



Chapter 7

Hydrology and Water Quality

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Introduction

This background report examines existing conditions related to surface water resources, groundwater resources, and water quality. A variety of methods were used to define existing and projected surface water, groundwater and water quality conditions. In general, the surface water and groundwater sections rely on data provided by the Solano County Water Agency (SCWA). The water quality section relies on information provided by Solano County's Environmental Management Department, the San Francisco Bay Regional Water Quality Control Board (RWQCB), and the U.S. Environmental Protection Agency (EPA).

Please refer to the Community Facilities Background Report for information related to water distribution and treatment facilities, waste water collection and treatment, and water supply and demand.

Environmental Setting

Climate

Suisun City has a mild Mediterranean climate, with hot dry summers and cool wet winters. Precipitation in the vicinity is derived from frontal low-pressure systems that originate over the Pacific Ocean and travel generally east into California. The mean annual precipitation in Suisun City is 20 inches, but is variable from year to year (for example, ranging from 12.32 inches in 1971 to 44.28 inches 1983). The majority of the annual precipitation falls as rain during the period from November through April. The 10-year, 24-hour estimated maximum precipitation amount is 3.0 inches and the 100-year, 24-hour maximum precipitation amount is 4.5 inches for the Suisun City area (City of Suisun City 2007:4.7-1).

Surface Water Resources

Suisun City is within the Suisun Hydrologic Unit within the San Francisco Bay Drainage Province, and within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (RWQCB). The Suisun Hydrologic Unit drains approximately 157 square miles. Suisun Marsh and Suisun Bay, located just south of the City's Sphere of Influence (SOI), are the receiving waters. The Suisun Drainage Canal flows south through the westernmost SOI parcel to Peytonia Slough and Suisun Marsh and Bay. Union Creek bisects the eastern portion of the City's SOI, flowing south to Suisun Marsh and Bay. Several drainage channels are also found in the eastern portion of the SOI. See Exhibit HWQ-1 for the location of these water bodies and smaller drainages.

Suisun Bay

Suisun Bay is a shallow tidal estuary that lies at the confluence of the Sacramento and San Joaquin Rivers and forms the entrance to the Sacramento Delta. On its western end, Suisun Bay is drained by the Carquinez Strait, which connects to San Pablo Bay, a northern extension of San Francisco Bay.

Suisun Marsh

Suisun Marsh is the largest contiguous brackish water marsh remaining on the west coast of North America. It is a critical part of the San Francisco Bay-Delta estuary ecosystem. Suisun Marsh is located in southern Solano County, California about 35 miles northeast of San Francisco. The marsh is bordered on the east by the Sacramento-San Joaquin Delta, on the south by Suisun Bay, on the west by Interstate 680, and on the north by State Route 12 and the Cities of Suisun City and Fairfield.

Bordered by upland grasslands, the Suisun Marsh is a mosaic of seasonally managed wetlands, unmanaged tidal wetlands, bays, and sloughs. Like much of California, the history of Suisun Marsh has been shaped by water. This brackish marsh was originally formed by erosion, sedimentation, and the dynamics of a tidal system where fresh river water and saline ocean water meet.

Encompassing 116,000 acres, the Suisun Marsh includes 52,000 acres of managed wetlands, 27,700 acres of upland grasses, 6,300 acres of tidal wetlands, and 30,000 acres of bays and sloughs.

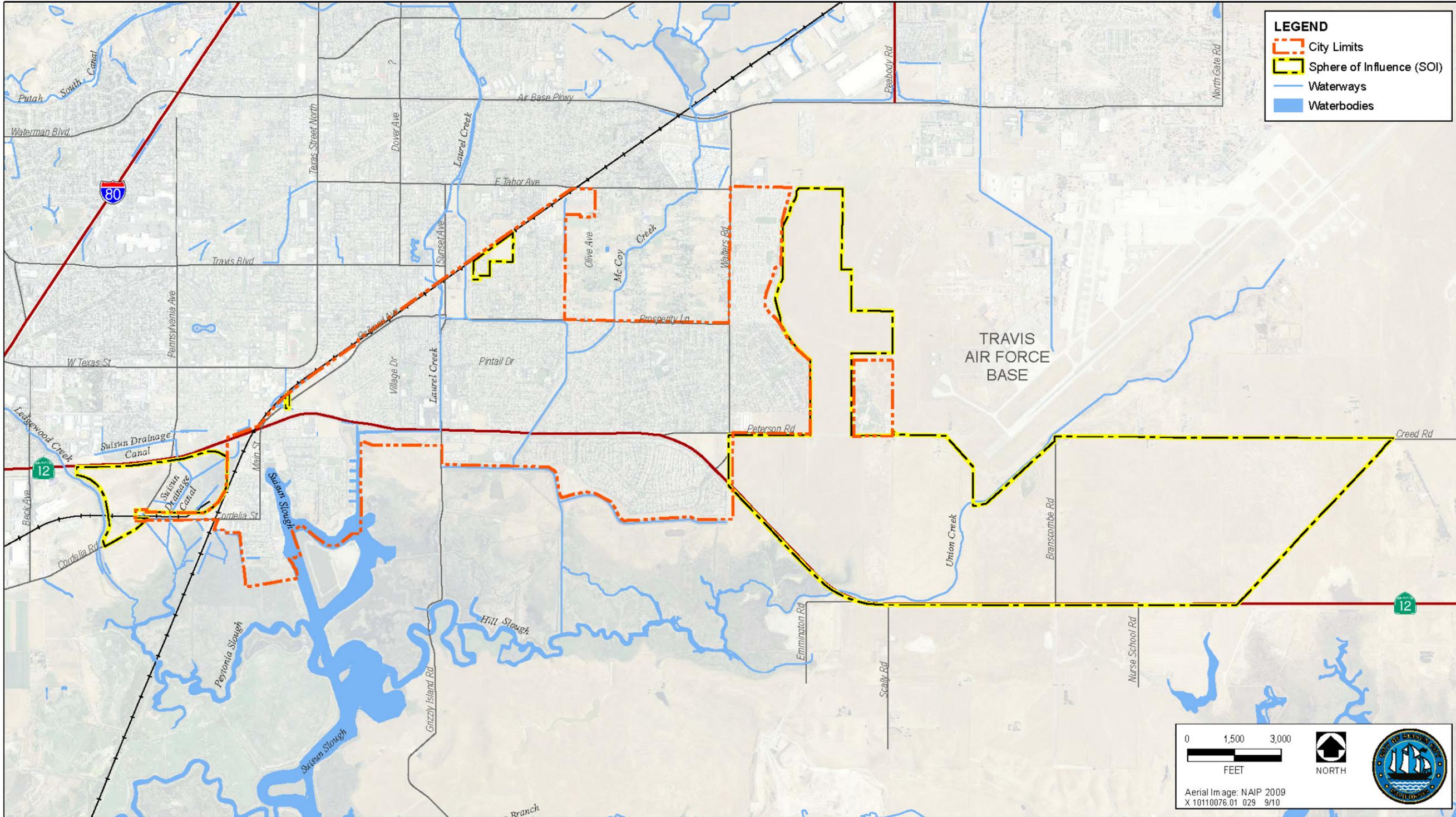
Suisun Marsh is home to public waterfowl hunting areas and 158 private duck clubs. The Marsh encompasses more than 10 percent of California's remaining natural wetlands and serves as a resting and feeding ground for thousands of waterfowl migrating on the Pacific Flyway. In addition, the Marsh provides essential habitat for more than 221 bird species, 45 animal species, 16 different reptilian and amphibian species, and more than 40 fish species. The Marsh's vast open space resources and proximity to large urban areas makes it ideally suited for wildlife viewing, hiking, canoeing, and other recreation opportunities.

In 1987, the California Department of Water Resources (DWR), California Department of Fish and Game (DFG), U.S. Bureau of Reclamation (USBR), and the Suisun Resource Conservation District (SRCD) signed the Suisun Marsh Preservation Agreement (SMPA), which included the following provisions:

- Construction of facilities to deliver lower salinity water to portions of the Suisun Marsh and meet water quality standards,
- A monitoring program to collect data on surface and soil water quality, water elevations, vegetation, and wildlife species,
- Wetlands mitigation for effects of facilities construction and upstream water diversions, and
- Wetland improvements through use of management plans and a cost-share program for installation and improvement of water conveyance facilities.

Suisun Marsh monitoring requirements are described in detail in the Suisun Marsh Monitoring Agreement, also signed by all the SMPA signatories except SRCD, in 1987 (DWR 2000).

Maintenance of Suisun Marsh levees falls under the jurisdiction or management of several agencies at the federal, state, and local levels, including the US Army Corps of Engineers (USACE), the USBR, and the State Water Resources Control Board (SWRCB). A Levee Systems Integrity Program (LSIP) is proposed for the Suisun Marsh levee system through a cooperative effort among the DWR, the DFG, USACE, participating local reclamation districts (RD), and SRCD. In January 2006 components of the LSIP were included in the Habitat Management, Preservation and Restoration Plan for the Suisun Marsh (Suisun Marsh Plan) (CALFED 2006).



Source: Solano County 2007
Exhibit HWQ-1

Water Bodies



In January of 2006, more than a half-dozen levees around the Suisun Marsh were breached due to storms and high tides that overwhelmed the marsh's levee system and flooded more than 3,500-acres of wetlands.

Flood Zones

Both portions of the City's SOI are within the Federal Emergency Management Agency (FEMA) designated 100- and 500-year flood zones (see Exhibit HWQ-2). Flooding in the vicinity of the City generally occurs along waterways, with infrequent localized flooding also occurring due to constrictions of storm drain systems and/or surface water ponding.

The western portion of the City's SOI is bisected by the Suisun Drainage Canal, bounded by Ledgewood Creek, and within the 100-year flood zone (FIRM Map No. 0606310431C). Eastern portions of the SOI are also in the 100-year flood zone (FIRM Map No. 0606310455B and FIRM Map No. 0606310475C).

Levee Conditions

The old levee system present in some Solano County marshlands was constructed initially by hand labor, and later by dredging to hold back river floods and daily tides, in order to create additional land for grazing and growing crops. Today, these levees remain as embankments of 5 to 6 feet in height, with foundation widths of roughly 20 to 30 feet. Roads have been constructed atop a number of these levees, which were generally constructed using weak materials excavated from adjacent water courses, including sand, silt, and peat (U.S. Army Corps of Engineers 1972).

Constant maintenance is necessary to hold these levees against the high tides and river floods that threaten reclaimed marsh lands. New material must be added to these levees continually to compensate for peat oxidation. Sand, silt, and peat are weak in shear and erode easily. Each year, as farm lands adjacent to levees subside, hydrostatic pressure against the levees increases, adding to the potential for failure. In addition, most of these levees are not maintained to any specific standard, which can increase the likelihood of failure and inundation.

Potential failure of levees due to liquefaction constitutes a potential hazard in much of the southern half of Solano County, including areas around Suisun City. Failure of levees south of Suisun City could flood parts of the city. Even inspected levees are prone to failure under certain conditions, such as the Jones Tract that failed in 2004 after it was inspected (County of Solano Water Agency 2006).

Groundwater Resources

Suisun City overlies the Suisun–Fairfield Valley groundwater basin, one of four groundwater basins within Solano County, as defined by DWR (2006). It is the second largest groundwater basin in Solano County and is located west of English Hills beneath the cities of Fairfield and Suisun City.

Groundwater is not used for domestic or irrigation purposes in the Suisun City area and is not considered a viable source for domestic water due to tidal inflows that affect water quality. Groundwater in the area is brackish and unsuitable for use without prohibitively expensive treatment (City of Fairfield 2006:5–6).

Regulatory Environment

Federal, state, and local policies related to water resources, hydrology, and water quality issues in the Suisun City SOI are described below.

Federal Agencies and Policies

U.S. Bureau of Reclamation

The U.S. Bureau of Reclamation (USBR) is part of the U.S. Department of the Interior and is responsible for development and conservation of most water resources in the western United States. While the original purpose of the Bureau was to provide for the reclamation of arid and semiarid lands in the west, the agency's current mission covers a wider range of interrelated functions, including providing municipal and industrial water supplies through the Central Valley Project (CVP); generating hydroelectric power; providing irrigation water for agriculture; improving water quality, flood control, and river navigation; providing river regulation and control and fish and wildlife enhancement; offering water-based recreation opportunities; and conducting research on a variety of water-related topics.

The Solano Project, operated under a cooperative agreement by the Solano County Water Agency and the Solano Irrigation District, provides water for irrigation and domestic supplies for the cities of Suisun City including the SOI, Vacaville, Vallejo, and Fairfield. The federal government owns the Solano Project facilities. Maintenance of Suisun Marsh levees falls under the jurisdiction or management of several agencies at the federal, State, and local levels, including the USBR, as well as the U.S. Army Corps of Engineers (USACE) and the State Water Resources Control Board (SWRCB).

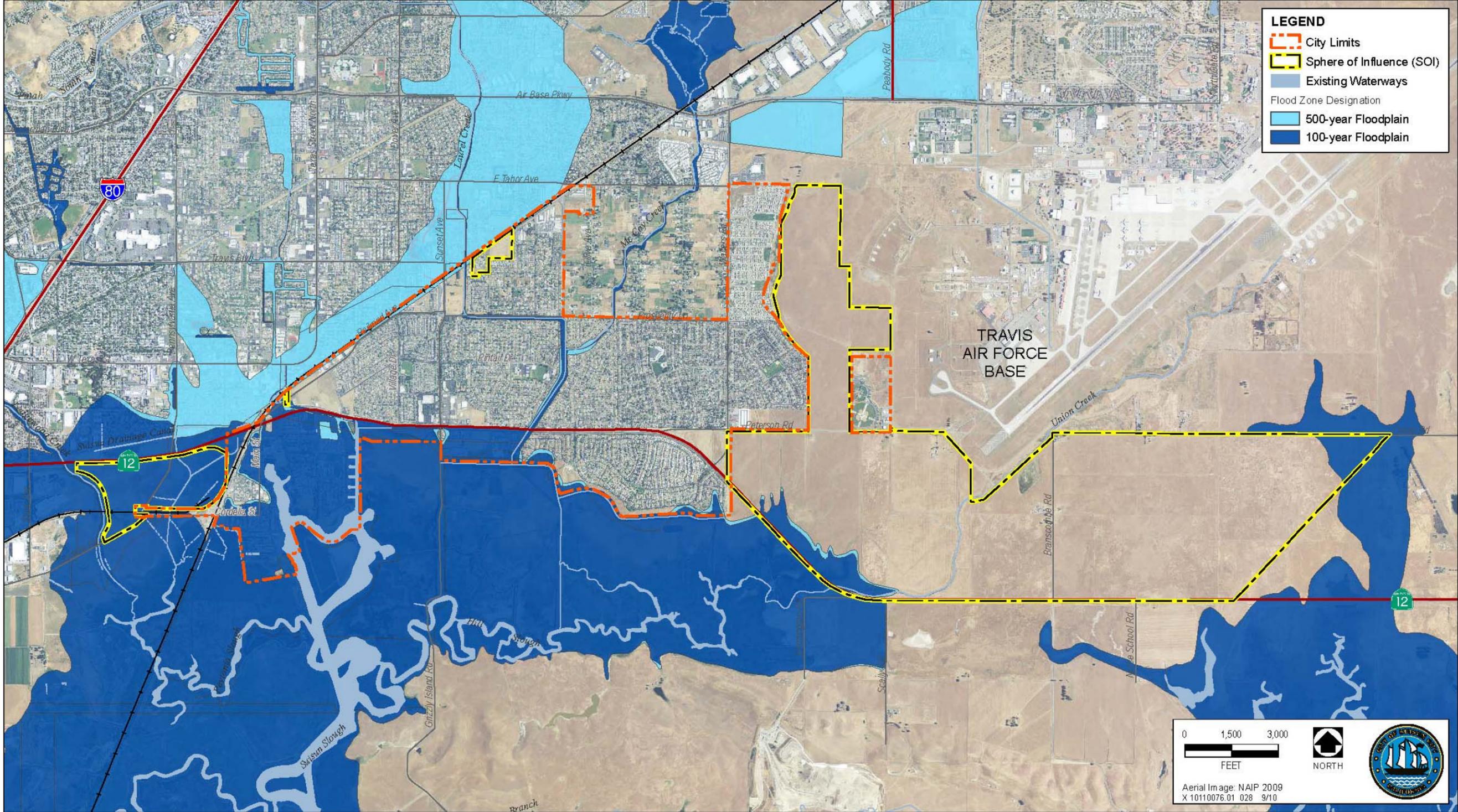
U.S. Army Corps of Engineers

The USACE is responsible for issuing permits for the placement of fill or discharge of material into waters of the United States. These permits are required under Sections 401 and 404 of the Clean Water Act. Water supply projects that involve in stream construction, such as dams or other types of diversion structures, trigger the need for these permits and related environmental reviews by USACE. USACE also is responsible for flood control planning and assisting state and local agencies with the design and funding of local flood control projects, including those in the Suisun City area.

U.S. Fish and Wildlife Service and National Marine Fisheries Service

The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS), in cooperation with other federal and state agencies, enforce the federal Endangered Species Act (ESA) by evaluating the potential for impacts on candidate, threatened, and endangered fish and wildlife resources.

The Suisun Marsh and other receiving waters of the City are under the jurisdiction of the USFWS for projects that may result in take of a species listed as threatened or endangered under the ESA, as described in more detail in the Biological Resources Background Report.



Source: FEMA 2010

Exhibit HWQ-2

Floodplains



U.S. Geological Survey

The U.S. Geological Survey (USGS) National Water Use Information Program is responsible for compiling and disseminating the nation's water-use data. USGS works in cooperation with federal, state, and local environmental agencies to collect water use information at the local level, including the Suisun City area.

Federal Clean Water Act of 1972

The federal Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into waters of the United States and setting water quality standards for all contaminants in surface waters. The CWA defines water quality standards as provisions of state or federal law that consist of a designated use or uses for the waters of the United States and water quality criteria for such waters based upon such uses. Water quality standards are designed to protect the public health and welfare, enhance the quality of water, and serve the purposes of the CWA. Water quality standards must contain:

- designation of beneficial uses of water; and
- application of water quality criteria to protect those designated uses.

The U.S. Environmental Protection Agency's (EPA) Office of Water is responsible for implementing the Clean Water Act and Safe Drinking Water Act (described below). EPA provides guidance, specifies scientific methods and data collection requirements, performs oversight, and facilitates communication among the federal, state, and local agencies that manage water quality.

National Pollutant Discharge Elimination System Permit Program

The National Pollutant Discharge Elimination System (NPDES) permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States. A discharge from any point source is unlawful unless the discharge is in compliance with an NPDES permit.

Federal NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify effluent and receiving water limits on allowable concentrations and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring, and other activities.

In November 1990, EPA published regulations establishing NPDES permit requirements for municipal and industrial stormwater discharges. Phase 1 of the permitting program applied to municipal discharges of stormwater in urban areas where the population exceeded 100,000 persons. Phase 1 also applied to stormwater discharges from a large variety of industrial activities, including general construction activity if a subject project would disturb more than 5 acres.

The Suisun City area is subject to the requirements of Phase 2 of the NPDES stormwater permit regulations, which became effective in March 2003, and required that NPDES

permits be issued for construction activity for projects that disturb 1 acre or more. Phase 2 of the municipal permit system (known as the NPDES General Permit for Small Municipal Separate Storm Sewer Systems [MS4s]) required small municipal areas of less than 100,000 persons to develop stormwater management programs.

California's Regional Water Quality Control Boards (RWQCBs) are responsible for implementing the NPDES permit system (details of the NPDES permit system as it pertains to the General Plan Update are discussed under "State Agencies and Policies" below).

Section 303(d) of the Clean Water Act

Section 303(d) of the Clean Water Act requires states to develop lists of water bodies (or segments of water bodies) that will not attain water quality standards after implementation of minimum required levels of treatment by point source dischargers (e.g., municipalities and industries).

Section 303(d) requires states to develop a total maximum daily load (TMDL) for each of the listed pollutants and water bodies. A TMDL is the amount of loading that the water body can receive and still meet water quality standards. The TMDL must include an allocation of allowable loadings to point and nonpoint sources, with consideration of background loadings and a margin of safety.¹ NPDES permit limitations for listed pollutants must be consistent with the load allocation prescribed in the TMDL. The most recently approved Clean Water Act Section 303(d) list for California identifies various waterways that are water quality impaired for a number of constituents. On October 25, 2006, the SWRCB approved California's 2006 Section 303(d) List of Water Quality Limited Segments.

Ledgewood Creek, which is located in the extreme western portion of the City's SOI, is listed on the 303(d) list for the pesticide, diazinon. The receiving waterways for Suisun City that are on the list are identified in Table HWQ-1.

Sections 401 and 404 of the Clean Water Act

Section 401 of the CWA states that any applicant for a federal permit or license that may result in the discharge of pollutants into waters of the United States must obtain a State certification showing that the activity complies with all applicable water quality standards, limitations, and restrictions. Under Section 401 of the CWA, an applicant for a Section 404 permit (to discharge dredged or fill material into waters of the United States) must first obtain a certificate from the appropriate state agency stating that the fill is consistent with the state's water quality standards and criteria. No license or permit may be granted by a federal agency until certification required by Section 401 has been granted. Further, no license or permit may be issued if certification has been denied. In California, the authority to either grant water quality certification or waive the requirements is delegated by the State Water Resources Control Board (SWRCB) to the nine Regional Water Quality Control Boards (RWQCBs). See Section "State Agencies and Policies" below for a discussion of the SWRCB and RWQCBs.

Section 404 of the Clean Water Act establishes a requirement to obtain a permit before conducting any activity that involves any discharge of dredged or fill material into waters of the United States, including wetlands. This permit is issued by the USACE.

¹ "Point" source pollution is defined by Section 502(14) of the Clean Water Act as any discernible, confined and discrete conveyance from which pollutants may be discharged, such as drainage pipes, ditches, channels, animal feeding operation, or vessel or other floating craft, but not irrigated agriculture. "Nonpoint" pollution is any source not defined by the Act as a "point" source, such as land runoff, precipitation, seepage, and atmospheric deposition.



Table HWQ-1
Solano County Section 303(d) Water Quality Limited Segments,
San Francisco Bay and Central Valley RWQCB(s)

Water Body Name	Pollutant/Stressor	Potential Sources	TMDL Priority	Estimated Size Affected*	Unit	Proposed TMDL Completion
Suisun Bay	Mercury	Industrial Point Sources	High	23,931	Acres	1
Suisun Bay	Mercury	Resource Extraction	High	23,931	Acres	1
Suisun Bay	Mercury	Atmospheric Deposition	High	23,931	Acres	1
Suisun Bay	Mercury	Natural Sources	High	23,931	Acres	1
Suisun Bay	Mercury	Nonpoint Source	High	23,931	Acres	1
Suisun Bay	Nickel	Source Unknown	Low	23,931	Acres	
Suisun Bay	Selenium	Industrial Point Sources	Low	23,931	Acres	
Suisun Bay	Selenium	Natural Sources	Low	23,931	Acres	
Suisun Bay	Selenium	Exotic Species	Low	23,931	Acres	
Suisun Bay	Exotic Species	Ballast Water	Medium	23,931	Acres	
Suisun Bay	Chlordane	Nonpoint Source	Low	23,931	Acres	
Suisun Bay	DDT	Nonpoint Source	Low	23,931	Acres	
Suisun Bay	Dieldrin	Nonpoint Source	Low	23,931	Acres	
Suisun Bay	Dioxin Compounds	Atmospheric Deposition	Low	23,931	Acres	
Suisun Bay	Furan Compounds	Atmospheric Deposition	Low	23,931	Acres	
Suisun Bay	PCBs	Unknown point source	High	23,931	Acres	2019
Suisun Bay	PCBs (dioxin-like)	Unknown Nonpoint Source	Low	23,931	Acres	2019
Suisun Marsh Wetlands	Metals	Agriculture	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Metals	Urban Runoff/Storm Sewers	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Metals	Flow Regulation/Modification	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Nutrients	Agriculture	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Nutrients	Urban Runoff/Storm Sewers	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Nutrients	Flow Regulation/Modification	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Organic Enrichment/ Low Dissolved Oxygen	Agriculture	Low	66,345	Acres	2019

**Table HWQ-1
Solano County Section 303(d) Water Quality Limited Segments,
San Francisco Bay and Central Valley RWQCB(s)**

Water Body Name	Pollutant/Stressor	Potential Sources	TMDL Priority	Estimated Size Affected*	Unit	Proposed TMDL Completion
Suisun Marsh Wetlands	Organic Enrichment/ Low Dissolved Oxygen	Urban Runoff/Storm Sewers	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Organic Enrichment/ Low Dissolved Oxygen	Flow Regulation/Modification	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Salinity/TDS/Chlorides	Agriculture	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Salinity/TDS/Chlorides	Urban Runoff/Storm Sewers	Low	66,345	Acres	2019
Suisun Marsh Wetlands	Salinity/TDS/Chlorides	Flow Regulation/Modification	Low	66,345	Acres	2019
Ledgewood Creek	Diazinon	Urban Runoff/Storm Sewers	High	9.32	Miles	2
Delta Waterways (western portion)	Unknown Toxicity	Source Unknown	Low	4,429	Acres	2019
Delta Waterways (western portion)	Mercury	Resource Extraction	Medium	4,429	Acres	1
Delta Waterways (western portion)	Electrical Conductivity	Agriculture	Medium	4,429	Acres	2019
Delta Waterways (western portion)	Chlorpyrifos	Agriculture	High	4,429	Acres	2
Delta Waterways (western portion)	Chlorpyrifos	Urban Runoff/Storm Sewers	High	4,429	Acres	2
Delta Waterways (western portion)	DDT	Agriculture	Low	4,429	Acres	2011
Delta Waterways (western portion)	Diazinon	Agriculture	High	4,429	Acres	2
Delta Waterways (western portion)	Diazinon	Urban Runoff/Storm Sewers	High	4,429	Acres	2
Delta Waterways (western portion)	Group A Pesticides	Agriculture	Low	4,429	Acres	2011

Notes: TMDL = total maximum daily load.

* Within Solano County

¹ On February 12, 2008, the federal Environmental Protection Agency approved a Basin Plan amendment incorporating a Total Maximum Daily Load (TMDL) for mercury in San Francisco Bay and an implementation plan to achieve the TMDL (SWRCB Resolution RS-2007-0045). The amendment was formerly adopted by the San Francisco Bay Water Board, the State Water Resources Control Board, and the state Office of Administrative Law. It is now officially incorporated into the San Francisco Bay Basin Plan.

² Ledgewood Creek is included in the Basin Plan amendment incorporating a TMDL and water quality attainment strategy for Diazinon and pesticide-related toxicity in the Bay Area's urban creeks (Water Board Resolution: R2-2005-0063) which has been incorporated into the San Francisco Bay Basin Plan. The amendment was adopted by the Regional Water Board on November 16, 2005, and approved by the State Water Resources Control Board on November 15, 2006. It has been approved by the State Water Board, the Office of Administrative Law, and the federal Environmental Protection Agency.

Source: SWRCB 2006; 2010



Antidegradation Policy

The federal antidegradation policy, established in 1968, is designed to protect existing uses and water quality and national water resources. The federal policy directs states to adopt a statewide policy that includes the following primary provisions:

- Existing in-stream uses and the water quality necessary to protect those uses shall be maintained and protected.
- Where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the State finds that allowing lower water quality is necessary for important local economic or social development.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

The federal and state antidegradation policies apply to San Francisco Bay up to and including Suisun Bay.

National Toxics Rule and California Toxics Rule

In 1992, EPA promulgated the National Toxics Rule under the Clean Water Act to establish numeric criteria for priority toxic pollutants for California. The National Toxics Rule established water quality standards for 42 pollutants not covered under California's statewide water quality regulations at that time. As a result of the court ordered revocation of California's statewide Basin Plans in September 1994, EPA initiated efforts to promulgate additional federal water quality standards for California. In May 2000, EPA issued the California Toxics Rule, which includes all the priority pollutants for which EPA has issued numeric criteria not included in the National Toxics Rule. These criteria apply to discharges to surface waters in the City and SOI.

Safe Drinking Water Act

The Safe Drinking Water Act was passed in 1974 to regulate the nation's drinking-water supply. The law was amended in 1986 and 1996, and requires many actions to protect drinking water and its sources—rivers, lakes, reservoirs, springs, and groundwater. The Safe Drinking Water Act authorizes EPA to set national health-based standards for drinking water to protect against both naturally occurring and human-caused contaminants that may be found in drinking water. EPA sets national standards for drinking water to protect against health risks, considering available technology and costs. These National Primary Drinking Water Regulations set enforceable Maximum contaminant levels (MCLs) for particular contaminants in drinking water or required ways to treat water to remove contaminants. EPA, states, and local agencies then work together to make sure that these standards are met (EPA 1999).

The water supply source for Suisun City provided by the Suisun-Solano Water Authority from Lake Berryessa via the Putah South Canal to the Cement Hill Water Treatment Plant. The water quality is good, with no MCL exceedances reported (Suisun-Solano Water Authority Annual Reports 2008; 2009).

Federal Emergency Management Agency

The Federal Emergency Management Agency (FEMA) administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations to limit development in floodplains.

FEMA also issues flood insurance rate maps (FIRMs) that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA. The minimum level of flood protection for new development is the 1-in-100 Annual Exceedance Probability, defined as a flood that has an average frequency of occurrence on the order of once in 100 years (although such a flood may occur in any given year). Participants in the NFIP must satisfy certain mandated floodplain management criteria. The FEMA flood zones in Suisun City are shown in Exhibit HWQ-2.

Executive Order 11988

Executive Order 11988 (Floodplain Management) addresses floodplain issues related to public safety, conservation, and economics. It generally requires federal agencies constructing, permitting, or funding a project in a floodplain to do the following:

- avoid incompatible floodplain development,
- be consistent with the standards and criteria of the NFIP, and
- restore and preserve natural and beneficial floodplain values.

State Agencies and Policies

Porter Cologne Water Quality Control Act of 1969

The Porter Cologne Water Quality Control Act, otherwise known as the California Water Code, is California's statutory authority for the protection of water quality. Under the Porter Cologne Act, the state must adopt water quality policies, plans, and objectives that protect the state's waters for the use and enjoyment of the people. The Porter Cologne Act sets forth the obligations of the SWRCB and RWQCBs pertaining to the adoption of Basin Plans and establishment of water quality objectives. It also authorizes the SWRCB and RWQCBs to issue and enforce permits containing waste discharge requirements. Basin Plans establish beneficial uses, water quality objectives, and implementation programs for each of the nine regions in California. Unlike the federal Clean Water Act, which regulates only surface water, the Porter Cologne Act regulates both surface water and groundwater.

State Water Resources Control Board

The SWRCB was established in 1967 to administer state water rights and water quality functions. The SWRCB and its nine RWQCBs administer water rights and enforce pollution control standards throughout the state. The SWRCB is responsible for granting of water right permits and licenses through an appropriation process following public hearings and appropriate environmental review by applicants and responsible agencies. In granting water right permits and licenses, the SWRCB must consider all beneficial uses, including water for downstream human and environmental needs. In addition to granting the water right permits needed to operate new water supply



projects, the SWRCB also issues water quality–related certifications to developers of water projects under Section 401 of the CWA. Suisun City is within the jurisdiction of the San Francisco Bay RWQCB (see below).

San Francisco Bay Regional Water Quality Control Board

The San Francisco Bay RWQCB is responsible for the preparation and implementation of basin water quality plans consistent with the CWA. Enforcement of these plans ensures that local water quality is protected. RWQCBs may become involved in water supply programs as responsible agencies with respect to project impacts on downstream beneficial uses.

The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) (San Francisco Bay RWQCB 2007) defines the beneficial uses, water quality objectives, implementation programs, and surveillance and monitoring programs for waters of that Basin.

Stormwater flows from the SOI are ultimately discharged and drain into Suisun Marsh, which is part of the area covered by the Basin Plan. The Basin Plan describes a set of designated beneficial uses for each water body; beneficial uses help to define the resources, services, and qualities of the aquatic systems. Beneficial uses also serve as a basis for establishing water quality objectives and discharge prohibitions. The Basin Plan contains specific numeric water quality objectives that are applicable to each water body or portions of water bodies. Objectives have been established for bacteria, dissolved oxygen, pH, pesticides, electrical conductivity, total dissolved solids, temperature, turbidity, and trace elements; numerous narrative water quality objectives have also been established. Finally, the Basin Plan contains a set of implementation plans, which represent the San Francisco Bay RWQCB’s programs and specific plans of action for meeting water quality objectives and protecting beneficial uses.

NPDES Permit System and Waste Discharge Requirement for Construction

The SWRCB and San Francisco Bay RWQCB have adopted specific NPDES permits for a variety of activities that have potential to discharge wastes to waters of the state. The SWRCB General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order 2009-0009-Division of Water Quality [DWQ]) is applicable to all land-disturbing construction activities that would affect one acre or more of land.

The NPDES permits all involve similar processes including submittal of Notices of Intent (NOI) to discharge to the San Francisco Bay RWQCB and implementation of best management practices (BMPs) to minimize those discharges. The San Francisco Bay RWQCB may also issue site-specific Waste Discharge Requirements (WDRs), or waivers to WDRs, for certain waste discharges to land or waters of the state.

Construction activities subject to the general construction activity permit include clearing, grading, stockpiling, and excavation. Dischargers are required to eliminate or reduce non-storm water discharges to storm sewer systems and other waters. The permit also requires dischargers to consider the use of post-construction permanent BMPs that will remain in service to protect water quality throughout the life of the

project. Types of BMPs include source controls, treatment controls, and site planning measures.

Activities subject to the NPDES general permit for construction activity must develop and implement a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP includes a site map and description of construction activities and identifies the BMPs that will be employed to prevent soil erosion and discharge of other construction related pollutants, such as petroleum products, solvents, paints, and cement, that could contaminate nearby water resources. A monitoring program is generally required to ensure that BMPs are implemented according to the SWPPP and are effective at controlling discharges of storm water related pollutants.

The SWRCB approved Order 2009-0009-DWQ on September 2, 2009 and it became effective on July 1, 2010. This new General Permit differs from the previous permit (Order 99-08-DWQ) in the following important ways:

- **Risk-Based Permitting Approach:** the amended general permit establishes three levels of risk possible for a construction site. Risk is calculated in two parts: 1) project sediment risk, and 2) receiving water risk.
- **Rainfall Erosivity Waiver:** the amended general permit includes the option of allowing a small construction site (>1 and <5 acres) to self-certify if the rainfall erosivity value (the variable "R" in the EPA's Revised Universal Soil Loss Equation) for their project's given location and time frame calculates to be less than or equal to 5. Dischargers can access an online rainfall erosivity calculator from EPA's website.
- **Technology-Based Numeric Action Levels (NAL):** the amended general permit includes NALs for pH and turbidity.
- **Technology-Based Numeric Effluent Limitations (NEL):** the amended general permit contains daily average NELs for pH during any construction phase where there is a high risk of pH discharge and daily average NELs turbidity for all discharges in Risk Level 3. The daily average NEL for turbidity is set at 500 Nephelometric Turbidity Units (NTU) to represent the minimum technology that sites need to employ (to meet the traditional Best Available Technology Economically Achievable (BAT)/ Best Conventional Pollutant Control Technology (BCT) standard) and the traditional, numeric receiving water limitations for turbidity.
- **Minimum Requirements Specified:** the amended general permit imposes more minimum BMPs and requirements that were previously only required as elements of the SWPPP or were suggested by guidance.
- **Project Site Soil Characteristics Monitoring and Reporting:** the amended general permit provides the option for dischargers to monitor and report the soil characteristics at their project location. The primary purpose of this requirement is to provide better risk determination and eventually better program evaluation.
- **Effluent Monitoring and Reporting:** the amended general permit requires effluent monitoring and reporting for pH and turbidity in storm water discharges. The purpose of this monitoring is to determine compliance with the NELs and evaluate whether NALs included in this General Permit are exceeded.
- **Receiving Water Monitoring and Reporting:** the amended general permit requires some Risk Level 3 dischargers to monitor receiving waters and conduct bioassessments.
- **Post-Construction Storm Water Performance Standards:** the amended general permit specifies runoff reduction requirements for all sites not covered by a Phase I



or Phase II MS4 NPDES permit, to avoid, minimize and/or mitigate post-construction storm water runoff impacts.

- **Rain Event Action Plan:** the amended general permit requires certain sites to develop and implement a Rain Event Action Plan (REAP) that must be designed to protect all exposed portions of the site within 48 hours prior to any likely precipitation event.
- **Annual Reporting:** the amended general permit requires all projects that are enrolled for more than one continuous 3-month period to submit information and annually certify that their site is in compliance with Draft Fact Sheet CGP -6- April 22, 2009 with these requirements. The primary purpose of this requirement is to provide information needed for overall program evaluation and public information.
- **Certification/Training Requirements for Key Project Personnel:** the amended general permit requires that key personnel (e.g., SWPPP preparers, inspectors, etc.) have specific training or certifications to ensure their level of knowledge and skills are adequate to ensure their ability to design and evaluate project specifications that will comply with General Permit requirements.
- **Linear Underground/Overhead Projects:** the amended general permit includes requirements for all Linear Underground/Overhead Projects (LUPs).
- **Low Impact Development:** the amended general permit requires that all projects implement low impact development (LID) site design features that control stormwater runoff at the source (i.e., on each project site) and treat 100% of the runoff generated at each project site. The LID features must either be located on each specific project site or be incorporated at a joint stormwater treatment facility.

California Department of Water Resources

The DWR is responsible for preparation of the California Water Plan, management of the State Water Project (SWP)², protection and restoration of the Sacramento–San Joaquin River Delta (Delta), regulation of dams, provision of flood protection, and other functions related to surface water and groundwater resources. These other functions include helping water agencies prepare their urban water management plans (UWMPs) and reviewing such plans to ensure that they comply with the related Urban Water Management Planning Act.

The latest UWMP from the Suisun-Solano Water Authority, which is operated by the Solano Irrigation district and provides domestic water supplies to Suisun City, was adopted in 2006.

Central Valley Flood Protection Plan

The Central Valley Flood Protection Plan (CVFPP) is proposed for implementation by DWR and the Central Valley Flood Protection Board. The CVFPP is an integrated flood management plan for the Sacramento-San Joaquin River Flood Management System. It outlines a flood management strategy that is intended to support California's agricultural economy, maintain agricultural land uses, limit growth in undeveloped

² The State Water Project is a series of dams, dykes, levees, reservoirs, aqueducts, power plants, pumping stations, habitat restoration projects, and other improvements beginning in the late 1950's designed to provide water to over 23 million Californians and 755,000 acres of irrigated farmland and includes the North Bay Aqueduct.

floodplains, and provide policies, programs, and incentives to encourage appropriate long-term floodplain management. The CVFPP would require cities and counties that wish to continue to develop in urban areas to achieve an urban level of flood protection against the 200-year (0.5-percent-chance) flood as defined in California Government Code (CGC) Section 65007(l) and CWC Section 9602(i). City and county General Plan Amendments must be prepared within 2 years of CVFPP adoption, and zoning ordinances must be modified within 3 years of CVFPP adoption, that outline how each local jurisdiction would comply with CVFPP requirements. Suisun City and the SOI are not located within the area that would be covered by the CVFPP.

California Department of Fish and Game

The California Department of Fish and Game (DFG) is a responsible agency with respect to the review of water right applications and also is responsible for issuing lake and streambed alteration permits for new water supply projects, as appropriate. DFG works in coordination with federal and state agencies to mitigate the impacts of projects on fish and wildlife resources, and is responsible for enforcing the California Endangered Species Act. DFG often helps establish in-stream flows (minimum releases below a dam or diversion structure) to maintain habitat below a project. Such release schedules may be included in water right permits and could affect the yield of a project.

Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California

The Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (also referred to as the Statewide Implementation Plan, or SIP) applies to discharges of toxic pollutants into inland surface waters, enclosed bays, and estuaries. The SIP describes methods for setting effluent limits in NPDES permits based on NTR and CTR criteria (please see above under the heading "National Toxics Rule and California Toxics Rule") and priority pollutant objectives established in basin plans. The policy also establishes certain monitoring requirements and provisions for controlling chronic toxicity, and includes special provisions for certain types of discharges.

Local Plans, Policies and Agreements

Municipal Regional Stormwater Permit

Suisun City is under the purview of the San Francisco Bay RWQCB Municipal Regional Stormwater NPDES Permit Order R2-2009-0074, NPDES Permit No. CAS612008, issued October 14, 2009.

In an effort to standardize stormwater management requirements throughout the region, this permit replaces the formerly separate municipal stormwater permits within the San Francisco Bay RWQCB area with a regional permit for 76 Bay Area municipalities, including Suisun City and the Fairfield-Suisun Urban Runoff Management Program, formed by Suisun City and Fairfield. The Regional Permit replaces NPDES Permit No. CASo612005 issued to the Fairfield-Suisun permittees by Order No. R2-2003-0034 on April 16, 2003 and amended by Order R2-2007-0026 on March 14, 2007.



The current permit differs from the previous separate municipal permits by specifying the actions necessary to reduce the discharge of pollutants in stormwater to the maximum extent practicable, in a manner designed to achieve compliance with water quality standards and objectives, and effectively prohibit non-stormwater discharges into municipal storm drain systems and watercourses within the permittees' jurisdictions, including Suisun Slough, Suisun Drainage Canal, Union Creek, and Ledgewood Creek, which drain to Suisun Marsh and Bay, (303(d) protected water bodies), and in the case of Suisun Marsh, under the requirements of the Suisun Marsh Preservation Act, described below.

This set of specific actions is equivalent to the requirements that in past permit cycles were included in separate Stormwater Management Plans for each permittee or countywide group of permittees (e.g. the Fairfield-Suisun Urban runoff Management Program stormwater requirements [FSURMP 2006]), and incorporated by reference. Under the current permit, that level of specific compliance detail is integrated into permit language and is not a separate document.

The NPDES permit includes requirements for the following components:

- Municipal Operations;
- New Development and Redevelopment;
- Industrial and Commercial Site Controls;
- Illicit Discharge and Elimination;
- Construction Site Controls;
- Public Information and Outreach;
- Water Quality Monitoring;
- Pesticides Toxicity Controls;
- Trash Reduction;
- Mercury Controls;
- PCBs Controls;
- Copper Controls;
- Polybrominated Diphenyl Ethers (PBDE), Legacy Pesticides, and Selenium; and
- Exempt and Conditionally Exempt Discharges.

Solano County Local Agency Formation Commission

The Solano County Local Agency Formation Commission (Solano County LAFCO) regulates local agency boundary changes, including annexations and changes to spheres of influence for each city and special district within the County. Solano County LAFCO is also responsible for approving the boundaries and spheres of influence of each water purveyor in the County, including Suisun City.

Solano County Water Agency

The boundaries of the Solano County Water Agency include the entire County of Solano, the property of the University of California at Davis, and the part of Reclamation District 2068 in Yolo County. The Agency was formed in 1951 by an act of the State Legislature, and was originally known as the "Solano County Flood Control

and Water Conservation District.” As originally established in 1951, the Board of Supervisors of Solano County was the governing board (ex-officio) of the Solano County Flood Control and Water Conservation District (SCFC&WCD). As with other countywide flood control and water conservation districts established at the time, the SCFC&WCD was given both water supply and flood control authorities. The first major action of the SCFC&WCD was to contract with the U.S Bureau of Reclamation for water supply from the Solano Project.

In 1988, the legislative act was changed to modify the governing board of the SCFC&WCD and to make other minor updates to the act. In 1989 the name of SCFC&WCD was changed to the “Solano County Water Agency” (SCWA). The change in the governing board of SCWA was significant. In addition to the five County Supervisors, the mayors of all seven cities in the County and a member from each of the three agricultural irrigation districts (Solano Irrigation District, Maine Prairie Water District, and Reclamation District No. 2068) were added. The three agricultural districts were added because those districts provide retail water service to their constituents.

The authorities of SCWA still include both water supply and flood control. The water supply function consists of providing wholesale, untreated water supply to cities, districts, and state agencies, including the Suisun-Solano Water Authority. Additionally, SCWA leads efforts to protect rights to existing sources of water and participates in efforts to secure new sources of water for future use within the County. SCWA also has authority to address all flood control matters within its boundaries. SCWA has prepared a Flood Control Master Plan that addresses countywide flooding and drainage problems

Solano County Environmental Health Services Division

The Solano County Environmental Health Services Division is responsible for a variety of services. The Technical Services Program implements County programs for liquid waste, water systems, solid waste disposal, wells, and land use, and provides assistance to the public in the planning and implementation of small public water systems, wells and on-site sewage disposal, and solid waste management.

The Environmental Health Division conducts or oversees evaluations of the site and soil to determine the best design for a septic system to assure proper disposal of sewage.³ However, septic systems are not allowed in Suisun City.

The Fairfield Suisun Sewer District (FSSD) operates a joint stormwater collection and wastewater treatment plant (WWTP) for the cities of Fairfield and Suisun City, and some unincorporated properties within Solano County. Tertiary-treated effluent is discharged to Boynton Slough and thence to Suisun Marsh. Approximately 10% of the treated effluent is recycled for agricultural irrigation, landscape irrigation, and industrial cooling, which discharges into irrigation water conveyance and distribution facilities owned and operated by FSSD and the Solano Irrigation District. The FSSD WWTP is regulated by the San Francisco Bay RWQCB through NPDES permit (ORDER NO. R2-2009-0039, NPDES NO. CA0038024), which mandates certain levels of discharge for various pollutants based on thresholds set in the Basin Plan and other state and federal regulations.

³ Site evaluations, plan reviews, permits, and construction and destruction inspections are also conducted for on-site sewage disposal systems and wells pursuant to the California Well Standards and Solano County Code Chapters 13.10 and 6.4.



Suisun City General Plan

The 1992 General Plan is being updated to reflect developments and other changes in local conditions since 1992, technical studies and planning processes that have occurred since the early 1990s, and changes in state law and regulatory requirements, among other considerations. New information is now available that will be useful for the General Plan Update, including the 2008 Solano County General Plan and EIR (prepared by AECOM with County staff). The 1992 General Plan addresses water quality and flooding in Chapter VII: Open Space and Conservation with policies that protect open spaces, watercourses, and floodways for flood control and watershed and water quality management. The 1992 General Plan established the following policies that relate to hydrology and water quality that are applicable to the project:

- Natural watercourses and drainage channels shall be protected and preserved to the extent possible; runoff from urban development and upland watershed areas will be contained by channels and reservoirs to control debris, sediment, and the rate and dispersal of runoff. (Chapter VII - Open Space and Conservation, Policy 9)
- The City will require that new developments contain drainage features and facilities which channel run-off away from adjacent properties, control erosion, and assure that water quality will not be adversely affected. The City will encourage development designs which incorporate natural features into the drainage system provided water quality and erosion concerns are addressed. Drainage standards will be governed by the Development Guidelines and the Subdivision Ordinance. (Chapter VIII - Community Facilities and Services, Policy 5).

Site Mitigation Program Local Oversight Program

Solano County provides regulatory oversight for soil and groundwater cleanup and mitigation under the Site Mitigation Program Local Oversight Program (LOP) through a contract with the SWRCB and voluntary agreements with responsible parties, pursuant to California Code of Regulations (CCR) Title 23 Article 11 and the Health and Safety Code Section 25297-25299.

Solano County Water Agency Integrated Regional Water Management Plan

An Integrated Regional Water Management Plan (IRWMP) was developed for the Solano County Water Agency (SCWA) and its member cities and districts, including the City of Suisun City (SCWA 2005). The IRWMP completes the second phase of a two-phased planning process. For the first phase, SCWA staff identified the major sources of water supply, existing demands, and water resources-related issues.

Phase Two of the IRWMP was developed in 2004 by engaging elected officials and a cross-section of technical and policy representatives from agricultural districts and urban agencies. This stakeholder group functioned as the knowledge base for the issues, ideas, and direction developed in the IRWMP.

The IRWMP proposes region-wide policies and projects to meet ten strategic issues identified by the stakeholder group:

- Match supply to demand through the long term;

- Manage the County’s groundwater resources;
- Encourage water of the appropriate quality for the intended use;
- Improve runoff water quality;
- Manage flood control services;
- Participate in multi-county flood control;
- Manage environmental resources;
- Leverage state and federal funding opportunities;
- Address safety and security issues; and
- Prepare for climate change.

These issues represent the fundamental water resource policy questions and critical challenges that affect the Solano agencies’ ability to accomplish their missions.

The IRWMP process documents a recommended path for SCWA to use its resources for the betterment of Solano County for programs within the authority of SCWA, including the SCWA related policies and projects defined in the IRWMP, designated as the “SCWA Strategic Plan.”

Solano County Water Agency Flood Control Master Plan

The SCWA has adopted a master plan governing flood control and flood control improvements within its territory. One of the major recommendations of the SCWA Flood Control Master Plan is to develop watershed studies to address flooding problems on a watershed basis. Several watershed studies have been completed and many projects are being considered for implementation. SCWA also funds small projects that address localized flood control and drainage projects that meet specified criteria.

Suisun Marsh Preservation Act

The Suisun Marsh comprises approximately 85,000 acres of tidal marsh, managed wetlands, and waterways in southern Solano County. It is the largest remaining wetland near San Francisco Bay and includes more than 10% of California’s remaining wetland area. The Suisun Marsh is also a wildlife habitat of nationwide importance.

Recognizing the threats to the Suisun Marsh from potential residential, commercial, and industrial developments, and the need to preserve this unique wildlife resource for future generations, the California government enacted the Nejedly-Bagley-Z’berg Suisun Marsh Preservation Act of 1974. This Act directed the San Francisco Bay Conservation and Development Commission (Commission) and the Department of Fish and Game (DFG) to prepare a Suisun Marsh Protection Plan “to preserve the integrity and assure continued wildlife use” of the Suisun Marsh. In December 1976, the Commission submitted the Suisun Marsh Protection Plan to the Governor and the Legislature. The Suisun Marsh Preservation Act was amended in 1977 to incorporate the findings and policies contained in the plan into state law.



Suisun City Code of Ordinances – Grading and Erosion Control

Chapter 15.12 of the City's Code of Ordinances contains grading, erosion control and creekside development requirements, performance standards, and regulations necessary to comply with the provisions of Suisun Marsh Protection Act of 1977 and is a part of the Suisun City component of the Marsh Protection Plan described in the "Suisun Marsh Preservation Act" above. Article 2 "Grading Permits" (Grading Permits) requires the acquisition of a grading permit prior to performing any grading, filling, excavation, or clearing of vegetation, with exceptions defined in Section 15.12.060. In addition, Section 15.12.080 requires that a runoff control plan be submitted to the City that includes an indication of the calculated runoff from the site under natural conditions, and after development has been completed using City drainage standards.

Article 3 "Erosion Control Standards" provides the minimum guidelines for performance standards and basic design principles necessary to minimize the potential for erosion. Control measures are required to apply to all aspects of the proposed grading and are intended to be operational during all stages of development.

Article 4 "Creekside Development" contains general policies to minimize erosion and sedimentation to creeks, and to mitigate significant adverse environmental impacts to the Suisun Marsh. Section 15.12.250 lists the requirements for maintaining minimum riparian habitat zones.

Article 5 "Dust Control" requires applicants to take all necessary measures to prevent windblown dust and debris from spreading to property adjacent to and downwind of the construction site.

General Plan Issues and Opportunities

Several key water resource issues that should be addressed within the Suisun City General Plan Update are discussed below:

- **Compliance with the new Statewide Storm Water Construction General Permit requirements.** Under the General Plan Update, construction activities could take place in areas with receiving water bodies draining to Suisun Marsh, under the requirements of the Suisun Marsh Protection Plan, and Suisun Bay, both of which are on the 303(d) list for numerous constituents (see Table HWQ-1). Recent inspections by the San Francisco RWQCB found that many construction site management practices within the region were not in full compliance with all provisions of the NPDES permit. A general lack of erosion control was observed, with most sites relying solely on sediment controls (i.e., silt fences or straw wattles) such that water quality is not being protected from adverse construction impacts (San Francisco Bay RWQCB 2010a). In order to improve the compliance with permit provisions, the new General Permit differs from the previous one in a number of important ways, as described above in "NPDES Permit System and Waste Discharge Requirement for Construction." The fact that that not all sites have the same risk to water quality is now reflected in the General Permit, which tiers permit requirements according to three risk levels. Risk level is determined by soil type,

site slope, rainfall, receiving water sensitivity, and timing of grading. All risk levels have required minimum best management practices. The medium and high-risk level sites will now be required to collect water quality samples. For medium-risk sites, pH or turbidity results outside or above action levels will require site operators to examine and improve their best management practices. For high-risk sites, pH or turbidity results outside or above effluent limitations will be permit violations. The new permit requirements provide an opportunity for the City to address these risk level criteria and provide more proactive guidance for erosion and sediment control for both new development and ongoing stormwater management operations in developed areas.

- **Compliance with the new Municipal Regional Stormwater Permit requirements.** Under the Fairfield-Suisun Urban Runoff Management Program (FSURMP) the cities of Fairfield and Suisun City collaborated with the Fairfield Suisun Sewer District to develop stormwater requirements for development and redevelopment projects, which were presented in FSURMP (2006). These requirements were designed to enable compliance with the FSURMP NPDES stormwater permit (NPDES Permit No. CAS0612005 issued by Order No. R2-2003-0034 on April 16, 2003, and amended by Order R2-2007-0026 on March 14, 2007) and included construction, site design and source control, treatment controls, and operation and maintenance of post-construction control requirements. This permit was superseded by San Francisco Bay RWQCB Municipal Regional Stormwater NPDES Permit Order R2-2009-0074, NPDES Permit No. CAS612008, issued October 14, 2009, with new requirements summarized above in “Local Plans, Policies, and Agreements” above. The City could prepare guidance to new development for compliance with the stormwater permit requirements.
- **New Beneficial Uses for Suisun City receiving waters.** The San Francisco RWQCB has proposed amendments that would result in the addition of Suisun City receiving water bodies and beneficial uses to the Basin Plan (SFRWQCB 2010b). Peytonia Slough would be added and additional beneficial uses would be added for Suisun Slough and Suisun Drainage Canal. If these proposed amendments are approved the City could identify these receiving water bodies and measures that would be taken (e.g. sediment and erosion control policies) to protect them as required by the new beneficial use designations.
- **Potential Groundwater Contamination in the East Area from Travis AFB.** There is a potential for groundwater contamination from the Travis Air Force Base (AFB) in the extreme eastern portion of the City’s SOI. These contaminants are primarily volatile organic compounds (VOCs), especially the solvent trichloroethene (TCE), jet fuels (total petroleum hydrocarbons or TPH), and nickel (Travis AFB 1996:5). Although the aquifer underlying Travis AFB and the SOI is not used for domestic purposes, there is a potential for future exposure in the event of movement of contaminated groundwater to a place where groundwater could be used as a domestic water supply, where there is hydrologic connectivity to surface water, or where construction workers may be exposed to groundwater during future trenching or other construction activities.
- **Development in Floodplains.** The City and SOI, which contains year-round and ephemeral creeks and drainage canals, also contain natural floodplains. Areas within the FEMA flood zones are shown in Exhibit HWQ-2. In addition, approximately 30 percent of all flood claims in Solano County come from outside of the 100-year floodplain (SCWA 2008: Chapter 1, p.2). An increase in the amount of impervious surfaces (e.g., rooftops, sidewalks, driveways, streets, and parking lots) can result in higher rates of runoff during rain events, which can be a source of surface-water pollution and increase the total volume and peak discharge rate of



stormwater runoff. This could alter local drainage patterns and result in localized flooding. These impacts could be addressed through alternative stormwater management approaches including Low Impact Development (LID) techniques such as rain gardens, filter strips, swales, and other natural drainage strategies, which are utilized to absorb stormwater, reduce polluted urban runoff, recharge groundwater, and reduce flooding.

- **Climate Change.** Flooding as a result of climate change, particularly sea level rise, will be an issue of great concern for Suisun City. The City is largely built out and there is little opportunity for relocation or rebuilding so as to be more resilient from sea level rise. However, the City can examine opportunities to contribute to greenhouse gas reduction through water conservation and naturalized stormwater management systems. The City can also begin to explore options to adapt to, and prepare for, the effects of climate through vulnerability assessments of critical infrastructure, civic buildings, and other municipal facilities to determine best strategies for their long-term integrity and function.
- **Canal and Levee Failure.** The old levee system that was built years ago to reclaim and protect much of the County's marshland is also a potential source of flooding. The levees are subject to damage due to slumping, liquefaction, peat oxidation, subsidence, and erosion. Canal and levee failure may cause injury or loss of life to those within the potential inundation proximity. Levee inspection and improvement requirements could assist the City in determining development suitability in areas identified as subject to potential canal or levee failure. The City could also coordinate with the County Office of Emergency Services (OES) to identify and establish evacuation routes and operational plans to be used in case of dam failure, flood disaster, and fire and include outreach to residents and businesses regarding evacuation routes in the event of flooding
- **Dam Inundation.** There are 18 dams in Solano County that currently retain water. Of these, the State of California OES has identified 11 of whose failure may cause injury or loss of life, including two that may result in inundation in Suisun City. The western portion of the SOI would be vulnerable to inundation in the event of the failure of the Pennsylvania/Curry and Curry dams. Dam failure could also occur during a seismic event in the Bay area. Hazard mitigation plans typically address this potential threat.

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