3.12 HYDROLOGY AND WATER QUALITY

EXECUTIVE SUMMARY

This section describes the drainage features, stormwater quality, flooding hazards, and flood-protection improvements within the City's Planning Area. Regulatory agencies governing stormwater quality and flooding hazards are also discussed. The City's Planning Area is comprised of the City's boundaries and adopted Sphere of Influence (SOI). The County's Planning Area consists of unincorporated land within the One Valley One Vision (OVOV) Planning Area boundaries that is outside the City's boundaries and adopted SOI. Together the City and County Planning Areas comprise the OVOV Planning Area. With implementation of the proposed General Plan goals, objectives, and policies potential impacts on hydrology and water quality would be less than significant.

EXISTING CONDITIONS

Surface Water Drainage Patterns within City's Planning Area

Surface water drainage patterns are dependent on topography, the amount and location of impervious surfaces, and the type of flood control that is located in an area. The size, or magnitude, of a flood is described by a term called a "recurrence interval." By studying a long period of flow record for a stream, hydrologists estimate the size of a flood that would have a likelihood of occurring during various intervals. For example, a five-year flood event would occur, on the average, once every five years (and would have a 20 percent chance of occurring in any one year). Although a 100-year flood event is expected to happen only once in a century, there is a 1 percent chance that a flood of that size could happen during any year. The magnitude of flood events could be altered if changes are made to a drainage basin, such as by diversion of flow or increased flows generated by additional impervious surface area. Additionally, flood control would help manage the surface runoff that occurs in a particular area.

The Federal Emergency Management Agency (FEMA) has mapped most of the flood risk areas within the United States as part of the National Flood Insurance Program (NFIP). Most communities with a 1 percent chance of a flood occurring in any given year have a floodway depicted on a Flood Insurance Rate Map (FIRM). **Figure 3.12-1, 100-Year Flood Zone of the City's Planning Area,** shows the 100-year flood event boundaries for the major watercourses in the Planning Area. These areas are indicated on **Figure 3.12-1** as Special Flood Hazard Areas (SFHA). These SFHA are generally located within and directly adjacent to the Santa Clara River and its tributaries, and along portions of Castaic Lake.

The City's Planning Area contains many natural streams and creeks that function as storm drain channels, conveying surface runoff into the Santa Clara River. From its headwaters in the San Gabriel Mountains to its mouth at the Pacific Ocean, the Santa Clara River drains a watershed of 1,643 square miles, approximately 80 miles in length and about 25 miles in width. Ninety percent of the river's watershed consists of mountainous terrain; the remaining portion is a mix of valley floor, floodplain, and coastal plain. Within the headwater areas of the City of Santa Clarita, discharge during rainfall events tends to be rapid due to the steep terrain. High intensity rainfalls, in combination with alluvial soils, sparse vegetation, erosion, and steep gradients, can result in significant debris-laden flash floods.

The Santa Clara River and its tributary streams play a major part in moving the large volume of runoff generated from the Valley and surrounding foothills and mountains. The drainage system, including natural streams as well as constructed storm drain infrastructure within the City's Planning Area, is adequate to handle normal precipitation in the region (8 to 22 inches per year). With the rapid urbanization of the Valley since 1960, stormwater volumes have increased due to increased impervious surface area from parking lots, rooftops, and streets. Flood control facilities have been constructed to mitigate the impacts of development on drainage patterns throughout the City's Planning Area. Throughout the central portion of the Planning Area, some streams have been channelized into soft bottom channels with concrete sides to allow for development in the floodplain of the Santa Clara River.

Rainfall

The 100-year average annual rainfall within the City's Planning Area is between 8 and 22 inches. However, annual rainfall fluctuates from year to year as well as from site to site.

Drainage Facilities

Los Angeles County formed a special district to provide flood control services throughout the County and to enable the County to collect a fee for these services. The Los Angeles County Flood Control District (LACFCD) was formed by an act of the State Legislature. Parcels in the County of Los Angeles pay a fee on their annual tax bill for these services. Currently, the fee provides additional funding to meet the mandates of the Federal Clean Water Act as implemented through the National Pollutant Discharge Elimination System (NPDES) permits that are issued by the Regional Water Quality Control Board (RWQCB). The NPDES permit is the responsibility of the cities within the County and LACFCD. Projects are reviewed by the City of Santa Clarita for compliance with NPDES.

Legend:

FEMA DFIRM

- Special Flood Hazard Areas (SFHA) High-risk Zones
- Special Flood Hazard Areas (SFHA) Low to Medium-risk Zones
- Watershed Boundary (Calwater v. 2.2) **(Name)**
- OVOV Planning Area
- City of Santa Clarita Boundary
- SOI
- Incorporated Areas
- Angeles National Forest
- County Boundary
- Waterbody and Perennial Stream
- Aqueduct

GIS Projection - CA State Plane, Zone 5, NAD83, Feet.

Source: City of Santa Clarita - Planning, City Boundary, 2008, California Interagency Watershed Mapping Committee Watersheds, 1999; Thomas Bros., Hydrology, Waterbodies, and Streets, 2008; LA County - Planning, OVOV Boundary National Forests; FEMA: DFIRM Layer, October 2008.

3 1.5 0 3

APPROXIMATE SCALE IN MILES

SOURCE: City of Santa Clarita, County of Los Angeles, Valleywide General Plan - March 2009

FIGURE **3.12-1**

100-Year Flood Zone of the City's Planning Area

LACFCD and the County of Los Angeles are under the same administration but are separate legal entities. The funding for LACFCD is mainly for flood control purposes not for water quality compliance. With the addition of the NPDES permitting, the LACFCD augmented their efforts to address water quality in addition to just flood control. In the Planning Area, the LACFCD is responsible for annual maintenance of flood control facilities, mainly in the concrete lined portion of the Santa Clara River and its tributaries. This maintenance includes manual and chemical clearing of vegetation and debris before the rainy season each year, patching and repair of concrete structures, riprap and other bank stabilization structures, as needed. Maintenance activities also include clearing out of catch basin areas that are upstream of developed lands to catch brush, rocks, and other large debris that would clog the drainage system downstream. The LACFCD is also responsible for maintenance of all in-street storm drain catch basins, pipes, and outfalls. Under the NPDES permit, the LACFCD is also responsible to provide annual street catch basin cleaning for areas in the unincorporated County areas and to provide regular street sweeping services. The NPDES permit also requires the County to serve as the lead agency for all of the cities for production of regional public education materials and advertising to increase awareness of the need to keep stormwater clean. The majority of storm drain catch basins, pipes, and outfalls within the City's Planning Area have been transferred to the County for maintenance (May 14, 2002). The transfer of responsibility for these facilities to the County is a standard part of the development review and approval process. There are a few storm drains that the City maintains through its storm water crew; these are the old County "Road Drains" that were never transferred to the County for maintenance after the City incorporated. The City does not have any role in the maintenance of major flood control facilities, except in the few areas where buried bank stabilization has been utilized.

Buried bank stabilization is a relatively new bank stabilization method that leaves the natural riverbank in place for use by vegetation and wildlife and preserves the aesthetic appeal of the river. The levees are made of gunite, reinforced concrete lining, or soil cement and buried with a slope of 1.5:1 or greater. **Figure 3.12-2, Bank Stabilization, Typical Cross Section**, depicts a typical cross-section for buried bank stabilization. As shown, the buried bank stabilization approach uses soil cement, which is buried beneath the existing banks of the river to resist future scouring. The following guidelines will be applied in selecting the proper protection system:

- Buried soil cement bank protection will be used in situations where the stream velocities are high or where there is the potential for lateral bank migration based on stream characteristics. Alternatively, buried underground rip-rap will be used if in situ soils do not meet soil cement design requirements.
- If there is not sufficient space to allow covering of the revetment with the earthen fill because of physical constraints such as topographic features or existing facilities, then exposed un-grouted rock rip-rap will be used if the velocities do not exceed the limitations of the rock.
- Locations where there are proposed bridge crossings would require the banks underneath the bridge to have concrete gunite slope protection.

As to buried bank stabilization, the soil placed on top of the bank stabilization is replanted with native vegetation to return the disturbed area to its natural condition upon completion of construction. Typically, the lining must be buried at least twice the height of the lining in order to resist scouring. Burying the toe of the lining requires temporary excavation and backfilling.

A temporary construction zone of approximately 75 feet would occur at the base of the bank protection in order to bury the material. The original channel elevation would be restored after buried bank stabilization construction. The area would also be replanted with native vegetation. The County agreed to the use of this innovative measure with the understanding that the City would assume responsibility to maintain the banks into the future. No funding mechanism is in place for the City to pay for maintenance activities associated with buried bank stabilization. However, the County began to accept transfers of funds for buried bank stabilization in November 2005. Maintenance activities associated with buried bank stabilization are funded by developer agreements.

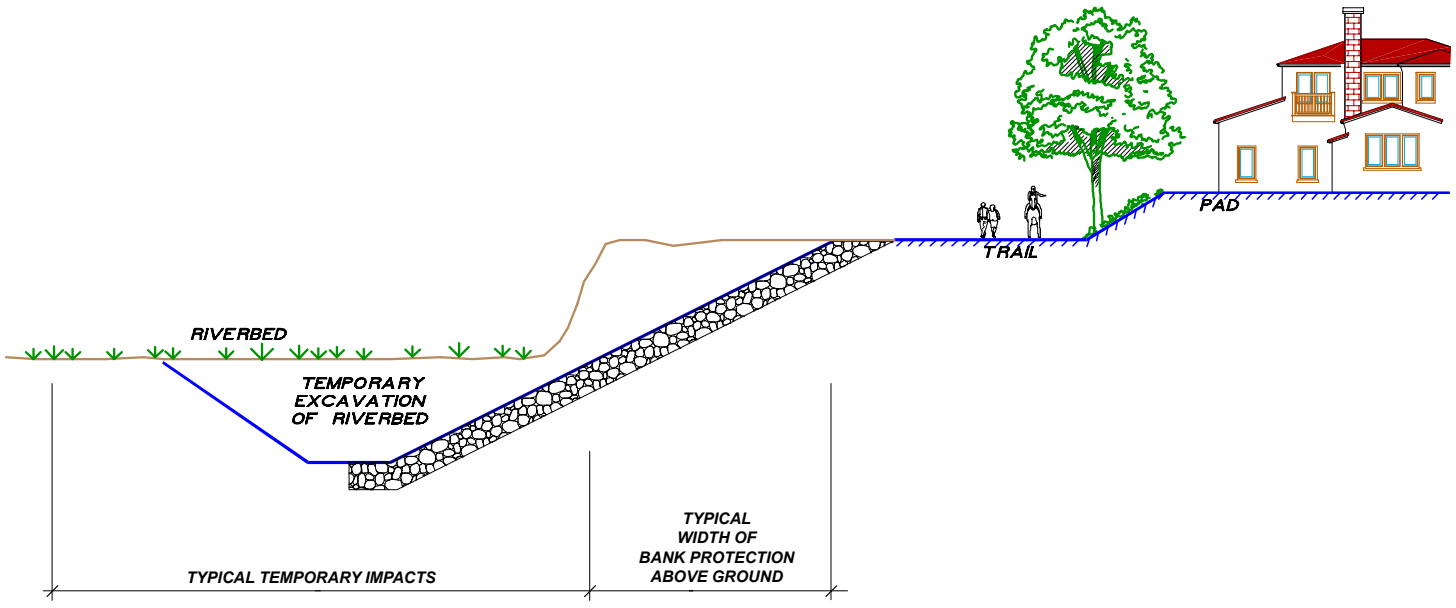
The City has also assumed responsibility for maintenance of water quality facilities along the river, specifically detention basins that are required of developers to meet their NPDES permit obligations. Funding for maintenance of these facilities has been provided through assessment of a special storm water fee that is paid by property owners that drain into the detention basin. Additionally, the City is responsible for compliance activities associated with the NPDES permit, and include catch basin cleaning, street sweeping, public education, and many other activities. Since the LAFCD handles maintenance of facilities on a regional level and the City's efforts focus on facilities at the local level, these efforts do not overlap.[1]

FLOODING

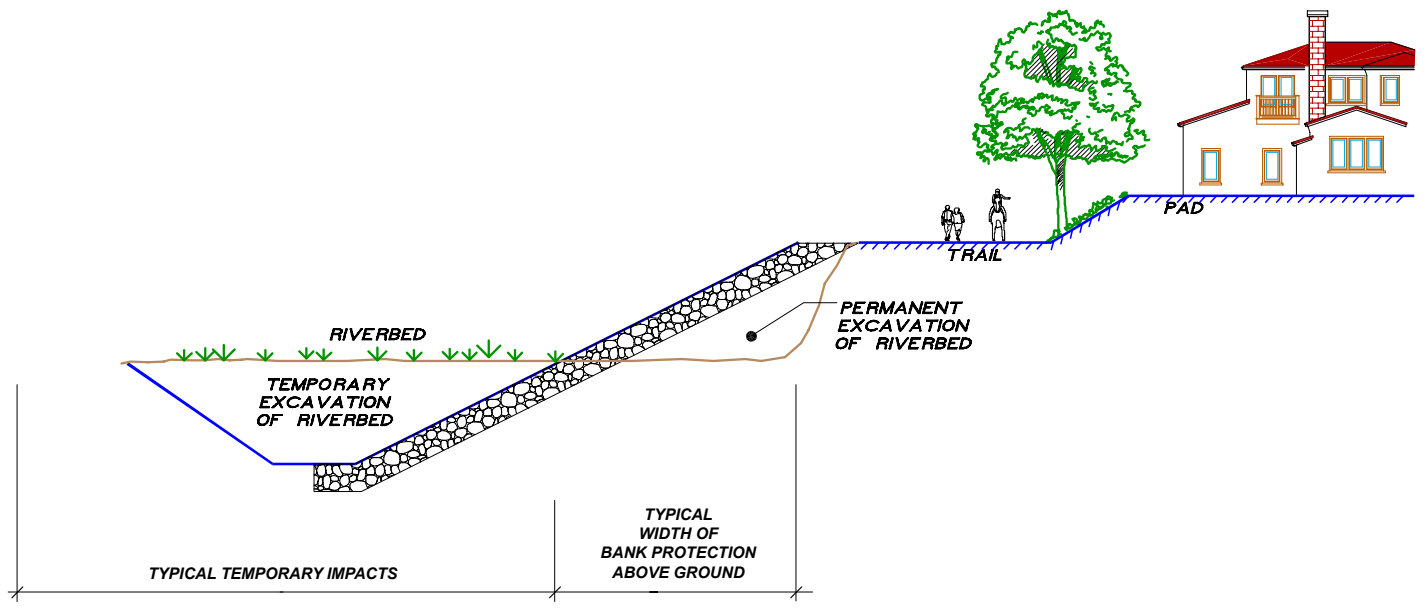
Flooding hazards are directly related to precipitation (rainfall) intensity and duration. Additionally, the regional topography, type and extent of vegetation coverage, amount of impermeable surfaces, local slope characteristics, and available drainage facilities all factor into the region's ability to divert precipitation runoff. Other key elements in a region's ability to safely manage runoff volume are the developments and urbanized areas within the region. Urbanization increases the volume and velocity of runoff water via two main processes:

- areas that would normally absorb rainfall (e.g., soils) have been replaced by impermeable surfaces (e.g., streets, houses); and
- the channelization and accumulation of runoff water adds to the collective whole, resulting in increased volumes and velocity.

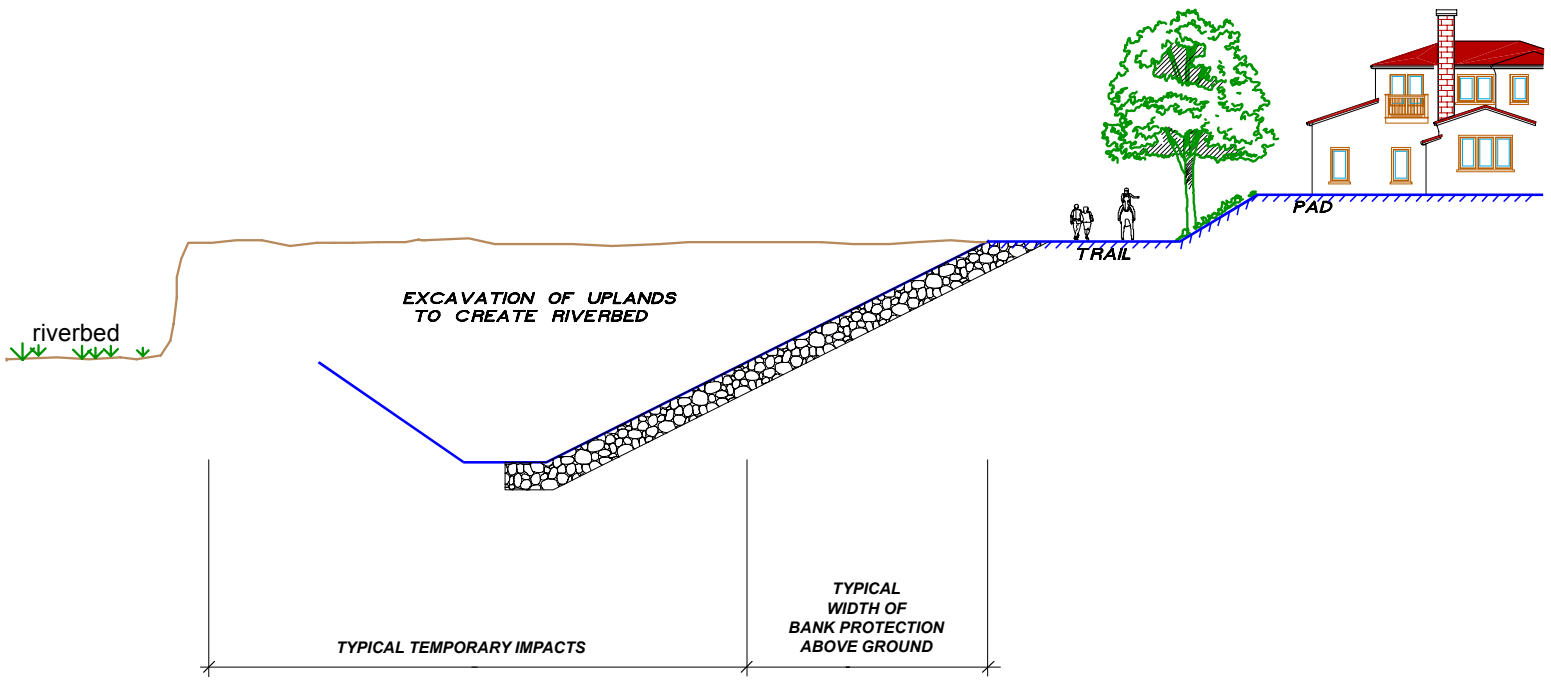
1 City of Santa Clarita Department of Public Works 2007.



Section A
No Permanent Loss of Riverbed, Only Temporary Impacts



Section B
Permanent Loss of Riverbed and Temporary Impacts



Section C
No Permanent Loss of Riverbed and No Temporary Impacts

35.0 17.5 0 35
APPROXIMATE SCALE IN FEET

SOURCE: FORMA – March 2002

FIGURE **3.12-2**

Bank Stabilization, Typical Cross Section

Throughout the central portion of the City's Planning Area, streams have been channelized to allow for development in the floodplain of the Santa Clara River and its tributaries. Soft bottom channels with concrete sides have been the predominant floodway improvement method used. However, the majority of the Santa Clara River has remained unchannelized, and a small portion has been stabilized using buried bank stabilization structures.

Localized Flood Areas

Two areas within the City's Planning Area are known to have periodic flooding problems. These areas are portions of Sand Canyon and Placerita Canyon. During storm events, transmission of storm flows within the street right-of-way may cause localized flooding making some roads impassable (e.g., Sand Canyon Road and Placerita Canyon Road). However, most streets in the City's Planning Area are designed to accommodate storm flow.

Along with heavy, prolonged rainfall, flooding within the City's Planning Area could also occur due to the leakage or collapse of nearby dams, the rupture of the Los Angeles Aqueduct, or on a smaller scale, within areas that have been cleared of vegetation by fires or mudslides. However, within the Planning Area, the primary flood hazard areas occur in and along natural drainage channels within the 100-year floodplain as shown above in **Figure 3.12-1**.

Dam Failure

Dam failure can result from natural or man-made causes, including earthquakes, erosion, improper siting or design, rapidly rising flood waters or structural flaws. Dam failure may cause loss of life, damage to property, and displacement of persons residing in the inundation path. Damage to electric generating facilities and transmission lines could also impact life support systems in communities outside of the immediate inundation areas. The City's Planning Area has been inundated by flood waters from a failure of a dam in the past. The St. Francis Dam was built by the Bureau of Water Works and Supply of the City of Los Angeles between 1925 and 1926, as a concrete gravity dam in the San Francisquito Canyon, about 5 miles northeast of the City of Santa Clarita. In 1928 the dam failed, and resulted in billions of gallons of water being sent down the San Francisquito Canyon and eventually dumping into the Santa Clara River within the current boundaries of the City. The flood waters drained 54 miles down the Santa Clara River and dumped into the Pacific Ocean. The dam collapse killed approximately 450 people, damaged a total of 1,200 homes, and damaged 10 bridges on its 54 mile traverse to the Pacific Ocean. The St. Francis Dam disaster is the second largest disaster in California history in which people were killed, and is eclipsed only by the San Francisco earthquake and fire in 1906.

Within the City's Planning Area, the one major reservoir which could have a significant impact on the City in the event of a dam failure is located in Bouquet Canyon. The Bouquet Canyon Reservoir is located in the central portion of the City's Planning Area. The reservoir has two earth-filled dams, one on the

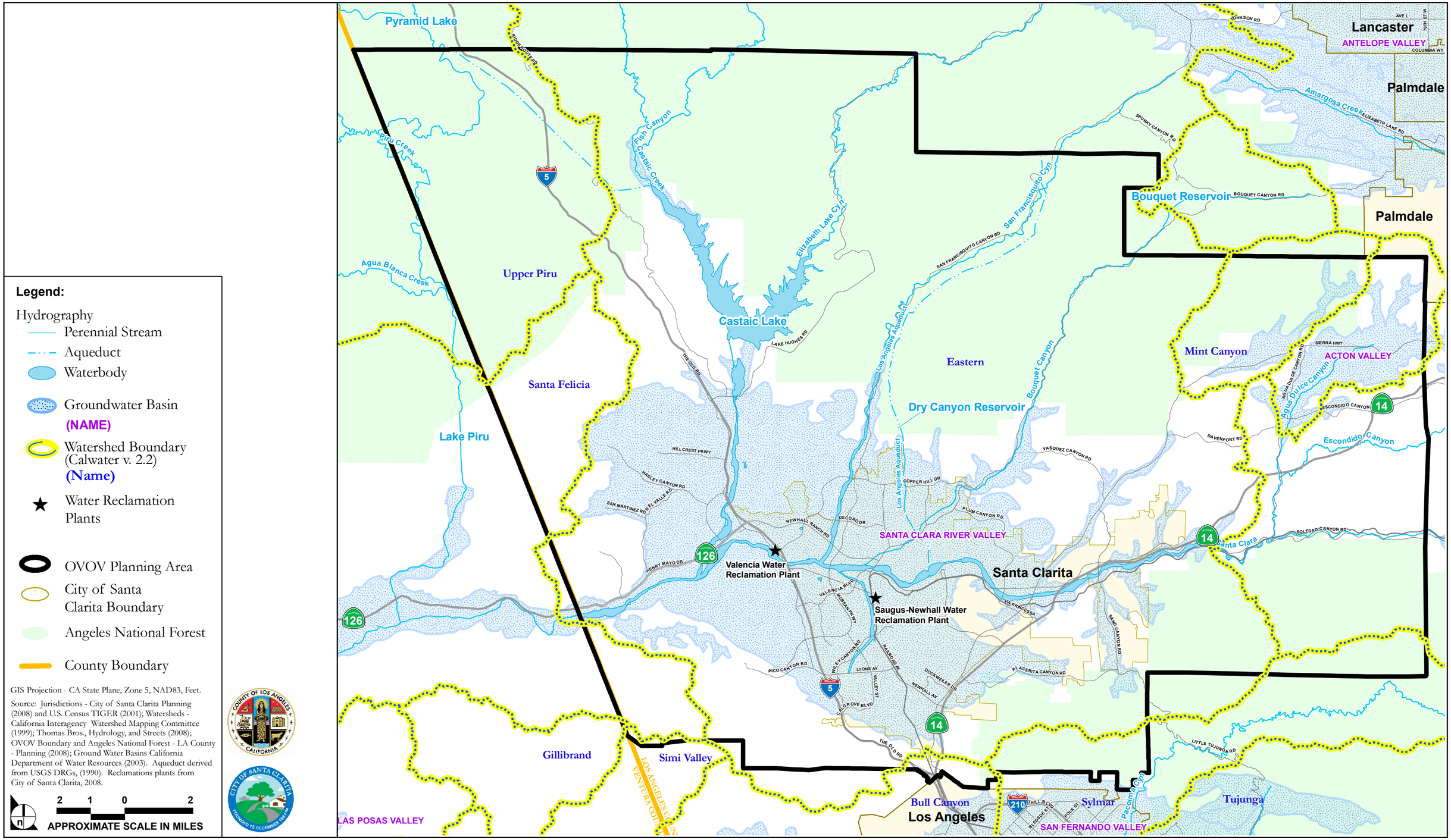
west side overlooking Cherry Canyon, and one on the south side above Bouquet Canyon. The Bouquet Reservoir has a maximum capacity of 36,505 acre-feet of water and 7.6 miles of shoreline. Because of its two dams, two potential inundation areas have been identified in the event of a dam failure. On the Cherry Canyon side, the water would flow west for approximately 2 miles through the Canyon into San Francisquito Canyon, and then south for approximately 11 miles into the Santa Clara River. The Bouquet Creek dam would drain south through Bouquet Canyon for 17 miles, into the Santa Clara River.

Failure of the Bouquet Canyon dams during a catastrophic event, such as a severe earthquake, is considered unlikely, due to their type of construction. However, local City and County safety plans have considered the possibility of dam failure and have outlined a procedure for response and recovery from this type of hazard, including identification of inundation areas and evacuation routes. See **Figure 3.9-2, Liquefaction and Landslide Hazards within the OVOV Planning Area**, which indicates the inundation area for the Bouquet Reservoir.

The Castaic Dam is located on Lake Hughes Road, 1 mile northeast of Interstate 5, just north of the community of Castaic. This dam is an earth-filled dam located at the confluence of Castaic and Elizabeth Lake Creeks. The dam facing is approximately 1 mile across with a maximum capacity of 350,000 acre-feet of water, covering a surface area of 2,600 acres with 34 miles of shoreline. Should a breach in the dam occur, the water will flow south in Castaic Creek for approximately 5 miles to the Santa Clara River. The Castaic Reservoir is north of the City of Santa Clarita boundaries; a dam failure would result in a flow of flood water that would not flow through the City's boundaries. See **Figure 3.9-2, Liquefaction and Landslide Hazards within the OVOV Planning Area**, which indicates the inundation area for Castaic Lake.

Groundwater Basins

Groundwater is concentrated into natural hydro-geological units called basins. An aquifer is a subsurface area where water collects, concentrates, and can be extracted within a basin. Multiple aquifers may be located within each basin. The two major groundwater basins underlying the Planning Area are the Santa Clara River Valley Groundwater Basin, East Subbasin, and the Acton Valley Groundwater Basin. The East Subbasin encompasses the upper Santa Clara River Valley and is comprised of two aquifer systems, the Alluvium (also referred to as the Alluvial Aquifer), and the Saugus Formation. The Alluvial Aquifer generally underlies the Santa Clara River and its tributaries, and the Saugus Formation underlies nearly the entire Upper Santa Clara River area. Groundwater from the East Subbasin generally flows from east to west, following the movement of the Santa Clara River. The East Subbasin is the sole source of local groundwater for urban water supply in the City of Santa Clarita. The groundwater basins within the proposed project area are shown in **Figure 3.12-3, Groundwater Basins within and Adjacent to the City's Planning Area**.



SOURCE: City of Santa Clarita, County of Los Angeles, Valleywide General Plan - August 2009

FIGURE **3.12-3**

Groundwater Basins within and Adjacent to the City's Planning Area

Because up to 80 percent of the average annual precipitation occurs between November and March, most groundwater infiltration is in the form of winter-storm flow. However, the East Subbasin is also replenished by deep percolation of agricultural land, urban irrigation, percolation from septic tanks and leach field systems, and treated effluent from water reclamation plants.

The Acton Valley Groundwater Basin encompasses about 17 square miles and is bounded by the Sierra Pelona on the north and the San Gabriel Mountains on the south, east, and west. Groundwater in the basin is unconfined and found in alluvium and stream terrace deposits. The regional direction of groundwater flow is in a southwesterly direction toward Soledad Canyon. Replenishment of this basin is through percolation of direct rainfall and infiltration of surface water runoff, agriculture and irrigation, and septic tanks. There is no pumping for urban water supply and distribution from this basin, although individual users in the far eastern portion of the planning area may have private wells in the Acton Valley Groundwater Basin.

Natural or soft bottom drainage channels and wide natural floodways and flood plains maximize the groundwater recharge and help to replenish the aquifers. As an unchannelized river, the Santa Clara River and its tributaries provide opportunities for groundwater recharge. The best available evidence shows that no adverse impacts on Basin recharge have occurred due to the existing or projected used of local groundwater supplies, consistent with the CLWA/purveyor groundwater operating plan for the basin (see *2005 Basin Yield Report*). In addition, according to the memorandum prepared by CH2MHill (*Effect of Urbanization on Aquifer Recharge in the Santa Clarita Valley*, February 22, 2004), urbanization in the Santa Clarita Valley has been accompanied by long-term stability in pumping and groundwater levels, and the addition of imported State Water Project water to the Valley, which together have not reduced recharge to groundwater, nor depleted the amount of groundwater in storage within the local groundwater basin.

Major Water Bodies and Tributaries

The area adjacent to and within the City's Planning Area contains abundant types of freshwater bodies, including lakes, rivers, streams, and tributaries. The following is a description of the lakes, rivers, streams, and tributaries that are nearest to the City's Planning Area, **Figure 3.12-4, Surface Water Within and Adjacent to the City's Planning Area.**

Santa Clara River

For ease of analysis, the *Final Santa Clara River Enhancement and Management Plan* (2005) divided the river into segments, known as reaches, to allow for a generalized assessment of each particular reach. Below are generalized descriptions of the reaches that fall within or adjacent to the City's Planning Area.

Ventura County Line to Interstate 5

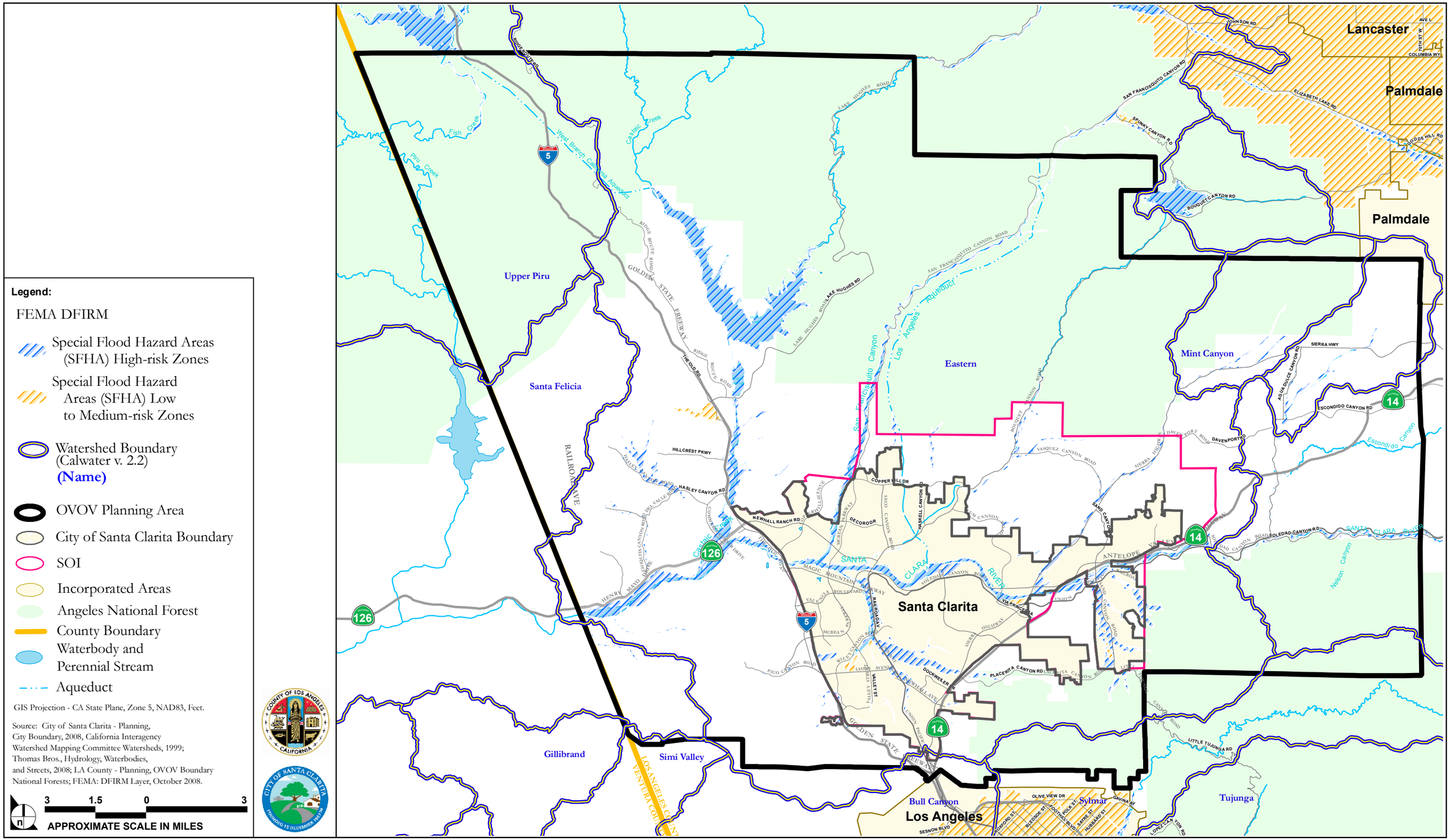
Between the Ventura–Los Angeles County line and I-5, the Santa Clara River passes primarily through privately owned land. This reach is a shallow floodplain that varies from 500 to 2,500 feet in width. Property owners have built levees to protect the farming areas, and Newhall Land has proposed a "Natural River Concept" that incorporates flood protection measures for this reach. These are detailed below in the "Flood Control Improvements" section.

Interstate 5 to Lang Station

A major segment of this reach meanders through the City of Santa Clarita. The flood plain varies in width from 500 feet at I-5, to 2,000 feet near Bouquet Canyon Road. West of Whites Canyon Road to the 14 Freeway, the 100-year floodplain is contained within levees on either one or both sides of the river. East of the 14 Freeway, the floodplain widens to an average of 1,000 to 1,500 feet. At Lang Station, it narrows down to less than 500 feet. Between Oak Spring Canyon and Sand Canyon, there are some permitted levees on the south bank of the river.

Castaic Lake

Castaic Lake is a 350,000 acre-foot storage facility created by an earth-filled dam across Castaic Creek. The reservoir serves as the West Branch Terminus of the California Aqueduct. In addition to its SWP functions, the lake is operated to conserve local floodwaters for use in water recharge of underlying groundwater basins. Castaic Lake is not located within the boundaries of the City's Planning Area. Castaic Lagoon is located directly south and downstream of Castaic Dam, and was created by the California Department of Water Resources (DWR) to provide recreational opportunities. The lagoon has a surface area of 197 acres and a capacity of 5,701 acre-feet. Elderberry Forebay is also a part of the Castaic Reservoir system, and is an enclosed section of Castaic Lake.



SOURCE: City of Santa Clarita, County of Los Angeles, Valleywide General Plan - March 2009

FIGURE **3.12-4**

Surface Water Within and Adjacent to the City's Planning Area

California Aqueduct

The SWP is one of the primary sources of water for the residents within the City. The SWP water is conveyed from the Sacramento Delta through 444 miles of the Edmund G. Brown California Aqueduct, south to the Southern California region (see **Section 3.13, Water Services,** for a more detailed description of the SWP). As described above, Castaic Lake is the most southerly reservoir on the West Branch of the SWP California Aqueduct.

Santa Clara River Tributaries

Principal tributaries to the upper Santa Clara River include creeks located in Mint, Bouquet, San Francisquito, Castaic, Oak Spring, and Sand Canyons. The principal tributaries of the Santa Clara River South Fork, which drains in a northerly direction toward its confluence with the main course of the river, include Placerita Creek, Newhall Creek, and Pico Creek. At higher elevations these creeks are typically perennial, flowing all year unless rainfall is below normal. Flow in the stream canyons near the valley floor is normally limited to the rainy season.

Bouquet Canyon Creek

Bouquet Canyon Creek is one of the major tributaries that feed the Santa Clara River. Bouquet Canyon Creek's headwaters are located within the Sierra Pelona Mountains and the creek flows from the Bouquet Reservoir southwest into the City's Planning Area along Bouquet Canyon. Bouquet Canyon Creek conveys surface water flows year round due to flow from urban runoff from development along its banks.

San Francisquito Creek

San Francisquito Creek is a natural drainage course that flows in a southwesterly direction through the City's Planning Area. The creek originates to the north of the City's Planning Area and connects to the Santa Clara River within the City's Planning Area, to the southwest of the intersection of Newhall Ranch Road and McBean Parkway. San Francisquito Creek carries water after winter rains, and as an intermittent stream, into the late spring dependent upon the amount of rainfall the creek experiences.

FLOOD CONTROL IMPROVEMENTS

Publicly maintained flood control facilities include approximately 12,000 linear feet of levee on the north bank and approximately 17,000 linear feet of levee on the south bank of the Santa Clara River.[2] These facilities are maintained by the Los Angeles County Department of Public Works.

Privately maintained levees amount to approximately 3,400 linear feet of the south bank of the river between Sierra Highway and SR-14, and 5,000 linear feet east of Castaic Creek on the north bank of the river.[3] Additionally, the adopted Newhall Ranch Specific Plan intends to incorporate floodway improvements such as buried bank stabilization, detention basins combined with habitat areas, rip-rap, and soft-bottom channels designed to appear natural, and additional drainage systems into the development plan. Other flood control improvements include the use of detention basins, rip rap, and soft bottom methods that are biologically sensitive and aesthetically pleasing.

Low Impact Development

In the past, traditional planning and design techniques have often focused on particular characteristics of a building site and the immediate areas, rather than on the relationship of each new development project to the surrounding regional environment. Even more holistic planning concepts such as new urbanism and smart growth have often overlooked the implications of a specific development project on environmental conditions in the greater watershed. Planners now understand that development decisions cannot be limited to site-specific conditions, but must be made in consideration of broader environmental conditions such as regional water quality.

The construction of impervious surfaces such as roads, parking lots, and rooftops leads to the degradation of water quality by increasing runoff volume, stream sedimentation and water acidity, altering regular stream flow and watershed hydrology, and reducing groundwater recharge. According to the EPA, a 1-acre parking lot produces a runoff volume almost 16 times as great as would an undeveloped meadow of the same size.

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2 Santa Clarita Valley General Plan, Technical Background Report, Chapter 6 Community Health and Safety, February 2004, p. 6-24.

3 Santa Clarita Valley General Plan, Technical Background Report, Chapter 6 Community Health and Safety, February 2004, p. 6-24.

The concept of Low Impact Development (LID) was created to ensure that new development is designed in consideration of overall environmental conditions, including regional water quality.[4] LID is a land use planning approach that incorporates "green infrastructure" concepts such as zero runoff, rainfall harvesting, groundwater recharge, biofiltration, native landscapes, green streets, and other measures to promote water quality protection in new development. The goal of LID is to protect a community's natural, pre-development water flow in order to minimize ecological impacts from urbanization.

The LID concept was created in the early 1990s in Maryland, with support from the US Environmental Protection Agency, to improve water quality in Chesapeake Bay. LID was designed to provide cost-effective alternatives to conventional stormwater management, which is typically designed to transport heavily polluted stormwater and urban runoff through pipes and concrete channels as quickly as possible into larger regional water bodies. LID principles were developed to control runoff at the source. According to information from the LID Center, basic planning principles include the following:

- Stormwater management. In LID, stormwater is managed as in a natural system, by creating permeable surfaces to infiltrate stormwater and urban runoff into the underlying soil and reduce the amount of runoff from impervious surfaces. Design measures to manage stormwater at the source include trenches, drainfields, dry wells, and bio-retention areas. Rain gardens are shallow depressions filled with soil, sand and plants that retain, filter, and treat stormwater. Filter strips and bioswales provide pretreatment before waters enter an infiltrated area. Constructed wetlands are designed to remove pollutants from runoff and provide habitat and recreation value. Vegetated swales move runoff to infiltration systems, slow the erosive velocity, and filter pollutants.

- Urban runoff reduction. Urban runoff during dry weather is largely the result of too much water for landscaped irrigation, and washing of driveways and sidewalks. This runoff mixes with fertilizer, pesticides, pollutants on roadways, and other contaminants to create some of the most polluted water entering creeks and rivers. LID measures include irrigation control and the use of native and compatible plant species that require less water.

- Site design and circulation. Minimizing the amount of asphalt and other impervious road and parking surfaces in site design and circulation decreases the amount of runoff and pollutants, while reducing both infrastructure and maintenance costs. Modifications to conventional design to reduce impervious surfaces area includes reduced street widths, reduced parking, use of porous materials in driveways and parking areas, and the use of traffic calming measures that include stormwater capture components. Mixed-use development which allows pedestrian circulation and incorporates green belts, conserves open space, and protects natural features will also protect water quality.

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4 Technical Advisory: CEQA and Low Impact Development Stormwater Design: Preserving Stormwater Quality and Stream Integrity Through California Environmental Quality Act (CEQA) Review. August 5, 2009. Governor's Office of Planning and Research

Policies have been proposed below that would require LID techniques in the design of both private development and capital projects, for the purpose of managing stormwater at the source, enhancing surface water quality, reducing runoff volumes, and economizing on infrastructure costs for drainage and treatment facilities.

Drainage Future Needs

The City has no plans to construct major new drainage facility improvements. Engineering studies show the current system has adequate capacity to handle projected storm flows, provided the system is properly maintained.[5]

WATER QUALITY

The Federal Clean Water Act was adopted to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The Act directs each state to establish water quality standards for all "water of the United States." The Environmental Protection Agency has delegated responsibility for implementation of portions of the Clean Water Act, including water quality control planning to the California State Water Resources Control Board (SWRCB) and nine RWQCBs. The SWRCB establishes statewide policies and regulations for implementing water quality control programs. The RWQCBs develop and implement Water Quality Control Plans (Basin Plans) that consider regional beneficial uses, water quality characteristics, and water quality problems. Each Basin Plan also provides strategies and implementation plans for the control of pollutants, remediation of pollution, monitoring, and assessment of the region's waters.

The NPDES Program was established in the Clean Water Act to regulate discharges of pollutants into surface waters of the United States. Both point discharges (such as a municipal or industrial discharge at a specific location or pipe) and nonpoint source discharges (such as diffuse runoff of surface water from streets and parking lots) are regulated by the NPDES Program. In addition, construction activities which may result in waterborne erosion from grading our stockpiling are regulated through various techniques called "best management practices." Water quality management plans and stormwater pollution prevention plans are required for development projects to meet the requirements of the NPDES Program to maintain water quality.

Surface water quality within the City's Planning Area is affected by a variety of discharges from both point and nonpoint sources. Wastewater treatment plant effluent is the largest and most common

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5 City of Santa Clarita, "Safety Element," *City of Santa Clarita General Plan*, April 4, 2008, S-15.

point-source discharge. Urban runoff, erosion, agricultural runoff, and other natural causes are common nonpoint sources. Pollutants from both point and nonpoint source include dissolved and suspended solids, oil, grease, nutrients, metals, bacteria, and pesticides.

The City's Planning Area is within the hydrological areas covered by the 1994 Water Quality Control Plan for the Santa Clara River Basin (California Department of Water Resources Hydrological Unit No. 403.51). Portions of the Santa Clara River watershed have been identified as an "impaired water body" by the SWRCB because waters in these areas exceed adopted standards for various pollutants. Pollutants of concern include chloride, coliform, ammonia, nitrates, nitrites, and various organics. In 2005, the Upper Santa Clara River Chloride Total Maximum Daily Load (TMDL) became effective, outlining a 13-year plan to reduce chloride levels in the river. Chloride sources include SWP Saugus WRPs and domestic sources (including water softeners and salt-water pools). Although installation of new automatic water softeners was prohibited in 2003 it is estimated that thousands of self-regenerating water softeners are still in use within the Santa Clarita Valley Joint Sewerage System. The Sanitation District has initiated a public awareness and education program, financial incentives for removal of water softeners, and a voluntary sales ban of salt and water softeners in local businesses. In 2007, the Sanitation District entered into an agreement with a water softener provider to remove nearly 600 rented water softeners from Valley residences in order to protect water quality. If salt levels discharged into the river do not decrease due to those voluntary compliance efforts, the Sanitation District may have to install additional costly treatment equipment, resulting in higher rate charges to sewage customers.

The City's Environmental Services Division is working closely with the SWRQCB to meet requirements for the TDML, through programs to provide pro-active public education and outreach, incentives for residents and business owners, and implementation of new technologies.

To ensure drinking water quality of SWP water, Castaic Lake Water Agency (CLWA) has two surface water treatment plants that eliminate microbial contaminant, salts, minerals, and algae. According to the 2005 Urban Water Management Plan (UWMP), groundwater from the East Subbasin does not have microbial water problems. Parasites, bacteria, and viruses are filtered out as water percolates through soil, sand, and rock on its way to the aquifer. However, disinfectants are added to local groundwater when it is pumped by wells to protect public health. All groundwater used for potable water meets or exceeds drinking water standards.

Perchlorate has been detected in two alluvial municipal-supply wells in the East Subbasin; however, wellhead treatment has been permitted and installed at one of the two impacted wells, VWC's Well Q2. The treatment removes perchlorate pumped from the well to a non-detect level. As discussed in the 2005

UWMP, Chapter 5 and Appendix D, there has been extensive investigation of the extent of perchlorate contamination, which, in combination with groundwater modeling has led to the current plan for integrated control of contamination migration and restoration of impacted pumping (well) capacity.

The short-term response plan for the protection of other alluvial wells, down gradient from the former Whittaker-Bermite site, is to promptly install wellhead treatment to ensure adequate water supplies. This plan complements the longer-term source control actions being undertaken by the Whittaker-Bermite property owner under supervision of the Department of Toxic Substances Control (DTSC) to address perchlorate contamination in the northern alluvium (to the north of the former Whittaker-Bermite site), and the subsequent restoration of the one other perchlorate-contaminated alluvial well (Stadium well). The long-term plan also includes the CLWA groundwater containment, treatment and restoration project to prevent further downstream migration of perchlorate, the treatment of water extracted as part of the containment process, and the recovery of lost local groundwater production from the Saugus Formation.

There are four Saugus wells contaminated by perchlorate. The four contaminated wells consist of one owned by Newhall County Water District, two owned by Santa Clarita Water District, and VWC Well 157 which has been sealed and abandoned, and replaced by VWC's Well 206 in a non-impacted part of the Basin. These four wells represent a total of 7,900 gpm of pumping capacity (or full-time source capacity of about 12,700 afy) inactivated due to perchlorate contamination.[6]

REGULATORY FRAMEWORK

Federal

National Flood Insurance Program

The federal government has been actively involved in flood control since 1927, following major floods on the Mississippi River. Beginning with the Flood Control Act of 1936, Congress assigned the US Army Corps of Engineers (USACE) the responsibility for flood control engineering works and later for floodplain information services. Flood control is provided through construction of dams and reservoirs.

Despite these programs and rapidly rising federal expenditures for flood control, flood losses continued to rise. In 1968, Congress passed the National Flood Insurance Act, which created the NFIP. The Flood Disaster Protection Act of 1973, which also amended the 1968 act, requires the purchase of flood

6 Refer to **Section 3.13, Water Service**, of this EIR for further discussion of perchlorate contamination and remediation within the OVOV Planning Area.

insurance by property owners who are located in special flood hazard areas and are being assisted by federal programs, or by federally supervised, regulated, or insured agencies or institutions.

National Flood Insurance Program Reform Act of 1994

In 1994, the National Flood Insurance Program Reform Act went through its first major revision since its inception. Included in this revision were provisions that if a lender were to escrow an account and if the structure were in the floodplain, then the lender must escrow for flood insurance. The revised legislation also included increased flood insurance limits and the elimination of the 1962 buy-out program. However, the legislation did initiate the Hazard Mitigation Fund as part of the flood insurance policy. This made it possible to cover the cost of elevating a continuously flood damaged home through the insurance policy. Also included in this legislation was the increase from a 5-day to a 30-day waiting period for a new policy to become effective. It also prohibits the waiver of flood insurance purchase requirements as a condition of receiving federal disaster assistance. If the flood insurance policy were not maintained, in the event of another disaster, no disaster assistance would be made available for that structure.

Executive Order 11988, Flood Plain Management

Executive Order 11988 requires the US Army Corps of Engineers to provide leadership and to take action to:

- avoid development in an existing 100-year floodplain, unless such development is the only practicable alternative;
- reduce the hazards and risk associated with floods;
- minimize the impact of floods on human health, safety, and welfare; and,
- restore and preserve the natural and beneficial values of current floodplains.

To comply with Executive Order 11988, the policy of USACE is to formulate projects, and to the extent possible, avoid or minimize adverse effects associated with use of a floodplain, and avoid inducing development in an existing floodplain unless there is no practicable alternative.

Federal Water Project Recreation Act of 1965 (Amended)

The act requires that recreation and fish and wildlife enhancement projects be given full consideration in federal water development projects. The act authorizes the use of federal water project funds for land acquisition in order to establish refuges for migratory waterfowl and authorizes the Secretary of the

Interior to provide facilities for outdoor recreation and fish and wildlife at all reservoirs under the Secretary's control, except those within national wildlife refuges. The act has three main purposes as shown below:

- In investigating and planning a federal navigation, flood control, reclamation, hydroelectric or multi-purpose water resource project, full consideration must be given to the opportunities which the project affords for outdoor recreation and fish and wildlife enhancement. If a project can provide either or both of these, it must be constructed, operated and maintained accordingly.

- Planning for project's recreation potential must be coordinated with existing and planned federal, state or local public recreation developments, and;

- Project construction agencies must encourage non-federal public bodies to administer project land and water areas for recreation and fish and wildlife enhancement purposes, and to operate, maintain and replace facilities provided for those purpose, unless the areas or facilities are within a national recreation area, the national forest system, the public lands classified for retention in federal ownership or an authorized federal program for the conservation and development of fish and wildlife.

State

Cobey-Alquist Flood Plain Management Act 8401

The Flood Plain Management Act states that a large portion of land resources in the State of California is subject to recurrent flooding. The public interest necessitates sound development of land use, as land is a limited, valuable, and irreplaceable resource, and the floodplains of the state are a land resource to be developed in a manner that, in conjunction with economically justified structural measures for flood control, will result in prevention of loss of life and of economic loss caused by excessive flooding. The primary responsibility for planning, adoption, and enforcement of land use regulations to accomplish floodplain management rests with local levels of government. It is the State of California's policy to encourage local levels of government to plan land use regulations to accomplish floodplain management and to provide state assistance and guidance.

Water Code Section 8100

The Water Code states that the boards of supervisors, in their respective counties, may appropriate and expend money from the general fund of a county for any of the following purposes in connection with streams or rivers in the county:

- The construction of works, improvements, levees, or check dams to prevent overflow and flooding;

- The protection and reforestation of watersheds;

- The conservation of the floodwaters;
- The making of all surveys, maps, and plans necessary to carry out any work, construction, or improvement authorized by this article; and,
- The carrying out of any work, construction, or improvement authorized by this article outside the county if the rivers or stream affect flow in or through more than one county.

LOCAL

City

The City of Santa Clarita regulates development within flood prone areas via a City Floodplain Management Ordinance.[7] This ordinance states that within special flood hazard areas no structure or land shall be constructed, located, extended, converted, or altered without full compliance with the terms of the ordinance and without obtaining a floodplain area development permit before any construction or other development begins within any area of special flood hazard.

The City has adopted its floodplain management ordinance to implement the National Flood Insurance Program (NFIP) and other federal requirements established by FEMA. The City has adopted Chapter 11.60 of the Los Angeles County Code by references which establishes floodway maps, governs land uses and construction of structures within floodways, and establishes water surface elevations. Floodplains are divided into two types of hazard areas:

- The "floodway," which is the portion of the stream channel that carries deep, fast moving water (usually defined as the area needed to contain a 100-year storm flow); and
- The "flood fringe" area, the remainder of the floodplain outside the floodway, which is subject to inundation from shallow, slow-moving water.

In all areas of special flood hazards the following standards are required for all types of construction[8]:

- Anchoring
  - All new construction and substantial improvements of structures including manufactured homes shall be adequately anchored to prevent floatation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.

7 City of Santa Clarita Municipal Code, Chapter 10.06 Floodplain Management.

8 City of Santa Clarita Municipal Code, Chapter 10.06 Floodplain Management.

- Construction Materials and Methods. All new construction and substantial improvements of structures, including manufactured homes, shall be constructed:

  – With flood-resistant materials as specified in FEMA Technical Bulletin TB 2-93, and utility equipment resistant to flood damage for all areas below the level of the base flood elevation plus one (1) foot;

  – Using methods and practices that minimize flood damage;

  – With electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding; and

  – Within Zones AH or AO (areas subject to inundation by 1-percent-annual-chance shallow flooding where average depths are between 1 and 3 feet), so that there are adequate drainage paths around structures on slopes to guide flood waters around and away from proposed structures.

- Elevation and Flood proofing.

  – Residential Construction. All new construction or substantial improvements of residential structures shall have the lowest floor, including basement:

    - In AE, A1-A30 (areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods) AH (areas subject to inundation by the 1-percent-annual-chance shallow flooding [usually areas of ponding] where average depths are between 1 and 3 feet) Zones, elevated to at least one (1) foot above the base flood elevation;

    - In an AO Zone, elevated above the highest adjacent grade to a height exceeding the depth number specified in feet on the FIRM (Flood Insurance Rate Map) by at least one (1) foot, or elevated at least three (3) feet above the highest adjacent grade if no depth number is specified;

    - In an A Zone (areas subject to inundation by the 1-percent-annual-chance flood event), without BFEs (Base Flood Elevations) specified on the FIRM (Flood Insurance Rate Map) (unnumbered A zone), elevated at least one (1) foot above the base flood elevation, as determined by Section 10.06.040(B)(3).Upon the completion of the structure, the elevation of the lowest floor, including basement, shall be certified by a registered civil engineer or licensed land surveyor, and verified by the community building inspector to be properly elevated. Such certification and verification shall be provided to the Floodplain Administrator.

- Nonresidential Construction. All new construction or substantial improvements of nonresidential structures shall either be elevated to conform with subsection (A)(3)(a) of this section or:

  - Be flood proofed, together with attendant utility and sanitary facilities, below the elevation recommended under subsection (A)(3)(a) of this section, so that the structure is watertight with walls substantially impermeable to the passage of water;

  - Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and

  - Be certified by a registered professional civil engineer or licensed land surveyor that the standards of subsection (A)(3)(b)(i) and (ii) of this section are satisfied. Such certification shall be provided to the Floodplain Administrator.

- Flood Openings. All new construction and substantial improvements of structures with fully enclosed areas below the lowest floor (excluding basements) that are usable solely for parking of vehicles, building access or storage, and which are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwater. Designs for meeting this requirement must exceed the following minimum criteria:

  - For non-engineered openings:

    - Have a minimum of two (2) openings on different sides having a total net area of not less than 1 square inch for every 1 square foot of enclosed area subject to flooding;

    - The bottom of all openings shall be no higher than 1 foot above grade;

    - Openings may be equipped with screens, louvers, valves or other coverings or devices; provided, they permit the automatic entry and exit of flood water; and

    - Buildings with more than one enclosed area must have openings on exterior walls for each area to allow flood water to directly enter; or

    - Be certified by a registered professional engineer or architect.

Drainage requirements set forth by the City are also addressed in other portions of the Unified Development Code and in the building code, in order to ensure that stormwater flows are directed away from buildings into drainage devices to prevent flooding.

County

Since October 1990, the County has been a voluntary participant in NFIP of FEMA. As a participant, the County is responsible for the regulation of development in special hazard flood areas of the County and the planning for other floodplain management activities that will promote and encourage programs for

the preservation and restoration of the natural state of the floodplain. As a compliance requirement of the NFIP, the County enforces regulations of these developments to ensure that buildings are erected at a safe elevation to prevent potential damages to property.

The County provides information regarding flood zone designations from FEMA's Flood Insurance Rate Maps to property owners for use in resolving flood insurance issues with their respective insurance companies and lending institutions.

The Flood Maintenance Division of the Department of Public Works (DPW) is responsible for operating and maintaining flood control and water conservation facilities. These facilities include 15 major dams, 284 debris basins, 450 miles of storm drain channel, 2,500 miles of drains, 33 pump plants, 30 spreading grounds covering 1,989 acres, and 22 miles of barrier projects that prevent the intrusion of seawater into the fresh water supply. The Flood Maintenance Division is also responsible for implementing Best Management Practices (BMPs) to meet the permit requirements of the NPDES. These BMPs include the inspection of all storm drains for illegal connections and discharges. The following guidelines apply to projects that are located within a Flood Zone as indicated on the Flood Zone Map for the County of Los Angeles:

- No permanent structures shall be constructed, altered, modified or enlarged within the boundaries of a flood zone, except those accessory structures that will not impede the flow of water and flood control structures approved by the County Flood Control District.
- Any development proposed within a flood zone area shall be reviewed by the County Engineer or Flood Control District who will define the area within which no permanent structures or improvements shall be permitted.
- The scale, design, and intensity of any approved project in a flood zone must minimize exposure of current and future community residents to flood related property damage and loss.
- Any proposed project in a flood zone must be consistent with density and use standards set forth in the Los Angeles County General Plan or applicable local-level plan, and must be compatible with the character of surrounding development.
- Any proposed project in a flood zone must be situated and designed so as to avoid isolation from essential services and facilities in the event of flooding.
- The costs associated with on and off-site hazard mitigation, including design, construction, and continued maintenance of necessary flood protection facilities will be assumed by the developer and/or future owners, occupants, or residents of the proposed development.

The County also conducts educational outreach programs to unincorporated communities on how to mitigate flooding impacts on their properties. The County seeks to reduce the flood insurance cost for

residents who are required to purchase flood insurance by taking actions which lower the community raring system number. The County restricts development within floodplains. Any development within the floodplain cannot increase the flood hazard to adjacent properties by increasing the capital flood water surface elevation, deflecting flows, or increasing velocity of the flow such that it causes bank erosion. Developments in the floodplain must make provisions to avoid these impacts and eliminate inundation hazards by providing adequate drainage facilities through protective walls, suitable fill, raising the floor level of the buildings, or a combination of these methods. The County also requires compliance with FEMA regulations, including a maximum 1-foot rise in water surface elevation of flood flows.

THRESHOLDS OF SIGNIFICANCE

In order to assist in determining whether a project will have a significant effect on the environment, the *State CEQA Guidelines*, Appendix G identify criteria for conditions that may be deemed to constitute a substantial or potentially adverse change in physical conditions.

Significant hydrology and water quality resource impacts will result if

- the proposed project would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- the proposed project would place housing within a 100-year flood hazard as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map or place structures within a 100-year flood hazard area, where the structures would impede or redirect flood flows.
- the proposed project would expose people or structures to a significant, risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

The *City of Santa Clarita Local CEQA Guidelines* (Resolution 05-38) adopted on April 26, 2005, also serve the basis for identifying thresholds to determine the significance of the environmental effects of a project on this resource area and have been included for analysis.

Significant hydrology and water quality resource impacts will result if

- the proposed project were to disturb, or encroach into, any river, river tributary, riparian habitat, stream or similar waterway identified on a United States Geologic Survey map as a "blue-line" watercourse, or any waterway otherwise identified as a significant resource by the City of Santa Clarita.

Impact Analysis

This impact analysis section evaluates the potential effects of the proposed General Plan goals, objectives, and policies on hydrology and water quality within the City's Planning Area using the *State CEQA Guidelines* threshold of significance.

Impact 3.12-1 **There would be a potentially significant impact if proposed project were to create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.**

As buildout of the City progresses, the City should strive to limit the disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing stormwater runoff at the source (**Objective CO 4.3). Objective S 2.2**, identifying areas within the City's Planning Area that are subject to inundation from flooding, would be met by the implementation of **Policies S 2.2.1 and S 2.2.2.** These policies require that the City prepare and maintain maps of floodways and floodplains based on information from FEMA and other appropriate sources in order to qualify for FEMA's NFIP (**Policy S 2.2.1)** and that the City identify areas prone to localized, short-term flooding due to drainage deficiencies (**Policy S 2.2.2**). The City would be required to plan for and construct adequate drainage and flood control infrastructure to ensure flood protection (**Objective S 2.3**, **Policies S 2.3.1 and S 2.3.2)**. **Policies S 2.3.1 and S 2.3.2** require the City implement drainage master plans designed to handle storm flows from the 100-year storm and to include funding for drainage and flood control improvements in the annual City budget. **Objective S 2.5**, limit risks to existing developed areas from flooding, would be implemented by **Policies S 2.5.1** and **S 2.5.2.** These policies would reduce surface water runoff by addressing and locating drainage problems within the City's Planning Area and putting responsibility on landowners, to make repairs for any type of issue that prevents proper drainage of excessive flooding and flood waters.

With a focus on flood management and protection, the City would be able to protect public safety and property within the City's Planning Area (**Goal S 2, Objective S 2.1**). Buildout within presently vacant areas of the City's Planning Area would result in an increase in residential and non-residential structures and associated facilities, increasing the amount of impervious surface area. The addition of impermeable surfaces would increase the volume and rate of stormwater runoff and limit the amount of ground infiltration during storm events. Roads and buildings generate greater amounts of runoff than typical open space and landscaped areas. Fixed drainage channels in urban areas may be unable to contain the runoff generated by relatively small, but intense rainfall events.

Policies S 2.1.4 and **S 2.1.5** encourage the City to cooperate with other agencies regarding flood control, watershed management, water quality and habitat protection and promote joint use of flood control facilities with other beneficial uses where feasible. **Policy S 2.1.2** would promote the use of LID standards throughout the City's Planning Area. The basic planning principals involved in LID construction include stormwater management, urban runoff reduction, and site design and circulation. In order to reduce urban runoff, achieve water quality and habitat objectives in addition to flood control, **Policy S 2.1.3** promotes the use of vegetated drainage courses and soft-bottom channels for flood control facilities to the extent feasible.

New development projects within the City's Planning Area can take such measures as utilizing building materials that allow infiltration, which in turn would reduce surface water runoff, recharge aquifers, and reduce impacts on water quality (**Policy S 2.1.2, Policy CO 4.3.1, Policy CO 4.3.4**). Future projects would be encouraged to reduce impervious surfaces by reducing street widths, reducing parking, using porous materials in driveways and parking area, and using traffic calming measures that include stormwater capture components. Flexibility in design standards would provide the benefits of stormwater retention, groundwater infiltration, and reduction of heat islands (**Policy CO 4.3.3**). Additionally, design measures that could be implemented on a project-by-project basis include, but are not limited to detention and retention basins or ponds, and ephemeral swales (**Policy CO 4.3.5**). On previously developed sites proposed for alteration, stormwater management should be improved to restore natural infiltration, as required by the reviewing authority (**Policy CO 4.3.2**).

With the increase in stormwater runoff that would occur with buildout under the General Plan, the potential exists for an increase in pollutants conveyed to the groundwater basins and surface waters in creeks and rivers (such as the Santa Clara River and its tributaries). **Policy CO 4.3.7** requires the City to reduce the amount of pollutants entering the Santa Clara River and its tributaries by capturing and treating stormwater runoff at the source, to the extent possible (**Goal CO 4**). Implementation of **Policies CO 4.3.1** through **CO 4.3.7** would provide specific guidance on how to reduce the possibility of pollution within water runoff that can penetrate into ground water beneath the City's Planning Area and that will possibly flow into the Santa Clara River and its tributaries. Properly designed landscaping and use of plant material as suggested in these policies would reduce the amount of pollution within surface water runoff that would increase due to buildout of the General Plan (**Objective CO 4.3,** and **Policy CO 4.3.6**). **Policy CO 4.4.3** discourages the use of chemical fertilizers, herbicides and pesticides in landscaping to reduce water pollution (**Objective CO 4.4).** Per **Policy CO 4.4.2,** the City would need to cooperate with property owners and appropriate agencies to eliminate perchlorate contamination on the Whittaker-

Bermite property and eliminate the use of any industrial chemicals or wastes in a manner that threatens groundwater quality.

Proposed General Plan Goals, Objectives and Policies

Goal S 2: Protection of public safety and property from unreasonable risks due to flooding.

Objective S 2.1: Plan for flood protection as part of a multi-objective watershed management approach for the Santa Clara River and its tributaries.

Policy S 2.1.2: Promote Low Impact Development standards on development sites, including but not limited to minimizing impervious surface area and promoting infiltration, in order to reduce the flow and velocity of stormwater runoff throughout the watershed.

Policy S 2.1.3: Promote the use of vegetated drainage courses and soft-bottom channels for flood control facilities to the extent feasible, in order to achieve water quality and habitat objectives in addition to flood control.

Policy S 2.1.4: Cooperate with other agencies as appropriate regarding the related issues of flood control, watershed management, water quality, and habitat protection.

Policy S 2.1.5: Promote the joint use of flood control facilities with other beneficial uses where feasible, such as by incorporating detention basins into parks and extending trails through floodplains.

Objective S 2.2: Identify areas in the Santa Clarita Valley that are subject to inundation from flooding.

Policy S 2.2.1: Prepare and maintain maps of floodways and floodplains based on information from the Federal Emergency Management Agency (FEMA) and other appropriate sources, in order to qualify for FEMA's National Flood Insurance Program.

Policy S 2.2.2: Identify areas subject to localized short-term flooding due to drainage deficiencies.

Policy S 2.3.1: Implement drainage master plans designed to handle storm flows from the 100-year storm.

Policy S 2.3.2: Include funding for drainage and flood control improvements in the annual City budget.

Objective S 2.5: Limit risks to existing developed areas from flooding.

Policy S 2.5.1: Address drainage problems that cause flooding on prominent transportation corridors by working with multi-jurisdictional agencies and stakeholders to construct needed drainage improvements.

Policy S 2.5.2: Provide for the maintenance of drainage structures and flood control facilities to avoid system malfunctions and overflows.

Goal CO 4: An adequate supply of clean water to meet the needs of present and future residents and businesses, balanced with the needs of natural ecosystems.

Objective CO 4.3: Limit disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing stormwater runoff at the source.

Policy CO 4.3.1: On undeveloped sites proposed for development, promote onsite stormwater infiltration through design techniques such as pervious paving, draining runoff into bioswales or properly designed landscaped areas, preservation of natural soils and vegetation, and limiting impervious surfaces.

Policy CO 4.3.2: On previously developed sites proposed for major alteration, provide stormwater management improvements to restore natural infiltration, as required by the reviewing authority.

Policy CO 4.3.3: Provide flexibility for design standards for street width, sidewalk width, parking, and other impervious surfaces when it

can be shown that such reductions will not have negative impacts and will provide the benefits of stormwater retention, groundwater infiltration, reduction of heat islands, enhancement of habitat and biodiversity, saving of significant trees or planting of new trees, or other environmental benefit.

Policy CO 4.3.4: Encourage and promote the use of new materials and technology for improved stormwater management, such as pervious paving, green roofs, rain gardens, and vegetated swales.

Policy CO 4.3.5: Where detention and retention basins or ponds are required, seek methods to integrate these areas into the landscaping design of the site as amenity areas, such as a network of small ephemeral swales treated with attractive planting.

Policy CO 4.3.6: Discourage the use of mounded turf and lawn areas which drain onto adjacent sidewalks and parking lots, replacing these areas with landscape designs that retain runoff and allow infiltration.

Policy CO 4.3.7: Reduce the amount of pollutants entering the Santa Clara River and its tributaries by capturing and treating stormwater runoff at the source, to the extent possible.

Objective CO 4.4: Promote measures to enhance water quality by addressing sources of water pollution.

Policy CO 4.4.2: Support the cooperative efforts of property owners and appropriate agencies to eliminate perchlorate contamination on the Whittaker-Bermite property and eliminate the use of any industrial chemicals or wastes in a manner that threatens groundwater quality.

Policy CO 4.4.3: Discourage the use of chemical fertilizers, herbicides and pesticides in landscaping to reduce water pollution by substances hazardous to human health and natural ecosystems.

Effectiveness of Proposed General Plan Goals, Objectives and Policies

The above goals, objectives, and policies provide promote the use of design and engineering techniques that would promote infiltration, reduce the volume and rate of stormwater runoff, and reduce the pollutants in stormwater runoff. However, the proposed goals, objectives, and policies would not solely reduce the impacts associated with exceeding the capacity of existing stormwater drainage systems or reduce the amount of polluted runoff that would occur from development. Implementation of mitigation measure **MM 3.9-1** and **MM 3.9-2** would reduce potential impacts on surface water runoff to less than significant.

Plan to Plan Analysis

Both the existing and proposed General Plans contain policies intended to minimize impacts to the flooding; however the existing General Plan does not solely address the impacts associated with the existing stormwater drainage systems or reduce the amount of polluted runoff to the extent of the proposed General Plan, with mitigation. Consequently, impacts would be greater under the existing General Plan.

Impact 3.12-2 **There would be a potentially significant impact if the proposed General Plan were to place housing within a 100-year flood hazard as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map or place structures within a 100-year flood hazard area, where the structures would impede or redirect flood flows.**

The City's Planning Area contains areas that are designated as 100-year floodplain along the Santa Clara River and its tributaries. (**Figure 3.12-1).** Development within a flood plain would pose potential impacts associated with the inundation of residential and commercial units, if a 100-year type of flood would occur in these areas. In addition to an increase in industrial, commercial, and public facilities, the number of dwelling units in the City's Planning Area is expected to increase at buildout of the General Plan. This large increase in demand for dwelling units may cause housing to encroach onto the 100-year flood plain and potentially place housing and structures in areas subject to flooding, from natural conditions, or dam inundation.

Implementation of flood safety measures in new developments is the aim of **Objective S 2.4**, which would be met through **Policies S 2.4.1 and S 2.4.2**. **Policy S 2.4.1** requires that new development comply with floodplain management requirements adopted to implement FEMA programs. **Policy S 2.4.2** requires the land use and zoning maps, restrict the type and intensity of land use in flood prone areas, or

require flood-proof construction, as deemed appropriate. Under the current Land Use Map**,** areas of land within the 100-year floodplain (**Figure 3.12-1)** are designated as land other than Open Space; along Sand Canyon, areas are mapped as Rural Residential; along the eastern portion of the Santa Clara River some area is designated as Urban Residential; and, along San Francisquito Canyon some area is mapped as Specific Plan.

Policy S 2.1.1 requires the Land Use Map designate appropriate areas within floodplains as open space for multi-purposes, including flood control, habitat preservation, and recreational open space. **Policy S 2.2.1** would require the City to prepare and maintain floodway areas based on FEMA records and other appropriate sources. The City currently has maps depicting 100-year flood zones as shown above in **Figure 3.12-1**. **Policy S 2.3.1** and **Policy S 2.4.1** would require that new development implement drainage master plans designed to handle storm flows from 100-year storm events and require that new development comply with FEMA floodplain management requirements. These policies would also help implement flood-proof construction and development for areas within the City's Planning Area that are within the 100-year floodplain (**Objective S 2.3**). Additionally, projects that will be developed within the City's Planning Area already are required to complete a hydrology/hydraulic study, and these reports must show that no hydrological impacts would occur from development of the individual projects.

Proposed General Plan Goals, Objectives and Policies

Objective S 2.3: Plan for and construct adequate drainage and flood control infrastructure to ensure flood protection.

Policy S 2.1.1: On the Land Use Map, designate appropriate areas within the floodplain as open space for multi-use purposes, including flood control, habitat preservation, and recreational open space. Development in the floodplain will require necessary mitigation as deemed necessary by the reviewing authority.

Policy S 2.2.1: Prepare and maintain maps of floodways and floodplains based on information from the Federal Emergency Management Agency (FEMA) and other appropriate sources, in order to qualify for FEMA's National Flood Insurance Program.

Objective S 2.4: Implement flood safety measures in new development

Policy S 2.4.1: Require that new development comply with FEMA floodplain management requirements.

Policy S 2.4.2: On the Land Use Map, restrict the type and intensity of land use in flood-prone areas, or require flood-proof construction, as deemed appropriate.

Effectiveness of Proposed General Plan Goals, Objectives and Policies

The above goals, objectives, and policies would be implemented in order to provide protection to residential and commercial units that are proposed for areas within the City's Planning Area that are within 100-year floodplains. These policies would provide guidance on the measures that should be taken for any residential or commercial units planned for development within the 100-year floodplain. However, these policies do not implement specific requirements to protect residential and housing units that are planned for development within a 100-year floodplain. The Land Use Policy Map is not consistent with **Policy S 2.1.1**, in that the Land Use Policy Map identifies land uses other than Open Space in areas of the 100-year flood plain within the City's Planning Area. Therefore, mitigation measures **MM 3.9-3 t**hrough **MM 3.9-5** are recommended to reduce potentially significant impacts from the 100-year flood hazard to a less than significant level.

Plan to Plan Analysis

The proposed General Plan differs from the existing Plan in that it provides policy for open space uses in the floodplain. The existing General Plan does not make a distinction as to allowed uses in the floodplain. Mitigation is proposed that would mitigate impacts from any uses other than open space in the floodplain. Consequently, impacts would be greater in the existing Plan.

Impact 3.12-3 **There would be a potentially significant impact if the proposed project were to expose people or structures to a significant, risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.**

As discussed above, there is one main reservoir in close proximity of the City's Planning Area that could cause flooding through the Planning Area if a breach in the dams supporting the water were to occur. The Bouquet Canyon Reservoir has two earth-filled dams, one on the west side overlooking Cherry

Canyon and one on the south side above Bouquet Canyon. If the earth-filled dam on the Cherry Canyon side were to fail, the water behind the dam would flow west for approximately 2 miles through the Canyon into San Francisquito Canyon, and then south for approximately 11 miles into the Santa Clara River. The Bouquet Creek dam, if breached, would drain south through Bouquet Canyon for 17 miles, into the Santa Clara River, within the City's Planning Area. The possibility of the failure of these dams during a catastrophic event is considered unlikely due to their type of construction; however, a slight possibility still exists that these dams could fail. Therefore, impacts on land uses within the dam inundation zones within the City's Planning Area could be potentially significant.

The Castaic Dam holds back the water from Castaic Lake, and is located on Lake Hughes Road, 1 mile northeast of Interstate 5. The inundation area, if this dam were to be breached, would not flood areas of the City. Should a breach in the dam occur, water would flow south in Castaic Creek for approximately 5 miles to the Santa Clara River. Castaic Creek is located north and west of the City of Santa Clarita boundaries and the portion of the Santa Clara River, where the water would flow into, is located south and west of the City's boundaries. The potential for flooding to occur as a result of the breach of Castaic Dam, within the City's Planning Area would be minimal.

As discussed under existing conditions for this section, the City has prepared maps of areas within its Planning Area that are subject to inundation from dam failure from the Castaic and Bouquet Dams (**Policy S 1.1.4** and **Policy S 1.2.5**). Dam inundation area maps will allow decision makers within the City's Planning Area to determine development plans that would be appropriate within potential dam inundation areas (**Objective S 1.1**), protecting the public and property within the City's Planning Area, and providing protection if a geologic catastrophe were to damage dams upstream from the City's Planning Area (**Goal S 1** and **Objective S 1.2**).

Proposed General Plan Goals, Objectives and Policies

Goal S 1: Protection of public safety and property from hazardous geological conditions, including seismic rupture and ground shaking, soil instability, and related hazards.

Objective S 1.1: Identify and map areas in the Santa Clarita Valley that are susceptible to geological hazards, for use by the public and decision makers in considering development plans.

Policy S 1.1.4: Maintain maps showing potential inundation areas from dam failure.

Objective S 1.2: Regulate new development in areas subject to geological hazards to reduce risks to the public from seismic events or geological instability.

Policy S 1.2.5: Consider the potential for inundation from failure of the Castaic or Bouquet Canyon Reservoir dams when reviewing development proposals within potential inundation areas.

Effectiveness of Proposed General Plan Goals, Objectives and Policies

Implementation of the General Plan goals, objectives, and policies related to dam inundation hazards would reduce potentially significant adverse impacts from dam inundation hazards to less than significant. No mitigation measures would be required.

Plan to Plan Analysis

Both the existing and proposed General Plans contain policies intended to minimize impacts to the from dam inundation hazards. Impacts would be similar under both Plans.

Impact 3.12-4 **There would be a potentially significant impact if the proposed project were to disturb, or encroach into, any river, river tributary, riparian habitat, stream or similar waterway identified on a United State Geologic Survey map as a "blue-line" watercourse, or any waterway otherwise identified as a significant resource by the City of Santa Clarita.**

The proposed General Plan does not use US Geological Survey (USGS) topography map information on blue-line streams as a basis for planning and land use decisions because the most recent information is available from the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps. These maps were most recently updated in 2008 and information from these maps has been included in the proposed General Plan's Safety Element, **Exhibit S-4, "Floodplains."** Additionally, the proposed General Plan incorporates goals, policies, and objectives that will decrease the chance that such development is placed in a waterway area, in such a way that it could impede the natural flow of the waterway.

Proposed General Plan Goals, Objectives and Policies

The above mentioned **Policy S 2.1.1, Policy S 2.2.1, Policy S 2.3.1, Objective S 2.4, Policy S 2.4.1, and Policy S 2.4.2** would reduce encroachment into any river, river tributary, riparian habitat, stream, or similar waterway, where development could impede the flow of these natural waterways.

Effectiveness of Proposed General Plan Goals, Objectives and Policies

Although the proposed General Plan does not incorporate use of US Geological Survey (USGS) survey maps that outline "blue-line" watercourses, implementation of the above policies and objectives would decrease the chance of development occurring within such waterway areas. This would therefore result in the decrease in probability that such development would impede the natural flow of any rivers, streams, creeks or other waterways within the City's Planning Area. As discussed above, the proposed General Plan uses the most recent information available from the FEMA Flood Insurance Rate Maps to determine the potential for any proposed developments within the City's Planning Area to disturb, or encroach into, any river, river tributary, riparian habitat, stream, or similar waterway. Impacts would be less than significant and no mitigation measures would be required.

Plan to Plan Analysis

Both the existing and proposed General Plans contain policies intended to minimize impacts to the availability of floodplain areas, however neither General Plan specifically addresses "blue-line" watercourses." Impacts would be similar under both Plans.

MITIGATION FRAMEWORK

The following mitigation measures would be implemented to reduce potential impacts on hydrology and water quality to less than significant.

MM 3.12-1 The City shall prohibit alteration of floodways and channelization unless alternative methods of flood control are found to be technically, economically, and practicably infeasible.

MM 3.12-2 The City shall not require all land uses to withstand flooding. These may include land uses such as agricultural, golf courses, and trails. For these land uses, water flows shall not be obstructed, and upstream and downstream properties, shall not be adversely affected by increased velocities, erosion backwater effects, concentration of flows, and adverse impacts to water quality from point and nonpoint sources of pollution.

MM 3.12-3 The City shall require that all structures (residential, commercial, and industrial) be flood-proofed from the 100-year storm flows. All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE and A1 through A30 as delineated on the Flood Insurance Rate Maps for the City of Santa Clarita, Map revised September 29,

1989), must be elevated so that the lowest floor is at or above the Base Flood Elevation in accordance with the effective Flood Insurance Rate Map.

MM 3.12-4 The City shall require that for agricultural, recreation, or other low-density uses, flows are not obstructed and that upstream and downstream properties are not adversely affected by increased velocities, erosion backwater effects, or concentration of flows.

MM 3.12-5 Any development that is located within a Regulatory Floodway as delineated on the Flood Insurance Rate Map for the City of Santa Clarita must not increase base flood elevations. (Development means any man-made change improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials). A hydrologic and hydraulic analysis shall be performed prior to the start of development, and must demonstrate that the development would not cause any rise in base flood levels and additionally would no allow any rise within regulatory floodways.

SIGNIFICANCE OF IMPACT WITH MITIGATION FRAMEWORK

Implementation of the above goals, objectives and policies and mitigation measures would reduce potential impacts on hydrology and water quality to a less than significant level.