPP Overall Levee Conditions RD 544

FSRP

RD 524 and RD 544 were grouped together for the FSRP. It was found that numerous seepage incidents have occurred in these districts in the past, along with some less numerous erosion issues. The results of the FSRP are shown in Table 30.

Table 30 - FSRP Results for RD 544

FSRP RESULTS – RD 544									
RD #	Name	Seepage Critical	Seepage Serious	Stability Critical	Stability Serious	Erosion Critical	Erosion Serious	Freeboard Critical	Freeboard Serious
524 544	Middle Roberts Island Upper Roberts Island	12	9	-	-	3	1	-	-

O&M Ratings

Maintenance of RD 544 levees is performed by the District. RD 544 was given a rating of Unacceptable, which was due to serious vegetation issues, as well as erosion, animal control, encroachments, and slope stability issues. Table 31 provides a summary of the overall maintenance rating for the levee.

Table 31 - O&M Results for RD 544

O&M RESULTS – RD 544			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
544	Upper Roberts Island	Unacceptable	Unacceptable

Risks Associated With Deficiencies

The RD 544 levee system protects over 7,574 acres of prime farmland, 75 residences, and non-residential, agriculture related structures.

A failure or breach of the RD 544 levee system could result in flooding of the District to depths of approximately 7.5 feet on average. Costs associated with such an event have been calculated using actual costs from the 2004 Jones Tract Flood. The estimated cost of a flood event resulting from a single levee failure would be approximately \$11,634,300.

The Public Policy Institute (PPIC) lists the asset value and land value of Lower Roberts Island, Middle Roberts Island, and Upper Roberts Island as one total value. Recent land sales of similar properties and soil types in the region indicate the current land values within the District total approximately \$59,768,000. The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately \$5,976,800. Therefore, the total estimated value of land and assets is approximately \$65,744,800.

In addition to protecting the public water supply, RD 544's levees protect approximately 3.7 miles of three high-voltage electrical transmission lines that cross the Delta which transmit roughly 10 percent of California's summer electricity load. In the event of a levee failure, if the transmission lines were to become non-operational, this would result in significant power outages in and around the Delta. The asset value of the portion of transmission lines protected by Upper Roberts Island is estimated to be approximately \$5,200,000. Finally, a PG&E natural gas pipeline runs across RD 544 is an important asset for the transportation of gas. A flood on RD 544 could potentially disrupt and shut down the gas pipeline.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 544:

- Implement an aggressive vegetation control plan.
- Achieve and maintain compliance with PL 84-99 levee standards on all District levees.
- Survey, evaluate and improve RD 544 levees to meet current flood system requirements.
- Identify all encroachments and address those that are not properly permitted or may not be in compliance.
- Improve levee erosion protection with supplemental rock slope protection on all of the RD 544 levees.
- Implement an aggressive rodent control and damage repair plan.
- Increase the levee crown widths where necessary and identify areas that would benefit from setback levees.
- Identify areas prone to excessive seepage and boils during high water events and develop strategy to mitigate the impacts.
- Potential flooding from a breach of a section of RD 2089 exterior levee or dryland levee.
- Implement an aggressive vegetation control plan.
- The Flood Contingency Map (FCM) for the Roberts Island Flood Control System was updated in August 2012.

RD 544 Projects

RD 544 projects are shown on Figure 41 and described below.

Address PL84-99 Deficiencies

District will bring any levee segments that do not meet the PL 84-99 Standard to six inches above the PL 84-99 Standard.

Erosion Protection

The District plans to ensure the protection of the existing levee by adding rock slope protection to portions of the waterside slope of the levees requiring additional rock slope protection. This will prevent erosion and minimize future erosion repairs.

Seepage Repairs

Levees along the San Joaquin River and Old River have experienced seepage during previous high water events. Critical seepage sites have also been identified by the FSRP. The District would like to implement the necessary improvements to mitigate seepage deficiencies. Identified seepage concern sites are in need of repair.

Address Encroachments

The District identified encroachments along the west bank of the San Joaquin River. The District would like to identify all encroachments and address those that are not properly permitted.

Slope Stability Repairs

Critical slope stability sites have been identified by the FSRP along District levees. Identified stability concern sites are in need of repair.

Evaluate Potential for Setback Levees

The District would like to evaluate the potential for setback levees in several areas.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Address PL84-99 Deficiencies	RD 544	TBD	Flood Management	TBD	Planning	\$12M	1
Erosion Protection*	RD 544	TBD	Flood Management	TBD	Planning	\$1.5M	1
Seepage Repairs (short, critical reaches)	RD 544	TBD	Flood Management	TBD	Planning	\$10M	1
Seepage Repairs* (long reaches)	RD 544	TBD	Flood Management	TBD	Conceptual	\$100,000 (Study & Plans) \$55M	3
Address Encroachments	RD 544	TBD	Flood Management	TBD	Conceptual	\$5M	2
Slope Stability Repairs*	RD 544	TBD	Flood Management	TBD	Conceptual	\$5M	2
Evaluate Potential for Setback Levees	RD 544	TBD	Flood Management	Ecosystem Restoration	Conceptual	\$50K	2

*Project derived from issues identified in FSRP

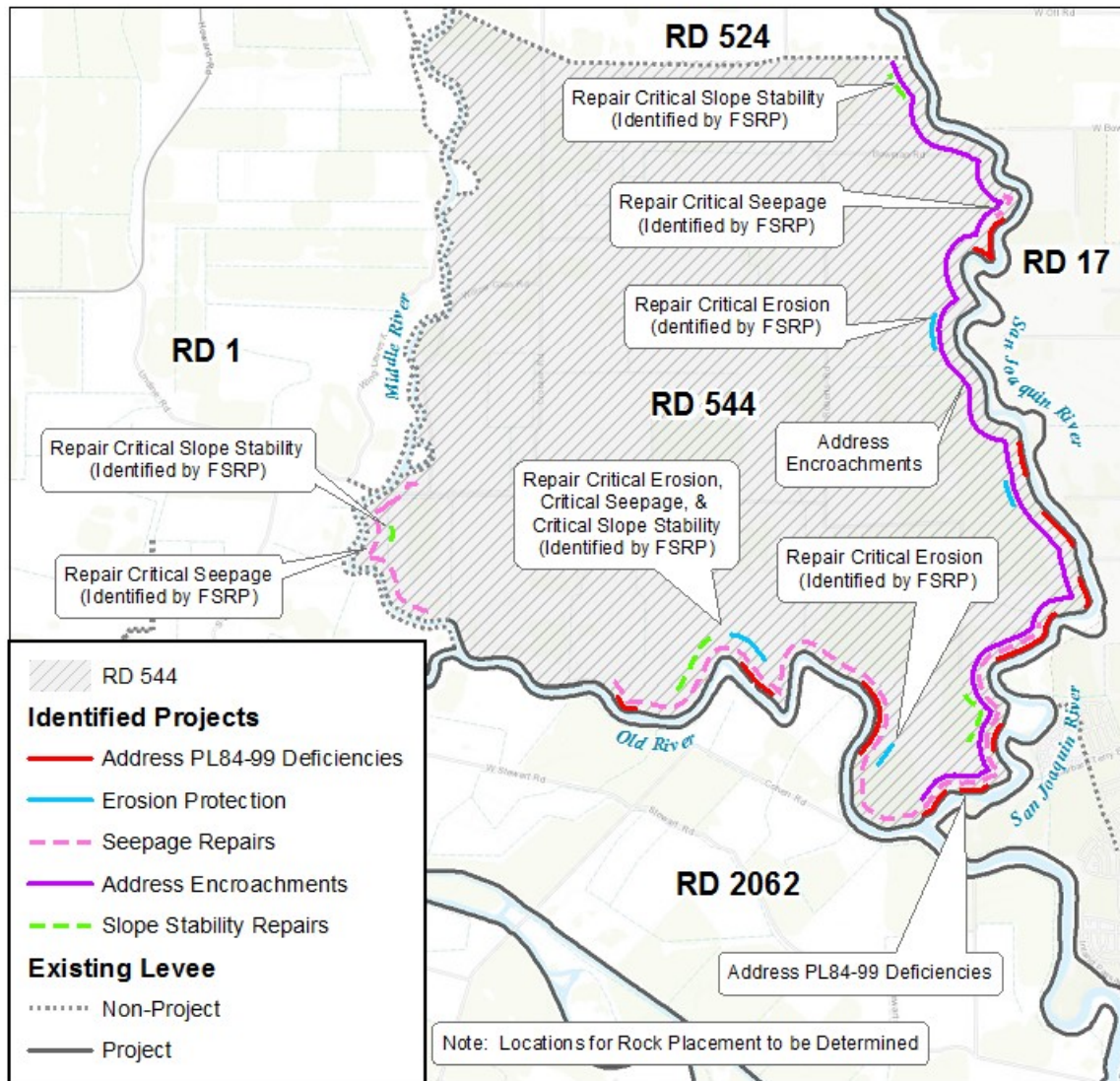


Figure 41 - RD 544 Projects

3.2.5 RD 684 Lower Roberts Island

RD 684 is located along the south and west banks of the San Joaquin. The District encompasses an area of approximately 10,437 acres and is protected by approximately 20 miles of non-project levee. The District is bordered by RD 2038 to the west, RD 2116 to the south, and the San Joaquin River on the north and east sides. The District is working towards meeting PL 84-99 standards, but will eventually further improve levees to their own adopted District template that calls for 22-foot-wide levee crowns that are 6-inches above PL 84-99.

There is not much existing information available for the RD 684 levees. These levees have not been studied by any of the State, or Federal plans, and have not been evaluated in detail on a local level. Some information was obtained during the initial small group meetings with stakeholders at the beginning of the RFMP process. The levee near the confluence of Turner Cut and the San Joaquin River is currently too narrow for access during a flood, and should be widened.

The District has constructed many levee improvement in the last five years:

- Work to address HMP deficiencies is currently underway (\$1.3 million) with assistance with a grant from DWR's Delta Special Projects Program.
- Upgraded several small levee reaches to PL 84-99 standards
- The District is also in the progress of widening and lower of the levee along Burns Cutoff – which will resolve a seepage issue.

2012 CVFPP and O&M Inspections

The 2012 CVFPP did not include an evaluation of the levees around RD 684. Additionally, the levees around RD 684 are not regularly inspected by DWR or USACE.

Risks Associated With Deficiencies

The RD 684 levee system protects more than 10,437 acres of prime farmland, containing several dozen residences, farm worker dwellings, barns and packing shed areas. Highway 4, the Mokelumne River Aqueduct, and the railroad all traverse RF 684.

The Delta Risk Management Strategy (DRMS) Phase 1 report estimates the total assets within RD 684 as a whole to be about \$1 million and does not include the value of the land. The Public Policy Institute (PPIC) estimates the land value of Roberts Island as a whole to be about \$164M, and the asset value as a whole to be about \$64M. Prorating those figures based on acreage, RD 684 is estimated to have a land value of \$56M and an asset value of about \$22M.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 684:

- Address seepage and erosion issues along the San Joaquin River
- Widen the levee/install a setback levee near the confluence of Turner Cut and the San Joaquin River for emergency access
- Ultimately, the RD would like to upgrade their levees to meet PL 84-99 standards.
- Widening & lowering of the levee along Burns Cutoff.

RD 684 Projects

Identified projects include: addressing PL84-99 deficiencies, constructing a setback levee, and conducting a study on the effectiveness of the Natali Levee. These projects shown on Figure 42 and are described below.

All Weather Road

All weather roads are needed for the levee along the San Joaquin River and Burns Cutoff.

Address PL84-99 Deficiencies

The District will bring any levee segments that do not meet the PL 84-99 Standard to six inches above the PL 84-99 Standard. One location is near the marina on Turner Cut, but other specific locations are currently unavailable.

Setback Levees

In the small group meetings with stakeholders, the District indicated the need for a setback levee along San Joaquin River/Turner Cut. Smaller setback levees are needed for access around two houses that sit near the levee crown.

Seepage Repair

The levee extending from near Turner Cut to about 1 mile east along the San Joaquin River will be reconstructed as a “fish friendly” levee in the process of resolving seepage problems.

Natali Levee Raising

A study of the Natali Levee (dryland levee) was conducted to find how much protection it offers in the event of RD 524 flooding. Raising the Natali Levee between RD 684 and RD 524 in coordination with provision for a relief cut along Burns Cutoff in RD 524 would reduce the risk of flood in RD 684 in the event of a RD 524 flood.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
All Weather Road	RD 684	TBD	Flood Management	TBD	Planning	\$400K	1

Address PL84-99 Deficiencies	RD 684	TBD	Flood Management	TBD	Conceptual	\$1M	1
Setback Levees	RD 684	TBD	Flood Management	Ecosystem Restoration	Planning	\$100,000 (Study & Plans) \$2.5M (Improvements)	1
Seepage Repair	RD 684	TBD	Flood Management	Ecosystem Restoration	Planning	\$2.5M	1
Natali Levee Raising	RD 684	TBD	Flood Management	TBD	Conceptual	\$400K	1

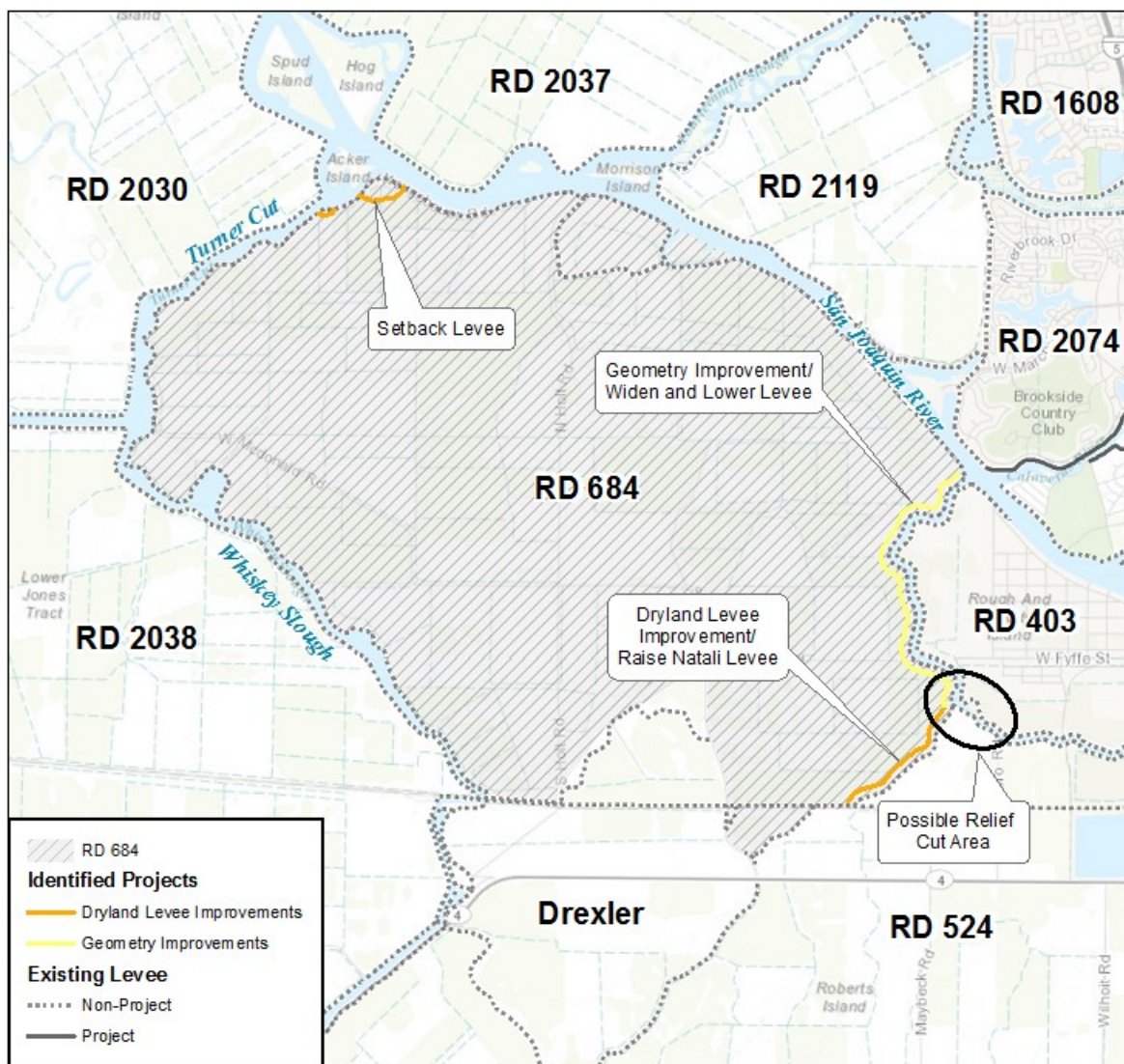


Figure 42 - RD 684 Projects

3.2.6 RD 773 Fabian Tract

RD 773 is protected by approximately 18.7 miles of non-project levee that is maintained by the District. The District is bordered by Fabian and Bell Canal to the north, Old River to the west and south, and Salmon Slough to the east.

The entire 98,995-foot length of levee along the perimeter of RD 773 currently meets HMP standards. However, approximately 2,597 feet of the levee system does not meet PL 84-99 geometry requirements.

2012 CVFPP and O&M Inspections

The 2012 CVFPP did not include an evaluation of the levees around RD 773. Additionally, the levees around RD 773 are not regularly inspected by DWR or USACE.

Risks Associated With Deficiencies

The RD 773 levee system protects nearly 6,900 acres of prime farmland, nearly 20 residences and several non-residential, agriculture related structures.

A failure or breach of the RD 773 levee system could result in flooding of the District to depths of approximately 9 feet on average. Costs associated with such an event have been calculated using actual costs from the 2004 Jones Tract Flood. The estimated cost of a flood event resulting from a single levee failure would be approximately \$23.3M.

The Delta Risk Management Strategy (DRMS) Phase 1 report estimates the total assets within RD 773 to be \$33,364,000, and does not include the value of the land. Recent land sales of similar properties and soil types in the region indicate the current land values are approximately \$48 million. The estimated value of other assets including homes, buildings, and appurtenant structures is approximately \$5 million. Therefore, the total estimated value of land and assets is approximately \$53 million.

The integrity of the RD 773 levee system is critical to the proper functioning of the DWR's South Delta Temporary Barriers Project which helps increase water levels, circulation patterns, and water quality in the southern Delta area for local agricultural diversions.

Flooding of RD 773 could also impact regional transportation and emergency access. For example, Tracy Blvd. provides access from Tracy to State Highway Route 4 and serves as a key emergency access route into and out of the Delta. Similarly, flooding of RD 773 could impact a high-voltage electrical transmission line operated by PG&E on Fabian Tract.

Finally, RD 773 provides multiple types of habitat and harbors a variety of species that would be severely impacted by flooding. If these impacts required mitigation, the current cost to replace those habitat values would range from \$65,000 to \$145,000 per acre.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 773:

- Improve levees along Grant Line canal (highest priority) and along Old River (next highest priority).
- Streamline permitting requirements to facilitate maintenance of existing levees.
- The primary concern of RD 773 on a project at Paradise Cut to divert water from the SJR is increased erosion along the northern boundary of RD 773.
- Improve levee erosion protection with supplemental rock slope protection on all of the RD 773 levees where needed. Specific sites discussed - South Bank Grant Line Canal and Old River.
- Continue with an aggressive vegetation control plan that complies with the environmental permitting requirements.
- Continue with an aggressive rodent control and damage repair plan.
- Maintain the levee crown with all-weather road where needed.
- Increase the levee crown widths where necessary and identify areas that would benefit from setback levees.
- Develop a Flood Contingency Map (FCM) for the “Old River” Flood Control System.

RD 773 Projects

Identified projects for RD 773 include addressing PL84-99 deficiencies, erosion protection, geometry improvements, installing all-weather road to District levees, and creating a flood contingency map for the “Old River” system. These projects are shown on Figure 43 and described below.

Address PL84-99 Deficiencies

A small amount of levees along Grant Line Canal do not currently meet PL 84-99 standards. The District will bring these portions of levee to six inches above the PL 84-99 Standard.

Erosion Protection

Levees along the south bank of Grant Line Canal and along Old River were mentioned as needing additional erosion protection. The District would like to add rock slope protection to these levee segments in order to prevent erosion and minimize future erosion repairs.

Geometry Improvements

The reach of levee adjacent to Fabian and Bell Canal currently contains segments of over-steepened landside slopes that require flattening in order to improve overall levee stability. The levee adjacent to Grant Line Canal was also noted as having land side slopes that are too steep. Necessary levee geometry improvements will be made to these levees to meet PL84-99 project standards discussed above. Additionally, the reach of levee adjacent to Fabian and Bell Canal contains segments of over-steepened waterside slopes. The District intends to set back the levee template thereby allowing the over-steepened waterside slopes to become sacrificial over time. These geometry improvements will be more critical if the expansion of Paradise Cut occurs.

Install All-Weather Road

Many unidentified segments of levee around the District do not have adequate crown widths or an all-weather access road. The District will increase width of levee crown where current width is not up to standards and install an all-weather road.

Flood Contingency Mapping

A Flood Contingency Map (FCM) does not exist for the “Old River” system. A FCM is needed in order to improve emergency response and reduce risk to people in the event of flood.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Address PL84-99 Deficiencies	RD 773	TBD	Flood Management	TBD	Conceptual	\$7.9 M	1
Erosion Protection	RD 773	TBD	Flood Management	TBD	Conceptual	\$54,000 (Study & Plans) \$10.8M (Improvements)	1
Geometry Improvements	RD 773	TBD, Paradise Cut Imp.	Flood Management	TBD	Conceptual	\$175,000 (Study & Plans) \$42M (Improvements)	3
Install All-Weather Road	RD 773	TBD	Flood Management	TBD	Conceptual	\$6M	2
Flood Contingency Mapping	RD 773	TBD	Flood Management	TBD	Conceptual	\$20k	1

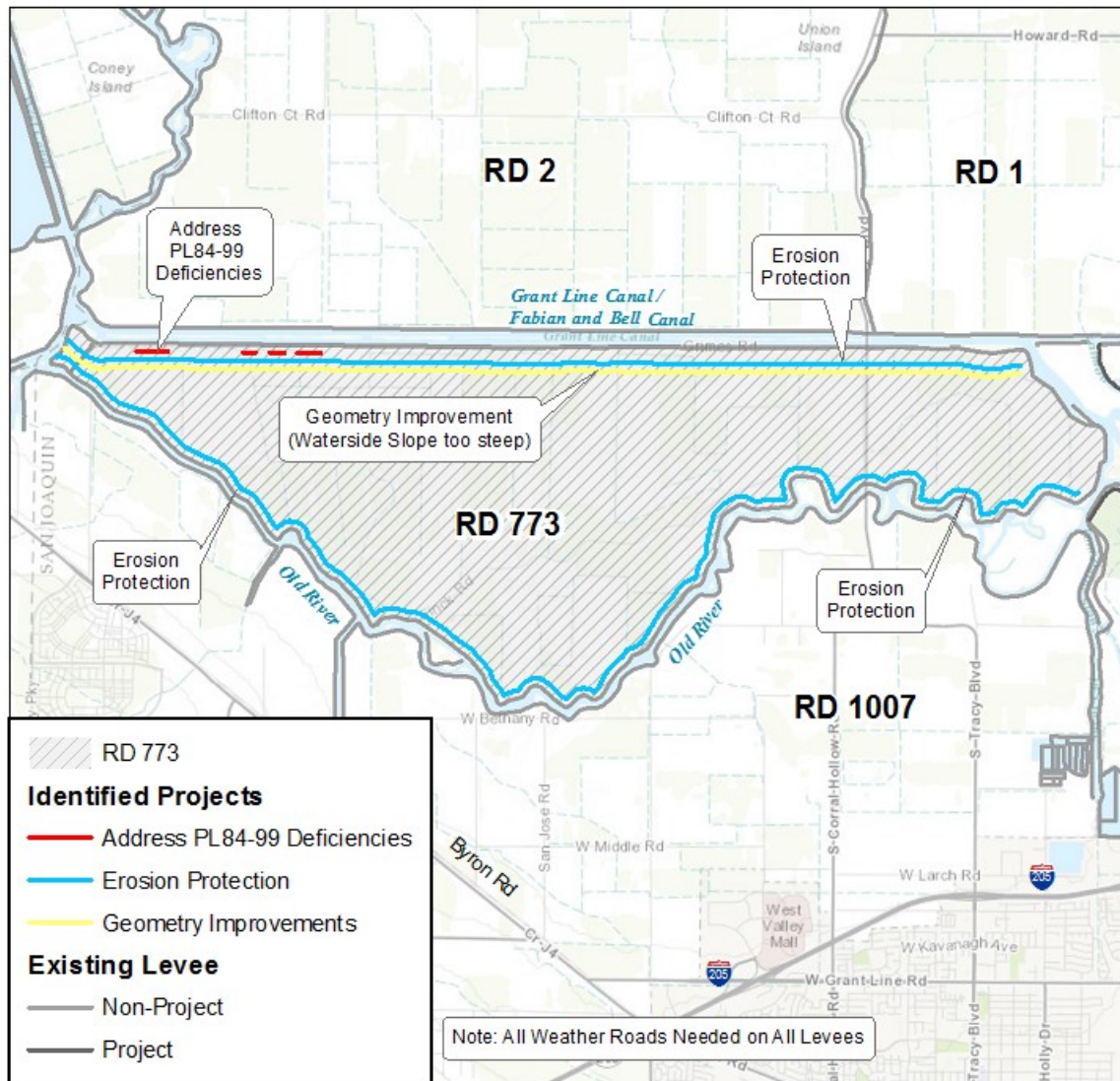


Figure 43 - RD 773 Projects

3.2.7 RD 1007 Pico & Nagle

RD 1007 is protected by approximately 21.9 miles of non-project levee. The District is bordered by unincorporated San Joaquin County to the west, Old River to the north, Tracy to the south, and RD 2058 to the east. RD 1007 is responsible for levee maintenance and the drainage is the District is handled by Natalie Burke Irrigation District. The RD 1007 levees are large and have had no recent need for critical repairs.

There is not much existing information available for the RD 1007 levees. These levees have not been studied by any of the State, or Federal plans, and have not been evaluated in detail on a local level.

Some information was obtained during the initial small group meetings with stakeholders at the beginning of the RFMP process. According to the District engineer, it is believed the levees currently meet PL 84-99 standards, although a thorough evaluation has not been performed. A survey, supported by a grant from DWR's Delta Special Flood Control Projects Program, is underway to confirm that levees meet PL 84-99 standards.

The waterside slopes of the levees along Old River are steeper than 3:1. However, the District engineer believes that a PL 84-99 cross section will fit within the existing geometry. Siltation in Old River is believed to have decreased the capacity of Old River adjacent to RD 1007. Finally, the levees at the northeast corner of the District lack an all-weather road and need to be improved in order to provide access during a flood.

Portions of levee near Sugar Cut and Old River are impassible during flood events must be widened and improved with an all-weather road so that they can be effectively traveled in a flood fight situation. This work (\$1.5 million) is in progress with assistance from a DWR Delta Special Flood Projects grant.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the NULE evaluations. Although the NULE evaluations reviewed the levees along the northern boundary of RD 1007 (along Old River), the overall category was shown as LD for lacking data. The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for levees around RD 1007 are presented in Table 32.

Table 32 - NULE Results for RD 1007

NULE RESULTS – RD 1007								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
1007	Pico & Nagle	NA	5014	A	A	A	LD (A/B)	LD (A/B)
		NA	5015	LD (A/B)	A	A	LD (A/B)	LD (A/B)

O&M Inspection

This District was not included in the 2012 LMA report and District levees are not inspected by USACE.

Risks Associated With Deficiencies

The RD 1007 levee system protects more than 5,993 acres of prime farmland, containing several residences, farm worker dwellings, barns, packing shed areas and the wastewater treatment plant for the City of Tracy.

The Delta Risk Management Strategy (DRMS) Phase 1 report estimates the total assets within Pico & Nagle as a whole to be approximately \$242,000,000. The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately \$24,200,000. Therefore, the total value of land and assets is estimated to be approximately \$266,200,000.

Additionally, a portion of City of Tracy's Wastewater Treatment facility is located on RD 1007 and is a vital facility for serving the city. If flooding of RD 1007 were to occur, floodwaters could impact and damage the treatment plant. Flooding would adversely affect not only water quality but would also impact the ability to treat wastewater for the City of Tracy.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 1007:

- Perform a study of the levees to see if they meet PL 84-99 standards
- Address steep waterside slopes along Old River
- Remove siltation along Old River
- Improve levee near Sugar Cut and Old River to provide access during floods.

RD 1007 Projects

The primary projects for the District include geometry improvements, restoring design capacity to Old River/Paradise Cut, and protecting the City of Tracy's industrial waste treatment ponds. These projects are shown in Figure 44 and described below.

Geometry Improvements

Waterside slopes have become too steep on the levees adjacent to Old River and need to be flattened out, especially to hold erosion protection. These slopes do not meet PL84-99 geometry criteria. The District engineer indicated that there is no immediate need for these improvements, but would need to be completed if Paradise Cut expansion is implemented. The geometry improvements are expensive because of waterside habitat and encroachments on the land side.

Restore Design Capacity to Old River/Paradise Cut

Old River and Paradise Cut have experienced significant sediment and siltation buildup, thereby significantly reducing the capacity of these conveyance facilities. This area should be dredged to restore the design capacity of the waterways, especially if Paradise Cut expansion is implemented.

Maintain Protection of the City of Tracy's Industrial Waste Treatment Ponds

The City of Tracy's industrial waste treatment ponds are within RD 1007 and need to be protected from flood events.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Geometry Improvements	RD 1007 & Paradise Cut Expansion	TBD	Flood Management	TBD	Conceptual	\$375,000 (Study & Plans) \$30M (Improvements)	3
Restore Design Capacity to Old River/Paradise Cut	RD 1007 & Paradise Cut Expansion	TBD	Flood Management, water quality and access to water	TBD	Conceptual	\$10	3
Protect City's WW Ponds	RD 1007 City of Tracy	TBD	Flood Management	TBD	Conceptual	\$2M	2

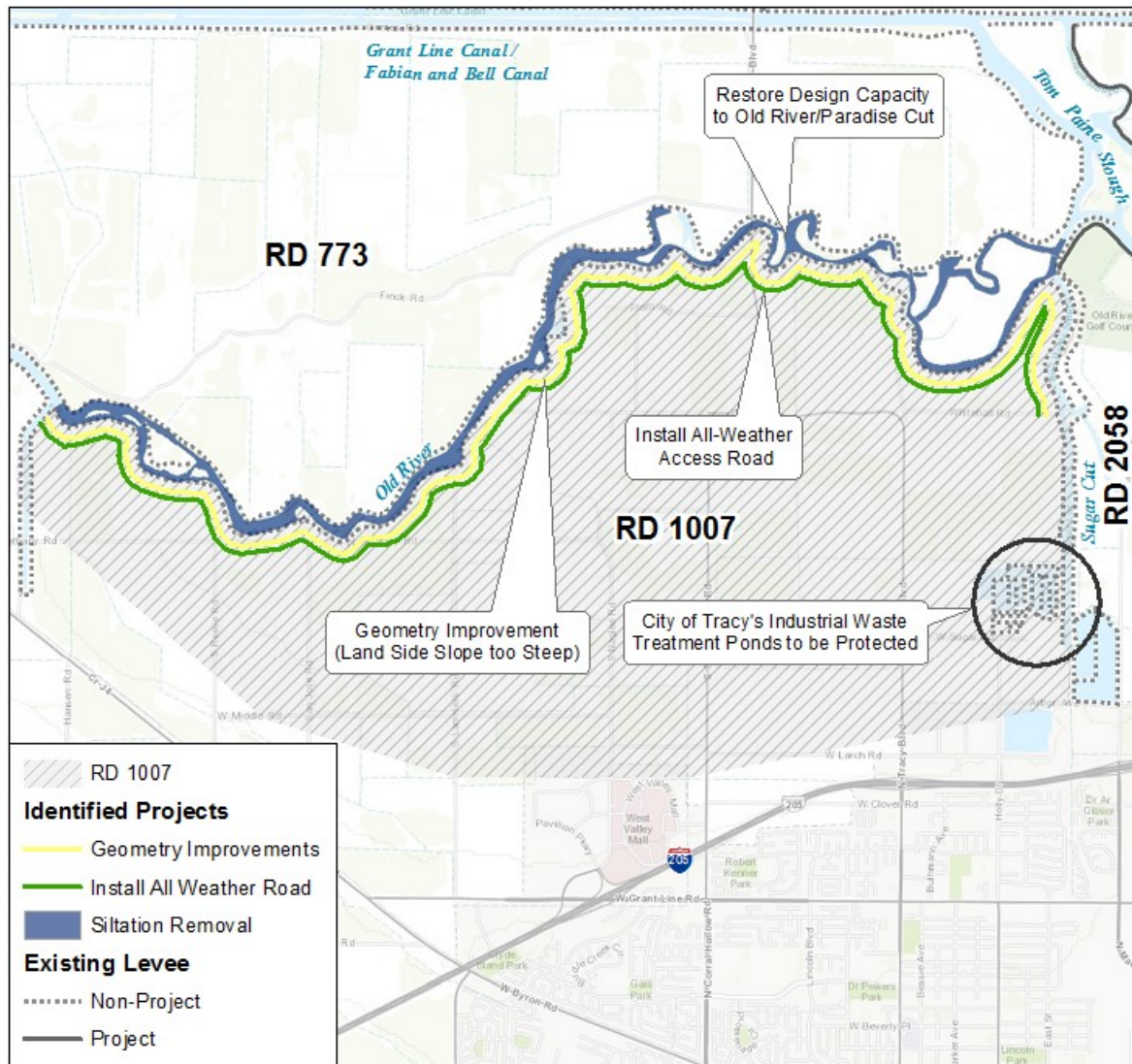


Figure 44 - RD 1007 Projects

3.2.8 RD 2058 Pescadero

RD 2058 maintains approximately 6.8 miles of project levee along Paradise Cut and approximately 2.2 miles of non-project levee around the remainder of the District. RD 2058 is bordered by Paradise Cut on the north, RD1007 to the west, RD 2095 to the east, and the City of Tracy to the south. A portion of the City of Tracy is within RD 2058.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the based on the NULE evaluations. RD 2058 was found to have generally moderate risk of failure due in most part to erosion concerns. One segment was found to have a high risk of failure due to critical seepage and erosion ratings. Figure 45 shows the Overall Hazard Level of levees around RD 2058.

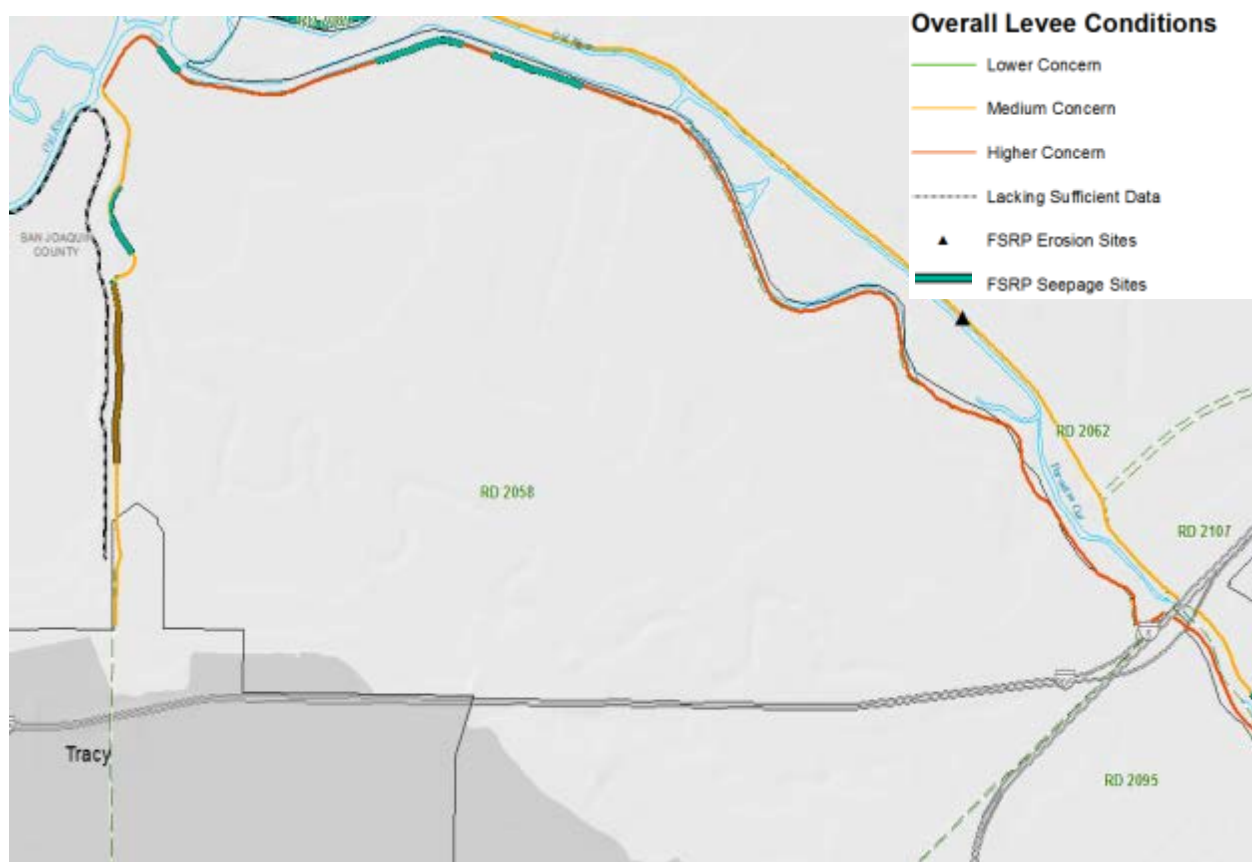


Figure 45 - CVFPP Overall Levee Conditions RD 2058

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for levees around RD 2058 are presented in Table 33.

Table 33 - NULE Results for RD 2058

NULE RESULTS – RD 2058								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2058	Pescadaro	1	192	C	A*	C	C	C
		NA	5016	A*	A	A*	B	B
		NA	5017	B	A*	A*	B	B

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

FSRP

RD 2058 is shown to have had three serious seepage events in the past, as well as one critical erosion issue. The results of the FSRP are shown in Table 34.

Table 34 - FSRP Results for RD 2058

FSRP RESULTS – RD 2058									
RD #	Name	Seepage Critical	Seepage Serious	Stability Critical	Stability Serious	Erosion Critical	Erosion Serious	Freeboard Critical	Freeboard Serious
2058	Pescadaro	-	3	-	-	1	-	-	-

O&M Inspections

Maintenance of levees around RD 2058 is performed by the District. RD 2058 was given a rating of Acceptable. Vegetation issues were cited but were minor. Table 35 provides a summary of the overall maintenance rating for the levee.

Table 35 - O&M Results for RD 2058

O&M RESULTS – RD 2058			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
2058	Pescadaro	Unacceptable	Acceptable

Condition of Flood Risk Management Facilities Identified in Local Studies

A recent field survey found locations throughout the left bank of the Paradise Cut levee system to be below HMP standards – approximately 2,400 feet of the levee provides less than 1-foot of freeboard for a 100-year flood event. The District has made some progress in upgrading geometry on short reaches of levee to HMP, but more work remains to be done.

Furthermore, field data and inspections along Paradise Cut show that levee crown widths, between mile marker 330+00 & 390+00, are below HMP standards. The levee crown between Alder Avenue and Cedar Avenue poses vehicular access limitations due to narrow levee crown. This section is approximately 6,000 feet long and would require placing engineered fill on the landside of the levee to widen the crown approximately 5-6 feet.

Additionally, Tom Paine Slough runs through the District and is used for irrigation water conveyance in the growing season and as the main collection facility for flood waters in the storm season. Silt and other material buildup are causing problems with irrigation and are reducing the carrying capacity of the channel for flood control purposes. Tom Paine Slough is in extreme need of dredging to improve its function primarily as a conveyance facility. The District estimates that environmental permitting fees to dredge the slough will exceed \$150,000. Cost estimates for the dredging itself are in the range of \$10.25 per cubic yard of dredged material. The District is planning to conduct sediment removal along Tom Paine Slough from 2014 through 2022 (about \$165,000 per year).

Furthermore, District maintenance activities often trigger permitting requirements with state and federal agencies, such as the US Fish and Wildlife Service and California Department of Fish and Game. The Service has notified the District of the potential presence of the riparian brush rabbit, Giant Garter Snake and Swanson hawk within the District levees. The Riparian Brush Rabbit was listed as endangered in 2000 and the giant garter snake in 1993, consequently, extensive modifications to maintenance practices have been required. Much of the vegetation that was routinely controlled in the past could not be controlled due to habitat concerns, resulting in an “unacceptable” rating from Department of Water Resources in 2009 inspections. Negotiations for a mitigated management plan are currently underway. It is anticipated that future allowable maintenance practices will pose an increased financial burden on the District.

Consequently, the District's budget takes into account the costs associated with acquiring the necessary permits to perform future work as well as the increased costs associated with that work.

The District's base map shows little to no habitat information/location and the California Department of Fish and Game Habitat Map, dated 2000, that only shows inspection data on Sugar Cut. The District needs to be aware of the location and extent of habitat that could contain riparian brush rabbit, giant garter Snake, Elderberry, etc. A habitat survey could provide this information. The figure below provides an overview of the deficiencies noted by stakeholders as part of the RFMP.

Risks Associated With Deficiencies

The RD 2058 levee system protects more than 7,386 acres of prime farmland, containing several residences, farm worker dwellings, barns, and packing shed areas.

The Delta Risk Management Strategy (DRMS) Phase 1 report estimates the total assets within the District as a whole to be approximately \$208,000,000. The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately \$20,800,000 million. Therefore, the total value of land and assets is estimated to be approximately \$228,800,000.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 2058:

- Develop a streamlined permitting process to facilitate vegetation maintenance on District levees
- Sedimentation in Tom Paine Slough needs dredging for access to water supply, but not for flood management
- Some sections of levee along Paradise Cut do not meet HMP standards

RD 2058 Projects

The projects identified for RD 2058 include erosion protection, seepage repair, geometry improvements, installing an all-weather access road, slope stability repairs, and conducting endangered species habitat mapping. These projects are shown in Figure 46 and are described in below.

Erosion Protection

A critical erosion protection site has been identified by the FSRP on the western side of the District (along Sugar Cut) adjacent to RD 1007. Rip rap or other erosion protection measures are needed in these areas.

Seepage Repairs

Critical seepage sites have been identified by the FSRP on the north and eastern sides of the District adjacent to RD 2089 and RD 1007 respectively. A study on the necessary repair and subsequent implementation of the repair needs to be done. Decisions on repairing the levee reach along Paradise Cut may be influenced by the timing and/or results of the investigation for expansion of Paradise Cut.

Geometry Improvements

Approximately 2,380 feet of levee needs to be raised with imported engineered fill so that the levee crown will meet the minimum HMP elevation.

Install All-Weather Access Road

The field data and inspections along Paradise Cut show that levee crown widths are narrower than HMP standards. The levee crown between Alder Avenue and Cedar Avenue poses vehicular access limitations due to narrow levee crown. This section is approximately 6,000 feet long and would require placing engineered fill on the landside of the levee to widen the crown approximately 5-6 feet.

Slope Stability Repairs

Serious slope stability sites have been identified by the FSRP along the northern side of the District. Identified stability concern sites are in need of repair. Decisions on repairing the levee reach along Paradise Cut may be influenced by the timing and/or results of the investigation for expansion of Paradise Cut.

Conduct Endangered Species Habitat Mapping

District maintenance activities often trigger permitting requirements with State and Federal agencies, such as the US Fish and Wildlife Service and California Department of Fish and Wildlife. The Service has notified the District of the potential presence of the riparian brush rabbit, giant garter snake and Swainson's hawk within the District Levees. Consequently, extensive modifications to maintenance practices have been required. Much of the vegetation that was routinely controlled in the past could not be controlled due to habitat concerns, resulting in an "unacceptable" rating from Department of Water Resources in 2009

The District needs to be aware of the location and extent of habitat that could contain riparian brush rabbit, giant garter snake, Elderberry, etc. A habitat survey could provide this information.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Erosion Protection*	RD 2058	TBD	Flood Management	TBD	Conceptual	\$4,000 (Study & Plans) \$750,000 (Improvements)	1
Seepage Repairs*	RD 2058	TBD	Flood Management	TBD	Conceptual	\$343,000 (Study & Plans) \$24.8M (Improvements)	2
HMP Geometry Improvements	RD 2058	TBD	Flood Management	TBD	Conceptual	\$94,000 (Study & Plans) \$2.5M (Improvements)	1
Install All-Weather Access Road	RD 2058	TBD	Flood Management	TBD	Conceptual	\$100,000	1
Slope Stability Repairs*	RD 2058	TBD	Flood Management	TBD	Conceptual	\$156,000 (Study & Plans) \$11.3M (Improvements)	2
Conduct Endangered Species Habitat Mapping	RD 2058	TBD	Flood Management	Ecosystem Restoration (riparian brush rabbit)	Conceptual	\$50,000	1

*Project derived from issues identified in FSRP

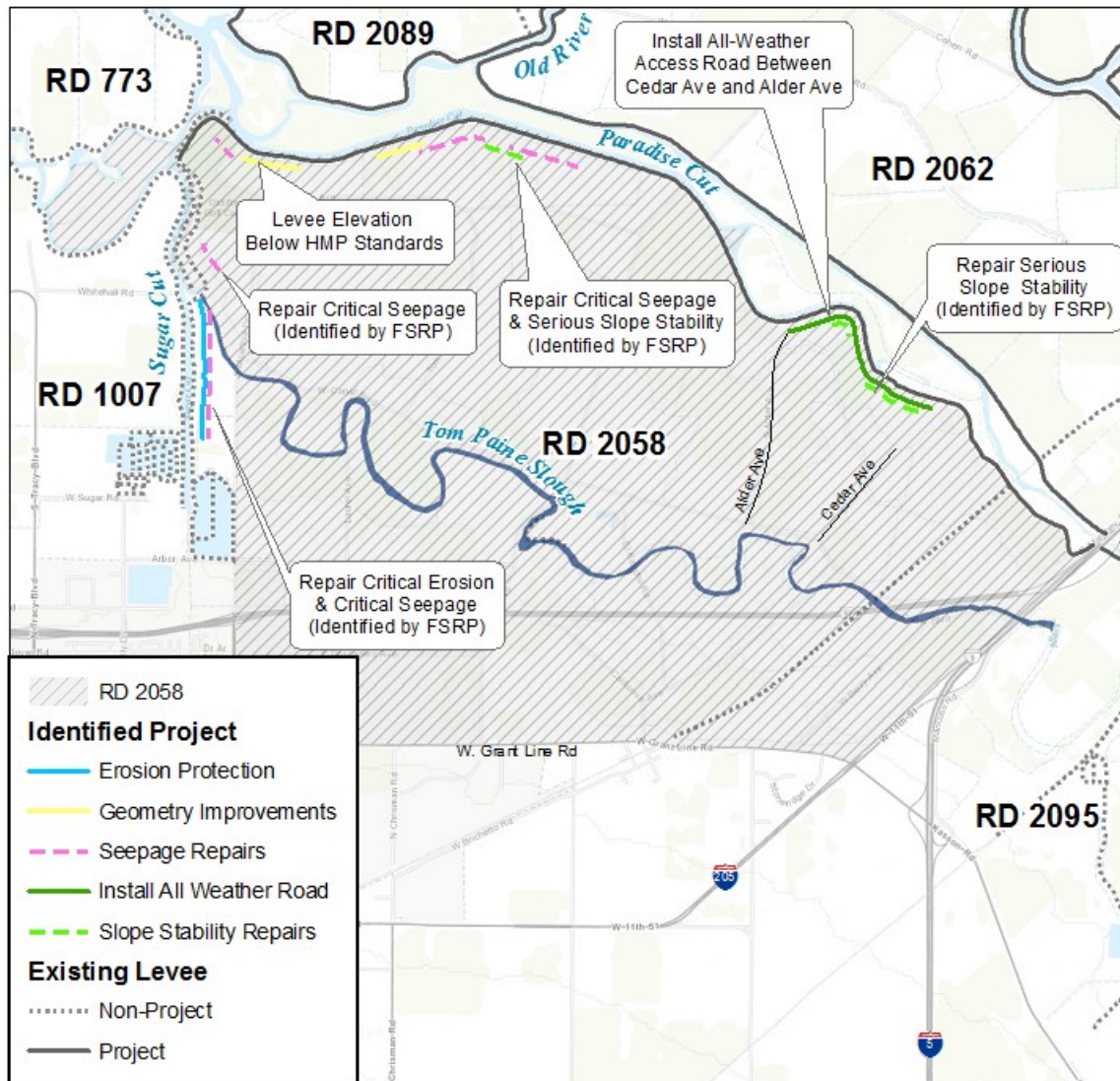


Figure 46 - RD 2058 Projects

3.2.9 RD 2062 Stewart Tract

RD 2062 maintains approximately 12.31 miles of Project Levees; 4.03 miles along the right bank of Paradise Cut, 5.63 miles along the left bank of Old River, and 2.65 miles along the left bank of the San Joaquin River. The District, and RD 2107 to the south, are divided by the Union Pacific Railroad alignment. The District currently maintains their levees to meet DWR maintenance standards. The District completed multiple repairs since their fall 2012 levee inspection to improve their maintenance rating with DWR to minimally acceptable. This rating will be finalized in summer 2014. Within the next year the District will continue to repair maintenance deficiencies to further improve the integrity of their levee system. The District is progressively working to regain active status in the USACE PL 84-99 RIP program, in conjunction with support from the CVFPB and RD 2107. RD 2062 is the one District in the Delta South Region is developing to 200-year ULOP.

Additionally, RD 2062 has constructed and will continue to construct non-federal levees in order to flood protected phases for development. Interior levees will be certified by FEMA.

The River Islands development on RD 2062 recently completed more than \$70 million in levee upgrades (and other improvements for development) to remove a portion of the City of Lathrop from the 100-year floodplain in 2006. These levees were designed and built to be approximately 300-feet wide to provide an increased level of flood protection. Construction of new homes began in late 2013.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the ULE/NULE evaluations. Figure 47 presents the Overall Hazard Level of levees in the Lathrop area.

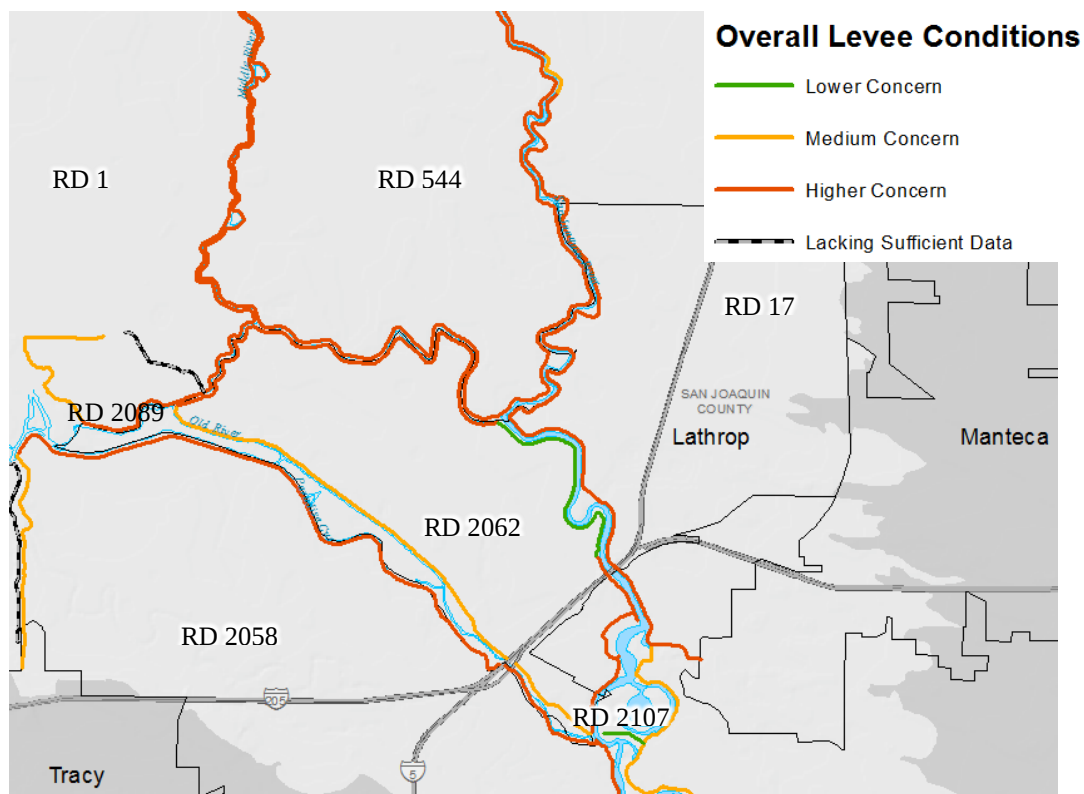


Figure 47 - CVFPP Overall Levee Conditions RD 2062

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations and are shown in Table 36.

Table 36 - NULE Results – RD 2062

NULE RESULTS – RD 2062								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2062	Stewart	1	193	A*	A	A*	A	A
		2	336	B	A	A	A	B
		3	256	C	C	C	B	C

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

The information in the tables above provide an indication of the nature of deficiencies used by DWR to determine the overall levee hazard level. This can be used as a measure of the overall reliability of each levee segment.

Flood System Repair

The Flood System Repair Project has identified the number of past critical and serious performance incidents for RD 2062. These were primarily related to seepage and erosion as shown in Table 37.

Table 37 - FSRP Results – RD 2062

FSRP RESULTS – RD 2062									
RD #	Name	Seepage Critical	Seepage Serious	Stability Critical	Stability Serious	Erosion Critical	Erosion Serious	Freeboard Critical	Freeboard Serious
2062	Stewart	2	6	-	-	-	2	-	-

PL84-99 Status

The levees protecting RD 2062 are inactive in the PL 84-99 program. RD 2062 feels it was inadequately notified of their PL 84-99 status. Nevertheless, the District is correcting deficiencies and will be requesting reinstatement in 2014.

O&M Ratings

The 2012 LMA report cited rutting, erosion, and vegetation for RD 2062. RD 2062 received an unacceptable O&M rating for both 2011 and 2012. The District has corrected, and will continue to correct deficiencies as identified by DWR and USACE.

The District currently maintains their levees to meet DWR maintenance standards. The District completed multiple repairs since their fall 2012 levee inspection to improve their maintenance rating with DWR to minimally acceptable. This rating will be finalized in summer 2014. Within the next year the District will continue to repair maintenance deficiencies to further improve the integrity of their levee system. The District is progressively working to regain active status in the USACE PL 84-99 RIP program, in conjunction with support from the CVFPB and RD 2107.

RD 2062 Projects

RD 2062 has a series of projects to achieve 200-year ULOP for development. The first stage has already improved levees for development on the eastern side of the District adjacent to RD 2107. This included about \$30 million in levee work. Two additional phases of work are planned, all with developer funds.

Phase 2 ULOP

Phase 2 construction will bring the north central portion of the District to 200-year ULOP. This will include habitat improvements along a portion of Old River. The earthwork for this phase is planned for the 2015-2016 period.

Phase 3 ULOP

Phase 3 is the largest of the three phases and will complete work to bring the entire Stewart Tract to 200-year ULOP. Levee work along Old River will include habitat improvements. The levee along Paradise Cut will be set back 900 to 1200 feet, which will add approximately 250 acres to Paradise Cut for habitat. The existing Paradise Cut north levee will be left in place, but will be breached in several places to allow water to flow on both sides. This existing levee will provide refugium for the for the riparian brush rabbit. This phase of work also includes setback of a portion of the north Paradise Cut levee on RD 2107 between I 5 and the upstream railroad. The bench (about 40 acres in size) downstream from the Paradise Cut weir will be lowered by about 5 feet to restore flow capacity to Paradise Cut. An alternative to bench removal may be an additional levee setback upstream from the railroad. These improvements will increase the existing flow capacity by about 1200 cfs and almost restore the original design capacity of 15,000 cfs. This work is planned to begin about year 2020.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Phase 2 ULOP	RD 2062	None	Flood Management	Ecosystem	Design	\$60M	1
Phase 3 ULOP	RD 2062	RD 2107	Flood Management	Ecosystem	Planning	\$110M	2
Study Paradise Cut Expansion	RD 2062	NGOs, State	Ecosystem	Flood Management	Conceptual	\$1.5M	1

3.2.10 RD 2085 Kasson District

RD 2085 is located along the west bank of the San Joaquin River just downstream of the Stanislaus River. The District encompasses an area of approximately 2,779 acres, and is protected by 5.1 miles of project levee along the San Joaquin River. The District is bordered by RD 2095 on the west, the San Joaquin River on the north, and unincorporated San Joaquin County to the south and east. RD 2085 has a Prop. 218 assessment that now allows them to conduct improved maintenance.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the NULE evaluations. RD 2085 levee segments 338 and 339 were found to have a low risk of failure due to erosion, which was the only category they were assessed on. Segment 197 was assessed on all categories but was found to have a high risk of failure due to

seepage and erosions concerns. Figure 48 presents the Overall Hazard Level of levees for RD 2085.

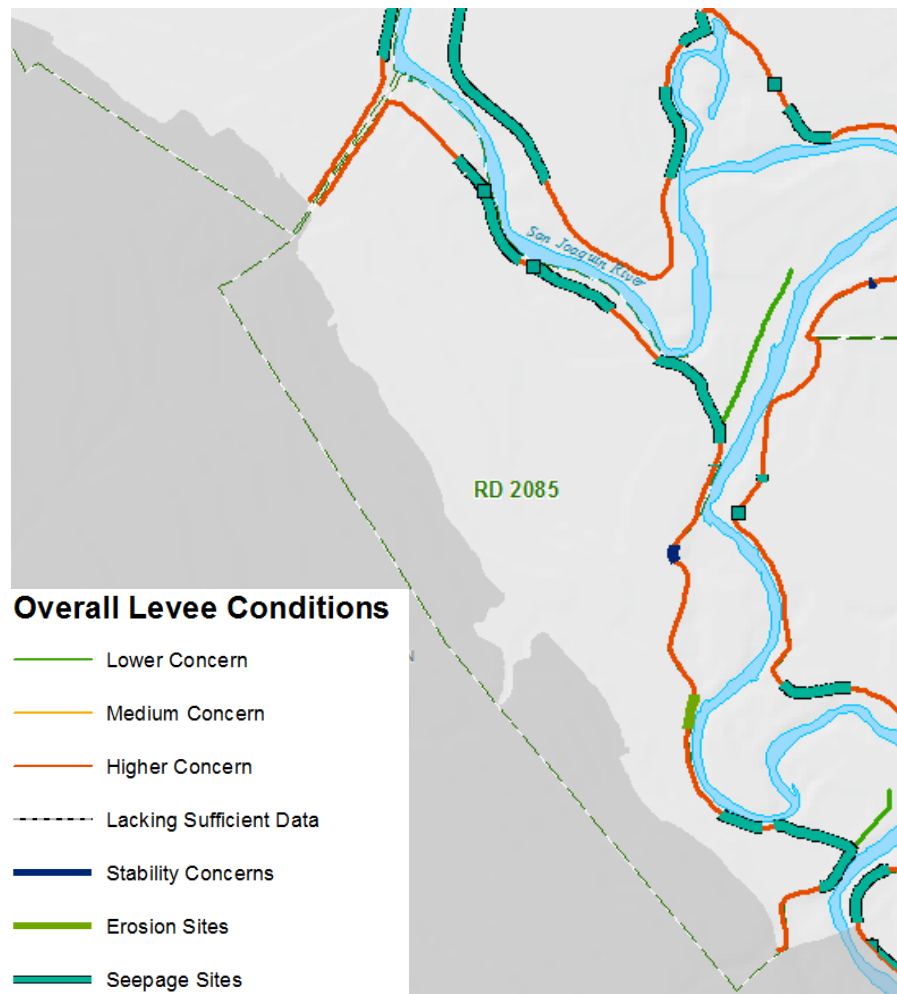


Figure 48 - CVFPP Overall Levee Conditions RD 2085

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for levees around RD 2085 are presented in Table 38.

Table 38 - NULE Results for RD 2085

NULE RESULTS – RD 2085								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2085	Kasson District	1	197	C	A	B	C	C
		2	338	Not Assessed	Not Assessed	Not Assessed	A	A
		3	339	Not Assessed	Not Assessed	Not Assessed	A	A

FSRP

The levees along the District were found to have erosion and seepage issues by the FSRP.

O&M Inspections

The District levees are not regularly inspected by DWR or USACE.

Risks Associated With Deficiencies

The RD 2085 levee system protects more than 1,460 acres of prime farmland, containing several residences, farm worker dwellings, barns, and packing shed areas.

The Delta Risk Management Strategy (DRMS) Phase 1 report estimates the total assets within the District as a whole to be approximately \$5.1 million. The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately \$500,000. Therefore, the total value of land and assets is estimated to be approximately \$5.6 million.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 2085:

- Limited funding for maintenance activities
- Ongoing seepage and erosion control repairs

- Capacity of San Joaquin River

RD 2085 Projects

Identified projects include erosion protection, seepage repairs and restoring San Joaquin River to Design Capacity. These projects are shown in Figure 49 and described below.

Erosion Protection

Critical erosion sites have been identified by the FSRP along District levees. One site is reported to be about 12 feet vertical for several hundred feet. These erosion sites are in need of repair.

Seepage Repair

Critical seepage sites have been identified by the FSRP along District levees. These seepage sites are in need of repair.

Restore Design Capacity of the San Joaquin River

According to the District, the San Joaquin River adjacent to RD 2085 has experienced siltation and sediment buildup that has significantly decreased the capacity of the river channel from its original design capacity. The District needs this silt to be removed to restore the design capacity and reduce the hydraulic load on its levees. This project is envisioned as a regional study to determine potential actions and tied to the study of Paradise Cut rather than a project for the RD 2085.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Erosion Protection*	RD 2085	TBD	Flood Management	TBD	Conceptual	\$300,000	1
Seepage Repairs*	RD 2085	TBD	Flood Management	TBD	Conceptual	\$375,000 (Study & Plans) \$33M (Improvements)	2
Restore Design Capacity of the SJ River	RD 2085	TBD	Flood Management	TBD	Conceptual (Need Study)	TBD	2

*Project derived from issues identified in FSRP

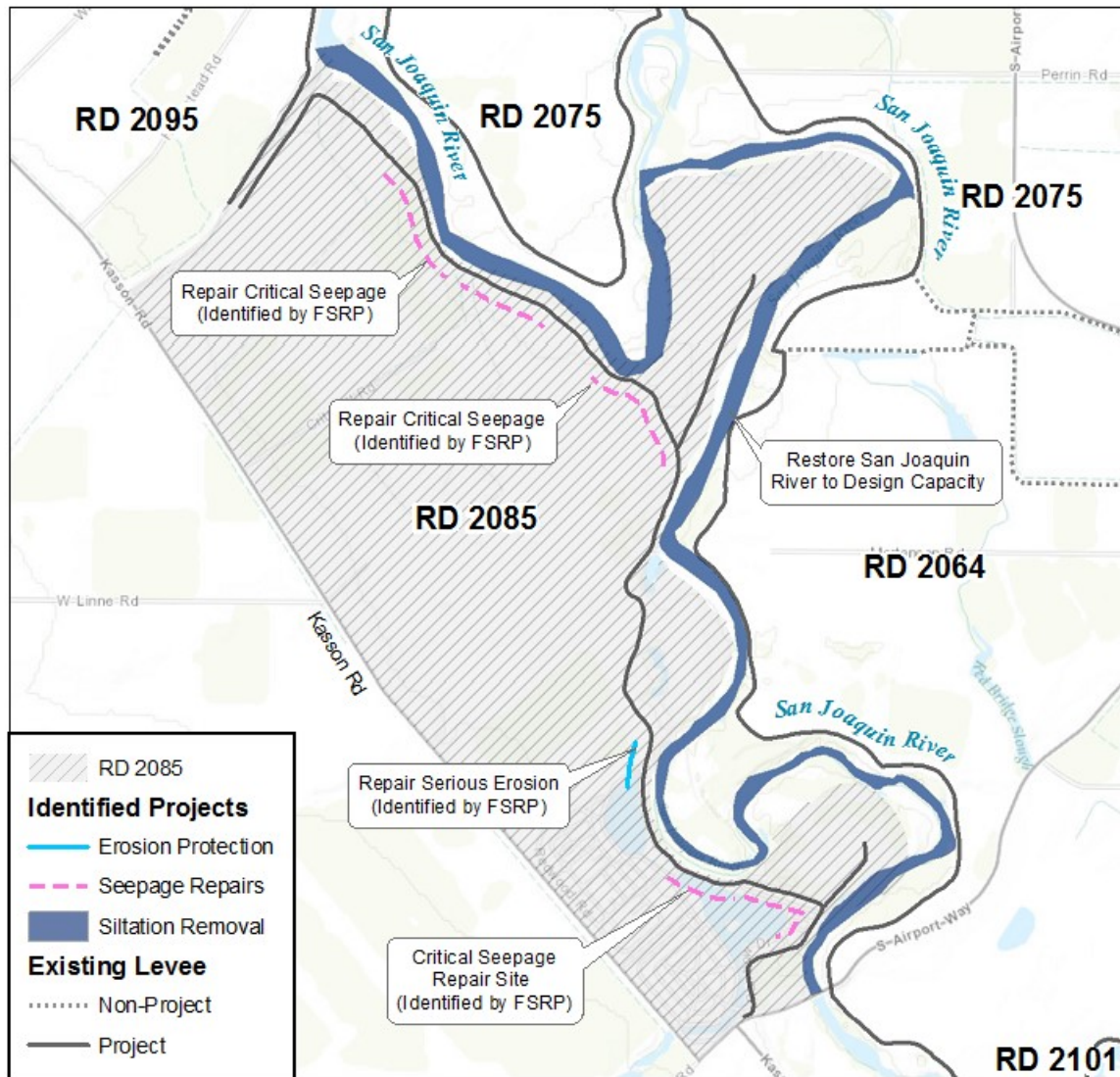


Figure 49 - RD 2085 Project

3.2.11 RD 2089 STARK TRACT

RD encompasses an area of approximately 714 acres, is surrounded by 3.5 miles of levee along the adjacent waterways and 1.4 miles of dryland levee. The length of project levees is 2.8 miles, and the length of non-project levees is 0.7 miles. RD 2089 is bordered by Old River on the south, Salmon Slough on the west, Grant Line Canal on the north, and RD1 on the east.

RD 2089 faces a challenge of having many miles of levees, but a small assessment base due to its relatively small acreage. This makes the assessments in RD 2089 some of the largest in the region (approx. \$30/acre). Developing a plan to deal with this challenge is necessary to have sustainable maintenance in the District.

The entire 19,418 foot length of levee along the perimeter of RD 2089 currently meets HMP standards. However, approximately 500 feet of the levee system does not meet PL 84-99 geometry requirements.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the NULE evaluations. RD 2089 was found to have generally moderate risk of failure due in most part to seepage and erosion concerns. Figure 50 presents the Overall Hazard Level of levees around RD 2064.

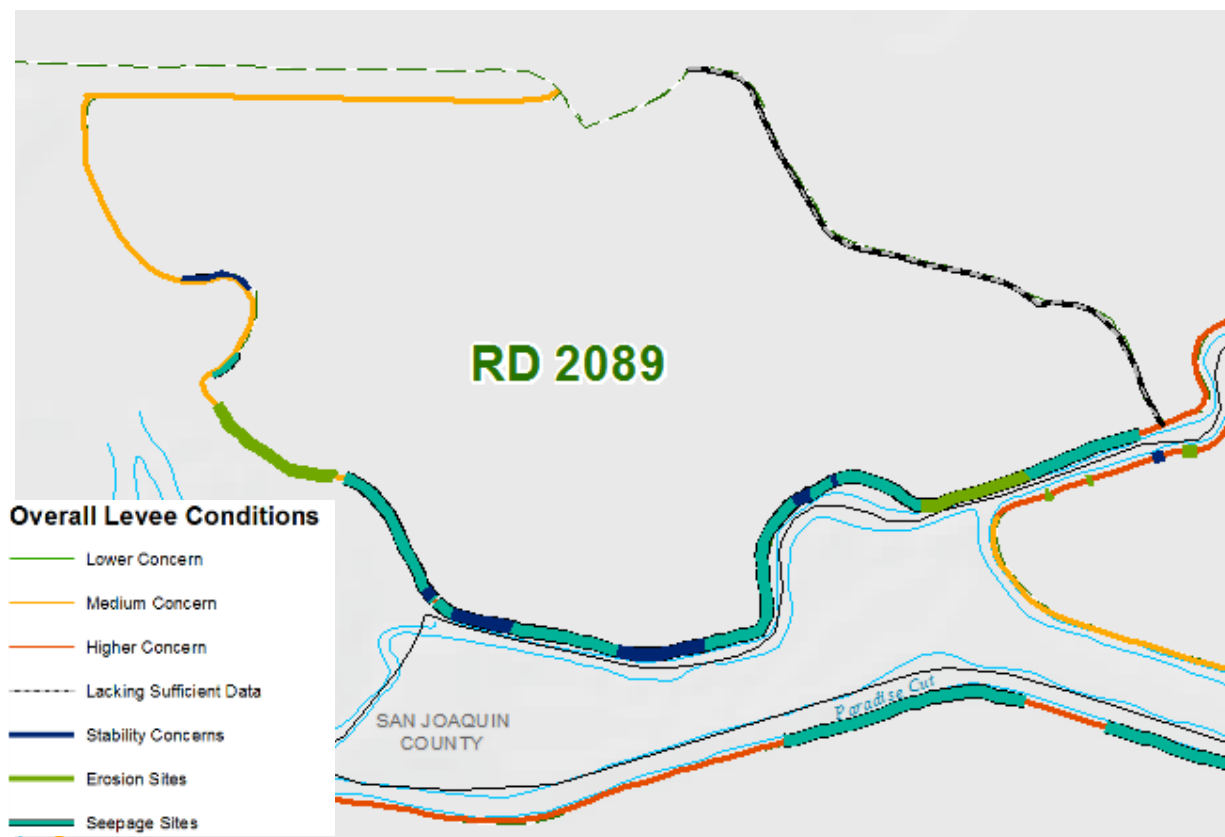


Figure 50 - CVFPP Overall Levee Conditions RD 2089

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. RD 2089 was found to have moderate to high likelihood of failure. Erosion was a concern in all segments, as well as seepage. Details of these evaluations for levees around RD 2089 are presented in Table 39.

Table 39 - NULE Results for RD 2089

NULE RESULTS – RD 2089								
RD #	RD Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2089	Stark	1	198	C	LD (A/B)	C	C	C
		2	335	B	A	B	B	B
		NA	5013	LD (A/B)	A*	A	B*	B

* = Denotes Independent Geotechnical Review Does Not Concur with DWR Findings

FSRP

RD 2089 has had both critical and serious instances of seepage and erosion in the past as shown in Table 40.

Table 40 - FSRP Results for RD 2089

FSRP RESULTS – RD 2089									
RD #	Name	Seepage Critical	Seepage Serious	Stability Critical	Stability Serious	Erosion Critical	Erosion Serious	Freeboard Critical	Freeboard Serious
2089	Stark	1	1	-	-	1	1	-	-

O&M Inspections

Maintenance of levees along the District are performed by RD 2089. A rating of Unacceptable was given, due mostly to crown surface/depressions/rutting issues. Erosion and vegetation were also cited but were deemed minor. Table 41 provides a summary of the overall maintenance rating for RD 2089.

Table 41 - O&M Results for RD 2089

O&M INSPECTION RESULTS – RD 2089			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
2089	Stark	Unacceptable	Unacceptable

Risks Associated With Deficiencies

A failure or breach of the RD 2089 levee system could result in flooding of the District to depths of approximately 7.5 feet on average. Costs associated with such an event have been calculated using actual costs from the 2004 Jones Tract Flood. The estimated cost of a flood event resulting from a single levee failure would be nearly \$3M.

This cost analysis does not include damage to privately owned property and improvements. The actual financial impact to those properties and facilities would depend greatly on the replacement costs, the amount of insurance those properties might have, and where they are located relative to the location of the levee breach and depth of water at those locations. Flooding could potentially eliminate a cropping season and affect natural gas well production.

In addition to protecting the State's water supply, electrical and natural gas transmission lines traverse RD 2089 which provide a significant amount of power to Central California. Damage to these transmission lines could severely affect the region's power supply, and would require repairs as soon as feasibly possible.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 2089.

- Implement an aggressive vegetation control plan.
- Salmon Slough is silted up which negatively impacts water flow.
- Improve levee erosion protection with supplemental rock slope protection on all of the RD 2089 levees.
- Improve levee crown with all-weather road.
- Increase the levee crown widths where necessary and identify areas that would benefit from setback levees.
- Maintain compliance with PL 84-99 levee standards on all District levees.

- Survey, evaluate and improve RD 2089 levees to meet current flood system requirements.
- Implement an aggressive rodent control and damage repair plan.
- RD 2089 has many levee miles to maintain with a relatively small assessment base with high assessments per acre.
- Update the Flood Contingency Map (FCM) for the Stark Tract Flood Control System to bring it up to current mapping standards. The current FCM for Stark Tract Flood Control System was created in August 2008.

RD 2089 Projects

Identified projects include upgrading levees to PL84-99 standards, improving dryland levees, erosion protection, seepage repairs, slope stability repairs, installing and all-weather access road, restoring design capacity to Salmon Slough, updating flood contingency mapping, conducting a study to determine the potential for setback levees, and developing a plan for sustainable maintenance of levees within the District. These projects are shown on Figure 51 and described below.

Address PL84-99 Deficiencies

The District would like to improve their levees to meet PL84-99 Standards. This applies to about 3% of the total levee length, located on the south-eastern side of the District near the confluence of Paradise Cut and Old River.

Improve Dryland Levee

RD 2089 shares a dryland levee along its northeastern boundary with RD 1. This levee is used as a second measure to curb flooding in the event that RD 1 floods. This levee is believed insufficient to hold back high water and should be studied further. However, RD 1 and 2 also have concerns about this levee to protect them from flooding of RD 2089. RD 2089 levees along Old River and Salmon Slough may be at a higher risk of failure of all levees for the three districts. Due to its high cost, improvement of the dryland levee is of lower priority.

Erosion Protection

Critical erosion sites have been identified by the FSRP along District levees. Other sites have been identified by stakeholders. Identified erosion sites are in need of repair. The District also plans to ensure the protection of the existing levee by adding supplementary riprap above the existing riprap to any portions of the waterside slope of the levee requiring additional rock slope protection. This will prevent erosion and minimize future erosion repairs. The erosion protection is estimated to cost about \$1.5 million plus an additional \$1 million for mitigation.

Seepage Repairs

Critical seepage sites have been identified by the FSRP along Old River and Salmon Slough. These sites are in need of repair.

Slope Stability Repairs

Critical slope stability concerns were identified by the FSRP throughout RD 2089 levees along Old River and Salmon Slough. These sites are in need of repair.

Install All-Weather Road

The SPFC levee along RD 2089 needs supplemental aggregate base to improve the all-weather road.

Restore Design Capacity to Salmon Slough

Salmon Slough is badly silted, and has does not convey flood flows efficiently. In the past, the slough was used to relieve pressure from flows in Paradise Cut, but now is a bottleneck. Dredging to allow original capacity will relieve pressure in Paradise Cut and reduce flood risk to the District.

Flood Contingency Mapping

The current flood contingency map for RD 2089 needs to be updated.

Conduct a Study to Determine the Potential for Setback Levees

Conducting a study to determine the potential for setback levees will allow the District to understand how setback levees can help reduce flood risk within the District.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Address PL84-99 Deficiencies	RD 2089	TBD	Flood Management	TBD	Conceptual	\$500K	1
Study/Improve Dryland Levees	RD 2089	RD 1 & RD 2	Flood Management	TBD	Conceptual	See RD 1 projects	3
Erosion Protection*	RD 2089	TBD	Flood Management	TBD	Conceptual	\$2.5M (Units 1, 2, & Grant Line)	1
Seepage & Slope Stability Repairs *	RD 2089	TBD	Flood Management	TBD	Conceptual	\$400,000 (Study & Plans) \$29M (Impr.)	3
Install All-Weather Road	RD 2089	TBD	Flood Management	TBD	Conceptual	\$600K	2
Restore Design Capacity to Salmon Slough	RD 2089	TBD, Paradise Cut Imp.	Flood Management	TBD	Conceptual	\$1M	3
Flood Contingency Mapping	RD 2089	TBD	Flood Management	TBD	Conceptual	\$20K	1
Conduct a Study to Determine the Potential for Setback Levees	RD 2089	TBD, Paradise Cut Imp.	Flood Management	Ecosystem Restoration	Conceptual	\$100K	1

*Project derived from issues identified in FSRP

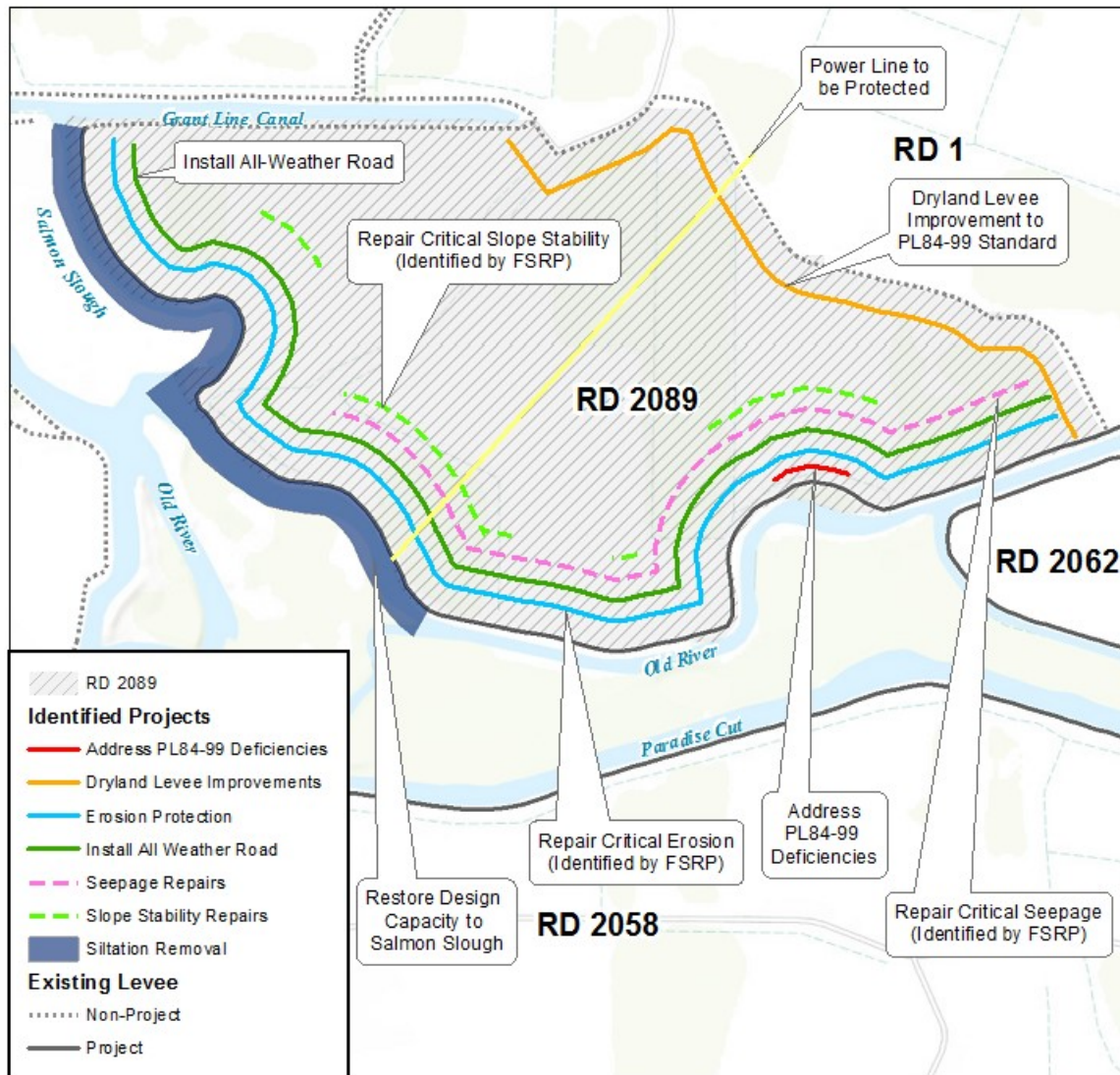


Figure 51 - RD 2089 Projects

3.2.12 RD 2095 Paradise Junction

RD 2095 encompasses an area of 4,020 acres and is protected by 4.7 miles of project levee along the San Joaquin River. The District is bordered by RD 2058 on the west, Paradise Cut and the San Joaquin River on the north, RD2085 to the southeast and unincorporated San Joaquin County to the south.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the NULE evaluations. RD 2095 was found to have a high risk of failure due to seepage concerns. Figure 52 presents the Overall Hazard Level of levees around RD 2095.

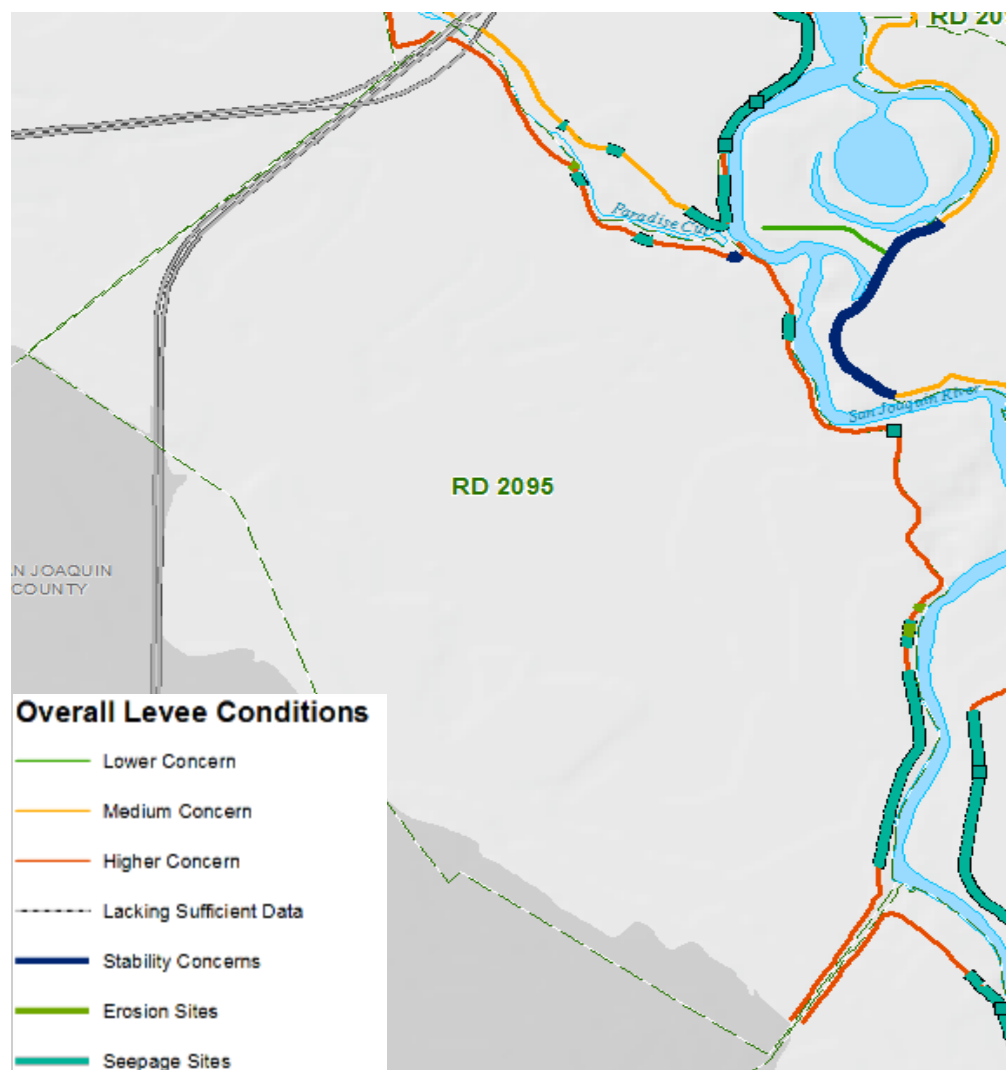


Figure 52 - CVFPP Overall Levee Conditions RD 2095

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the NULE evaluations. Details of these evaluations for levees around RD 2095 are presented in Table 42.

Table 42 - NULE Results for RD 2095

NULE RESULTS – RD 2095								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2095	Paradise Junction	1	202	C	A*	C	A*	C
		2	258	C	A	B	B	C

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

FSRP

RD 2095 was found to have had both critical and serious instances of seepage and erosion in the past, with seepage issues being more numerous.

Table 43 - FSRP Results for RD 2095

FSRP RESULTS – RD 2095									
RD #	Name	Seepage Critical	Seepage Serious	Stability Critical	Stability Serious	Erosion Critical	Erosion Serious	Freeboard Critical	Freeboard Serious
2095	Paradise Junction	1	4	-	-	1	1	-	-

O&M Inspections

Maintenance of levees along the District are performed by RD 2095. RD 2095 received a Minimally Acceptable rating due to crown surface, erosion, and vegetation issues. Table 44 provides a summary of the overall maintenance rating for RD 2095.

Table 44 - O&M Results for RD 2095

O&M INSPECTION RESULTS – RD 2095			
RD No.	Name	Overall O&M Rating	
		Fall 2011	Fall 2012
2095	Paradise Junction	Minimally Acceptable	Minimally Acceptable

Risks Associated With Deficiencies

The RD 2095 levee system protects more than 3,750 acres of prime farmland, containing several residences, farm worker dwellings, barns, and packing shed areas.

The Delta Risk Management Strategy (DRMS) Phase 1 report estimates the total assets within the District as a whole to be approximately \$104,400,000. The value of other assets including homes, buildings, irrigation, drainage and appurtenant structures have been estimated to be 10% of the land value, for a total of approximately \$10,400,000. Therefore, the total value of land and assets is estimated to be approximately \$114,800,000.

Primary Concerns

Based on the information above and discussions with stakeholders in the Regions, the list below was developed to present some of the primary concerns of RD 2095:

- Critical seepage and erosion control repairs are primary concerns for the District.
- Stakeholders are concerned the Paradise Cut widening may exacerbate seepage, erosion, and the risk of flooding during high water events.
- Siltation in Paradise Cut should be removed to restore the original design capacity

RD 2095 Projects

Identified projects include erosion protection, seepage repairs, and slope stability repairs. These projects are shown on Figure 53 and are described in more detail below.

Erosion Protection

Serious erosion protection sites have been identified by the FSRP along the San Joaquin River on the eastern side of the District. The following erosion sites are in need of repair:

- Unit 1 LM 0.73-0.74
- Unit 1 LM 0.86-0.86
- Unit 2 LM 1.77-1.80
- Unit 2 LM 1.85-1.89

All are on the DWR Erosion Survey and are Minimally Acceptable in the DWR Spring 2014 Levee Inspection. The District would like to repair these sites before they become Unacceptable for flood protection.

Seepage Repairs

Serious seepage repair sites have been identified by the FSRP along the San Joaquin River on the eastern side of the District. Identified seepage sites are in need of repair. Decisions on fixing additional smaller sites along Paradise Cut may be influenced by the timing and/or results of the investigation for expansion of Paradise Cut.

Slope Stability Repairs

Serious slope stability sites have been identified by the FSRP along the San Joaquin River on the eastern side of the District and along Paradise Cut. Identified stability sites are in need of repair. Decisions on fixing the longest levee reach along Paradise Cut may be influenced by the timing and/or results of the investigation for expansion of Paradise Cut.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
Erosion Protection*	RD 2095	TBD	Flood Management	TBD	Conceptual	\$450,000	1
Seepage & Slope Stability Repairs*	RD 2095	TBD	Flood Management	TBD	Conceptual	\$312,000 (Study & Plans) \$22.5M (Improvements)	2

*Project derived from issues identified in FSRP

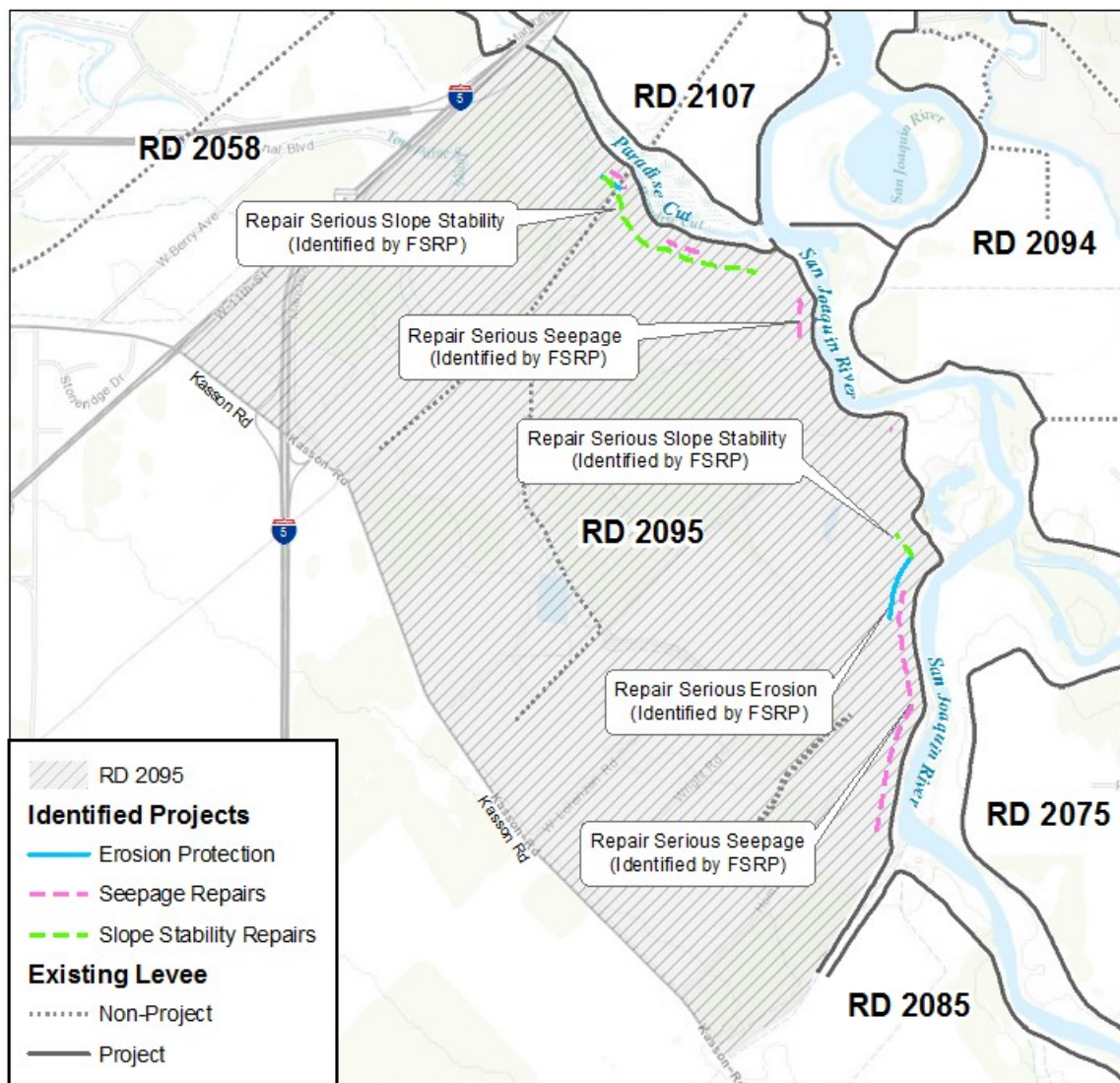


Figure 53 - RD 2095 Projects

3.2.13 RD 2107 Mossdale Island

RD 2107 encompasses approximately 1,031 acres and is responsible for O&M for approximately 4.0 miles of project levee and 2.4 miles of non-project levee. The District lands are primarily used for agriculture and sand mining. The District's goal is to achieve and maintain levees to the PL 84-99 standard.

2012 CVFPP

The 2012 CVFPP identified seepage, erosion, and slope stability concerns with levees in the Regions based on the ULE/NULE evaluations. Figure 54 presents the Overall Hazard Level of levees in the Lathrop area.

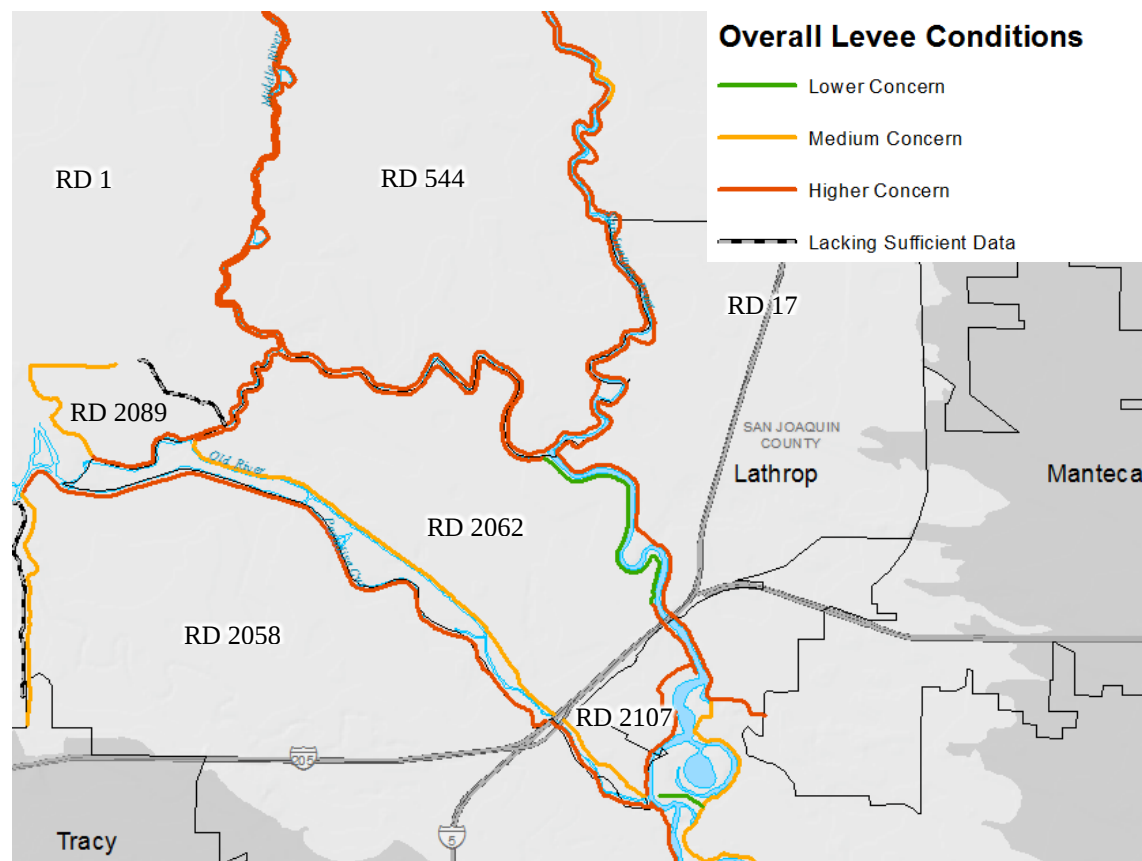


Figure 54 - CVFPP Overall Levee Conditions RD 2107

The Overall Hazard Levels are a composite of the seepage, stability, and erosion concerns identified in the ULE/NULE evaluations. Details of these evaluations for levees in and around Lathrop are presented in Table 45.

Table 45 - NULE Results – RD 2107

NULE RESULTS - 2107								
RD #	Name	Unit #	Segment #	Under-seepage	Slope Stability	Through Seepage	Erosion	Overall
2107	Mossdale Island	1	208	C	B*	C	A	C
		2	259	B	B	B	A	B

* = Denotes Independent Geotechnical Review by ENGEO Does Not Concur with DWR Findings

The information in the table above provide an indication of the nature of deficiencies used by DWR to determine the overall levee hazard level. This can be used as a measure of the overall reliability of each levee segment.

PL84-99 Status

As noted previously, PL 84-99 provides guidelines that levee must meet in order to be eligible for disaster assistance in the event of a levee failure. The levees protecting RD 2107 are inactive in the PL 84-99 program. RD 2107 feels it was inadequately notified of their PL 84-99 status. Nevertheless, the District is correcting deficiencies and will be requesting reinstatement in 2014.

O&M Ratings

The 2012 LMA report cited slope stability as a concern for RD 2107. Both the 2011 and 2012 O&M ratings for RD 2107 were acceptable.

RD 2107 Projects

The District has no plans for projects in the near future. However, levee improvements to the PL 84-99 standard will eventually be completed.

Project	Agencies Responsible	Project Partners	Primary Benefit	Secondary Benefit(s)	Current Status	Estimated Total Cost	Tier
PL 84-99 improvements	RD 2107	TBD	Flood Management	TBD	Conceptual	\$2.8M	3

3.2.14 RD 2116 Holt and Drexler Tract & Drexler Pocket

RD 2116, Drexler Tract, and Drexler Pocket are three contiguous areas on the western side of the Delta South Region. Although they are included in the study area, representatives did not participate in the RFMP process.

Levee maps prepared by DWR show about 1 mile of non-project levee for RD 2116, about 7.6 miles of non-project levee for Drexler Tract, and 1.3 miles of non-project levee for Drexler Pocket. DWR maps for these areas can be found at <http://deltacouncil.ca.gov/delta-maps>.

RD 2116/Drexler/Drexler Pocket Projects

No projects were identified for these three areas.