



Annex to 2010 Association of Bay
Area Governments
Local Hazard Mitigation Plan
Taming Natural Disasters

Solano Irrigation District

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Introduction

Established in 1948, the Solano Irrigation District (SID, or District) has been responsible in large part for the development and continued operation of the Solano Project, one of the most important elements of water infrastructure in Solano County. Deriving water primarily from the 576 square mile Upper Putah Creek Watershed, the 304 foot high concrete Monticello Dam impounds up to 1.6 Million Acre Feet (AF) of water providing for agriculture, municipalities and industrial uses. Refer to Exhibit A for depiction of areas served by the federal Bureau of Reclamation Solano Project, as operated by SID. This Annex parallels and overlaps with that of the Solano County Water Agency which is responsible for flood control and wholesale water sales in the county, inclusive of waters extracted from the State Water Project (at North Bay Aqueduct).

The Solano Project provides irrigation water for over 80,000 acres of irrigable soils and is responsible for rich agricultural production in Solano County. It is also the key water source for the residential water needs of a population of over 200,000 and thousands of businesses. A staff of 94 SID employees is responsible for operations delivering this water directly to SID customers, and indirectly to customers of other agencies, such as the Cities of Vacaville, Fairfield, Vallejo, Benicia, Maine Prairie Water District, and to SID's partners (Joint Powers Authorities) in water service to Suisun residents, the City of Suisun City via the Suisun-Solano Water Authority. SID is also the largest public agency groundwater pumper in Solano County, providing groundwater to portions of the City of Dixon (Dixon-Solano Water Authority), rural areas and agriculture.

As of 2010, SID is directly responsible for service to 14,157 agricultural parcels covering 71,653 acres of irrigable land (excluding roadways). SID owns and operates 12 miles of concrete lined canals and 100 miles of unlined ditches servicing the farming community. SID also operates nine Public Water Systems serving over 37,000 persons and producing over 2,575 Million Gallons (MG) of treated drinking water annually.

SID is a public agency with an elected Board of Directors, organized as an irrigation district formed under the Water Code of the State of California. SID is governed by the State Water Code sections relevant to irrigation districts, and further governed by the policies adopted by the five-member SID Board of Directors. SID is thus an agency of the State of California. It is subject to the same open meeting laws and public disclosure requirements as other forms of local governments, such as cities and counties. SID is the largest independent special district in Solano County.

SID has an annual operating budget of \$10.5 Million and through Joint Power Authorities, manages \$2.1 M for the Suisun-Solano Water Authority and \$600,400 for Dixon-Solano Water Authority. Current facilities consist of approximately 22,000 square feet of administrative and technical and operations support buildings. A future move to a shared facility with the Solano County Water Agency will encompass nearly 84,000 square feet inclusive of administrative, operations plus vehicle, equipment and supply storage areas.

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The Regional Planning Process

The Solano Irrigation District has participated in various Association of Bay Area Governments (ABAG) workshops, conferences, and meetings, including providing comments on the ABAG Multi-Jurisdictional Local Hazard Mitigation Plan (MJ-LHMP) work products inclusive of reviewing draft priorities and input for reaching consensus on priorities for mitigation. In particular, SID staff was instrumental in working with ABAG and cities subject to inundation should Monticello Dam fail. Identification of appropriate for hazard mitigation strategies have been the subject of numerous tabletop exercises and discussions.

For more information on these meetings and for rosters of attendees, please see Appendix A and H in the ABAG 2010 MJ-LHMP. In addition, SID has provided written and oral comments on the multi-jurisdictional plan and provided information on facilities that are defined as “critical” to ABAG.

The Local Planning Process

Solano Irrigation District regularly participates with a multitude of agencies for emergency preparedness training and exercises such as: routine U.S. Bureau of Reclamation “table top exercises”, meetings with local Fire Departments and regular inspections of key facilities by agencies inclusive of, but not limited to: the Federal Energy Regulatory Commission, Pacific Gas and Electric, California Department of Water Resources Division of Safety of Dams, and the California Department of Public Health (for all public water systems). Other agencies that have closely associated infrastructure and facilities near ours, such as Pacific Bell/American Telephone and Telegraph (AT&T) and California Department of Transportation (CalTrans) are coordinated on a regular basis. Additionally, close coordination with state and local resource agencies establishes collaborative approaches to control of invasive species or environmental threats to our facilities.

For our internal process, key representatives from multiple Solano Irrigation District departments met to identify responsibilities and lead personnel needed to prioritize appropriate mitigation strategies. Personnel involved in these meetings included senior management and staff from the Engineering, Risk Management, Finance, Agricultural Operations, Solano Project Operations, Municipal & Industrial Operations and Technical Services. Typically, each person was responsible for communicating existing efforts and thoughts on appropriate future action in their area of expertise.

At our first meeting, general priorities and appropriate departments were identified and future responsibilities and tasks for key personnel were established. Subsequent meetings identified mitigation strategies, prioritized said strategies, and reviewed preliminary budgets and potential funding sources for strategies designated as “High” priority for District-owned-and-operated facilities.

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Review and Incorporation of Existing Information

This process involved consideration of both the hazard and the risk information developed by ABAG and discussed in the overall multi-jurisdictional Local Hazard Mitigation Plan, as well as the hazard and risk assessments contained in SID's internal evaluations as described on pages 5-8.

Process for Updating Plan Sections

SID did not participate in the 2005 multi-jurisdictional Local Hazard Mitigation Plan. Thus, none of the sections in this Annex are updates of a prior Annex.

Public Meetings

The public had two opportunities to comment on the draft Annex.

- (1) The Solano Irrigation District has provided opportunity for public comments on the DRAFT mitigation strategies at a public meeting on August 11, 2009 at 7:00 P.M. at the SID Board Room located at 508 Elmira Road, Vacaville. The meeting and agenda item was advertised on our SID website (<http://www.sidwater.org/home>) and local newspaper (Vacaville Reporter) one week prior. No public comments were received at this meeting regarding this Local Hazard Mitigation Plan Annex.
- (2) The draft mitigation strategies were also published on the SID website for public viewing. No public comments were received from either the meeting or the internet posting. Copies of the internet posting are included as **Exhibit B** to this SID 2010 Annex. We continue to post the information for public comment on our website with active links to the ABAG website at <http://quake.abag.ca.gov/mitigation/>. No public comments were received as a result of this posting on this Local Hazard Mitigation Plan Annex.

The Solano Irrigation District Board of Directors will adopt the plan in a public meeting via an official Resolution upon pre-approval by FEMA. The mitigation strategies will be integrated into the Emergency Operations Plan and Capital Improvement Plan of SID.

However, because SID is committed to continually providing public oversight of its planning process, SID will consider writing letters to the editor of local newspapers in its service area and/or other innovative strategies to promote wider public knowledge of the process.

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Hazards and Risk Assessment

The ABAG Multi-Jurisdictional Local Hazard Mitigation Plan, to which this is an annex, lists nine hazards that impact the Bay Area, five related to earthquakes (faulting, shaking, earthquake-induced landslides, liquefaction, and tsunamis) and four related to weather (flooding, landslides, wildfires, and drought). Maps of these hazards and risks are shown on the ABAG website at <http://quake.abag.ca.gov/mitigation/>.

The Solano Irrigation District does not face any known natural disasters not listed in the ABAG multi-jurisdictional plan and new hazards have been identified by SID since the original development of this plan in 2005. Additional hazards identified by SID could potentially include: biological pandemics and invasive species that disrupt water distribution, ecological balances and agriculture in our region.

While SID has undertaken a number of general hazard mapping activities, all of these maps are less detailed and are not as current as those shown on the ABAG website at <http://quake.abag.ca.gov/mitigation/>.

Service Area Hazards

SID has examined the hazard exposure of District facilities based on information in ABAG's website at <http://quake.abag.ca.gov/mitigation/pickdbh2.html>. For the purposes of this evaluation, Solano County is considered in its entirety and as operators of the Solano Project facilities, we have specifically paralleled or added to material as provided by the Solano County Water Agency.

- Earthquake faulting- 3,589 acres are in California Geological Survey study zones. The only currently mapped active fault that could produce surface rupture in the County is the Concord-Green Valley fault.
- Earthquake shaking- While 69,041 acres are in the two highest categories for earthquake shaking potential, 3,905 acres are in the lowest shaking potential category. The County is in the vicinity of several known active and potentially active earthquake faults. These include the Hayward, Concord/Green Valley, North Hayward and Mt. Diablo faults.
- Earthquake-induced landslides- The California Geological Survey has not mapped Solano County for earthquake induced landslides. The hazard is assumed to be similar to that for rainfall-induced landslides, discussed below.
- Tsunamis- While portions of Solano County are at or below sea level, the areas are far enough away from the ocean that they are not considered particularly vulnerable to tsunamis. For example, if a 42-foot tsunami arrived at the Golden Gate, it would be approximately 4 feet at the north end of the Bay near cities of Vallejo on the western edge of the Solano Project distribution points. The Solano County Water Agency will

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reexamine this issue when maps are issued by the California Office of Emergency Services.

- Flooding-158,975 acres are in the 100-year flood plain, while an additional 27,158 acres are in the 500 year flood plain or “other concerns”.
- Landslides-25,057 acres in areas “mostly a landslide area” and 143,352 acre in “few landslides”.
- Wildfires-99,130 acres are subject to high, very high, or extreme wildfire threat, and 49,485 acres are in wildland-urban interface threat areas.
- Dam Inundation- 134,553 acres are subject to dam inundation.
- Drought- all 523,803 acres are subject to drought.

There are 76 claims of repetitive loss from 28 properties in the County based on the information at <http://quake.abag.ca.gov/mitigation/pickflood.html>. The Solano Irrigation District performs operations and maintenance for Solano Project facilities on behalf of the Solano County Water Agency (SCWA or Agency). The Agency has primary responsibility for flood control in Solano County. The Agency has conducted watershed based studies in several watersheds that are prone to flooding. SCWA has identified some areas that suffer from repetitive flooding and plan to perform some cost-benefit analyses to determine the extent to which mitigation is appropriate in these areas. For example, properties along Sweeney, Ledgewood and Suisun Creek are subject to repetitive losses. SID shares data and provides assistance to the Agency as needed.

Drought is addressed through the Solano County Water Agency’s Urban Water Management Plan and Urban Water Management Plans of the cities in Solano County. SID provides technical assistance and data input as needed.

District Facility Hazards

The District also examined the hazard exposure of infrastructure based on the information on ABAG’s website at <http://quake.abag.ca.gov/mitigation/pickdbh2.html>.

- Earthquake faulting- The Putah South Canal of the Solano Project crosses the Concord/Green Valley fault and the Terminal Reservoir is in the Alquist-Priolo Special Studies Zone for the Concord/Green Valley fault. No other infrastructure is impacted by known faults.
- Earthquake shaking- Solano Project Dams are in a moderate to low shaking zone. The Putah South Canal runs through a high intensity zone related to the Green Valley Fault, but the rest of the Canal is in the moderate zone. Of the 31 facilities owned by the District, the Terminal Reservoir, SSWA Gregory Hill Tank, the Union/Texas St. Suisun

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Cross Tie, and the Cement Hill Water Treatment Plant are located in areas with relatively higher shaking potential than other facilities.

- Earthquake-induced landslides- The California Geological Survey has not completed mapping of this hazard in the District service area. The Putah South Canal has some areas prone to landslide damage. In addition, both the Terminal Reservoir and the Carrington Tank are in areas with landslides.
- Earthquake liquefaction- The California Geological Survey has not completed mapping of this hazard in the District service area. Solano Project dams are in a very low hazard zone. Putah South Canal has a small section in a high zone, but most of the canal is in a moderate or low zone. In addition, the Elmira Public Water System location and the Diversion Dam are located in areas mapped as “Very High Liquefaction Susceptibility” by the U.S. Geological Survey, Park Lane Well #54 and Quail Canyon PWS Well are located in areas mapped as “High Liquefaction Susceptibility.” Several facilities are located in areas mapped as “Moderate Liquefaction Susceptibility” by the U.S. Geological Survey, including Watson Ranch Well #47, School Well #48, Industrial Well #44, Fitzgerald Pump and Tank Facility, Eldredge Pumping Plant, Stocking Ranch PWS, Vaca Valley Relift and Vaca Valley Main, and the Union/Texas St. Suisun Cross Tie
- Tsunamis- No District facilities are within mapped tsunami zones.
- Flooding- Parts of Putah South Canal cross some 100 year flood zones. In addition, Park Lane Well #54, Diversion Dam, Vaca Valley Relift are in 100-year flooding areas as mapped by FEMA, and the Fitzgerald Pump and Tank Facility is in an area mapped by FEMA as in a 500-year flood zone.
- Landsliding- Parts of the Putah South Canal cross some areas susceptible to landslides. In addition, both the Terminal Reservoir and the Carrington Tank are in areas with landslides.
- Wildfires- Some infrastructure is in high and moderate wildfire areas, but the infrastructure is not susceptible to wildfire damage because they are constructed of fire resistant materials with defensible space. For example, the Simpson Tank, Quail Canyon Tank, Carrington Tank are in areas of Very High Wildfire Threat, and the Bascherini Reservoir, Solar Hills Tank, and Serenity Tank are in areas of High Wildfire Threat. In addition, the BRO Cross-Tie with Fairfield, the Bascherini Reservoir, the Simpson Tank, Solar Hills Tank, Serenity Tank, Boles-Knowles Tank, Vaca Valley Relift, and Cement Hill Water Treatment Plant are located within the Wildland-Urban-Interface Fire Threat area.
- Dam Inundation- The Putah South Canal crosses two smaller dam inundation zones. Monticello Dam inundation area and explain that the Dam is owned by U.S. Bureau of Reclamation / Solano County Water Agency and only operated by SID.

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- Drought- is not a hazard for District infrastructure. However, if a drought occurs, the Solano County Water Agency, and the cities in the service area, are responsible for preparing Urban Water Management Plans. SID is not directly responsible these plans.
- Sea Level Rise- is not a hazard for District infrastructure.

The District plans to continue to work with ABAG to develop specific information about the kind and level of damage to buildings, infrastructure, and critical facilities which might result from any of the hazards previously noted.

Hazards Conclusion: The Solano Irrigation District has reviewed the hazards identified and ranked the hazards based on past disasters and expected future impacts. The conclusion is that earthquakes (particularly shaking), flooding (including dam failure), wildfire, and landslides (including unstable earth) pose a significant risk for potential loss.

Repetitive Loss Properties

The SID facilities are not repetitive loss properties for flooding.

Past Occurrences of Disasters (natural and human-induced)

As most areas in California and specifically the San Francisco Bay Area, Solano County is subject to a wide variety of potential hazards making disaster preparedness and hazard mitigation planning an important task. A brief literature review of disasters impacting Solano County (solanohistory.net) indicates that natural and anthropogenic events have afflicted the area to some extent since recorded time.

One of the earliest recorded entries (1837) includes references to smallpox epidemics impacting local Native American populations of the Patwin tribe. Disease brought by European explorers decimated the Native American groups in California, killing hundreds of thousands. Epidemics of smallpox, dysentery, malaria, and influenza swept through villages of indigenous peoples who had no immunities for these Old World diseases (Rice et. al. 1996). In 1833 a malaria outbreak killed approximately 20,000 Native American groups in California in the Central Valley, apparently spread by a member of the Hudson Bay Company exploration party. (Wilson and Towne 1982).

Other more recent bio-hazards include agricultural pandemics such as phylloxera (plant lice) impacting grape roots of the region as early as 1875. Other pandemics affecting numerous counties in the region included hoof and mouth disease outbreaks in 1924. Concern over infestations from invasive plant and animal species continues, as well as spread of potential pandemic flu and the West Nile virus.

More typical event listings for the area include: numerous wildland and structural fires, regional flooding, several droughts and earthquake damage. Storm damage from heavy wind and rain is

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frequently cited. The County has experienced a number of flooding incidents, the most recent occurring in December 2002 and December of 2005.

Several man-caused and transportation associated events are noted in historical records such as: oil spills, leaking pipelines, railcar derailments and clandestine toxic waste caches. Notable local events also included the Port Chicago (Contra Costa County) munitions explosion (1944) and a crash of a B-29 bomber aircraft in 1950 carrying high explosives and Brigadier General Robert F. Travis, after which the local Air Force Base is now named.

Other more recent examples of large scale disasters that have occurred in the recent history of the Bay Area include:

The Loma Prieta Earthquake of 1989 is an example of the kind of large scale disaster which can strike the Bay Area. It killed 63 persons, injured 3,757, and displaced over 12,000 persons. With over 20,000 homes and businesses damaged and over 1,100 destroyed, this quake caused approximately \$6 Billion of damage. Reconstruction continues some two decades later as the replacement for Oakland-Bay Bridge is still several years from completion.

The Oakland Hills Firestorm of 1991 ranks as one of the worst wildland-urban firestorm disasters to ever strike the United States with 25 deaths, 150 injuries, and the displacement of over 10,000 persons. With destruction and damage to over 3,400 residential units, losses were in excess of \$1.5 Billion.

Most recently, the San Bruno Pacific Gas & Electric Co. (PG&E) gas distribution pipeline explosion of September 9, 2010 claimed eight lives and destroyed 37 homes. PG&E was recently quoted as saying that the San Bruno natural gas pipeline explosion could wind up costing the utility \$1 billion. PG&E recently revealed that the cost of repairing the devastated neighborhood, compensating victims, inspecting its pipes and other expenses could reach \$550 million. Replacing valves on those pipelines is expected to cost \$450 million. Costs for proposed major renovations or relocation of the utility's gas network haven't been calculated.

More information on State and Federally declared disasters in Solano County can be found at <http://quake.abag.ca.gov/mitigation/ThePlan-D-Version-December09.pdf>

Given the diverse organizational responsibilities associated with the extensive physical distribution of our agricultural, municipal, and industrial water systems, the Solano Irrigation District would play a significant role in evaluations, emergency response coordination and repair of damaged facilities. Participation in Emergency/Disaster Preparedness currently focuses on earthquake, fire, storms and terrorist events. Our on-going operations and maintenance activities monitor, repair and plan for water distribution integrity, water quantities, water quality and pest management issues.

References: www.solanohistory.net/timelines/CaVaHC-TIMELINE-1999-0005.pdf
http://www.jimmydoolittlemuseum.org/html/travis_crash.html
(Wilson and Towne 1982).
(Rice et. al. 1996).

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National Flood Insurance Program

As special district, SID is not eligible to participate in the National Flood Insurance Program (NFIP).

Mitigation Goals and Objectives

The goal of the ABAG MJ-LHMP is to maintain and enhance a disaster-resistant region by reducing the potential for loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters. This goal is unchanged from the 2005 plan and continues to be the goal of the Solano Irrigation District in designing its mitigation program.

Mitigation Activities and Priorities

Existing Mitigation Activities

SID was not a participant in the 2005 ABAG-led Local Hazard Mitigation Plan. However, SID has been committed to hazard mitigation for many years.

Being that SID is a relatively small District and has no formal planning department, administrative staff commit to sit down to make the decisions on project priorities that incorporate the goals, objectives, and strategies identified in this annex in requests that are incorporated into the annual Capital Improvement Plan and the annual Operating Budget.

SID has utilized, and will continue to utilize, the latest code standards during the design and construction of any future buildings or facilities.

Future Mitigation Actions and Priorities

As a participant in the 2010 ABAG multi-jurisdictional planning process, the staff of SID helped in the development and review of the comprehensive list of mitigation strategies in the overall multi-jurisdictional plan. The decision on priority was made based on a variety of criteria, not simply on an economic cost-benefit analysis. These criteria include being technically and administratively feasible, politically acceptable, socially appropriate, legal, economically sound, and not harmful to the environment or our heritage.

These draft priorities were submitted to Solano Irrigation District management and Board of Directors for review. The draft priorities will be provided to the SID Board of Directors for adoption pending approval of this LHMP by FEMA.

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The District planning team also prioritized specific mitigation tasks for the next 5 years. This list includes implementation process, funding strategy, responsible agency, and approximate time frame. The full list is included as an attachment to this Annex. This list includes implementation process, funding strategy, and responsible agency.

Based on the hazard exposure information described above, the District has determined the following priorities for mitigation:

Project: Landslide Protection for the Putah South Canal

2010 MJ-LHMP Strategy Number: INFR-e-1

New or Existing Assets: Existing

Hazard Mitigation: Landslide

Responsible Agency: SID Administration, Engineering, and Water and Power Operations have a supporting role to Solano County Water Agency, as the lead and responsible agency

Estimate of Cost: \$800,000

Anticipated Funding Source: SCWA Property Tax

Anticipated Schedule: FY 11/12

Comments: The Putah South Canal crosses an area of known landslide hazard. Landslides into the canal could block crucial water deliveries. Construction of the bypass pipeline is necessary.

Project: Move Administration and Operations to earthquake reinforced facilities

2010 MJ-LHMP Strategy Number: INFR-e-1

New or Existing Assets: Existing

Hazard Mitigation: Earthquake

Responsible Agency: Solano Irrigation District Administration, Engineering, and Water and Power Operations

Estimate of Cost: \$13,800,000

Anticipated Funding Source: Existing SID water revenues

Anticipated Schedule: FY 11/12

Comments: The existing facilities are 50 year old frame and stucco construction on hillside. The newer construction is steel frame built to more stringent earthquake resistant standards.

Project: Storage tank evaluations of earthquake resistance

2010 MJ-LHMP Strategy Number: INFR-e-1

New or Existing Assets: Existing

Hazard Mitigation: Earthquake

Responsible Agency: Solano Irrigation District Administration, Engineering, and Water and Power Operations and Joint Power Authorities and/or special Improvement Districts

Estimate of Cost: To Be Determined

Anticipated Funding Source: Existing SID water revenues

Anticipated Schedule: Under evaluation.

Comments: The District is in the process of evaluating the risk of numerous water storage tanks to determine if they can be reinforced in a cost effective manner. Many of the existing facilities are 50 years or older. The District engineering staff will evaluate appropriate reinforcement techniques if a study of the facilities is performed.

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On-Going Mitigation Strategy Programs

SID has many on-going mitigation programs that help create a more disaster-resistant region and utility systems. Collaboratively working with numerous other agencies at the federal, state and local levels, the District has implemented institutional as well as physical infrastructure improvements. The following list highlights those programs identified as *Existing Programs* in the mitigation strategy spreadsheet. Others are on-going programs that are currently underfunded or partially funded by other agencies. It is the District's priority to find additional funding to sustain these on-going programs over time.

- Participate in vulnerability assessments of District facilities and infrastructure with U.S. Bureau of Reclamation, Solano County Water Agency, California Department of Water Resources California Division of Safety of Dams (GOVT-a-1).
- Encourage the cooperation of utility system providers and cities, counties and special districts, and PG&E to develop strong and effective mitigation strategies for infrastructure systems and facilities (INFR-a-3).
- Support and encourage efforts of other (lifeline infrastructure) agencies as they plan for and arrange financing for seismic retrofits and other disaster mitigation strategies (INFR-a-5)
- Engage in, support, and/or encourage research by others (such as USGS, universities, or Pacific Earthquake Engineering Research Center-PEER) on measures to further strengthen transportation, water, sewer, and power systems so that they are less vulnerable to damage in disasters (INFR-a-6).
- Encourage communication between State Emergency Management Agency (CalEMA), FEMA, and utilities related to emergencies occurring outside of the Bay Area that can affect service delivery in the region (INFR-a-14).
- Monitor scientific studies of the Sacramento-San Joaquin Delta and policy decisions related to the long-term disaster resistance of that Delta system to ensure that decisions are made based on comprehensive analysis and in a scientifically-defensible manner. Levee failure due to earthquakes, flooding, and climate change (including sea level rise and more frequent and more severe flooding) are all of concern. The long-term health of the Delta area is critical to the Bay Area's water supply, is essential for the San Francisco Bay and estuary's environmental health, provides recreation opportunities for Bay Area residents, and provides for the long-term sustainability of Delta communities. While only part of the Delta is within the nine Bay Area counties covered by this multi-jurisdictional LHMP, the Delta is tied to the infrastructure, water supply, and economy of the Bay Area (INFR-a-22).
- Include "areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture" in the list of criteria used for determining a replacement schedule for pipelines (along with importance, age, type of construction material, size, condition, and maintenance or repair history) (INFR-b-3).
- Comply with all applicable building and fire codes, as well as other regulations (such as state requirements for fault, landslide, and liquefaction investigations in particular mapped areas) when constructing or significantly remodeling infrastructure facilities (INFR-b-8).

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- Clarify to workers in critical facilities and emergency personnel, as well as to elected officials and the public, the extent to which the facilities are expected to perform only at a life safety level (allowing for the safe evacuation of personnel) or are expected to remain functional following an earthquake (INFR-b-9).
- Assist, support, and/or encourage the U.S. Army Corp of Engineers, various Flood Control and Water Conservation Districts, and other responsible agencies to locate and maintain funding for the development of flood control projects that have high cost-benefit ratios (such as through the writing of letters of support and/or passing resolutions in support of these efforts) (INFR-d-4).
- Ensure that utility systems in new developments are constructed in ways that reduce or eliminate flood damage (INFR-d-13).
- Work for better cooperation among the patchwork of agencies managing flood control issues (INFR-d-16).
- Include “areas subject to ground failure” in the list of criteria used for determining a replacement schedule for pipelines (along with importance, age, type of construction material, size, condition, and maintenance or repair history) (INFR-e-1).
- Provide materials to the public related to coping with reductions in water supply or contamination of that supply beyond regulatory notification requirements (INFR-g-3).
- Provide materials to the public related to coping with disrupted storm drains, sewage lines, and wastewater treatment (such as that developed by ABAG’s Sewer Smart Program) (INFR-g-4).
- Facilitate and/or coordinate the distribution of emergency preparedness or mitigation materials that are prepared by others, such as by making the use of the internet or other electronic means, or placing materials on community access channels or in city or utility newsletters, as appropriate (INFR-g-5).
- Sponsor the formation and training of Community Emergency Response Teams (CERT) through partnerships with local businesses and encourage employees to participate in their local community programs (GOVT-c-3, ECON-j-5, HWNG-k-6);
- Develop and distribute culturally appropriate materials related to disaster mitigation and preparedness, such as those on the <http://www.preparenow.org> website related to infrastructure issues (NFR-g-7).
- Clarify to workers in critical facilities and emergency personnel, as well as to elected officials and the public, the extent to which the facilities are expected to perform only at a life safety level (allowing for the safe evacuation of personnel) or are expected to remain functional following an earthquake (GOVT-a-3).
- Encourage joint meetings of security and operations personnel at critical facilities to develop innovative ways for these personnel to work together to increase safety and security (GOVT-a-11).
- Prior to acquisition of property to be used as a critical facility, conduct a study to ensure the absence of significant structural hazards and hazards associated with the building site (GOVT-a-12).
- Establish a framework and process for pre-event recovery that specifies roles, priorities, and responsibilities of various departments within the local government organization, and that outlines a structure and process for policy-making involving elected officials and appointed advisory committees (GOVT-b-1).

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- Establish a goal for the resumption of local government services that may vary from function to function (GOVT-b-3).
- Develop a plan for short-term and intermediate-term sheltering of your employees (GOVT-c-1).
- Encourage your employees to have a family disaster plan (GOVT-c-2).
- Periodically assess the need for changes in staffing levels, as well as for additional or updated supplies, equipment, technologies, and in-service training classes (GOVT-c-5).
- Maintain and update as necessary the local government's Standardized Emergency Management System (SEMS) Plan and the National Incident Management System (NIMS) Plan, and submit an appropriate NIMSCAST report (GOVT-c-12).
- Continue to participate not only in general mutual-aid agreements, but also in agreements with adjoining jurisdictions for cooperative response to fires, floods, earthquakes, and other disasters (GOVT-c-13).
- Monitor weather during times of high fire risk using, for example, weather stations tied into police and fire dispatch centers (GOVT-c-17).
- Establish regional protocols on how to respond to the NOAA Monterey weather forecasts, such as identifying types of closures, limits on work that could cause ignitions, and repositioning of suppression forces. A multi-agency coordination of response also helps provide unified messages to the public about how they should respond to these periods of increased fire danger. Response should also be modified based on knowledge of local micro-climates. Local agencies with less risk then may be available for mutual aid (GOVT-c-18).
- Improve coordination among cities, counties, and dam owners so that cities and counties can better plan for evacuation of areas that could be inundated if a dam failed, impacting their jurisdiction (GOVT-c-23).
- Promote information sharing among overlapping and neighboring local governments, including cities, counties, and special districts, as well as utilities (GOVT-d-1).
- Recognize that emergency services is more than the coordination of police and fire response; it also includes planning activities with providers of water, food, energy, transportation, financial, information, and public health services (GOVT-d-2).
- As new flood-control projects are completed, request that FEMA revise its flood-insurance rate maps and digital Geographic Information System (GIS) data to reflect flood risks as accurately as possible (GOVT-d-4).
- Cooperate with researchers working on government-funded projects to refine information on hazards, for example, by expediting the permit and approval process for installation of seismic arrays, gravity survey instruments, borehole drilling, fault trenching, landslide mapping, flood modeling, and/or damage data collection (GOVT-d-10).
- Continue to enforce State-mandated requirements, such as the *California Environmental Quality Act*, to ensure that mitigation activities for hazards, such as seismic retrofits and vegetation clearance programs for fire threat, are conducted in a way that reduces environmental degradation such as air quality impacts, noise during construction, and loss of sensitive habitats and species, while respecting the community value of historic preservation (ENVI-a-1).
- Encourage regulatory agencies to work collaboratively with safety professionals to develop creative mitigation strategies that effectively balance environmental and safety

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needs, particularly to meet critical wildfire, flood, and earthquake safety levels (ENVI-a-2).

- Continue to enforce and/or comply with State-mandated requirements, such as the *California Environmental Quality Act* and environmental regulations to ensure that urban development is conducted in a way to minimize air pollution. For example, air pollution levels can lead to global warming, and then to drought, increased vegetation susceptibility to disease (such as pine bark beetle infestations), and associated increased fire hazard (ENVI-a-3).
- Develop and implement a comprehensive program for watershed management optimizing ecosystem health and water yield to balance water supply, flooding, fire, and erosion concerns (ENVI-a-4).
- Balance the need for smooth flow of storm waters versus the need to maintain wildlife habitat by developing and implementing a comprehensive Streambed Vegetation Management Plan that ensures the efficacy of flood control efforts, mitigates wildfires and maintains the viability of living rivers (ENVI-a-5).
- Comply with applicable performance standards of any national *Pollutant Discharge Elimination System* municipal stormwater permit that seeks to manage increases in stormwater run-off flows from new development and redevelopment construction projects (ENVI-a-6).
- Enforce and/or comply with the grading, erosion, and sedimentation requirements by prohibiting the discharge of concentrated stormwater flows by other than approved methods that seek to minimize associated pollution (ENVI-a-7).
- Enforce and/or comply with the hazardous materials requirements of the State of California Certified Unified Program Agency (CUPA) (ENVI-a-9).
- Stay informed of scientific information compiled by regional and state sources on the subject of rising sea levels and global warming, especially on additional actions that local governments can take to mitigate this hazard including special design and engineering of government-owned facilities in low-lying areas, such as wastewater treatment plants, ports, and airports (ENVI-b-1).
- Non-structural mitigation for building contents (GOVT-a-4);
- Installation of micro and/or surveillance cameras at critical public assets tied to web-based software (GOVT-a-6);
- Coordination with the State Division of Safety of Dams to ensure that cities and counties are aware of the timeline for the maintenance and inspection of dams whose failure would impact their jurisdiction; (GOVT-a-8);
- Development of interoperable communications for first responders from cities, counties, special districts, state, and federal agencies. (GOVT-c-7);
- Participation in general mutual-aid agreements and agreements with adjoining jurisdictions for cooperative response to fires, floods, earthquakes, and other disasters (GOVT-c-13);
- Participation in FEMA's National Flood Insurance Program (GOVT-d-5)
- Develop printed materials, utilize existing materials (such as developed by FEMA and the American Red Cross), conduct workshops, and/or provide outreach encouraging employees of these critical health care facilities to have family disaster plans and conduct mitigation activities in their own homes (HEAL-a-7);

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- Increase efforts to reduce landslides and erosion in existing and future development through continuing education of design professionals on mitigation strategies (HSNG—i-2, ECON-g-2);
- Continue to repair and make structural improvements to storm drains, pipelines, and/or channels to enable them to perform to their design capacity in handling water flows as part of regular maintenance activities (INFR—d-6, INFR-d-7)

Incorporation into Existing Planning Mechanisms

The District has used, and will continue to use, a variety of project-specific mechanisms to ensure that the projects and mitigation strategies identified as existing or having relatively high priorities in this LHMP Annex are implemented.

As shown in the following list of mitigation strategies, most of SID's specific mitigation strategies and priorities are being implemented as part of the Capital Improvement Plan. In addition, the strategies are being implemented throughout the District organization. There are no other planning mechanisms available to District that are appropriate to incorporate this LHMP Annex.

The following key documents are currently on file within District offices Emergency Command Center for reference. Dates provided indicate publication or last update version. Documents that SID has input on will be updated as needed or as provided by responsible agency.

- ◆ Solano Irrigation District Emergency Response Plan Sept. 2006. Six Volumes
- ◆ Response Protocol Toolbox: Drinking Water Contamination Threats and Incidents. December 2003
- ◆ Solano County Operations Area Emergency Plan, June 1997
- ◆ Standard Operating Procedures: Terminal Dam and Reservoir. June 2006. USBR.
- ◆ SID Emergency Response and Recovery Plan, June 2002
- ◆ Monticello Powerhouse Emergency Action Plan: FERC Project 2780, January 2007
- ◆ City of Suisun Emergency Operation Plan, January 2002.
- ◆ Solano County Operational Area Department of Environmental Health Hazardous Materials Area Plan, Sept 2002.
- ◆ Emergency Planning for Water Utility Management, American Water Works Association, 1984 AWWA M19.
- ◆ Emergency Response Plan Guidance for Small and Medium Community Water Systems to Comply with Public Health Security and Bioterrorism Preparedness and Response Act of 2002.
- ◆ Emergency Planning Guidance Public and Private Water Utilities, Office Emergency Services, March 1999
- ◆ Water Quality Emergency Notification Plans Annual Update 2009
- ◆ Crisis and Emergency Risk Communication Tool Kit. California Dept. of Health Services, March 2006
- ◆ Office of Emergency Services Disaster Assistance Resource Manual, November 1995

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- ◆ General SID Safety Element.
- ◆ Capital Improvements Plan
- ◆ Solano Irrigation District Strategic Vision and Plan

The District is not a land use agency, thus does not have a General Plan. This Annex will be made available to Solano County and other agencies within the County for their use in General Plan elements, as appropriate.

The information in this Annex will be used in the District's Capital Improvement Plan for setting priorities of capital improvements of District infrastructure and facilities.

The District adheres to the requirements of the California Environmental Quality Act (CEQA), which, since 1988, requires mitigation for identified natural hazards. The District has used these pre-existing programs as a basis for identifying gaps that may lead to disaster vulnerabilities in order to work on ways to address these risks through mitigation.

The final strategies and Annex will be adopted in the same resolution adopting the overall LHMP by the District Board following "Pre-Approval Pending Adoption" by FEMA.

Ongoing integration of the policies and programs identified in this Local Hazard Mitigation Plan will be monitored by District Executive Management.

Plan Update Process

As required Disaster Mitigation Act of 2000, the Solano Irrigation District will update this plan annex at least once every five years, by participating in a multi-agency effort with ABAG and other agencies to develop a multi-jurisdictional plan.

Under the direction of the Board of Directors, the General Manager of the District will ensure that monitoring of this Annex will occur. The plan will be monitored on an on-going basis. However, the major disasters affecting our District, legal changes, notices from ABAG as the lead agency in this process, and other triggers will be used. For example, if a structural engineering evaluation shows that a major risk exists at more or more facilities based on data collected from a future earthquake, the priority associated with upgrading those facilities will be re-evaluated. Finally, the Annex will be a discussion item on the agenda of the meeting of Department leaders at least once a year. At that meeting, the department heads will focus on evaluating the Annex in light of technological and political changes during the past year or other significant events. The Department leaders will be responsible for determining if the plan should be updated.

The District is committed to reviewing and updating this plan annex at least once every five years, as required by the Disaster Mitigation Act of 2000. Under the direction of the Board of Directors, the General Manager of the District will contact ABAG four years after this plan is approved to ensure that ABAG plans to undertake the plan update process. If so, the County again plans to participate in the multi-jurisdictional plan. If ABAG is unwilling or unable to act

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as the lead agency in the multi-jurisdictional effort, other agencies will be contacted, including the County's Office of Emergency Services. Counties should then work together to identify another regional forum for developing a multi-jurisdictional plan.

The District is committed to public participation. All SID Board meetings are open to the public and the public is invited to comment on items on the Board Agenda. The public will continue to be involved whenever the plan is updated and as appropriate during the monitoring and evaluation process. Prior to adoption of updates, the County will provide the opportunity for the public to comment on the updates. A public notice will be posted prior to the meeting to announce the comment period and meeting logistics. The District is committed to improving public participation in the update process over the next five years. To improve this process, SID will consider writing letters to the editor of local newspapers in its service area to promote wider public knowledge of the issues related to disaster mitigation and the planning process.

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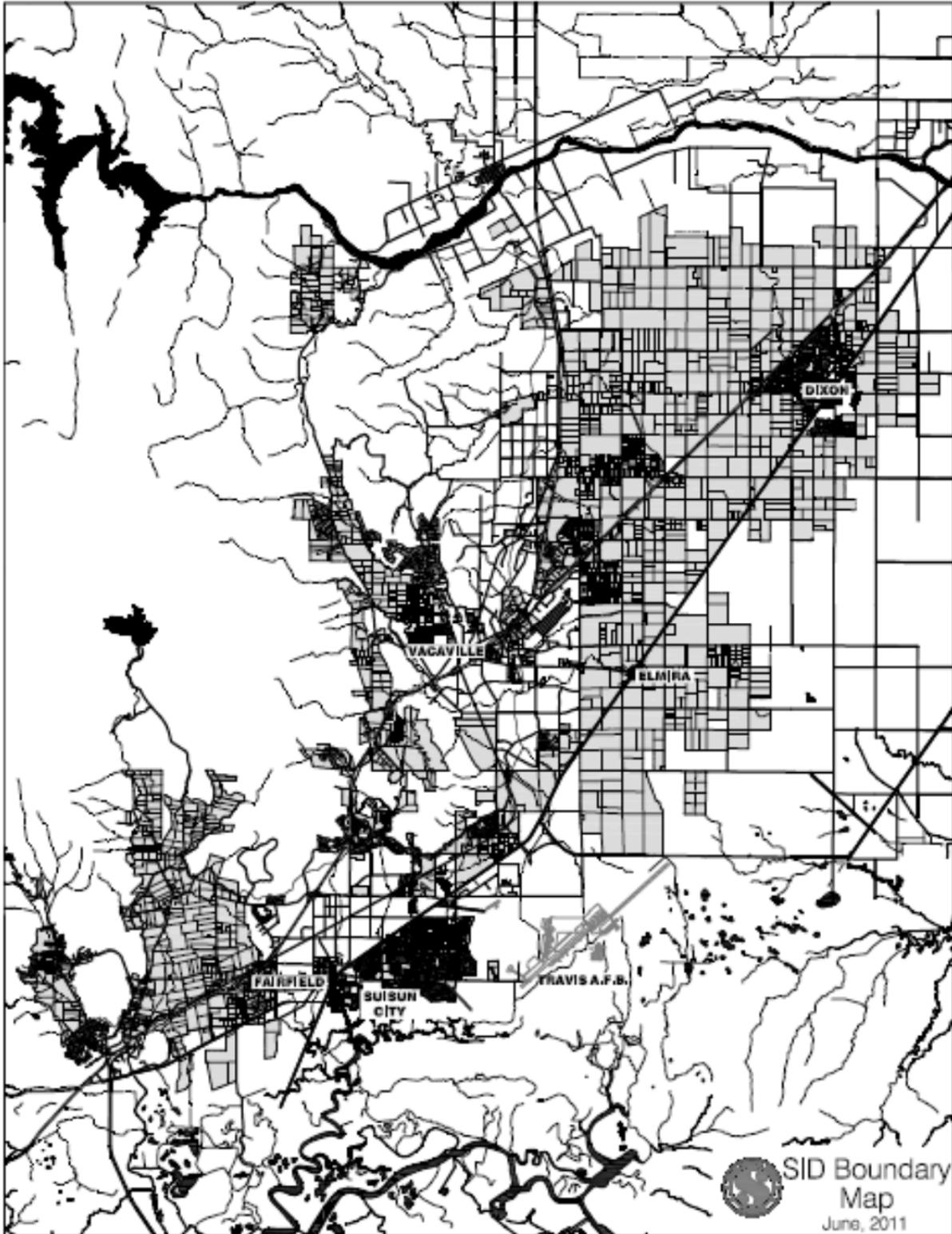
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Exhibit A - Jurisdiction Boundary Map



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Exhibit B - SID 2010 Mitigation Strategy Spreadsheet

[Available on LHMP CD or at <http://www.abag.ca.gov/bayarea/eqmaps/mitigation/strategy.html>]