

20. CONTRA COSTA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

20.1 HAZARD MITIGATION PLAN POINT OF CONTACT

Primary Point of Contact

Paul R. Detjens
Senior Civil Engineer
255 Glacier Drive, Martinez, CA 94553
Telephone: 925-313-2394
E-mail Address: paul.detjens@pw.cccounty.us

Alternate Point of Contact

Mike Carlson
Deputy Chief Engineer
255 Glacier Drive, Martinez, CA 94553
Telephone Number: 925-313-2321
E-mail Address: mike.carlson@pw.cccounty.us

20.2 JURISDICTION PROFILE

20.2.1 Overview

The Contra Costa County Flood Control and Water Conservation District (District) is a dependent Special District, first formed by an act of the State legislature in 1951. Its governing document is the *Contra Costa County Flood Control and Water Conservation District Act*, last amended in 1992, which grants the District various powers such as the ability to acquire and hold property; sue and be sued; conserve, store and import water; control flood waters; issue bonds; levy taxes and assessments and use eminent domain. The governing board of the District is the County's five-member Board of Supervisors, which are elected to four year terms. Each Supervisor represents a specific area of the County.

The District plans, constructs and maintains major flood protection infrastructure to reduce flooding risk. The District's jurisdiction encompasses all of Contra Costa County, including all nineteen incorporated cities.

The District's funding comes from a combination of ad-valorem taxes and fees paid by developers upon creation of impervious surfaces. The District has approximately 20 staff, and relies on other specialists from the Contra Costa County Public Works Department, with whom they share office space.

The District currently serves a population of approximately 1,123,429 residents as of January 1, 2016 (California Department of Finance estimate) covering a land area of approximately 720 square miles. The District's service area is broken up into three distinct regions of the County: west, central and east. The west and central portions of the county are nearing their full development potential. Service demands are expected to increase in these areas not because of added population, but primarily because of increased customer demands for more ecologically sensitive flood protection, including potential removal of concrete lining of channels and restoration of the resulting streams. Other factors expected to increase demands for District services include the effect of global climate change on low-lying areas, increased regulatory requirements on operation and maintenance of existing facilities, and new clean water requirements on trash and other pollutants.

The eastern portion of the District’s service area includes the fast-growing cities of Pittsburg, Antioch, Oakley and Brentwood. Here, population growth means significantly increased runoff and customer demands for improved levels of protection as agricultural lands are converted to residential and commercial uses. Additionally, this eastern portion of the County has the same issues noted for central and west portions noted above.

The Deputy Chief Engineer of the Flood Control District assumes responsibility for the adoption of this plan by the County Board of Supervisors; the Deputy Chief Engineer of the Flood Control District will oversee its implementation.

20.2.2 Assets

Table 20-1 summarizes the critical assets of the district and their value.

Table 20-1. Special Purpose District Assets	
Asset	Value
Property	
2,600 acres in fee, 1450 acre easement	\$100M
Critical Infrastructure and Equipment	
47 Drop Structures	\$66M
13.2 miles Concrete Channels	\$209M
5 Dams	\$122M
34,600 LF Levees	\$35M
24 Detention Basins	\$36M
Various specialized equipment and trucks	\$1M
Total:	\$469M
Critical Facilities	
Glacier Drive (District main office)	\$8M
Waterbird Maintenance Yard	\$2M
Total:	\$10M

20.3 CAPABILITY ASSESSMENT

20.3.1 Planning and Regulatory Capabilities

Jurisdictions develop plans and programs and implement rules and regulations to protect and serve residents. When effectively prepared and administered, these plans, programs and regulations can support the implementation of mitigation actions. The following existing codes, ordinances, policies, programs or plans are applicable to this hazard mitigation plan:

- Regulatory permitting from:
 - US Army Corps of Engineers
 - California Natural Diversity Database
 - California Department of Public Health
 - California and US Environmental Protection Agencies
 - California Code of Regulations
 - Federal Endangered Species Act
 - California Environmental Quality Act (CEQA)

- Expenditure Policy, June 2005
- Infrastructure Report: Status of Flood Protection Infrastructure, November 2013
- Contra Costa County Code, Title 8—Zoning; originally adopted March 17, 1947; last updated July 11, 2017.
- Contra Costa County Code, Title 9—Subdivisions; originally adopted October 2, 1933; last updated 2015.
- Contra Costa County Code, Title 10—Public Works and Flood Control; last updated in 2005.

20.3.2 Fiscal, Administrative and Technical Capabilities

Fiscal capability is an indicator of a jurisdiction's ability to fulfill the financial needs associated with hazard mitigation projects. An assessment of fiscal capabilities is presented in Table 20-2. Administrative and technical capabilities represent a jurisdiction's staffing resources for carrying out the mitigation strategy. An assessment of administrative and technical capabilities is presented in Table 20-3.

Table 20-2. Fiscal Capability

Financial Resource	Accessible or Eligible to Use?
Capital Improvements Project Funding	Yes
Authority to Levy Taxes for Specific Purposes	Yes
User Fees for Water, Sewer, Gas or Electric Service	No
Incur Debt through General Obligation Bonds	Yes
Incur Debt through Special Tax Bonds	Yes
Incur Debt through Private Activity Bonds	No
State-Sponsored Grant Programs	Yes
Development Impact Fees for Homebuyers or Developers	Yes
Federal Grant Programs	Yes
Other	No

Table 20-3. Administrative and Technical Capability

Staff/Personnel Resource	Available?	Department/Agency/Position
Planners or engineers with knowledge of land development and land management practices	Yes	Flood Control District/Engineers
Engineers or professionals trained in building or infrastructure construction practices	Yes	Flood Control District/Engineers
Planners or engineers with an understanding of natural hazards	Yes	Flood Control District/Engineers
Staff with training in benefit/cost analysis	Yes	Flood Control District/Engineers
Surveyors	Yes	Flood Control District/Surveyors
Personnel skilled or trained in GIS applications	Yes	Flood Control District/Technicians
Scientist familiar with natural hazards in local area	Yes	Flood Control District/Engineers and Hydrologists
Emergency manager	Yes	County Public Works and OES/Various
Grant writers	Yes	Flood Control District/Engineers
Other	No	

20.3.3 Education and Outreach Capabilities

Outreach and education capability identifies the connection between government and community members, which opens a dialogue needed for a more resilient community. An assessment of education and outreach capabilities is presented in Table 20-4.

Table 20-4. Education and Outreach	
Criterion	Response
Do you have a Public Information Officer or Communications Office?	Yes
Do you have personnel skilled or trained in website development?	Yes
Do you have hazard mitigation information available on your website? • If yes, please briefly describe	Yes Information on hazard mitigation plan (http://www.contracosta.ca.gov/6415/Local-Hazard-Mitigation-Plan)
Do you utilize social media for hazard mitigation education and outreach? • If yes, please briefly describe	No N/A
Do you have any citizen boards or commissions that address issues related to hazard mitigation? • If yes, please briefly describe	No N/A
Do you have any other programs already in place that could be used to communicate hazard-related information? • If yes, please briefly describe	Yes Flood Forecast Information (http://www.cccounty.us/1578/Flood-Forecast-Information)
Do you have any established warning systems for hazard events? • If yes, please briefly describe	No – warnings would be issued by County OES N/A

20.3.4 Adaptive Capacity for Climate Change

Given the uncertainties associated with how hazard risk may change with a changing climate, a jurisdiction's ability to track such changes and adapt as needed is an important component of the mitigation strategy. Table 20-5 summarizes the District's adaptive capacity for climate change.

20.4 INTEGRATION WITH OTHER PLANNING INITIATIVES

The information on hazards, risk, vulnerability and mitigation contained in this hazard mitigation plan is based on the best available data. Plan integration is the incorporation of this information into other relevant planning mechanisms, such as general planning and capital facilities planning. It includes the integration of natural hazard information and mitigation policies, principles and actions into local planning mechanisms and vice versa. Additionally, plan integration is achieved through the involvement of key staff and community officials in collaboratively planning for hazard mitigation.

Table 20-5. Adaptive Capacity for Climate Change

Criterion	Jurisdiction Rating ^a
Technical Capacity	
Jurisdiction-level understanding of potential climate change impacts <i>Comments/Additional Information: None provided</i>	Medium
Jurisdiction-level monitoring of climate change impacts <i>Comments/Additional Information: None provided</i>	Medium
Technical resources to assess proposed strategies for feasibility and externalities <i>Comments/Additional Information: None provided</i>	Low
Jurisdiction-level capacity for development of greenhouse gas emissions inventory <i>Comments/Additional Information: None provided</i>	Low
Capital planning and land use decisions informed by potential climate impacts <i>Comments/Additional Information: None provided</i>	Medium
Participation in regional groups addressing climate risks <i>Comments/Additional Information: Participate in the Adapting to Rising Tides Program of the San Francisco Bay Conservation and Development Commission, and in CHARG, Coastal Hazards Adaptation Resiliency Group of San Francisco Bay Area planners, scientists, engineers, and policy makers from local, state, and federal agencies.</i>	High
Implementation Capacity	
Clear authority/mandate to consider climate change impacts during public decision-making processes <i>Comments/Additional Information: None provided</i>	Medium
Identified strategies for greenhouse gas mitigation efforts <i>Comments/Additional Information: None provided</i>	Low
Identified strategies for adaptation to impacts <i>Comments/Additional Information: None provided</i>	Medium
Champions for climate action in local government departments <i>Comments/Additional Information: None provided</i>	Low
Political support for implementing climate change adaptation strategies <i>Comments/Additional Information: None provided</i>	Medium
Financial resources devoted to climate change adaptation <i>Comments/Additional Information: None provided</i>	Low
Local authority over sectors likely to be negative impacted <i>Comments/Additional Information: None provided</i>	Low
Public Capacity	
Local residents knowledge of and understanding of climate risk <i>Comments/Additional Information: None provided</i>	Low
Local residents support of adaptation efforts <i>Comments/Additional Information: None provided</i>	Low
Local residents' capacity to adapt to climate impacts <i>Comments/Additional Information: None provided</i>	Low
Local economy current capacity to adapt to climate impacts <i>Comments/Additional Information: None provided</i>	Low
Local ecosystems capacity to adapt to climate impacts <i>Comments/Additional Information: None provided</i>	Low

- a. High = The capacity exists and is in use; Medium = The capacity may exist, but is not used or could use some improvement; Low = Capacity does not exist or could use substantial improvement; Unsure= Not enough information is known to assign a rating.

20.4.1 Existing Integration

In the performance period since adoption of the previous hazard mitigation plan, the Contra Costa County Flood Control and Water Conservation District made progress on integrating hazard mitigation goals, objectives and actions into other planning initiatives. The following plans and programs currently integrate components of the hazard mitigation strategy:

- **Expenditure Policy**—The expenditure policy sets the following order of priorities: system preservation, public safety, and system expansion. This relates to the hazard mitigation plan because it emphasizes repair and rehabilitation of existing facilities to ensure they remain able to reduce flood risk and minimize the risk of dam failure.

Resources listed in Section 20.11 were used for information on hazards and local jurisdiction capabilities.

20.4.2 Opportunities for Future Integration

As this hazard mitigation plan is implemented, the Contra Costa County Flood Control and Water Conservation District will use information from the plan as the best available science and data on natural hazards. The capability assessment presented in this annex identifies codes, plans and programs that provide opportunities for integration. The area-wide and local action plans developed for this hazard mitigation plan include actions related to plan integration, and progress on these actions will be reported through the progress reporting process described in Volume 1. New opportunities for integration also will be identified as part of the annual progress report. The capability assessment identified the following plans and programs that do not currently integrate goals or recommendations of the hazard mitigation plan but provide opportunities to do so in the future:

- **Public Works Emergency Response Plan**—Risk assessment information will be incorporated as appropriate.
- **Capital Improvement Plan (Draft)**—Funding for mitigation activities will be considered and incorporated as appropriate.

20.5 JURISDICTION-SPECIFIC NATURAL HAZARD EVENT HISTORY

Table 20-6 lists past occurrences of natural hazards for which specific damage was recorded in the Contra Costa County Flood Control and Water Conservation District. Other hazard events that broadly affected the entire planning area, including the Contra Costa County Flood Control and Water Conservation District, are listed in the risk assessments in Volume 1 of this hazard mitigation plan.

Table 20-6. Natural Hazard Events

Type of Event	FEMA Disaster # (if applicable)	Date	Damage Assessment
Severe Weather, Flood	DR-4308	2/1/2017-2/23/2017	\$800,000
Severe Weather, Flood	DR-4301	1/3/2017-1/12/2017	\$250,000
Severe Weather, Flood, Landslides	FEMA-1628	12/31/2005	\$1,900,000
Severe Weather, Flood	FHWA	12/16/2002	No data
Severe Weather, Flood, Landslides	FEMA-1203	2/2/1998	\$1,200,00
El Nino Storm, Flood, Landslides	FEMA-1155	1/1/1997	\$973,000
Severe Weather, Flood	FEMA-1046	3/1995	\$753,000
Severe Weather, Flood	FEMA-1044	1/1995	\$1,100,000
Severe Weather, Flood	FEMA-979	1/1993	\$911,000
Severe Weather, Flood, Landslides	FEMA-758	2/17/1986	\$63,000
Severe Weather, Flood	NA	3/1980	\$150,000
Severe Weather, Flood, Landslides	NA	11/21/1977	No data

20.6 JURISDICTION-SPECIFIC VULNERABILITIES

Volume 1 of this hazard mitigation plan provides complete risk assessments for each identified hazard of concern. Noted vulnerabilities within the district include the following:

- There is a significant risk for flood damage in the County, with approximately 8 percent of the total replacement value located within the 0.2 percent annual chance floodplain.
- In many areas, the FEMA flood insurance rate maps do not accurately show current flood risk
- There is a low community understanding of flood risks, and a general feeling that flood risks are lower than they actually are.
- Creek bank erosion is a concern, especially in unlined earthen channels throughout the county.
- Dam failures due to seismic activity may impact the County.
- Funding shortfalls
- Many of the District's facilities are nearing the end of their useful life, and may need significant rehabilitation or replacement.
- Most District reservoirs are nearing 50 years old, and will likely need rehabilitation including a seismic vulnerability analysis.
- District funding sources are insufficient to meet new or expected clean water mandates, such as trash and mercury total maximum daily loads (TMDL). This reduces available local funds for flood risk reduction and structure analysis and rehabilitation.
- Some District levees no longer enjoy FEMA accreditation, and the District lacks the resources to study and potentially improve these levees for re-accreditation.
- Many District facilities lack instrumentation that would allow timely notification and emergency response to address flood hazards.

20.7 HAZARD RISK RANKING

Table 20-7 presents a local ranking for the Contra Costa County Flood Control and Water Conservation District of all hazards of concern for which Volume 1 of this hazard mitigation plan provides complete risk assessments. This ranking summarizes how hazards vary for this jurisdiction. As described in detail in Volume 1, the ranking process involves an assessment of the likelihood of occurrence for each hazard, along with its potential impacts on people, property and the economy.

Table 20-7. Hazard Risk Ranking

Rank	Hazard Type	Risk Rating Score (Probability x Impact)	Category
1	Severe weather (<i>excluding extreme heat</i>)	45	High
2	Flood	39	High
3	Landslide	36	High
3	Drought	36	High
4	Earthquake	32	High
5	Sea level rise	14	Low
6	Dam and levee failure	12	Low
7	Tsunami	6	Low
7	Wildfire	6	Low
8	Severe Weather (extreme heat)	0	None

20.8 STATUS OF PREVIOUS PLAN ACTIONS

Table 20-8 summarizes the actions that were recommended in the previous version of the hazard mitigation plan and their implementation status at the time this update was prepared.

Table 20-8. Status of Previous Plan Actions

Action Item	Completed	Removed; No Longer Feasible	Carried Over to Plan Update	
			Check if Yes	Enter Action #
FCD1—Repair bank erosion, various sites countywide. (i.e.: Green Valley Creek, Grayson Creek at County Quarry, San Ramon Creek, etc.). <i>Comment:</i>			X	CCCFCWCD-4
FCD2—Construct / expand detention basins (implement basin construction as identified in FCD CIP: Lower Sand Creek Basin, Oakley / Trembath, etc.). <i>Comment:</i>			X	CCCFCWCD-5
FCD3—Expand Upper Sand Creek detention basin to significantly reduce flood risk for downstream communities. Construct Upper Sand Creek dam to state Division of Dam Safety requirements. <i>Comment:</i> Completed 2014	X			
FCD4—Repair bank erosion, various sites countywide. (i.e.: Green Valley Creek, Grayson Creek at County Quarry, San Ramon Creek, etc.). <i>Comment:</i>			X	CCCFCWCD-4
FCD5—Widen creeks / channels and raise / rehabilitate levees (implement projects as identified in FCD CIP: Marsh Creek, East and West Antioch Creeks, etc.). <i>Comment:</i>			X	CCCFCWCD-6
FCD6—Assess condition of Wildcat and San Pablo Creek levees to determine/seek levee re-accreditation. <i>Comment:</i> Completed 2017	X			
FCD7—Remove sediment from channels and detention basins (implement projects as identified in FCD CIP. i.e.: Kubicek Basin, Walnut Creek, Grayson Creek, etc.). <i>Comment:</i>			X	CCCFCWCD-7
FCD8—Seismic assessment of existing dams. <i>Comment:</i>			X	CCCFCWCD-8
FCD9—Seismic rehabilitation/retrofitting of existing dams (may combine with FCD5 above). <i>Comment:</i>			X	CCCFCWCD-9
FCD10—Acquire floodplain easements over privately held parcels at various sites District-wide (i.e.: Trembath floodplain on East Antioch Creek, floodplains on Marsh Creek, Walnut Creek overflow area at Pacheco Creek, etc.). <i>Comment:</i>			X	CCCFCWCD-10
FCD11—Support County-wide initiatives identified in the 2011 Hazard Mitigation Plan. <i>Comment:</i>			X	CCCFCWCD-31
FCD12—Continue to support the implementation, monitoring, maintenance, and updating of this Plan, as defined in the 2011 Hazard Mitigation Plan. <i>Comment:</i>			X	CCCFCWCD-2

20.9 HAZARD MITIGATION ACTION PLAN AND EVALUATION OF RECOMMENDED ACTIONS

Table 20-9 lists the actions that make up the Contra Costa County Flood Control and Water Conservation District hazard mitigation action plan. Table 20-10 identifies the priority for each action. Table 20-11 summarizes the mitigation actions by hazard of concern and mitigation type.

Table 20-9. Hazard Mitigation Action Plan Matrix

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Responsible Agency ^a	Estimated Cost	Sources of Funding	Timeline
CCCFCWCD-1 —Where appropriate, support retrofitting or relocation of structures in high hazard areas, prioritizing structures that have experienced repetitive losses.						
Existing	All Hazards	1, 10	County	High	HMGP, PDM, FMA	Short-term
CCCFCWCD-2 —Actively participate in the plan maintenance protocols outlined in Volume 1 of this hazard mitigation plan.						
New and Existing	All Hazards	All	FCD	Low	Staff Time, General Funds	Short-term
CCCFCWCD-3 —Analyze and reconstruct (as needed) spillway structures at DSOD regulated dams to ensure continued safe passage of releases (i.e.: Marsh Creek Reservoir Emergency Spillway armoring at downstream toe)						
Existing	Flood, Dam and Levee Failure, Earthquake, Severe Weather	1, 10	FCD	High	FCD Funds, FMA	Short-term
CCCFCWCD-4 —Repair bank erosion, various sites countywide. (i.e.: Green Valley Creek, Grayson Creek at County Quarry, San Ramon Creek, Rodeo Creek, etc.).						
Existing	Flood, Landslide, Severe Weather, Earthquake	1, 10	FCD	Low	FCD Funds, FMA, HMGP, Possible EPA	Short-term
CCCFCWCD-5 —Construct / expand detention basins (implement basin construction as identified in FCD CIP: Lower Sand Creek Basin, Deer Creek, Oakley / Trembath, etc.).						
New and Existing	Flood, Dam and Levee Failure, Severe Weather, Drought	1, 10	FCD	Medium	FCD Funds, FMA, HMGP, Possible EPA	Short-term
CCCFCWCD-6 —Widen creeks / channels and raise / rehabilitate levees (implement projects as identified in FCD CIP: Marsh Creek, East and West Antioch Creeks, etc.)						
Existing	Flood, Dam and Levee Failure, Severe Weather	1, 10	FCD	Medium	FCD Funds, FMA, HMGP, Possible EPA	Short-term
CCCFCWCD-7 —Remove sediment from channels and detention basins (implement projects as identified in FCD CIP. i.e.: Kubicek Basin, Walnut Creek, Grayson Creek, Wildcat Creek, Rodeo Creek, San Pablo Creek, Pine Creek, San Ramon Creek, etc.).						
Existing	Flood	1, 10	FCD	Medium	FCD Funds, FMA, HMGP, Possible EPA	Short-term
CCCFCWCD-8 —Conduct seismic assessment of flood control facilities and structures, various sites countywide (dams, channels, structures, etc.)						
Existing	Flood, Earthquake, Dam and Levee Failure	1, 10	FCD	Medium	FCD Funds, Possible Grants	Long-term
CCCFCWCD-9 —Seismic rehabilitation/retrofitting of existing dams (may combine with CCCFCWCD8 above).						
Existing	Flood; Dam and Levee Failure, Earthquake	1, 10	FCD	High	FCD Funds, HMGP, FMA	Long-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Responsible Agency ^a	Estimated Cost	Sources of Funding	Timeline
CCCFCWCD-10 —Acquire floodplain easements over privately held parcels at various sites District-wide (i.e.: Trembath floodplain on East Antioch Creek, floodplains on Marsh Creek, Walnut Creek overflow area at Pacheco Creek, etc.).						
New and Existing	Flood, Dam and Levee Failure, Landslide	1, 5, 10	FCD	Medium	FCD Funds, FMA	Long-term
CCCFCWCD-11 —Habitat Improvements, various sites countywide (Wildcat Creek, Pinole Creek, Pacheco Creek, East Antioch Creek Marsh, Marsh Creek, etc.)						
New and Existing	Flood, Dam and Levee Failure	1, 10	FCD	Medium	FCD Funds, FMA, HMGP, Possible EPA	Short-term
CCCFCWCD-12 —Creek channel improvements, various sites countywide (Galindo Creek, Wildcat Creek, San Pablo Creek, etc.)						
Existing	Flood	1, 10	FCD	Medium	FCD Funds, FMA, HMGP, Possible EPA	Short-term
CCCFCWCD-13 —Conduct silt surveys in creeks and sediment basins, various sites countywide (Grayson Creek, Walnut Creek, San Pablo Creek, Rheem Creek, Wild Cat Creek, Rodeo Creek, etc.)						
Existing	Flood	1, 10	FCD	Medium	FCD Funds, Possible Grants	Short-term
CCCFCWCD-14 —Conduct condition assessment of flood control facilities and structures, various sites countywide (Shadow Creek, West Alamo Creek, Canyon Lakes Creek, Rossmoor Creek, Bogue Creek, Rassier Creek, San Pablo Creek, Rheem Creek, Wild Cat Creek, Rodeo Creek, etc.)						
Existing	Flood, Landslide, Earthquake	1, 10	FCD	Medium	FCD Funds, Possible Grants	Short-term
CCCFCWCD-15 —Conduct functional assessment of flood control facilities, various sites countywide						
Existing	Flood	1, 10	FCD	Medium	FCD Funds, Possible Grants	Short-term
CCCFCWCD-16 —Conduct geotechnical investigation of flood control facilities and structures, various sites countywide						
Existing	Flood, Dam and Levee Failure, Earthquake, Landslide	1, 10	FCD	Medium	FCD Funds, Possible Grants	Short-term
CCCFCWCD-17 —Marsh Creek Reservoir Capacity and Habitat Restoration						
Existing	Flood, Dam and Levee Failure, Drought	1, 10	FCD	Low	FCD Funds, Possible Grants	Short-term
CCCFCWCD-18 —North Richmond Stormwater Pump Station Retrofit						
Existing	Flood	1, 10	FCD/County	Low	FCD/County Funds, FMA, HMGP	Short-term
CCCFCWCD-19 —DA46 Grayson and Murderer's Creek local drainage (Subregional) Capacity Improvements						
New and Existing	Flood	1, 10	FCD	Low	FCD Funds, Possible Grants	Short-term
CCCFCWCD-20 —Grayson Creek Levee Rehabilitation at CCCSD Treatment Plant						
Existing	Flood, Dam and Levee Failure	1, 10	FCD	Medium	FCD Funds, FMA, HMGP	Short-term
CCCFCWCD-21 —Grayson Creek Channel Fence Rehabilitation						
Existing	Flood	1, 10	FCD	Medium	FCD Funds, Possible Grants	Short-term
CCCFCWCD-22 —Lower Walnut Creek Restoration Project						
New and Existing	Flood, Dam and Levee Failure, Drought	1, 10	FCD	High	FCD Funds, , Possible Grants	Short-term

Applies to new or existing assets	Hazards Mitigated	Objectives Met	Responsible Agency ^a	Estimated Cost	Sources of Funding	Timeline
CCCFCWCD-23—Sustainable Capacity Improvement at Rodeo Creek						
Existing	Flood, Landslide, Earthquake	1, 10	FCD	Low	FCD Funds, , Possible Grants	Short-term
CCCFCWCD-24—DA 67 - Tice Creek Bypass						
New	Flood	1, 10	FCD	Low	FCD Funds, , Possible Grants	Short-term
CCCFCWCD-25—Walnut Creek Levee Rehabilitation at Buchanan Field Airport						
Existing	Flood, Dam and Levee Failure	1, 10, 13	FCD/County	Low	FCD Funds, FMA, HMGP	Short-term
CCCFCWCD-26—DA 33A Concord Boulevard Culvert Replacement						
Existing	Flood, Severe Weather	1, 10	FCD/City of Concord	Low	FCD Funds, FMA, HMGP	Short-term
CCCFCWCD-27—DA 48B Line A storm Drainage Improvements at Port Chicago Highway						
New and Existing	Flood, Severe Weather	1, 10	FCD	Low	FCD Funds, FMA, HMGP	Short-term
CCCFCWCD-28—West Antioch Creek Improvements - L Street to 10th Street						
New and Existing	Flood	1, 10	FCD/City of Antioch	Low	FCD Funds, FMA	Short-term
CCCFCWCD-29—West Antioch Creek Improvements at Highway 4						
New and Existing	Flood	1, 10	FCD/City of Antioch	Low	FCD Funds, FMA	Short-term
CCCFCWCD-30—Marsh Creek Supplemental Capacity						
New	Flood	1, 10	FCD	Medium	FCD Funds, Possible Grants	Short-term
CCCFCWCD-31—Support County-wide initiatives identified in the 2017 Hazard Mitigation Plan.						
New and Existing	All Hazards	All	County*, FCD	Low	FCD Funds	Short-term, ongoing
CCCFCWCD-32—Integrate Local Hazard Mitigation Plan into the Safety Element of the General Plan						
Existing	All Hazards	All	County*, FCD	Low	County Funds	Short-term, ongoing

a. Where multiple responsible agencies are listed, an asterisk (*) identifies the lead agency.

Table 20-10. Mitigation Action Priority

Action #	# of Objectives Met	Benefits	Costs	Do Benefits Equal or Exceed Costs?	Is Project Grant-Eligible?	Can Project Be Funded Under Existing Programs/Budgets?	Implementation Priority ^a	Grant Pursuit Priority ^a
CCCFCWCD-1	8	High	High	Yes	Yes	No	Medium	High
CCCFCWCD-2	3	Low	Low	Yes	No	Yes	High	Low
CCCFCWCD-3	2	Medium	Medium	Yes	Yes	Yes	Medium	Medium
CCCFCWCD-4	2	High	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-5	2	High	Medium	Yes	Yes	Yes	Medium	High
CCCFCWCD-6	2	High	Medium	Yes	Yes	Yes	Medium	Medium
CCCFCWCD-7	2	High	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-8	2	Medium	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-9	2	High	High	Yes	Yes	Yes	Medium	Medium
CCCFCWCD-10	3	Medium	Low	Yes	Yes	Yes	Low	High
CCCFCWCD-11	2	Medium	Medium	Yes	Yes	Yes	Low	Medium
CCCFCWCD-12	2	Medium	Medium	Yes	Yes	Yes	Medium	High
CCCFCWCD-13	2	Medium	Medium	Yes	Yes	Yes	Medium	High
CCCFCWCD-14	2	Medium	Medium	Yes	Yes	Yes	Medium	High
CCCFCWCD-15	2	Medium	Medium	Yes	Yes	Yes	Medium	High
CCCFCWCD-16	2	Medium	Medium	Yes	Yes	Yes	Medium	High
CCCFCWCD-17	2	High	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-18	2	Medium	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-19	2	Medium	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-20	2	Medium	Medium	Yes	Yes	Yes	Medium	High
CCCFCWCD-21	2	Medium	Medium	Yes	Yes	Yes	Medium	High
CCCFCWCD-22	2	High	High	Yes	Yes	Yes	High	High
CCCFCWCD-23	2	Medium	Low	Yes	Yes	Yes	Low	Medium
CCCFCWCD-24	2	Medium	Low	Yes	Yes	Yes	Low	Medium
CCCFCWCD-25	3	Medium	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-26	2	Medium	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-27	2	Medium	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-28	2	Medium	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-29	2	Medium	Low	Yes	Yes	Yes	Medium	High
CCCFCWCD-30	2	Medium	Medium	Yes	Yes	Yes	Medium	High
CCCFCWCD-31	18	Medium	Low	Yes	No	Yes	Medium	High
CCCFCWCD-32	18	Medium	Low	Yes	No	Yes	Medium	High

a. See the introduction to this volume for explanation of priorities.

Table 20-11. Analysis of Mitigation Actions

Hazard Type	Action Addressing Hazard, by Mitigation Type ^a							
	Prevention	Property Protection	Public Education and Awareness	Natural Resource Protection	Emergency Services	Structural Projects	Climate Resilient	Community Capacity Building
All hazards	2, 31, 32	1	2, 10, 32		2, 9, 32			
Dam and Levee Failure	8, 9, 16	5, 9		5, 11, 17, 22, 31		3, 5, 9		8, 16
Drought								
Earthquake	8, 9, 16	4, 9, 14, 16, 23				3, 9		8, 16
Flood	8, 9, 14, 16, 23	3, 4, 5, 6		3, 4, 5, 6	25, 26, 27, 28, 29	1, 3, 4, 5, 18		8, 16
Landslide	14, 16, 23	4, 16, 23		4		4		16
Severe weather		4, 5, 6		4, 5, 6		3, 4, 5		
Tsunami								
Wildfire								

a. See the introduction to this volume for explanation of mitigation types.

20.10 FUTURE NEEDS TO BETTER UNDERSTAND RISK/VULNERABILITY

- District facilities generally lack instrumentation that would allow timely notification and emergency response to address flood hazards. Additional instrumentation would help inform our understanding of risk.
- District reservoirs are nearing 50 years old, and the seismic risk is poorly understood. A seismic vulnerability analysis is needed to better understand risk and keep probability of dam failure low.
- Some District levees no longer enjoy FEMA accreditation, and the District lacks the resources to study and potentially improve these levees for re-accreditation. Lacking a specific assessment, actual risk is poorly understood.
- Many District facilities are nearing or over 50 years old, and need facility condition assessment to help prioritize needed repairs, rehabilitation, or replacement.

20.11 REVIEW AND INCORPORATION OF RESOURCES FOR THIS ANNEX

The following technical reports, plans, and regulatory mechanisms were reviewed for this annex.

- **Hazard Mitigation Plan Annex Development Tool-kit**—The tool-kit was used to support the development of this annex including past hazard events, noted vulnerabilities, risk ranking and action development.
- **Contra Costa County Flood Control and Water Conservation District Capital Improvement Plan (DRAFT) June 2017**—This CIP was used to determine which upcoming projects would help inform or reduce flood risk, and thus should be included in this annex.

