5.9 - Hydrology and Water Quality

5.9.1 - Introduction

This section of the Master EIR evaluates the potential environmental effects related to hydrology and water quality associated with implementation of the proposed General Plan and Development Code Update. The analysis includes a review of surface water, groundwater, flooding, stormwater, and water quality.

The General Plan Update includes policies in the Public Utilities and Services Element and the Resource Conservation and Resilience Element that guide development and infrastructure practices to protect surface water and groundwater from the degradation of runoff and pollution.

5.9.2 - Environmental Setting

Study Area for Project Impacts

The study area for project impacts regarding hydrology and water quality is the City of Fresno Planning Area and the immediate surrounding County of Fresno and City of Clovis areas because potential development under the City of Fresno General Plan and Development Code Update could affect areas inside and outside the Planning Area.

Study Area for Cumulative Impacts

The study area for the analysis of cumulative hydrology and water quality impacts is the Fresno-Clovis Metropolitan Area because the Fresno Metropolitan Flood Control District (District) includes an area of approximately 400 square miles and covers the entire portion of the Fresno-Clovis Metropolitan Area. The study area for the analysis of cumulative groundwater impacts is the Kings River Sub-basin.

Precipitation

Precipitation in the Planning Area occurs mostly as rain during the months of November through April. Climate data collected from 1948 to 2012 shows that annual rainfall averaged 10.89 inches, but is variable. Recorded annual rainfall has ranged from a low of 3.01 inches in 2013 to a high of 21.61 inches in 1983 (Western Regional Climate Center, 2014).

Hydrology

The San Joaquin River and the Kings River are the principal rivers that influence the hydrology in the Planning Area. The western slopes of the Sierra Nevada drain to the west via the San Joaquin and Kings Rivers. The Kings River is connected to the San Joaquin River by the James Bypass, a man-made canal. Floodwater from the Kings River is diverted to the San Joaquin River. Three dams control flows on the two rivers. The Friant and Mendota Dams are located on the San Joaquin River. These two dams provide some flood control; however, these two dams were not designed for the purpose of flood control. The Pine Flat Dam was built for the purpose of flood control. In addition to the dams on the two rivers, there are reservoirs and detention basins that have been constructed.
to prevent flooding. These facilities include the Redbank Dam and the Redbank-Fancher Creeks Flood Control Project. This Project consists of two dams (Big Dry Creek Dam and Fancher Creek Dam), three detention basins (Redbank Creek, Pup Creek, and Alluvial Drain Detention Basins), and canals to convey discharges in and around the City of Fresno. These facilities were designed to protect developed areas from a 200-year storm event (County of Fresno, 2000).

**Stormwater Drainage**

Storm drainage facilities within the Fresno-Clovis Metropolitan area are planned, implemented, operated and maintained by the Fresno Metropolitan Flood Control District (FMFCD). The storm drainage facilities are documented in the Storm Drainage Master Plan (SDMP), which is developed and updated by FMFCD. The master plan drainage system for the Planning Area consists of over 130 individual drainage areas or urban watersheds. Drainage area boundaries are determined by geographic and topographic features and the economics of providing storm drainage service to the watershed. The storm drainage facilities within a drainage area consist of storm drain inlets, pipeline, retention basins, urban detention (water quality) basins, and stormwater pump stations. Surface grading improvements such as streets, curbs, gutters, and valley gutters are part of the City of Fresno infrastructure, but the general grading of these features is governed by the SDMP to provide a coherent implementation of drainage within the Planning Area.

Storm drain inlets are located at low points in the topography as determined by the SDMP. Pipeline alignments and sizes are also shown on the SDMP. Pipeline alignments are subject to change as development proposals are put forward by development projects. Retention basins and urban detention basins locations and geometry are part of the SDMP as well. Basins are sited in the topographic low point of the drainage area. All of the storm drainage pipelines are directed to the retention and urban detention basins. Retention basins store and percolate stormwater from the drainage area. Urban detention basins provide quiescent (still) conditions for the removal or settling out of suspended solids prior to discharge of the stormwater to the San Joaquin River.

The Fresno-Clovis Metropolitan area consists of drainage areas that are completed, e.g., all of the master planned facilities are constructed and functional; or in the process of being completed, e.g. portions of the retention basins, pipelines, and inlets are constructed and portions are not. For the drainage areas that are in the planning stage, e.g., the drainage area is planned and documented, the retention basin land may have been purchased, but no construction has occurred. Implementation of the SDMP occurs in response to development activity in newly developing areas and through Capital Improvement Project (CIP) planning in previously developed areas. Funding for storm drainage facilities occurs through the collection of drainage fees assessed on parcels as they develop through grant funding from the State of California and the Federal Government, through low interest infrastructure improvement bonds, and in the past, through assessment districts. Drainage fees fund the majority of the construction of master plan facilities in newly developing areas. Grants, infrastructure loans, and assessment districts fund the majority of construction in previously developed drainage areas.
Groundwater

The Planning Area is underlain by the Kings River Sub-basin, which, along with six other sub-basins, comprises the San Joaquin Valley Groundwater Basin. In turn, the San Joaquin Basin is located within the Tulare Lake Hydrologic Region. The Tulare Lake Hydrologic Region spans approximately 10.9 million acres (17,000 square miles) and includes most of Fresno County. The Region encompasses the southern one-third of the Central Valley Regional Water Quality Control Board (RWQCB).

The Kings River Sub-basin extends from the Sierra Nevada foothills on the east to the San Joaquin Valley trough on the west, and from the San Joaquin River on the north to roughly the Fresno County line on the south.

Historically, water demand within the Planning Area obtained its water supply by extracting groundwater from the Kings Sub-basin. Groundwater levels in the Planning Area have declined by an average of 1.5 feet per year since 1990. In the past 80 years, the water level has decreased from 30 feet below ground surface to more than 128 feet below ground surface, according to 2009 data provided by the City. According to Figures 4.4 and 4.5 provided in the Urban Water Management Plan adopted in 2008, included in the Urban Plan, there was cone of depression from Herndon Avenue in the north to Jensen Avenue in the south and from Maple Avenue to Brawley Avenue in the east-west direction in both the lower and upper aquifer zones. A groundwater mound is located near the Fresno-Clovis Regional Wastewater Reclamation Facility (Regional Facility) as a result of the disposal of treated effluent at the FCRWRF percolation basins.

Groundwater used by the City to meet its demands is replenished by three different methods:

- Natural recharge
- Subsurface inflow
- Intentional recharge

Natural recharge occurs through rainfall, irrigation, canal and stream flows that seep into the soil and replenish the aquifer below. Based on City data, the natural recharge was approximately 24,400 AF in 2010. According to the Metropolitan Plan Update, the average annual natural recharge is 37,000 AF within the Planning Area. As additional development occurs throughout the Planning Area, there will be less pervious surfaces to allow natural recharge to occur. However, as the City annexes portions of the Planning Area, the amount of natural recharge allocated to the City will increase. At buildout, the natural recharge is estimated to be approximately 27,000 AF/year.

Subsurface recharge occurs from the movement of groundwater from external sources such as the Sierra Nevada moving into the local aquifer. Since the groundwater table surrounding the Planning Area is higher than inside the Planning Area, subsurface water tends to flow from surrounding areas with a higher groundwater table into the aquifer within the Planning Area that has a lower groundwater table. Based on City data, the annual subsurface inflow to the City is approximately 22,500 AF in 2010. By the year 2025, the City anticipates that groundwater operations (i.e., subsurface inflows and outflows) would be balanced and subsurface flows will not be directed to the
Planning Area. Therefore, during and after the year 2025, subsurface water flows will not be a water supply source for the City since the water levels within the Planning Area would match the levels of the entire region.

Intentional recharge is provided by directing surface water into the underground aquifer by means of groundwater recharge basins located throughout the Planning Area. Currently, the City’s primary recharge facility is Leaky Acres, located just northwest of Fresno-Yosemite International Airport. Other recharge facilities include Fresno Metropolitan Flood Control District (FMFCD) storm drainage basins and the Alluvial Groundwater Recharge System (AGRS) owned and operated by the City of Clovis. Based on the 2008 UWMP, the average intentional recharge between 1985 and 2007 was approximately 44,200 AF/year. The maximum intentional recharge was approximately 62,000 AF/year in 2003. Based on information provided by City staff. The intentional recharge quantity in 2009 was approximately 54,600 AF and in 2010, the intentional recharge was approximately 53,100 AF.

Based on the natural groundwater recharge (24,400 AF), subsurface inflow (22,500 AF), and intentional recharge (453,100 AF) that occurred in 2010, the total groundwater recharge during normal year supply is approximately 100,000 AF. At buildout, the City anticipates that the natural groundwater recharge will increase to 27,000 AF/year, subsurface inflow will be 0 AF/year, and intentional groundwater recharge will increase to 75,100 AF/year due to an increase in the capacity of surface water treatment. The total groundwater recharge at buildout will be approximately 102,100 AF/year.

In 2004, the Northeast Surface Water Treatment Facility (NESWTF) located at Chestnut and Behymer Avenues began operation. The NESWTF has reduced the dependence on groundwater pumping by the City needed to meet water demand. Prior to NESWTF operation, 100 percent of the City’s water demand was met through groundwater pumping. The addition of the NESWTF has reduced the percentage of total water demand provided by groundwater from 100 percent prior to 2004 to approximately 87 percent in 2010, according to the 2010 Urban Water Management Plan.

The City currently has approximately 272 active wells, which pump an average of 146 million gallons of water per day (MGD). Groundwater pumping data provided by the City indicates that approximately 128,578 AF was pumped in 2010. Between 2006 and 2010, the City pumped an average of approximately 139,207 AF/year. This average groundwater pumping has exceeded the current estimated groundwater safe yield of approximately 100,000 AF/year.

In the near future, groundwater will continue to be an important part of the City’s supply but will not be relied upon as heavily as has historically been the case. The 2010 UWMP projects that groundwater pumped by the City will decrease from approximately 128,578 AF/year in 2010 to approximately 85,000 AF/year at buildout of the General Plan Update. This would represent a decrease in the groundwater percentage of total water supply from 87 percent to 36 percent. This reduction in groundwater pumping will recharge the aquifer by approximately 15,000 acre-feet per year because the safe yield is approximately 1000,000 acre-feet per year. In order to meet this
projection, the City is planning to rely on expanding their delivery and treatment of surface water supplies and groundwater recharge activities.

**Water Quality**

**Surface Water**

San Joaquin River

The primary surface water feature within the General Plan Update Planning Area is the San Joaquin River, which generally serves as the Planning Area’s northern boundary. At 366 miles long, the San Joaquin River is the largest river in Central California, spanning from the Sierra Nevada Mountains to the San Francisco Bay via the San Joaquin Valley. Much of the water that flows through the San Joaquin River is used for irrigation purposes. Much of the agricultural production in the San Joaquin Valley depends on water that at least originated from the San Joaquin River.

The San Joaquin River has been identified by the Central Valley RWQCB as having numerous beneficial uses, including municipal and domestic water supply, agricultural, industrial, recreational, freshwater and wildlife habitat, and migration and spawning grounds. Water quality in the San Joaquin River is affected by both natural and anthropogenic sources, including soil erosion; stormwater runoff; wastewater discharges, industrial, residential, and agricultural runoff; recreational activity; and flora and fauna. While the segment of the San Joaquin River in the Planning Area is not considered substantially impaired, significant downstream portions of the River throughout the Valley and near the Sacramento-San Joaquin Delta are affected by various constituents and pollutants, usually as a result of agricultural runoff. However, the portion of the San Joaquin River in the Planning Area appears on the State Water Resources Control Board’s 2010 Impaired Water Bodies/303(d) List for invasive species (non-native fish species).

**Millerton Lake**

Aside from the San Joaquin River, another prominent surface water feature in the general Planning Area is Millerton Lake, which is located upstream and just outside of the of the Planning Area’s northeast boundary. The Lake was created by the construction of Friant Dam on the San Joaquin River by the United States Bureau of Reclamation in 1942. While Millerton Lake’s secondary uses include recreation, hydroelectric power generation, and flood control, the primary purpose of the Lake is the storage of irrigation water for the San Joaquin Valley. Millerton Lake is included on the 2010 Impaired Water Bodies/303(d) List for mercury.

**Other Surface Waters**

In addition to these larger surface water features, a network of agricultural canals and flood control channels traverse the Planning Area. Numerous agricultural ponds, recharge basins, and other similar features dot the Planning Area’s landscape.

The City began to use surface water as a source of potable water supply in 2004, when the Surface Water Treatment Facility (SWTF) became operational and began delivering approximately 20 mgd of potable water to residents of northeast Fresno. In 2009, the SWTF treated 19,600 AF, which offset groundwater demand by 12 percent. The City is currently implementing various improvements that
would ultimately increase production to near annual design capacity levels of 30,800 AF. Surface water starts as snow melt in the Sierra Nevada before traveling down the San Joaquin and Kings Rivers via Millerton Lake and Pine Flat Reservoir. These locations serve as temporary storage locations before the surface water is delivered via the Enterprise Canal to the SWTF, where the water is treated to drinking water standards.

**Ground Water**

Groundwater quality throughout the Tulare Lake Hydrologic Region is generally suitable for most urban and agricultural uses, and meets primary and secondary drinking water standards for municipal use. Local impairments are found in the Tulare Lake Hydrologic Region’s groundwater supply, however, with high TDS, nitrate, arsenic, and organic compounds acting as the primary constituents of concern within the Region. With the exception of the western portion of the Tulare Lake Hydrologic Region, the Region lacks any substantial low permeability units that would isolate deep from shallow aquifers. As such, most of the aquifer underlying the Planning Area is unconfined. As a single, unconfined aquifer, the groundwater basin within the Planning Area has been designated as a Sole Source Aquifer as authorized by Section 14246 of the Federal Safe Drinking Water Act of 1974. This designation means that Planning Area is dependent on a single source of groundwater and that this sole source must be protected from contamination.

While the groundwater supply within the Kings River Subbasin generally meets drinking water standards, extensive contamination occurs throughout the Planning Area. Of the City’s 272 groundwater wells, 96 wells are impacted by one contaminant plume, 33 wells are impacted by two contaminant plumes, and 5 wells are impacted by three contaminant plumes. Thirty-four of the City’s active wells currently have wellhead treatment systems.

Several different types of pollutants have contaminated the groundwater in portions of the Planning Area. Major contaminant plumes include dibromochloropropane (DBCP), ethylene dibromide (EDB), trichloropropane (TCP), other volatile organic compounds (VOCs) like trichlorethylene (TCE), tetrachloroethylene (PCE), nitrate, manganese, radon, chloride, and iron. Nitrate, pesticides, and nutrients in agricultural drainage are currently found within much of the Planning Area’s groundwater supply, and their levels exceed some drinking water standards established by the State. While nitrates may occur naturally, their presence is often attributed to anthropogenic reasons. Leaking septic tanks, which are prevalent in the less dense southeast portion of the City, are also a substantial source of nitrate contamination.

Another major problem facing the Planning Area’s groundwater supply is the presence of Dibromo-Chloropropane (DBCP) in the City’s groundwater wells. This fumigant was widely used in the 1960’s to control nematodes in vineyards and is now present in down gradient groundwater wells.

**Floodplain**

The City of Fresno is located in the alluvial fans of numerous foothill streams and creeks that drain the western slope of the Sierra Nevada foothills. These streams include Big Dry Creek, Alluvial Drain, Pup Creek, Dog Creek, Redbank Creek, Mud Creek, and Fancher Creek. Numerous smaller, unnamed drainage courses also drain into the Planning Area from the rural areas east of the Planning Area.
Based on a review of the Federal Emergency Management Agency’s Flood Insurance Rate Maps (FIRM) for the Planning Area, there are areas that are subject to the 100-year frequency flood zone (see Exhibit 5.9-1). The primary area that is subject to the 100-year flood zone is along the San Joaquin River below the bluffs. There are additional areas in the vicinity of the Fresno International Airport, the Southeast Development Area in the vicinity of the Redbank Creek Dam, adjacent to Highway 180 east of Clovis Avenue, and within an industrial area east of SR-99, south of California Avenue and north of Jensen Avenue. In addition, various detention basins are subject to the 100-year flood zone.

5.9.3 - Regulatory Setting

Federal

Clean Water Act

The Clean Water Act (CWA) established a basic structure for regulating discharges of pollutants into Waters of the United States and regulating quality standards for surface waters. The basis of the CWA was enacted in 1948 and was called the Federal Water Pollution Control Act, but the Act was significantly reorganized and expanded in 1972. The “Clean Water Act” became the Act’s common name with amendments in 1977.

Under the CWA, the Environmental Protection Agency (EPA) has implemented pollution control programs and established water quality standards for all contaminants in surface waters. The CWA made it unlawful to discharge any pollutant from a point source into navigable waters, unless a National Pollutant Discharge Elimination System (NPDES) permit was obtained. Point sources are discrete conveyances such as pipes or manmade ditches. While residential structures that are either connected to a municipal system or otherwise do not discharge into surface waters are not required to obtain a NPDES permit, industrial, municipal, and similar facilities must obtain permits to discharge directly into surface waters. In California, the NPDES program is administered through the nine Regional Water Quality Control Boards (RWQCB).

Non-point sources are similarly regulated through a General Construction Activity Stormwater NPDES permit. Construction activities subject to this permit include clearing, grading, excavating, and general disturbances to the ground. Stormwater Pollution Prevention Plans (SWPPPs) are required for the issuance of a General Construction Activity Stormwater NPDES permit and typically include the implementation of structural and non-structural Best Management Practices (BMPs) to reduce impacts related to surface water quality.

National Pollutant Discharge Elimination System (NPDES) Permit

Section 402 of the CWA established the NPDES to control water pollution by regulating point sources that discharge pollutants into Waters of the United States. In the State of California, the EPA has authorized the State Water Resources Control Board (SWRCB) as the permitting authority to implement the NPDES program. The SWRCB issues two-baseline general permits; one for industrial operations, the other for construction activities (General Construction Permit). Additionally, the NPDES program includes the regulation of stormwater discharges from cities, counties, and other municipalities under Order No. R8-2009-0030 (waste discharge requirements for stormwater).
Under the General Construction Permit, stormwater discharges from construction sites with a disturbed area of one or more acres are required to obtain either individual NPDES permits for stormwater discharges or be covered by the Construction General Permit. Coverage under the Construction General Permit is accomplished by completing and filing a Notice of Intent with the SWRCB. Each Applicant under the Construction General Permit is required to both prepare a SWPPP prior to the commencement of grading activities and to ensure implementation of the SWPPP during construction activities. The primary objective of the SWPPP is to identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction activities. BMPs may include programs, technologies, processes, practices, and devices that control, prevent, remove, or reduce pollution. The SWPPP would also address BMPs developed specifically to reduce pollutants in stormwater discharges following the completion of construction activities.

**Safe Drinking Water Act (Federal)**

The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the United States. This SDWA focuses on all waters either designed or potentially designed for drinking water use, whether from surface water or groundwater sources. The SDWA and subsequent amendments authorized the EPA to establish health-based standards, or maximum contaminant levels (MCLs), for drinking water to protect public health against both natural and anthropogenic contaminants. All owners or operators of public water systems are required to comply with these primary (health-related) standards. State governments, which can be approved to implement these primary standards for the EPA, also encourage attainment of secondary (nuisance-related) standards. At the federal level, the EPA administers the SDWA and establishes MCLs for bacteriological, organic, inorganic, and radiological constituents (United States Code Title 42, and Code of Federal Regulations Title 40). At the state level, California has adopted its own SDWA, which incorporates the federal SDWA standards with some other requirements specific only to California (California Health and Safety Code, Section 116350 et seq.).

The 1996 SDWA amendments established source water assessment programs pertaining to untreated water from rivers, lakes, streams, and groundwater aquifers used for drinking water supply. According to these amendments, the EPA must consider a detailed risk and cost assessment, as well as best available peer-reviewed science, when developing standards for drinking water. These programs are the foundation of protecting drinking water resources from contamination and avoiding costly treatment to remove pollutants. In California, the Drinking Water Source Assessment and Protection (DWSAP) program fulfills these federal mandates. The California Department of Public Health is the primary agency for developing and implementing the DWSAP program, and is responsible for performing the assessments of existing groundwater sources.
State

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act of 1969, which became Division 7 of the California Water Code, authorized the SWRCB to provide comprehensive protection for California’s waters through water allocation and water quality protection. The SWRCB implements the requirement of the CWA Section 303, which states that water quality standards must be established for certain waters through the adoption of water quality control plans under the Porter-Cologne Act. The Porter-Cologne Act established the responsibilities and authorities of the nine RWQCBs, which include preparing water quality plans within the regions, identifying water quality objectives, and instituting waste discharge requirements. Water quality objectives are defined as limits or levels of water quality constituents and characteristics established for reasonable protection of beneficial uses or prevention of nuisance. Beneficial uses consist of all the various ways that water can be used for the benefit of people and wildlife. The Porter-Cologne Act was later amended to provide the authority delegated from the EPA to issue NPDES permits regulating discharges to Waters of the United States.

Local

The existing City of Fresno regulations regarding hydrology and water quality are presented below.

City of Fresno General Plan

The City of Fresno General Plan contains goals, objectives, and policies that address hydrology and water quality. The following General Plan goals, objectives, and policies are applicable to the proposed project:

Safety Element

I-5. OBJECTIVE: Protect the lives and property of current and future residents of the Fresno Clovis Metropolitan Area (FCMA) from the hazards of periodic floods. Recognize and institute adequate safeguards for the particular flooding hazards of areas on the San Joaquin riverbottom and bluffs.

I-5-a. Policy: Support the full implementation of the Fresno Metropolitan Flood Control District (FMFCD) Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities.

I-5-b. Policy: The San Joaquin River will not be channelized, and levees will not be used in the river corridor for flood control, excepting those alterations in river flow that are approved with surface mining and subsequent reclamation activities for mined sites (e.g., temporary berms and small side channel diversion to control water flow through ponds).

I-5-c. Policy: Ensure implementation of the Fresno Metropolitan Flood Control District control programs for the Fresno County Stream Group, including completion of the Redbank-Fancher Creek Flood Control Project, and the FMFCD rural streams program to provide protection to the urban community from waters originating outside the urban area.
I-5-d. Policy: Ensure implementation of the Fresno Metropolitan Flood Control urban drainage system program, including completion of the urban storm drainage systems to provide protection to the urban community from waters originating within the urban area.

I-5-e. Policy: Ensure implementation of land grading and development policies which protect area residents from flooding caused by urban runoff produced by events which exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities.

I-5-f. Policy: The minimum level of design flood protection shall be the 100-year (one percent) event, as established by the best and most current available data from the U.S. Army Corps of Engineers and the California Department of Water Resources, pursuant to Federal Emergency Management Agency (FEMA) direction.

I-5-g. Policy: Establish special building standards for private structures, public structures, and infrastructure elements in the San Joaquin riverbottom, which would protect:

- construction in this area from being damaged by the intensity of flooding in the riverbottom.
- water quality in the San Joaquin River watershed from flood damage-related nuisances and hazards (e.g., the release of raw sewage).
- public health, safety, and general welfare from the effects of flood events.

I-5-h. Policy: Complete studies, addressing the limitations of the area’s geological and hydrological status and all the relevant features of the proposed project, will be required prior to the approval of any construction or development project proposed in the San Joaquin riverbottom or below the top of the San Joaquin River bluffs.

- Designated Floodway Map developed by the State Board of Reclamation.
- Mapping of the 100-year floodplain with the best available current data and its relationship to the finished project.
- Central Valley Project easements on the property.
- Surrounding topography, river channel configuration and flow characteristics, and on- and off-site drainage features.
- The presence of wetlands, natural vegetation, and wildlife, for which the Clean Water Act and related federal and state legislation may require wit the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the California Department of Fish and Game.
- Existing sand and gravel mining and processing facilities in the vicinity.
- Grading activity proposed for the construction of the project.
- Residential uses, and proposed structures and accessory structures.
• Vehicular and pedestrian access for ingress, egress, and emergency response access; primary and secondary roadway and driveway with appurtenant bridges, trestles, and culverts.

• Water wells, septic tanks, and on-site propane or other fuel tanks.

• Utility infrastructure (water, sewer, power, and telecommunication lines).

• Fencing and walls.

• Ability to provide flood warning and rapid evacuation of the site.

In consideration of these and other relevant factors that may arise during project review, the proposed construction or development project may be denied, or additional flood protection measures may be required.

I-5-i. Policy: The City of Fresno shall preserve flood-prone areas within the City of Fresno and its Sphere of Influence, particularly the San Joaquin riverbottom for uses, which will not have permanent improvements that would be adversely affected by periodic floods.

I-5-j. Policy: The City of Fresno shall continue to assign open space zoning to all undeveloped areas, which are within the Designated Floodway of the San Joaquin River and the floodway channels of Dry Creek, Redbank Creek, Francher Creek, and other streams.

I-5-k. Policy: Except in the San Joaquin riverbottom (where new residential subdivisions are not allowed by the multi-use open space land use designation), the City of Fresno shall require developers of residential subdivisions to preserve those portions of development sites as open space, which may be subject to 100-year flood events, unless the flood hazard can be substantially mitigated by development project design. This shall be a condition of subdivision map and special permit approval.

The density of developable adjacent land may be increased to allow the same number of dwelling units as if the entire site were developed. In such instances, the open space area should be incorporated into the project design to provide amenity and passive open space for future residents. This open space should be improved and maintained by the developer, or through the use of mechanisms as homeowners association fees or maintenance districts.

I-5-m. Policy: A valid beneficial use of the San Joaquin River Corridor is to transport floodwater, and this use must be protected. Riverbottom land uses will be managed with the following objectives:

• to control and reduce erosion in the floodway.

• to maintain the combined existing flow capacity in the river channel and the designated floodway by establishing ordinances and policies to prevent nuisance blocking of flood flow.

• to maintain the river stage required to pass any given flow, so as not to increase the extent of flooded area (no increase in the designated floodway), unless any resulting loss in private land value is first purchased from willing sellers.
to coordinate any snagging and clearing activities for river channel enhancement with resource agencies to minimize conflicts with natural habitat preservation and mineral extraction activities (including reclamation).

I-5-n. Policy: As new information becomes available, maps of record which designate areas subject to flooding will be amended.

- Assist the U.S. Army Corps of Engineers, State Department of Water Resources, FEMA, and the Fresno Metropolitan Flood Control District, with mapping projects for floodplains. Establish the updating of floodplain maps in the San Joaquin riverbottoms as a main priority in order to protect health, safety, and general welfare in the riverbottom.
- Maps of the inundation areas for dam failures on the San Joaquin River, Kings River, and the Fresno Stream Group will also be maintained for city emergency preparedness and other planning purposes.
- Provide and utilize updated flood map and inundation information for review of development projects.

I-5-o. Policy: Pursuant to state law, the city shall prepare and update emergency dam failure inundation plans, evacuation plans and other emergency response plans for designated flood-prone areas, including the San Joaquin riverbottom.

Resource Conservation Element

G-2. Objective: Maintain a comprehensive, long-range water resource management plan that provides for appropriate management of all sources of water available to the Planning Area and ensures that sufficient and sustainable water supplies of good quality will be economically available to accommodate existing and planned urban development.

G-2-b. Policy: Implement the Fresno Metropolitan Water Resources Management Plan, and update this plan as necessary, to ensure cost-effective use of water resources and continued availability of good-quality groundwater and surface water supplies.


G-3. Objective: Protect water resources in the area from further degradation in quality.

G-3-a. Policy: Monitor key pollutants to determine directions and rates of contaminant travel, in order to achieve cost-effective and timely intervention for containment and remediation of contamination, and to indicate which areas may require water treatment to supply acceptable-quality drinking water.

G-3-b. Policy: Continue to participate in interagency committees and task forces (with local, state, and federal representation, as may be needed) to share information, to efficiently utilize financial
resources devoted to evaluating water quality problems, and to facilitate cost-effective management of water pollution.

**G-3-c. Policy:** Support continued efforts to identify and mitigate detriments to surface and ground water quality that may result from stormwater discharge from urbanized areas.

**G-3-d. Policy:** Continue to implement water system policies that ensure compliance with Federal and State Safe Drinking Water Standards.

**G-3-e. Policy:** Support and encourage actions of the Regional Water Quality Control Board, the State Environmental Protection Agency, and the local health department to control and prevent water contamination, including leaking underground storage tank and abandoned storage tank abatement programs.

**G-3-f. Policy:** Continue programs to collect and treat sewage to enhance water quality and reclaim water resources in a manner that protects the Fresno Sole Source Aquifer.

**G-3-g. Policy:** Restrict urban development in areas that are not served by a wastewater treatment/management system that is capable of preventing the buildup of compounds that would degrade the aquifer. Oppose the development of new sewage disposal facilities either within the planning area or upgradient (north and east) of the planning area, unless the treatment produce effluent that:

- will not degrade the aquifer in the long term.
- will not introduce contaminants into surface water that would negatively affect its potential economic use of drinking water.
- will not deleteriously affect downstream agricultural and urban uses.
- will not degrade sensitive riparian habitat.

**G-4. Objective:** Manage, use, and replenish water resources to maintain a balanced “water budget” in the Fresno area.

**G-4-b. Policy:** In cooperation with other agencies, enhance the recharge of groundwater as may be necessary.

**G-4-c. Policy:** Address localized groundwater deficiencies and groundwater quality problems that exist or may arise in portions of the planning area.

*Public Facilities Element*

**E-22. Objective:** Manage and develop the City of Fresno's water facilities to ensure a safe, economical, and reliable water supply for existing and planned urban development and economic diversification.
H-22-g. Policy. Continue to implement water system policies that require the provision of a potable water supply that complies with the standards of the Federal and State Safe Drinking Water Acts for consumptive use, and meets applicable standards of volume and pressure for fire suppression purposes.

H-22-h. Policy. Implement appropriate measures consistent with water system policies, including the removal of pump stations from active use, installation of wellhead treatment facilities, construction of aboveground storage and surface water treatment facilities, and enhancement of transmission grid mains to ensure adequate water quality and quantity.

City of Fresno Municipal Code
Chapter 6, Municipal Services and Utilities, Article 7, Urban Storm Water Quality Management and Discharge Control, of the Fresno Municipal Code establishes provisions regarding stormwater discharges. The purpose and intent of Article 7 is to ensure the health, safety, and general welfare of residents, and to protect the water quality of surface water and groundwater resources in a manner pursuant to and consistent with the Federal CWA by reducing pollutants in urban stormwater, discharges to the maximum extent practicable, and by effectively prohibiting non-stormwater discharges to the storm drain system.

5.9.4 - Thresholds of Significance
In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impacts on the environment. The criteria used to determine the significance of an impact to hydrology and water quality are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines and identified below. Accordingly, hydrology and water quality impacts resulting from the proposed project are considered significant if the project would:

a) Violate any water quality standards or waste discharge requirements? (See Water Quality Standards and Requirements, Impact HYD-1)

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted? (See Groundwater Supplies and Recharge, Impact HYD-2)

c) Substantially alter the existing drainage pattern of area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? (See Drainage Pattern: Erosion or Siltation, Impact HYD-3)

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? (See Drainage Pattern: Flooding, Impact HYD-4)
e) 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? (See Runoff Water and Drainage Systems, Impact HYD-5)

f) Otherwise substantially degrade water quality? (See Water Quality, Impact HYD-6)

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map? (See Housing Placement: Flood Hazard Area, Impact HYD-7)

h) Place within a 100-year flood hazard area structures, which would impede or redirect flood flows? (See Structures: Flood Hazard Areas, Impact HYD-8)

i) 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? (See Flooding: Failure of Levee or Dam, Impact HYD-9)

j) Inundation by seiche, tsunami, or mudflow? (See Sieche, Tsunami, or Mudflow, Impact HYD-10)

5.9.5 - Impact Analysis, Mitigation Measures, and Level of Significance After Mitigation

Water Quality Standards and Requirements

| Impact HYD-1 | The project would not violate any water quality standards or waste discharge requirements. |

Project Specific Impact Analysis

Short-Term Construction Impacts

Construction activities associated with buildout of the Planning Area would result in ground-disturbing activities such as grading, excavation, placing fill, trenching, spoil pile storage, and backfilling of trenches. Such earthmoving activates would increase the potential for erosion and sedimentation, particularly during storm events. Additionally, construction equipment and vehicles could deposit constituents such as diesel fuel, hydraulic fluid, oil, and exhaust into the environment that could be conveyed within stormwater runoff to surface waters or groundwater. Construction activities use concrete, solvents, glues, oils, paints, and generate trash, all of which, if they come into contact with rainfall or stormwater runoff can cause pollution in stormwater. While temporary, all of these construction activities and products, including ground-disturbing construction activities could still result in the pollution of stormwater runoff that leaves the construction site that could contribute to downstream surface waters or groundwater degradation.

There are regulatory mechanisms in place that would reduce the effects of construction activities on water quality, including the National Pollutant Discharge Elimination System (NPDES) Construction General Permit. Development within the Planning Area would be required to comply with the requirements of the NPDES Construction General Permit. The NPDES Permit Program, which is administered by the Planning Area region by the Central Valley RWQCB, helps control pollution in stormwater by regulating sources of pollution at construction sites that would result in the discharge
of pollutants into the stormwater and subsequent receiving waters during both construction and operations activities.

Any development project disturbing one or more acres of soil must obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ). Construction activities subject to the Construction General Permit includes clearing, grading, and other ground-disturbing activities such as stockpiling or excavation. The Construction General Permit requires development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). Among other mandated items that are included in a SWPPP, are features designed to eliminate contact of rainfall and stormwater runoff with sources of pollution that occur on construction sites, of which a primary source is soil erosion as a result of unstabilized soils coming in contact with water and wind. These features are known as Best Management Practices (BMPs). Common BMPs to limit pollution in stormwater runoff from construction sites include maintaining or creating drainages to convey and direct surface runoff away from bare areas and installing physical barriers such as berms, silt fencing, waddles, straw bales, and gabions.

The required preparation, implementation, and participation with the Construction General Permit, including the SWPPP and BMPs, would reduce project construction impacts on water quality to less than significant levels. Therefore, short-term construction impacts associated with water quality standards and waste discharge requirements would be less than significant.

Long-Term Project Impacts

Development under the General Plan Update would result in new industrial, commercial, residential, and mixed-use land uses that would increase the amount of paved impervious surfaces within the Planning Area. This increase in impervious surfaces would increase stormwater runoff rates and volumes over the rates and volumes from undeveloped land. The Fresno Metropolitan Flood Control District (FMFCD) is responsible for developing and implementing the Storm Drainage Master Plan for the City of Fresno. As land is developed, the FMFCD works with the developers and the City to implement the storm drainage system to collect and dispose of the increased runoff rates and volumes and prevent them from entering local surface waters, including the San Joaquin River, local creeks, and numerous irrigation canals that cross through the Planning Area. The storm drainage systems that are implemented for the Planning Area consist of streets, curbs and gutters that direct runoff to storm drain inlets, which direct runoff to underground pipelines. The underground pipelines convey stormwater to retention and urban detention (water quality) basins located at strategic locations within the Planning Area. The stormwater retention basins dispose of runoff through percolation into the groundwater and, in emergencies, through pumping to designated irrigation canals. The urban detention (water quality) basins discharge to the San Joaquin River. Discharges from the retention basins and the urban detention (water quality) basins could affect water quality in the receiving waters by potentially increasing the concentration of sediment and pollution found in stormwater.
Typically, stormwater runoff from urban development contains an array of constituents, including automotive fluids (e.g., fuel, oils, and antifreeze), combustion and exhaust byproducts (e.g., lead, cadmium, and nickel), sediments, fertilizers, pesticides, herbicides, and nutrients and bacteria pollutants from domestic and agricultural animal waste. These constituents are expelled into the environment throughout the year, where they settle onto the ground surface. During the wet season, stormwater runoff conveys these pollutants downstream, resulting in polluted stormwater runoff, especially during the first storm events of the season.

The City of Fresno is a co-permittee with the Fresno Metropolitan Flood Control District, the County of Fresno, the City of Clovis, and California State University Fresno in the Phase 1 NPDES Permit for Stormwater Discharges from Municipal Separate Storm Sewer Systems (MS4s). This Phase 1 MS4 Permit requires that the City and its co-permittees implement water quality and watershed protection measures for all development projects. The waste discharge requirements contained in the NPDES Permit have been designed to be consistent with the water quality standards and goals established in the Central Valley RWQCB’s Basin Plan. The Phase 1 MS4 Permit prohibits discharges from violating applicable water quality standards or creating a nuisance or water quality impairment in receiving waters. Participation in the Phase 1 MS4 permit and implementation of the Storm Drainage Master Plan will reduce impacts to surface waters to acceptable levels and long-term project impacts to surface or groundwater quality will not exceed acceptable levels.

Additionally, the General Plan Update includes the following policies designed to reduce water quality impacts:

**Parks, Opens Space, & Schools Element**

**Policy POSS-6-b.** Effects of Stormwater Discharge. Support efforts to identify and mitigate cumulative adverse effects on aquatic life from stormwater discharge to the San Joaquin River.

- Avoid discharge of runoff from urbanuses to the San Joaquin River or other riparian corridors.
- Approve development on sites having drainage (directly or indirectly) to the San Joaquin River or other riparian areas only upon a finding that adequate measures for preventing pollution of natural bodies of water from their runoff will be implemented.
- Periodically monitor water quality and sediments near drainage outfalls to riparian areas. Institute remedial measures promptly if unacceptable levels of contaminant(s) occur.

**Public Utilities and Services Element**

**Policy PU-5-a:** Mandatory Septic Conversion. Continue to evaluate and pursue where determined appropriate of the mandatory abatement of existing private wastewater (septic) disposal systems and mandatory connection to the public sewage collection and disposal system.

**Policy PU-5-b:** Non-Regional Treatment. Discourage, and when determined appropriate, oppose the use of private wastewater (septic) disposal systems, community wastewater disposal systems or other non-regional sewage treatment and disposal systems within or adjacent to the Metropolitan.
Area if these types of wastewater treatment facilities would cause discharges that could result in groundwater degradation.

**Policy PU-5-c:** Satellite Facilities. Work with the Regional Water Quality Control Board to ensure that approval of any satellite treatment and reclamation facility proposal is consistent with governing statutes and regulations.

**Policy PU-7-a:** Reduce Wastewater. Identify and consider implementing water conservation standards and other programs and policies, as determined appropriate, to reduce wastewater flows.

**Policy PU-7-b:** Reduce Stormwater Leakage. Reduce storm water infiltration to the sewer collection system, where feasible, through a program of replacing old and deteriorated sewer collection pipeline; eliminating existing stormwater sewer cut-ins to the sanitary sewer system; and avoiding any new sewer cut-ins except when required to protect health and safety.

**Policy PU-7-c:** Biosolid Disposal. Investigate and consider implementing economically effective and environmentally beneficial methods of biosolids handling and disposal.

**Policy PU-7-d:** Wastewater Recycling. Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely technical, practicable, and institutional evaluation of treatment, facility siting and water exchange elements.

**Policy PU-7-e:** Infiltration Basins. Continue to rehabilitate existing infiltration basins, and if determined appropriate, pursue acquiring additional sites for infiltration basins, as needed.

**Policy PU-7-f:** Food and Drink Industry. Ensure adequate provision of facilities for the appropriate management of wastewater from wineries and food processing and beverage facilities, including conformance with Waste Discharge Requirements issued by the Regional Water Quality Control Board.

**Resource Conservation and Resilience**

**Policy RC-6-e:** Protect Aquifer. Oppose urban development in unincorporated areas that are not served by a wastewater treatment/management system capable of preventing the buildup of compounds that would degrade the aquifer.

**Policy RC-5-f:** Regulate Sewage Disposal Facilities. Oppose the development of new sewage disposal facilities either within the planning area or up gradient (north and east) of the Planning Area, unless the treatment facilities produce effluent that:

- Will not degrade the aquifer in the long term;
- Will not introduce contaminants into surface water that would negatively affect its potential economic use for drinking water;
- Will not deleteriously affect downstream agricultural and urban uses; and
- Will not degrade sensitive riparian habitat.
Policy RC-6-g: Protect Recharge Areas. Continue to protect areas of beneficial natural groundwater recharge by preventing uses that can contaminate soil or groundwater.

Policy RC-6-h: Conditions of Approval. Include in the Development Code standards for imposing conditions of approval for development projects to ensure long-term maintenance of adequate clean water resources. Require findings that adequate water supply must exist prior to any discretionary project approval for residential and commercial development requiring annexation (excluding County Islands), as required by law.

Noise and Safety Element

Policy NS-3-e: Pollutants. Work with FMFCD to prevent and reduce the existence of urban stormwater pollutants pursuant to the requirements of the National Pollution Discharge Elimination Systems Act.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Along with preparation, implementation, and participation of the NPDES Permit, implementation of the aforementioned General Plan Update policies would reduce long-term project impacts associated with water quality standards and wastewater discharge requirements to less than significant levels.

Cumulative Impact Analysis

Short-Term Construction Impacts

Buildout of the Planning Area, along with construction of related projects in the Planning Area vicinity, would result in activities that could pollute stormwater runoff, particularly ground-disturbing activities that would increase the potential for erosion and sedimentation. Although temporary, these construction activities could still result in pollution of the runoff, including on- and off-site soil erosion, sedimentation, and siltation that could contribute to downstream surface waters or groundwater degradation, ultimately resulting in cumulative impacts.

Construction of projects within the Planning Area would be required to comply with the requirements of the NPDES Construction General Permit. The NPDES Construction General Permit program helps control stormwater pollution by controlling the contact of sources of pollution on construction sites with rainfall and stormwater runoff. Stormwater that is discharged into local receiving waters would also result in the discharge of those pollutants from the construction and operations activities into receiving waters. As stated previously, the Construction General Permit requires that any development project disturbing one or more acres of soil must obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit Order 2009-0009-DWQ) that is issued by the State Water Resources Control Board. The Construction General Permit requires development and implementation of a
SWPPP, which would include implementable features designed to protect rainfall and stormwater runoff from contact with sources of pollution on construction sites, including unstabilized soil that would be eroded by the stormwater. The Construction General Permit also requires counter measures to protect against wind erosion of unstabilized soils. These protection measures, BMPs, along with the implementation of a SWPPP would reduce construction impacts on water quality, both individually and collectively, to acceptable levels. As a result, less than significant cumulative short-term construction impacts associated with water quality standards and waste discharge requirements would occur within the Planning Area, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable and short term impacts are considered to be less than significant.

**Long-Term Project Impacts**
Buildout of the Planning Area, along with construction of related projects in the vicinity of the Planning Area would increase the amount of paved impervious surfaces. This increase in impervious surfaces would increase stormwater runoff rates and volumes over those that occur from undeveloped land. The FMFCD works with the developers of cumulative projects within their jurisdiction to implement a storm drainage system to collect and dispose of the increased runoff rates and volumes and prevent them from entering local surface waters, including the San Joaquin River, local creeks, and numerous irrigation canals that cross through the Planning Area. Because the County of Fresno and City of Clovis are co-permittees in the Phase I MS4 Permit, they are required to implement water quality and watershed protection measures for cumulative projects. Compliance with the MS4 Permit would result in less than significant cumulative long-term impacts associated with water quality standards and waste discharge requirements. Since the implementation of the General Plan Update would result in less than significant long-term impacts on water quality standards and waste discharge requirements, the contribution of the General Plan Update to cumulative impacts would not be considerable and long term cumulative impacts are considered to be less than significant.

**Mitigation Measures**

*Project Specific*
No mitigation measures are required.

*Cumulative*
No mitigation measures are required.

**Level of Significance After Mitigation**

*Project Specific*
Less than significant impact.

*Cumulative*
Less than significant impact.
Groundwater Supplies and Recharge

Impact HYD-2 The project could substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted.

Project Specific Impact Analysis

The City of Fresno relied on groundwater for approximately 87 percent of its domestic water supply in 2010, which is approximately equal to a 128,578 acre feet. The groundwater was withdrawn from the Kings Groundwater Sub-basin of San Joaquin Basin Hydrologic Area. The City projects that groundwater withdrawal will be reduced to 86,000 AF/year by the Year 2025, according to the 2010 UWMP. In 2010, natural groundwater recharge (24,400 AF), subsurface inflow (22,500 AF), and intentional recharge (53,100 AF) occurred for a total groundwater recharge of 100,000 AF/year. At present, the City is creating an overdraft of the Kings Groundwater Sub-basin aquifer as defined by the California State Department of Water Resources.

The City of Fresno has adopted a key objective of balancing its groundwater operations by the Year 2025 (West Yost Associates, 2011). According to the 2010 UWMP, achieving this objective includes implementing a host of strategies, which includes increasing the amount of intentional groundwater recharge from 43,100 AF in 2010 to 63,700 AF in 2025, and 75,100 AF in 2035. In addition, the amount of groundwater that would be pumped would be reduced from 128,578 AF in 2010 to 53,500 AF in 2025, and 85,000 in 2035. Reducing groundwater pumping can occur with an increase in the use of treated surface water from 18,474 AF in 2010 to 123,400 AF/year beginning in 2020. In addition, groundwater pumping can be reduced due to the expansion of the water conservation program, and development of a recycled water program, which is anticipated to be implemented by 2025, for irrigating landscaping. The projected groundwater-pumping rate of 86,000-acre feet per year by the Year 2025 can be more than balanced by the estimated natural recharge of 26,900 AF plus the intentional long-term recharge rate of 63,700 AF in the Year 2025 for a total of 90,300 AF. In 2035, the total groundwater recharge is estimated at 102,100 AF while the groundwater-pumping rate is anticipated to remain at 86,000 AF.

Based on the 2010 UWMP, projected water demand which includes development of the General Plan Update is based on a per capita target. For the years of 2020 and after, the per capita target is 250 gallons per day per capita (gpcd). The projected water demand for the City of Fresno in the Year 2035, based on a population of 780,600 is 218,596 AF/year. To accommodate the 2035 water demand, 123,400 AF/year would need to be provided from treated surface water, 25,000 AF/year would be provided as recycled water, and 70,196 AF/year would be pumped from the groundwater. Depending on the specific conditions each year, there could be some variability in the amount of treated surface water and/or recycled water, and in those situations, up to 86,000 AF/year of groundwater could be pumped while treated surface water and/or recycled water could be reduced.

The projected water demand for the City at full build out of the General Plan Update, based on a population of 970,000 and a per capita water demand of 250 gpcd from the 2010 UWMP, is 271,594
AF/year. Assuming treated water supplies, recycled water supplies, and pumped groundwater remain the same, the total supply of water would be 234,400 AF/year. This water supply would be less than the buildout demand by approximately 37,194 AF/year. As discussed in Section 5.15, Utilities and Service Systems, groundwater pumping would remain at 85,000 AF/year in approximately 2035 and beyond. To accommodate the buildout population of 970,000 people, additional water conservation measures would need to be developed to reduce water demand from 250 gpcd to 215 gpcd. At 215 gpcd, the population of 970,000 people would demand 233,606 AF/year of water. This demand would be less than the total water supply of 234,400 AF/year.

To accommodate the buildout water demand, the treated surface water supply would need to be increase, the recycled water supply would need to be increase, or the amount of groundwater to be pumped would need to be increased. An increase in water conservation could also accommodate the buildout demand.

Additionally, the General Plan Update includes the following policies designed to reduce the potential for groundwater overdraft impacts:

Additionally, the General Plan Update includes the following policies designed to reduce the potential for groundwater overdraft impacts:

**Resource Conservation and Resilience Element**

**Objective RC-6:** Ensure that the City has a reliable, long-range source of drinkable water.

**Policy RC-6-a:** Regional Efforts. Support cooperative, multi-agency regional water resource planning efforts and activities on developing and implementing the Upper Kings Basin Integrated Regional Water Management Plan.

**Policy RC-6-b:** Water Plans. Adopt and implement ordinances, standards, and policies to achieve the intent of the City of Fresno Urban Water Management Plan, Fresno-Area Regional Groundwater Management Plan, and City of Fresno Metropolitan Water Resources Management Plan to ensure a dependable supply of water.

**Policy RC-6-c:** Land Use and Development Compliance. Ensure that land use and development projects adhere to the objective of the Metropolitan Water Resource Management Plan to provide sustainable and reliable water supplies to meet the demand of existing and future customers through 2025.

**Policy RC-6-d:** Recycled Water. Prepare, Adopt, and implement a City of Fresno Recycled Water Master Plan.

**Policy RC-6-e:** Protect Aquifer. Oppose urban development in unincorporated areas that are not served by a wastewater treatment/management system capable of preventing the buildup of compounds that would degrade the aquifer.
Policy RC-6-i: Natural Recharge. Support removal of concrete from existing canals and change the practice of lining new and existing canals with concrete to allow for natural recharge.

Objective RC-7: Promote water conservation through standards, incentives and capital investments.

Policy RC-7-a: Maintain a comprehensive conservation program to help reduce per capita water usage in the city’s water service area to 243 gallons per capita per day (gpcd) by 2020 and 190 gpcd by 2035, by adopting conservation standards and implementing a program of incentives, design and operation standards, and user fees.

- Support programs that result in decreased water demand, such as landscaping standards that require drought-tolerant plants, rebates for water conserving devices and systems, turf replacement, xeriscape landscape for new homes, irrigation controllers, commercial/industrial/institutional water conserving programs, prioritized leak detection program, complete water system audit, landscape water audit and budget program, and retrofit upon resale ordinance.

- Implement the U.S. Bureau of Reclamation Best Management Practices for water conservation as necessary to maintain the City’s surface water entitlements.

- Adopt and implement policies in the event that an artificial lake is proposed for development.

- Work cooperatively toward effective uniform water conservation measures that would apply throughout the Planning Area.

- Expand efforts to educate the public about water supply issues and water conservation techniques.

Policy RC-7-b: Water Pricing and Metering. Develop a tiered water cost structure for both residential and commercial users that will properly price water based on its true cost; require all new development to be metered for water use; and charge all customers the true, full cost of their water supply, including costs of acquisition, initial treatment, conveyance, wastewater treatment, operations, maintenance, and remediation.


Policy RC-7-e: Retrofit City Facilities, and Consider Incentives Programs to Encourage Retrofitting of Other Existing Public and Private Residential and Non-Residential Facilities and Sites. Reduce water use in municipal buildings and City operations by developing a schedule and budget for the retrofit of existing municipal buildings with water conservation features, such as auto shut-off faucets and
water saving irrigation systems. Prepare a comprehensive incentive program for other existing public and private residential and non-residential buildings and irrigation systems.

**Policy RC-7-f:** Implementation and Update Conservation Program. Continue to implement the City of Fresno Water Conservation Program, as may be updated, and periodically update restrictions on water uses, such as lawn and landscape watering and the filling of fountains and swimming pools, and penalties for violations. Evaluate the feasibility of a 2035 conservation target of 190 gpcd in the next comprehensive update of the City of Fresno Water Conservation Program.

**Policy RC-7-g:** Educate on State Requirements. Educate the residents and businesses of Fresno on the requirements of the California Water Conservation Act of 2009.

**Policy RC-7-h:** Landscape Water Conservation Standards. Refine landscape water conservation standards that will apply to new development installed landscapes, building on the State Model Water Efficient Landscape Ordinance and other state regulations.

- Evaluate and apply, as appropriate, augmented xeriscape, “water-wise,” and “green gardening” practices to be implemented in public and private landscaping design and maintenance.
- Facilitate implementation of the State’s Water Efficient Landscape Ordinance by developing alternative compliance measures that are easy to understand and observe.

**Public Utilities and Services Element**

**Policy PU-7-d:** Wastewater Recycling. Pursue the development of a recycled water system and the expansion of beneficial wastewater recycling opportunities, including a timely technical, practicable, and institutional evaluation of treatment, facility siting, and water exchange elements.

**Policy PU-7-e:** Infiltration Basins. Continue to rehabilitate existing infiltration basins, and if determined appropriate, pursue acquiring additional sites for infiltration basins, as needed.

**Objective PU-8:** Manage and develop the City’s water facilities on a strategic timeline basis that recognizes the long-life cycle of the assets and the duration of the resources, to promote a safe, economical, and reliable water supply for existing and planned urban development and economic diversification.

**Policy PU-8-a:** Forecast Need. Utilize available and innovative tools, such as computerized flow modeling to determine system capacity, as necessary to forecast demand on water production and distribution systems by urban development, and to determine appropriate facility needs.

**Policy PU-8-b:** Potable Water Supply and Cost Recovery. Prepare for provision of increased potable water capacity (including surface water treatment capacity) in a timely manner to facilitate planned urban development consistent with the General Plan. Accommodate increase in water demand from the existing community with the capital costs and benefits allocated equitably and fairly between
existing users and new users, as authorized by law, and recognizing the differences in terms of quantity, quality and reliability of the various types of water in the City’s portfolio.

**Policy PU-8-c:** Conditions of Approval. Set appropriate conditions of approval for each new development proposal to ensure that the necessary potable water production and supply facilities and water resources are in place prior to occupancy.

**Policy PU-8-d:** CIP Update. Continue to evaluate capital improvement plans and update the, as appropriate, to meet the demands of both existing and planned development consistent with the General Plan.

**Policy PU-8-e:** Repairs. Continue to evaluate existing water production and distribution systems and plan for necessary repair or enhancement of damaged or antiquated facilities.

**Policy PU-8-f:** Water Quality. Continue to evaluate and implement measures determined to be appropriate and consistent with water system policies, including prioritize the use of groundwater, installing wellhead treatment facilities, constructing above-ground storage and surface water treatment facilities, and enhancing transmission grid mains to promote adequate water quality and quantity.

**Policy PU-8-g:** Review Project Impact on Supply. Mitigate the effects of development and capital improvement projects on the long-range water budget to ensure an adequate water supply for current and future uses.

The implementation of the proposed project could result in significant impacts to groundwater levels within the Kings Sub-basin if the increase in water demand is met through an increase of water supply from increased groundwater pumping.

**Cumulative Impact Analysis**

The Kings Sub-basin is a source of groundwater for the communities of Clovis, Fresno, Sanger, Del Rey, Orange Cove, East Orosi, Orosi, Cutler, Dinuba, Reedley, Parlier, London, Traver, Kingsburg, Selma, Fowler, Easton, Bowles, Laton, Caruthers, Raisin City, Biola, Kerman, Riverdale, Lanare, and San Joaquin. The aquifer also provides groundwater for agricultural irrigation water and numerous private domestic wells. The Kings Basin Integrated Regional Water Management Plan (IRWMP) was developed by the Kings Basin Water Authority to provide regional planning and management of water resources in the Kings Sub-basin to maintain a sustainable supply of the surface and groundwater resources for the water users within the basin (Kings Basin Water Authority, 2012). The first regional goal (RG1) of the Kings Basin IRWMP is to reduce groundwater overdraft in the Kings Sub-basin (Kings Basin Water Authority, 2012). To accomplish this goal, the Kings Basin Water Authority has developed Measurable Objective, Resource Strategies, and Projects and Programs. The current planning horizon of the Kings Basin IRWMP is the Year 2032.

The Kings Basin IRWMP has developed strategies to achieve the regional goal to reduce groundwater overdraft. These include (Kings Basin Water Authority, 2012):
1. Increase conjunctive use of water and groundwater storage
2. Precipitation enhancement
3. Increase surface storage
4. Regional conveyance enhancement
5. Increase recycled water use for recharge
6. Remediation of contaminated groundwater and reinjection of the treated water
7. Encourage the use of stormwater runoff for recharge by agencies that collect and discharge stormwater
8. Increasing number and storage capacities of basins to store flood flows
9. Protect recharge areas from urban development

The Kings Basin Water Authority has developed a project review process to identify projects, rank their ability to achieve the goals of the Authority as articulated in the Kings Basin IRWMP. Participating agencies within the Kings Sub-basin vet projects with the Authority and funds are allocated to finance all or portions of projects that work to achieve the goals, including Goal RG1, reduce groundwater overdraft.

While not an instant solution for the cumulative groundwater overdraft in the Kings Sub-basin, the coalition of water agencies that make up the Kings Water Authority and their stated goal to reduce groundwater overdraft through education and providing funding for projects that work to achieve this goal through implementing the aforementioned strategies will eventually result in a no cumulative overdraft impact on the aquifer. Short-term cumulative impacts on the groundwater aquifer could be significant while long-term cumulative impacts are considered to be less than significant. Since the proposed project is projected to increase water use to meet future demands, this increase could result in significant impacts to groundwater levels within the Kings Sub-basin if the increase in water demand is met through an increase of water supply from increased groundwater pumping. Therefore, the project’s contribution to the potential cumulative effect on the groundwater basin is cumulatively considerable, and thus a significant cumulative impact.

**Mitigation Measures**

*Project Specific*

Implementation of Mitigation Measures USS-5 and USS-17 is required.

**MM HYD-1** The City shall develop and implement water conservation measures to reduce the per capita water use to 215 gallons per capita per day.

**MM HYD-2** The City shall continue to be an active participant in the Kings Water Authority and the implementation of the Kings Basin IRWMP.
Cumulative
Implementation of Mitigation Measure USS-5, USS-17, HYD-1, and HYD-2 is required.

Level of Significance After Mitigation
Project Specific
Less than significant impact.

Cumulative
Less than significant impact.

Drainage Pattern: Erosion or Siltation

| Impact HYD-3 | The project would not substantially alter the existing drainage pattern of area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site. |

Project Specific Impact Analysis
Short-Term Construction Impacts
As discussed in Impact HYD-1, construction activities associated with buildout of the proposed project would result in ground-disturbing activities such as grading, excavation, placing fill, trenching, spoil pile storage, and backfilling of trenches. These activities could result in silt laden stormwater that could contribute to downstream surface waters or groundwater degradation.

Development within the Planning Area could propose the realignment of an existing stream or canal. The construction activity to realign the stream or canal could result in erosion of soils within the channel or channel banks during rainfall events that could cause siltation of stormwater runoff that leaves/enter the stream or canal. Silt laden stormwater could contribute to downstream surface water degradation.

There are regulatory mechanisms in place that would reduce the effects of construction activities on drainage patterns and erosion caused by stormwater, including

- The City of Fresno grading plan check process (City of Fresno, 2013)
- The Fresno Metropolitan Flood Control District Storm Drainage Master Plan
- The National Pollutant Discharge Elimination System (NPDES) Construction General Permit (State Water Resources Control Board, 2013)

Development within the Planning Area would be required to obtain a permit to grade land and comply with the City of Fresno grading plan check process. The grading plan check process is a review process that requires anyone who develops property:

1. Properly grade their property in accordance with the California Building Code (CBC)
2. Submit a grading plan showing the proposed grading of the development
3. Obtain approval of the Fresno Metropolitan Flood Control District indicating conformance of the grading plan with the Storm Drainage Master Plan

4. Obtain coverage under the NPDES Construction General Permit and comply with the requirements of the permit, including developing an erosion control site plan.

The Storm Drainage Master Plan contains proposed elevations for tops of curbs in undeveloped area, delineation of storm drain inlet watershed areas, collection system pipeline alignments and sizes, and retention basin or urban detention (water quality) basin locations and geometry. The development of land in conformance with the Storm Drainage Master Plan ensures that development within the Planning Area is graded to drain to storm drainage facilities that are designed to collect and dispose of stormwater from the planned development. Stormwater retention and urban detention (water quality) basins intercept and remove silt from stormwater before it can be discharged to surface water features.

The review of the grading plan checklist for a proposed development within the Planning Area will disclose any plan to alter the course of any creek, stream, or irrigation canal. The City will require any other reviews, permits, and agreements be obtained prior to allowing the grading to proceed. Such reviews could include the US Army Corps of Engineers, the US Fish and Wildlife Service, the California Department of Fish and Game, the Central Valley Flood Protection Agency, the California State Water Resources Control Board, The Central Regional Water Quality Control Board, the Fresno Metropolitan Flood Control District, and the Fresno Irrigation District. The list of possible permits and agreements includes the Clean Water 401 and 404 permits, Endangered Species or Habitat Plan, Section 1603 Streambed Alternation Agreement, and Irrigation Canal Encroachment Permit. The Fresno Metropolitan Flood Control District maintains a Master Plan for Redbank Creek, which flows through the Planning Area and should provide review and approve any development that plans to alter the channel to ensure that it will pass the design flood event.

The NPDES Construction General Permit program, which is administered in the Planning Area region by the Central Valley RWQCB, helps control siltation in stormwater by regulating sources of erosion at construction sites that would result in the discharge of silt laden stormwater from the site and into subsequent receiving waters during both construction and operations activities.

The requirement to obtain a grading permit and follow the grading plan check process and requirements would reduce project construction impacts on grading patterns and erosion to acceptable levels. Therefore, short-term construction impacts associated with grading land, altering streams, or erosion will be less than significant.

Long-Term Project Impacts
Development under the General Plan Update would result in new industrial, commercial, residential, and mixed-use land uses that would regrade undeveloped land to new grading patterns, may propose to alter the alignments of existing creeks, streams, or irrigation canals, and would increase impervious surfaces that would increase stormwater runoff rates. Higher rates of stormwater runoff would increase the potential for erosion of soils. FMFCD works with the developers and the City to
implement the storm drainage system to collect and prevent silt laden stormwater from entering local surface waters, including the San Joaquin River, local creeks, and numerous irrigation canals that cross through the Planning Area. The above ground storm drainage infrastructure directs runoff to underground pipelines. The underground pipelines convey stormwater to retention and urban detention (water quality) basins within the Planning Area. Discharges of stormwater from the retention basins and the urban detention (water quality) basins could increase the concentration of sediment in the receiving waters.

Development under the General Plan Update will be required to obtain a grading permit from the City of Fresno and follow the grading plan check process as described above. As a co-permittee in the Phase I NPDES Permit, development associated with the General Plan Update would be reviewed to ensure coverage under the Construction General Permit.

Additionally, the General Plan Update includes the following policies designed to reduce erosion and siltation impacts:

**Parks, Open Space, & Schools Element**

**POSS-6-b:** Effects of Stormwater Discharge. Support efforts to identify and mitigate cumulative adverse effects on aquatic life from stormwater discharge to the San Joaquin River.

- Avoid discharge of runoff from urban uses to the San Joaquin River or other riparian corridors.
- Approve development on sites having drainage (directly or indirectly) to the San Joaquin River or other riparian areas only upon a finding that adequate measures for preventing pollution of natural bodies of water from their runoff will be implemented.
- Periodically monitor water quality and sediments near drainage outfalls to riparian areas. Institute remedial measures promptly if unacceptable levels of contaminant(s) occur.

**Noise and Safety Element**

**Objective NS-3:** Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

**Policy NS-3-a:** Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

**Policy NS-3-b:** Curb and Gutter Installation. Coordinate with the Fresno Metropolitan Flood Control District (FMFCD) to install curbing, gutters, and other drainage facilities consistent with the Storm Drainage and Flood Control Master Plan.

**Policy NS-3-d:** Landscaped Buffer. Require the perimeter of all permanent stormwater ponding basins to have a landscaped buffer.
Policy NS-3-e: Pollutants. Work with FMFCD to prevent and reduce the existence of urban stormwater pollutants pursuant to the requirements of the National Pollution Discharge Elimination Systems Act.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Along with the grading plan check process, implementation of the aforementioned General Plan Update polices would reduce long-term project impacts associated with alteration of grading patterns or creeks or streams and erosion to less than significant levels.

Cumulative Impact Analysis

Short-Term Construction Impacts

Cumulative impacts from erosion and sedimentation due to alteration of existing grading patterns or streams and irrigation canals could result from construction activities that occur both within the Planning Area and outside of the Planning Area. Buildout of the Planning Area, along with construction of related projects beyond the Planning Area vicinity, would result in activities that could pollute stormwater runoff, particularly ground-disturbing activities that would increase the potential for erosion and sedimentation and alter existing grading patterns. Increased erosion and sedimentation would be temporary, but construction activities could still result in on- and off-site soil erosion, sedimentation, and siltation that could contribute to downstream surface waters degradation, ultimately resulting in cumulative impacts. Alteration of grading patterns would be created by short-term construction projects, but would be long-term in effect.

Construction of projects within the Planning Area, whether within the City limits or within Fresno County (which would be required to annex to the City) would comply with the requirements of the City of Fresno grading plan check process. This process includes preparation of grading plans, review and approval of the grading plan for conformance with the Storm Drainage Master Plan, and conformance with the NPDES Construction General Permit. Construction projects outside of the Planning Area, but within the watersheds of streams or canal tributary to the Planning Area would be required to obtain City of Clovis or the County of Fresno grading permits to develop. The permitting process requires that a grading plan be prepared and reviewed for approval. In Fresno County, this process includes the requirement to provide erosion control measures for unstabilized ground, drainage retention basin or basins to store runoff, and conformance with the NPDES Construction General Permit (County of Fresno, 2011). In the City of Clovis, the grading permit process requires that a grading plan be prepared, reviewed, and approved by the Fresno Metropolitan Flood Control District for conformance with the Storm Drainage Master Plan, that appropriate erosion control measures will be implemented, and that the development conforms to the NPDES Construction General Permit (Smith, 2013). In all permitting processes, the need for additional permits that are required to alter the alignment of a stream or canal are verified.
The NPDES Construction General Permit program helps control stormwater pollution by controlling erosion on construction site due to rainfall and stormwater runoff. Stormwater that is discharged into local receiving waters would also result in the discharge of siltation from the construction and operations activities into receiving waters. The required preparation, implementation, and participation with the Construction General Permit, including the SWPPP and BMPs, would reduce construction impacts on water quality, both individually and collectively, to acceptable levels. As a result, no cumulative short-term construction impacts associated with silt and sediments in storm water runoff would occur, within the Planning Area, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable and short-term impacts are considered to be less than significant.

Long-Term Impacts

Buildout of the Planning Area and development within watersheds that are tributary to the Planning Area, but not a part of the Planning Area, would increase the amount of paved impervious surfaces and alteration of grading patterns. The increase in impervious surfaces would increase stormwater runoff rates and volumes over those that occur from undeveloped land. The alteration of grading patterns would direct stormwater runoff from its existing path of travel to different locations.

Development within the Planning Area would be required to adhere to the grading plan check process of the City of Fresno Building and Safety Services Division. The grading plan check process ensures that developments properly grade developments in accordance with the California Building Code, the Storm Drainage Master Plan, and the Construction General Permit. Development within the watersheds tributary to the Planning Area that are within the County of Fresno or the City of Clovis are also required to adhere to the grading plan check process of those entities. These processes ensure that the developments within the areas tributary to the Planning Area properly grade the developments in accordance with their respective ordinances, the Fresno Metropolitan Flood Control District’s Storm Drainage Master Plan, the Construction General Permit, and any other permits that are required to alter streams or irrigation canals.

As discussed previously, FMFCD is responsible for developing and implementing the Storm Drainage Master Plan for the City of Fresno. The implementation of the Plan would reduce the potential for erosion and siltation because the storm drainage infrastructure would convey stormwater to retention and urban detention basins where silt could be deposited on the bottom of the basins. Discharges from the retention basins and the urban detention (water quality) basins should not increase sedimentation in receiving waters.

As a result of the grading permit processes, the implementation of the Phase 1 MS4 NPDES Permit and the FMFCD Storm Drainage Master Plan, less than significant cumulative long-term project impacts associated with erosion or sedimentation would occur within the Planning Area, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable and long-term impacts are considered to be less than significant.
**Mitigation Measures**

*Project Specific*

No mitigation measures are required.

*Cumulative*

No mitigation measures are required.

**Level of Significance After Mitigation**

*Project Specific*

Less than significant impact.

*Cumulative*

Less than significant impact.

**Drainage Pattern: Flooding**

| Impact HYD-4 | The project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. |

**Project Specific Impact Analysis**

*Short-Term Construction Impacts*

Construction activities associated with buildout of the Planning Area in accordance with the General Plan Update would result in ground-disturbing activities such as grading, excavation, placing fill, trenching, spoil pile storage, and backfilling of trenches. Such earthmoving activities would change existing surface drainage patterns and increase the potential for flooding, particularly during storm events. While temporary, ground-disturbing construction activities that significantly compact the development site soils could increase runoff rates and volumes that could result in flooding on the construction site or off of the construction site.

Development within the Planning Area could propose the realignment of an existing stream or canal. The construction activity to realign the stream or canal could result in the alteration of drainage patterns that could result in flooding on or off of the construction site.

There are regulatory mechanisms in place that would reduce the effects of construction activities on drainage patterns that would result in flooding on or off of the construction site:

- The City of Fresno grading plan check process (City of Fresno, 2013)
- The Fresno Metropolitan Flood Control District Storm Drainage Master Plan
- The National Pollutant Discharge Elimination System (NPDES) Construction General Permit (State Water Resources Control Board, 2013)
A discussion of each of these regulatory mechanisms is provided in Impact HYD-3, above. Compliance with these required mechanisms would reduce project construction impacts on grading patterns and flooding on and off of the construction site to less than significant.

**Long-Term Project Impacts**

Development under the General Plan Update would result in new industrial, commercial, residential, and mixed-use land uses that would re-grade undeveloped land to new grading patterns, may propose to alter the alignments of existing creeks, streams, or irrigation canals, and would increase impervious surfaces that would increase stormwater runoff rates and volumes. Higher runoff rates and greater volumes of stormwater runoff would increase the potential for flooding of the development site and off site locations. Since the FMFCD is responsible for developing and implementing the Storm Drainage Master Plan for the City of Fresno, the FMFCD works with the developers and the City to implement the storm drainage system to collect and dispose of the increased runoff rates and volumes and prevent flooding as the result of the development and grading of land. The storm drainage systems that are implemented for the Planning Area consist of streets, curbs and gutters that direct runoff to storm drain inlets, which direct runoff to underground pipelines. The underground pipelines convey stormwater to retention and urban detention (water quality) basins located at strategic locations within the Planning Area. The stormwater retention basins dispose of runoff through percolation into the groundwater and, in emergencies, through pumping to designated irrigation canals. The urban detention (water quality) basins discharge to the San Joaquin River.

As development occurs under the General Plan Update, the grading permit process is required to be followed. This process would reduce the potential for long-term flooding impacts to less than significant. Additionally, the General Plan Update includes the following policies designed to reduce flooding impacts:

**Noise and Safety Element**

**Objective NS-3:** Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

**Policy NS-3-a:** Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

**Policy NS-3-b:** Curb and Gutter Installation. Coordinate with the Fresno Metropolitan Flood Control District (FMFCD) to install curbing, gutters, and other drainage facilities consistent with the Storm Drainage and Flood Control Master Plan.

**Policy NS-3-e:** Pollutants. Work with FMFCD to prevent and reduce the existence of urban stormwater pollutants pursuant to the requirements of the National Pollution Discharge Elimination Systems Act.
Policy NS-3-h: Runoff Controls. Implement grading regulations and related development policies that protect area residents from flooding caused by urban runoff produced from events that exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities. Place all structures and/or flood-proofing in a manner that does not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Along with the grading plan check process, implementation of the aforementioned General Plan Update polices would reduce long-term project flooding impacts associated with alteration of grading patterns of creeks or streams to less than significant levels.

Cumulative Impact Analysis

Short-Term Construction Impacts

Cumulative impacts from on-site and off-site flooding due to alteration of existing grading patterns or streams and irrigation canals could result from construction activities that occur both within the Planning Area and outside of the Planning Area. Buildout of the Planning Area, along with construction of related projects beyond the Planning Area vicinity, would result in activities that could result in on- and off-site flooding, particularly ground-disturbing activities that would increase the compaction of the natural ground and alter existing grading patterns. Increased stormwater runoff due to construction activities would be temporary, but these activities could still result in on- and off-site flooding that could ultimately result in cumulative impacts. Alteration of grading patterns would be created by short-term construction projects, but would be long-term in effect.

Construction of projects within the Planning Area, whether within the City limits or within Fresno County (which would be required to annex to the City) would comply with the requirements of the City of Fresno grading plan check process. This process includes preparation of grading plans, review and approval of the grading plan for conformance with the Storm Drainage Master Plan, and the requirement to drain to permanent Fresno Metropolitan Flood Control District storm drainage master plan facilities or provide temporary stormwater runoff facilities if the permanent facilities are not available. Construction projects outside of the Planning Area, but within the watersheds of streams, canals or storm drainage systems tributary to the Planning Area would be required to obtain City of Clovis or the County of Fresno grading permits to develop. The permitting process requires that a grading plan be prepared and reviewed for approval. In Fresno County, this process includes the requirement to provide erosion control measures for unstabilized ground, and construction of drainage retention basin or basins to store runoff. (County of Fresno, 2011). In the City of Clovis, the grading permit process requires that a grading plan be prepared, reviewed, and approved by the Fresno Metropolitan Flood Control District for conformance with the Storm Drainage Master Plan. In addition, FMFCD also ensures that appropriate erosion control measures be implemented and that the development drains to permanent FMFCD storm drainage master plan.
facilities or to temporary storm drainage facilities (Smith, 2013). In all permitting processes, the need for additional permits that are required to alter the alignment of a stream or canal are verified.

As a result, no cumulative short-term construction impacts associated with on or off site flooding would occur within the Planning Area, and therefore, implementation of the General Plan Update is not deemed cumulatively considerable and short-term impacts are considered to be less than significant.

Long-Term Impacts

Buildout of the Planning Area and development within watersheds that are tributary to the Planning Area, but not a part of the Planning Area, would increase the amount of paved impervious surfaces and alteration of grading patterns. The increase in impervious surfaces would increase stormwater runoff rates and volumes over those that occur from undeveloped land. The alteration of grading patterns would direct stormwater runoff from its existing path of travel to different locations.

Development within the watersheds or drainage areas tributary to the Planning Area that are within the County of Fresno or the City of Clovis are also required to adhere to the grading plan check process of those entities. These processes ensure that the developments within the areas tributary to the Planning Area properly grade the developments in accordance with their respective ordinances, the Fresno Metropolitan Flood Control District’s Storm Drainage Master Plan, the Construction General Permit, and any other permits that are required to alter streams or irrigation canals. Compliance with these requirements would reduce potential cumulative flooding impacts to less than significant. Since development associated with the proposed project would require compliance with the City’s grading plan check process to reduce potential flooding impacts, the project’s contribution to cumulative flooding impacts is less than cumulatively considerable and therefore, less than cumulatively significant.

Mitigation Measures

Project Specific

No mitigation measures are required.

Cumulative

No mitigation measures are required.

Level of Significance After Mitigation

Project Specific

Less than significant impact.

Cumulative

Less than significant impact.
Runoff Water and Drainage Systems

Impact HYD-5 The project could 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.

Project Specific Impact Analysis

Development under the General Plan Update would result in new industrial, commercial, residential, and mixed-use land uses that would re-grade undeveloped land to new grading patterns and would increase impervious surfaces that would increase stormwater runoff rates and volumes.

Redevelopment of existing land uses, such as changing a residential land use area to a multi-family land use area, which has a greater level of imperviousness, will also increase stormwater runoff rates and volume. Increased runoff rates and greater volumes of stormwater runoff could exceed the capacity of existing or planned stormwater drainage systems or could increase polluted runoff. FMFCD’s Storm Drainage Master Plan divides the Planning Area into a number of drainage areas or urban watersheds. Each drainage area has its own Master Planned pipeline collection system and retention or urban detention basin. One hundred thirty (130) master planned drainage areas are completely or partially within the Planning Area. Three of the master planned drainage areas have collection systems, but do not have retention basins. The disposal of stormwater from these drainage areas occurs by pumping the stormwater directly into a nearby irrigation canal. Eight of the master planned drainage areas discharge to the San Joaquin River. One drainage area discharges directly to the river. Seven discharge to the river from urban detention (water quality) basins. The storm drainage master plan for the proposed Southeast Growth Area has been developed to a preliminary state. Final master planning will be completed when the General Plan Update process has been approved.

The storm drainage master plan is used to develop costs for the proposed facilities that are used to develop drainage fees. The drainage fees are paid by project proponents at the time they obtain entitlements. The fees are used to pay for the cost of constructing the Master Plan pipeline collection and obtaining land and constructing retention or urban detention basin disposal facilities within each drainage area.

The potential impacts on the existing storm drain facilities from the buildout of the land use identified in the General Plan Update are identified below. These impacts are categorized as impacts that would occur with the buildout of the current 2025 General Plan land uses. After determining the potential impacts that would occur from 2025 General Plan land uses, an evaluation of potential additional impacts from the development of full buildout under the General Plan Update was assessed. The two separate evaluations identify the potential impacts that would occur from full buildout of the General Plan Update compared to existing conditions.

Existing Condition to 2025 General Plan

Runoff Rates and Volumes

The buildout of the Fresno metropolitan area to the 2025 General Plan would result in the development of permeable land uses such as farming or vacant land to impervious land uses such as residential, multifamily residential, commercial, and industrial. Conversion of land to more
impervious land uses that are unmitigated, always results in higher peak stormwater runoff rates and greater volumes of runoff from that land. Where development is an infill condition, such as within existing urbanized areas, master planned storm drainage facilities are generally available and are designed to provide service to the site as long as the development is consistent with the 2025 General Plan land uses. There are locations within the urbanized area where master planned storm drainage facilities are not fully available and runoff from the proposed developments would exceed the ability of existing storm drainage facilities to provide service to the developments. Likewise, there may be cases where the proposed development would result in a greater level of imperviousness than what was planned in the Storm Drainage Master Plan. In these cases, the stormwater runoff from the proposed development would exceed the ability of the existing storm drainage facilities to provide service to the developments.

Much of the area that is planned to be developed within the non-urbanized Planning Area has been master planned for storm drainage, such as the non-urbanized areas have been divided into drainage areas, master plan grading patterns have been documented, and the collection systems and retention basins have been located and sized. In most cases, the retention basins sites for the planned drainage areas have been purchased by FMFCD, but have not been excavated, and there are no existing storm drainage collection systems in place due to the low level of development. The existing storm drainage facilities in these areas consist of roadside drainage swales that follow the natural gradient of the land and they convey and store the runoff from the roadway only. The increased stormwater runoff rates and volumes from development projects within these areas would exceed the capacity of these existing facilities. The master planned storm drainage facilities are designed to collect, convey, and dispose of the runoff from the planned land uses for the 2025 General Plan at full buildout.

One hundred-nineteen drainage areas have projected increases in imperviousness due to the planned land uses in the 2025 General Plan. The drainage areas are illustrated in Appendix B of Appendix G-1. The increase in imperviousness is expressed in Appendix G-1 as increases in equivalent area (CA). Ninety drainage areas will have increases in imperviousness that are equal to or exceed 5 percent. The change in planned land use in the 90 drainage areas would significantly exceed the capacity of the existing drainage collection facilities in these drainage areas, and therefore, would result in potential significant impacts on the existing drainage collection facilities. The change in the planned land use for the remaining 29 drainage areas are not expected to exceed the capacity of the existing drainage collection facilities as the change in imperviousness is projected to be less than five percent. The 119 drainage areas are listed in Table 3 in Appendix G-1. The table is sorted from least to greatest change in imperviousness expressed as change in equivalent area (CA) by percent from the Existing Condition to the 2025 General Plan.

Of the 119 drainage areas that have projected increases in imperviousness, 37 drainage areas are projected to have increases that will result in runoff volumes that would exceed the design capacity of the retention basins for those drainage areas. These exceedances would result in potential significant impacts on the storage capacities of the retention basins. There are 82 drainage areas in which the increases in land uses would not affect the storage capacity provided by the retention
basins. The 37 basins are listed in Table 3 in Appendix G-1. The table is sorted from greatest to least storage deficit in the retention basin design capacity.

Three drainage areas that have urban detention basins that are projected to have increases in imperviousness expressed at equivalent area (CA) in Appendix G-1. The increases are 1.1 percent for Drainage Area DG, 12 percent for Drainage Area DK, and 13 percent for Drainage Area DI. The change in land use could have a significant impact on the weir overflow rates and residence times provided by the detention basins in Drainage Areas DK and DI.

Three drainage areas have pump systems for disposal of stormwater. Of the three drainage areas, Drainage Areas: WW and UU1 have projected increases in imperviousness that could exceed the capacity of the existing pump station. This exceedance would be a significant impact. Drainage Area WW has a projected increase in imperviousness of 4 percent and Drainage Area UU1 has a projected increase of 10 percent.

Sources of Polluted Runoff
The change in land uses from the Existing Condition to the 2025 General Plan would substantially increase the sources of pollution in stormwater runoff by converting undeveloped, agricultural uses to urban uses. The increase in sources would result from the increased number of landowners and uses that would occur within the Planning Area.

Typically, stormwater runoff from urban development contains an array of constituents, including automotive fluids (e.g., fuel, oils, and antifreeze), combustion and exhaust byproducts (e.g., lead, cadmium, and nickel), sediments, fertilizers, pesticides, herbicides, and nutrients and bacteria pollutants from domestic and agricultural animal waste. These constituents are expelled into the environment throughout the year, where they settle onto the ground surface. During the wet season, stormwater runoff conveys these pollutants downstream, resulting in polluted stormwater runoff, especially during the first storm events of the season.

The City of Fresno is a co-permittee with the Fresno Metropolitan Flood Control District, the County of Fresno, the City of Clovis, and California State University Fresno in the Phase 1 NPDES Permit for Stormwater Discharges From Municipal Separate Storm Sewer Systems (MS4s). This Phase 1 MS4 Permit requires that the City and its co-permitees implement water quality and watershed protection measures for all development projects. The waste discharge requirements contained in the NPDES Permit have been designed to be consistent with the water quality standards and goals established in the Central Valley RWQCB’s Basin Plan. The Phase 1 MS4 Permit prohibits discharges from violating applicable water quality standards or creating a nuisance or water quality impairment in receiving waters. Participation in the Phase 1 MS4 permit and implementation of the Storm Drainage Master Plan would reduce impacts to surface waters to acceptable levels, and long-term project impacts to surface or groundwater quality would not exceed acceptable levels.

Additionally, the General Plan Update includes the following policies designed to reduce impacts on the capacities of existing storm drain facilities and reduce water quality impacts:
Noise and Safety Element

Policy NS-3-a: Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

Policy NS-3-b: Curb and Gutter Installation. Coordinate with the Fresno Metropolitan Flood Control District (FMFCD) to install curbing, gutters, and other drainage facilities consistent with the Storm Drainage and Flood Control Master Plan.

Policy NS-3-e: Pollutants. Work with FMFCD to prevent and reduce the existence of urban stormwater pollutants pursuant to the requirements of the National Pollution Discharge Elimination Systems Act.

Policy NS-3-h: Runoff Controls. Implement grading regulations and related development policies that protect area residents from flooding caused by urban runoff produced from events that exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities. Place all structures and/or flood-proofing in a manner that does not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Parks, Open Space, & Schools Element

POSS-6-b: Effects of Stormwater Discharge. Support efforts to identify and mitigate cumulative adverse effects on aquatic life from stormwater discharge to the San Joaquin River.

- Avoid discharge of runoff from urban uses to the San Joaquin River or other riparian corridors.
- Approve development on sites having drainage (directly or indirectly) to the San Joaquin River or other riparian areas only upon a finding that adequate measures for preventing pollution of natural bodies of water from their runoff will be implemented.
- Periodically monitor water quality and sediments near drainage outfalls to riparian areas. Institute remedial measures promptly if unacceptable levels of contaminant(s) occur.

Along with preparation, implementation, and participation of the NPDES Permit, implementation of the aforementioned General Plan Update polices would reduce long-term project impacts associated with significant impacts on the capacities of existing storm drain facilities and reduce potential storm water quality to less than significant.
2025 General Plan to General Plan Update

Runoff Rates and Volume
The land use changes between the 2025 General Plan to the General Plan Update are projected to increase the imperviousness in 39 drainage areas over the increase in the Existing Condition to 2025 General Plan. Of these 39 drainage areas, 10 would have projected increases in imperviousness that would exceed the capacity of the storm drainage collection systems. The change in land use is not projected to increase imperviousness to the point where the capacity of the storm drainage collection systems would be exceeded for 29 drainage area collection systems. The 39 drainage areas are listed in Table 4 of Appendix G-1. The table is sorted from least to greatest change in imperviousness expressed at equivalent area (CA) by percent from the 2025 General Plan to the General Plan Update.

The land use changes between the 2025 General Plan to the General Plan Update would reduce the number of drainage areas retention basins that are impacted by increases in imperviousness from 37 to 35. Three drainage areas, CH, L, and P would no longer have storage deficits. Drainage Area U would, however, experience a deficit in storage capacity due to land use changes to the drainage area from the 2025 General Plan land uses to the General Plan Update land uses. Therefore, the project would significantly impact the storage capacity of the retention basins in Drainage Area U. The information for the retention basin in Drainage Area U is provided in Table 4 in Appendix G-1.

Two drainage areas that have urban detention basins are projected to have increases in imperviousness. The increases are small, ranging from 0.6 percent for Drainage Area EK to 1 percent for Drainage Area DG and are projected to have a less than significant impact on the overflow weir rates or residence times in the detention basins.

Of the three drainage areas that have pump systems for disposal of stormwater, only one, Drainage Area VV has a projected increase in imperviousness. The projected increase is 10.7 percent, which could result in stormwater runoff rates exceeding the pump station capacity of the Drainage Area VV pump system. This potential exceedence would be a significant impact on the capacity of the pump station.

Sources of Polluted Runoff
The change in land uses from the 2025 General Plan to the General Plan Update would not substantially increase the sources of pollution in stormwater runoff, as the Planning Area boundaries are identical. Therefore, along with preparation, implementation, and participation of the NPDES Permit, implementation of the aforementioned General Plan Update polices would reduce project specific impacts on water quality associated with the significant increase in stormwater runoff to less than significant.

Cumulative Impact Analysis
Five drainage areas, DN, CZ, Q, T and BU have watershed area and drainage systems that convey runoff that originates outside of the Planning Area into the Planning Area. Drainage Areas CZ, Q, and T straddle the Planning Area boundary and are partially within the City of Fresno and partially within the City of Clovis sphere of influence (City of Clovis, 2013). Drainage Area DN is partially within
Fresno County’s planning area (Mintier Harnish, 2013). Two drainage areas, CL and BW have watershed area and drainage systems that convey runoff that originates within the Planning Area out of the Planning Area and into the City of Clovis sphere of influence. Changes to the land uses within the portions of the drainage areas that are outside of the Planning Area could result in changes to runoff rates and volumes that exceed the capacity of existing or planned stormwater drainage systems. This potential exceedence would be a significant cumulative impact. Since the proposed project would result in potential significant impacts on the capacities of existing storm drain facilities, the project’s contribution to potential cumulative impacts on the capacities of stormwater facilities would be considerable and a significant cumulative impact.

Buildout of the Planning Area, along with construction and operation of related projects in the Planning Area vicinity, would increase the amount of paved impervious surfaces within the Planning Area. This increase in impervious surfaces would increase stormwater runoff rates and volumes over those that occur from undeveloped land. This increase in runoff would have the potential to increase the amount of polluted runoff; however, all development projects within the Fresno-Clovis area would be required to comply with the MS4 Permit that requires the implementation of water quality and watershed protection measures. Compliance with the MS4 Permit would reduce potential impacts from cumulative projects to less than significant. Since the development under the proposed project would also need to comply with the MS4 Permit and includes specific General Plan Update policies identified above, the project’s contribution to potential cumulative impacts would not be considerable, and the project would result in a less than significant cumulative impact.

**Mitigation Measures**

**Project Specific**

**MM HYD-5.1** The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan collection systems to less than significant.

- Implement the existing Storm Drainage Master Plan (SDMP) for collection systems in drainage areas where the amount of imperviousness is unaffected by the change in land uses.

- Update the SDMP in those drainage areas where the amount of imperviousness increased due to the change in land uses to determine the changes in the collection systems that would need to occur to provide adequate capacity for the stormwater runoff from the increased imperviousness.

- Implementation of the updated SDMP to provide stormwater collection systems that have sufficient capacity to convey the peak runoff rates from the areas of increased imperviousness.

- Require developments that increase site imperviousness to install, operate, and maintain FMFCD approved on-site detention systems to reduce the peak runoff rates resulting from the increased imperviousness to the peak runoff rates that will not exceed the capacity of the existing stormwater collection systems.
MM HYD-5.2  The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan retention basins to less than significant.

- Update the SDMP to analyze the impacts to existing and planned retention basins to determine remedial measures required to reduce the impact on retention basin capacity to less than significant. Remedial measures would include:
  1. Increase the size of the retention basin through the purchase of more land or deepening the basin or a combination for planned retention basins.
  2. Increase the size of the emergency relief pump capacity required to pump excess runoff volume out of the basin and into adjacent canal that convey the stormwater to a disposal facility for existing retention basins.
  3. Require developments that increase runoff volume to install, operate, and maintain, Low Impact Development (LID) measures to reduce runoff volume to the runoff volume that will not exceed the capacity of the existing retention basins.

MM HYD-5.3  The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan urban detention (stormwater quality) basins to less than significant.

- Updating the SDMP to determine the impacts to the urban detention basin weir overflow rates and determine remedial measures required to reduce the impact on the detention basin capacity to less than significant. Remedial measures would include:
  1. Modify overflow weir to maintain the suspended solids removal rates adopted by the FMFCD Board of Directors.
  2. Increase the size of the urban detention basin to increase residence time by purchasing more land. The existing detention basins are already at the adopted design depth.
  3. Require developments that increase runoff volume to install, operate, and maintain, Low Impact Development (LID) measures to reduce peak runoff rates and runoff volume to the runoff rates and volumes that will not exceed the weir overflow rates of the existing urban detention basins.

MM HYD-5.4  The City shall implement the following measures to reduce the impacts on the capacity of existing or planned storm drainage Master Plan pump disposal systems to less than significant.

1. Update the SDMP to determine the extent and degree to which the capacity of the existing pump system will be exceeded.
2. Require new developments to install, operate, and maintain FMFCD design standard on-site detention facilities to reduce peak stormwater runoff rates to existing planned peak runoff rates.

3. Provide additional pump system capacity to maximum allowed by existing permitting to increase the capacity to match or exceed the peak runoff rates determined by the SDMP update.

**MM HYD-5.5**  
The City shall develop and adopt a storm drainage master plan update to the SDMP for the Southeast Growth Area that is designed to collect, convey and dispose of runoff rates and volumes based on the planned land uses of the General Plan Update.

*Cumulative*  
Implementation of Mitigation Measures HYD-5.1 through HYD-5.5 shall be implemented.

**Level of Significance After Mitigation**

*Project Specific*  
Less than significant impact.

*Cumulative*  
Less than significant impact.

**Water Quality**

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*Project Specific Impact Analysis*  
See water quality discussion under Impact HYD-1. As discussed, short-term construction impacts on water quality would be less than significant with the required preparation, implementation, and participation with the Construction General Permit, including the SWPPP and BMPs. Long-term impacts to surface water and groundwater would be less than significant with participation in the Phase 1 MS4 permit and implementation of the Storm Drainage Master Plan. Additionally, the General Plan Update includes various policies to reduce water quality impacts.

*Cumulative Impact Analysis*  
See water quality discussion under Impact HYD-1. As discussed, the project’s contribution to cumulative short-term construction and cumulative long-term operation impacts on water quality would not be considerable because the project would be required to comply with the NPDES Construction General Permit program and the MS4 Permit to reduce impacts to water quality. Therefore, the project would result in less than cumulative significant water quality impacts.
Mitigation Measures

Project Specific
No mitigation measures are required.

Cumulative
No mitigation measures are required.

Level of Significance After Mitigation

Project Specific
Less than significant impact.

Cumulative
Less than significant impact.

Housing Placement: Flood Hazard Area

| Impact HYD-7 | The project would not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. |

Project Specific Impact Analysis

Development of housing in floodplains places those homes in danger of repeated flooding from sources of flooding. The sources of flooding include the San Joaquin River and a number of foothill creeks that flow into the Planning Area. These include Big Dry Creek and its associated Dry Creek Canal, Redbank Creek, and Fancher Creek. Pup Creek, Alluvial Drain, and Dog Creek are tributaries of these three main creeks. Big Dry Creek is regulated by the Big Dry Creek Dam and Reservoir. Fancher Creek is regulated by Fancher Creek Dam and Fancher Creek Detention Basin. Redbank Creek is regulated by Redbank Dam and Redbank Creek Detention Basin.

The San Joaquin River forms the northern boundary of the Planning Area as well as the northern boundary of Fresno County, in this area. The San Joaquin River is regulated by Friant Dam, which creates Millerton Lake reservoir. The dam was constructed in 1942 to provide flood control to the San Joaquin River and to harvest runoff from the San Joaquin River for irrigation purposes. The dam is administered by the US Bureau of Reclamation.

Big Dry Creek Dam, located north of Shepherd Avenue on the DeWolf Avenue alignment was originally constructed in 1948 by the U.S. Army Corps of Engineers to protect the Cities of Clovis and Fresno from this significant source of flooding. The dam was enlarged in 1993 by the U.S. Army Corps of Engineers as part of the Redbank and Fancher Creek Flood Control Project to provide protection to the communities from the probable maximum flood event from Big Dry Creek. The dam is administered by the Fresno Metropolitan Flood Control District. The Redbank Creek Dam, located on the north side of East Shaw Avenue on the North Indianola Avenue alignment, was constructed in 1961 by the Fresno Metropolitan Flood Control District to reduce flood damage to the City of Fresno resulting from Redbank Creek. The dam and reservoir provide a 0.5 percent exceedence probability, also known as the 200-year recurrence interval, level of protection for the
community. However, the dam does not control significant inflow to Redbank Creek below the dam. Therefore, the U.S. Army Corps of Engineers constructed the Redbank Creek Detention Basin in 1990, which is located north of East McKinley Avenue and on the west side of North DeWolf Avenue. The Redbank Detention Basin provides the community with a 0.5 percent exceedence probability, also known as the 200-year recurrence interval, level of protection. Fancher Creek Dam located at the intersection of East Bullard Avenue alignment and North Newmark Avenue alignment, and along the east side of the Friant Kern Canal, was constructed by the U.S. Army Corps of Engineers in 1991. It provides protection to the community for the 0.5 percent exceedence probability, also known as the 200-year recurrence interval, level of protection on Fancher Creek upstream of the Friant Kern Canal. Significant watershed exists on Fancher Creek below the dam, which could still produce significant flood flows in Fancher Creek. Therefore, the Fresno Metropolitan Flood Control District constructed the Fancher Creek Detention Basin in 2002. The detention basin provides the community with a 0.5 percent exceedence probability, also known as the 200-year recurrence interval, level of protection.

The City of Fresno has participated in the Federal Emergency Management Agency (FEMA) Flood Insurance Program (FIP) since its inception in the early 1970’s. Participation on the FIP requires that the community adopt the Flood Insurance Rate Maps (FIRMs), appoint a trained Floodplain Administrator, adopt a floodplain ordinance modeled after the FIP model ordinance, and enforce the ordinance and the requirements of Title 40 of the Code of Federal Regulations, Part 60. The 40CFR60 regulations and the floodplain ordinance of the City of Fresno require that all new construction and substantial reconstruction of buildings located within an adopted floodplain be flood proofed and that the Community Floodplain Administrator review for conformance with the floodplain ordinance and 40CFR60, and approve the flood proofing. The City of Fresno has a Community Floodplain Administrator and has adopted a floodplain ordinance that complies with the model ordinance promulgated by FEMA.

FEMA has prepared and the City of Fresno has adopted the Flood Insurance Rate Maps (FIRMs) for the Planning Area. The effective FIRM maps were last revised February 18, 2009. Numerous Letters of Map Revision (LOMRs) have been issued since that revision date. The FIRMs show portions of the Planning Area are within numbered and un-numbered Special Flood Hazard Area (SFHA) Zone A. SFHA Zone A means that these areas are within the floodplain of the base flood or 1 percent exceedence probability flood event. The 1 percent exceedence probability flood event is also known as the 100-year recurrence interval flood event (see Exhibit 5.9-1).

The SFHA zone A areas within the Planning Area are located below the bluff line of the San Joaquin River; along Redbank Creek between the Planning Area boundary and Redbank Detention Basin (North DeWolf Avenue and East Clinton Avenue alignment); northeast of State Route 99 between Ventura Avenue on the north, East Jensen Avenue on the south and South Orange Avenue on the east; and north of West Central Avenue between South Walnut Avenue and South East Avenue.

Developing within these areas would require flood proofing the development in accordance with the City of Fresno floodplain ordinance and 40CFR60. Existing housing within these areas would be required to flood proof at such time as significant reconstruction of the housing occurs. Significant
reconstruction is defined as improving the house to a value that meets or exceeds 50 percent of its assessed value.

Additionally, the General Plan Update includes the following policies designed to reduce flood hazards to housing.

**Noise and Safety Element**

**Objective NS-3:** Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

**Policy NS-3-a:** Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

**Policy NS-3-b:** Curb and Gutter Installation. Coordinate with the Fresno Metropolitan Flood Control District (FMFCD) to install curbing, gutters, and other drainage facilities consistent with the Storm Drainage and Flood Control Master Plan.

**Policy NS-3-f:** Flooding Emergency Response Plans: Work with responsible agencies to update emergency dam failure inundation plans, evacuation plans and other emergency response plans for designated flood-prone areas, including the San Joaquin riverbottom.

**Policy NS-3-h:** Runoff Controls. Implement grading regulations and related development policies that protect area residents from flooding caused by urban runoff produced from events that exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities. Place all structures and/or flood-proofing in a manner that does not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

**Policy NS-3-i:** New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

**Policy NS-3-j:** National Federal Flood Insurance Program. Continue to participate in the National Flood Insurance Program (NFIP) by ensuring compliance with applicable requirements. Review NFIP maps periodically to determine if areas subject to flooding have been added or removed and make adjustments to the Land Use Diagram Figure LU-1.

**Policy NS-3-k:** 100-Year Floodplain Policy. Require developers of residential subdivisions to preserve those portions of development sites as open space that may be subject to 100-year flood events, unless the flood hazard can be substantially mitigated by development project design.
Policy NS-3-I: 200-Year Floodplain Protection. Promote flood control measures that maintain natural conditions within the 200-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Discourage construction of permanent improvements that would be adversely affected by periodic floods within the 200-year floodplain, particularly in the San Joaquin riverbottom.

Policy NS-3-m: Flood Risk Public Awareness. Continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation. Remind households and businesses located in flood-prone areas of opportunities to purchase flood insurance.

Along with the Flood Plain Ordinance, implementation of the aforementioned General Plan Update policies would reduce project impacts associated with housing located in a 100-year flood hazard area to less than significant.

Cumulative Impact Analysis
The City of Fresno, the City of Clovis, and the County of Fresno are participants in the FIP and have adopted the FEMA FIRMs. Each has adopted floodplain ordinances that conform to the model floodplain ordinance promulgated by FEMA and have appointed Community Floodplain Administrators to review and approve proposed developments within proposed floodplains in conformance with the floodplain ordinances and 40CFR60 (City of Clovis) (County of Fresno, 2011).

The City of Clovis has adopted the following polices regarding development in floodplains in the City’s 1993 General Plan (DCE The Planning Center, 1993):

Policy 1.1: Minimize risks of personal injury and property damage associated with natural hazards.

Policy 1.2: Provide flood protection for existing development and for areas planned for new development.

Policy 1.3: Utilize the unprotected 100-year floodplain for low density uses such as agriculture, open space, recreation, and for reclaiming water and wetlands.

The County of Fresno has adopted the following policies regarding development in floodplains in the 2000 General Plan Policy Document (County of Fresno, 2000):

Policy HS-A.3: The County shall ensure that the siting of critical emergency response facilities such as hospitals, fire stations, sheriffs’ offices and substations, dispatch centers, emergency operations centers, and other emergency service facilities and utilities are sited and designed to minimize their exposure and susceptibility to flooding, seismic and geological effects, fire, avalanche, and explosions as required by State regulations. Exception to this policy shall be allowed on the condition that the only alternative location would be so distant as to jeopardize the safety of the community, given that precautions are taken to protect the facility.
Policy HS-C.1: The County shall encourage the Fresno Metropolitan Flood Control District to control stormwater flows originating in the streams of the Fresno County Stream Group, generally located east and north of the Fresno-Clovis urban area, by dams or other storage means prior to entering the Fresno-Clovis Metropolitan area.

Policy HS-C.2: The County shall require that the design and location of dams and levees be in accordance with applicable design standards and specifications and accepted design and construction practices.

Policy HS-C.3: The County shall promote a floodplain management approach in flood hazard areas that are presently undeveloped by giving priority to regulation of land uses over development of structural controls as a method of reducing flood damage.

Policy HS-C.4: The County shall encourage the performance of appropriate investigations to determine the 100-year water surface elevations for the San Joaquin River, taking into account recent storm events and existing channel conditions, to identify the potential extent and risk of flooding. New development, including public infrastructure projects, shall not be allowed along the river until the risk of flooding at the site has been determined and appropriate flood risk reduction measures identified.

Policy HS-C.5: Where existing development is located in a flood hazard area, the County shall require that construction of flood control facilities proceed only after a complete review of the environmental effects and a project cost/benefit analysis.

Policy HS-C.6: The County shall promote flood control measures that maintain natural conditions within the 100-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Existing irrigation canals shall be used to the extent possible to remove excess stormwater. Retention-recharge basins should be located to best utilize natural drainage patterns.

Policy HS-C.7: The County shall continue to participate in the Federal Flood Insurance Program by ensuring compliance with applicable requirements.

Policy HS-C.8: During the building permit review process, the County shall ensure project compliance with applicable Federal Emergency Management Agency (FEMA) standards pertaining to residential and non-residential development in the floodplain, floodway, or floodway fringe.

Policy HS-C.9: The County shall prohibit the construction of essential facilities in the 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

Policy HS-C.10: The County shall require that all placement of structures and/or flood proofing be done in a manner that will not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.
Policy HS-C.11: The County shall encourage open space uses in all flood hazard areas. Land Conservation contracts, open space and scenic easements should be made available to property owners.

Policy HS-C.12: The County shall consider dam failure inundation maps of all reservoirs in making land use and related decisions.

Policy HS-C.13: The County shall continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation.

The participation of the Cities of Fresno, Clovis, and Fresno County in the FIP, their adoption of floodplain ordinances, and the implementation of their respective General Plan policies will not place housing that is not flood proofed within documented 100-year floodplains as mapped by the FIP FIRMs and as a result, no cumulative long-term project impacts associated with placing housing in floodplains would occur. Therefore, implementation of the General Plan Update would not be cumulatively considerable, and the impacts would be considered less than significant.

Mitigation Measures

Project Specific
No mitigation measures are required.

Cumulative
No mitigation measures are required.

Level of Significance After Mitigation

Project Specific
Less than significant impacts.

Cumulative
Less than significant impacts.

Structures: Flood Hazard Area

| Impact HYD-8 | The project would not place within a 100-year flood hazard area structures which would impede or redirect flood flows. |

Project Specific Impact Analysis

Placing structures in floodplains puts those structures in danger of repeated flooding from sources of flooding. The sources of flooding within the Planning Area include the San Joaquin River and a number of foothill creeks that flow into the Planning Area. These include Big Dry Creek and its associated Dry Creek Canal, Redbank Creek, and Fancher Creek. Pup Creek, Alluvial Drain, and Dog Creek are tributaries of these three main creeks. Big Dry Creek is regulated by the Big Dry Creek Dam and Reservoir. Fancher Creek is regulated by Fancher Creek Dam and Fancher Creek Detention Basin. Redbank Creek is regulated by Redbank Dam and Redbank Creek Detention Basin.
As discussed in Impact HYD-7, the San Joaquin River is regulated by Friant Dam to provide flood control to the San Joaquin River and to harvest runoff from the San Joaquin River for irrigation purposes. Big Dry Creek Dam protects the Cities of Clovis and Fresno from significant sources of flooding. The dam and reservoir provide a 0.5 percent exceedance probability, also known as the 200-year recurrence interval, level of protection for the community. The Redbank Detention Basin provides the community with a 0.5 percent exceedance probability Fancher Creek Dam also provides protection to the community for the 0.5 percent exceedance probability. The Fancher Creek Detention Basin also provides the community with a 0.5 percent exceedance probability.

Title 40 of the Code of Federal Regulations, Part 60 regulations and the floodplain ordinance of the City of Fresno require that placement and flood provision structures within a floodplain not result in a cumulative change in the floodplain water surface that exceeds one foot. In addition, the regulations under 40CFR60 do not allow placement of structures within a regulatory floodway unless that placement will not result in any increase in the floodplain water surface elevation, meaning that there is no displacement or redirection of the floodway. The City's floodplain ordinance requires that a registered Civil Engineer in the State of California certify that no displacement of floodwater will result from the flood proofing of a structure within a floodplain or a regulatory floodway.

Additionally, the General Plan Update includes the following policies designed to reduce flood hazards to structures.

**Noise and Safety Element**

**Objective NS-3:** Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

**Policy NS-3-a:** Stormwater Drainage and Flood Control Master Plan. Support the full implementation of the FMFCD Storm Drainage and Flood Control Master Plan, the completion of planned flood control and drainage system facilities, and the continued maintenance of stormwater and floodwater retention and conveyance facilities and capacities. Work the FMFCD to make sure its Storm Drainage and Flood Control Master Plan consistent with General Plan.

**Policy NS-3-g:** Essential Facilities Siting Outside of Floodplains. Avoid siting emergency response and essential public facilities, such as fire and police stations, within a 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

**Policy NS-3-h:** Runoff Controls. Implement grading regulations and related development policies that protect area residents from flooding caused by urban runoff produced from events that exceed the capacity of the Storm Drainage and Flood Control Master Plan system of facilities. Place all structures and/or flood-proofing in a manner that does not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

**Policy NS-3-i:** New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of...
approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

**Policy NS-3-j**: National Federal Flood Insurance Program. Continue to participate in the National Flood Insurance Program (NFIP) by ensuring compliance with applicable requirements. Review NFIP maps periodically to determine if areas subject to flooding have been added or removed, and make adjustments to the Land Use Diagram Figure LU-1.

**Policy NS-3-k**: 100-Year Floodplain Policy. Require developers of residential subdivisions to preserve those portions of development sites as open space that may be subject to 100-year flood events, unless the flood hazard can be substantially mitigated by development project design.

**Policy NS-3-l**: 200-Year Floodplain Protection. Promote flood control measures that maintain natural conditions within the 200-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Discourage construction of permanent improvements that would be adversely affected by periodic floods within the 200-year floodplain, particularly in the San Joaquin riverbottom.

**Policy NS-3-m**: Flood Risk Public Awareness. Continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation. Remind households and businesses located in flood-prone areas of opportunities to purchase flood insurance.

Along with the Flood Plain Ordinance, implementation of the aforementioned General Plan Update policies would reduce project impacts associated with structures located in a 100-year flood hazard area to less than significant.

**Cumulative Impact Analysis**

The City of Fresno, the City of Clovis, and the County of Fresno are participants in the FIP and have adopted the FEMA FIRMs. They have adopted floodplain ordinances that conform to the model floodplain ordinance promulgated by FEMA and have appointed Community Floodplain Administrators to review and approve proposed developments within proposed floodplains in conformance with the floodplain ordinances and 40CFR60 (City of Clovis) (County of Fresno, 2011). These floodplain ordinances require that flood proofing of structures does not divert or displacement of floodwater within a floodplain so as to increase the size of the floodplain.

The City of Clovis has adopted the following polices regarding development in floodplains in the City’s 1993 General Plan (DCE The Planning Center, 1993):

**Policy 1.1**: Minimize risks of personal injury and property damage associated with natural hazards.

**Policy 1.2**: Provide flood protection for existing development and for areas planned for new development.
Policy 1.3: Utilize the unprotected 100-year floodplain for low density uses such as agriculture, open space, recreation, and for reclaiming water and wetlands.

The County of Fresno has adopted the following policies regarding development in floodplains in the 2000 General Plan Policy Document (County of Fresno, 2000):

Policy HS-C.3: The County shall promote a floodplain management approach in flood hazard areas that are presently undeveloped by giving priority to regulation of land uses over development of structural controls as a method of reducing flood damage.

Policy HS-C.4: The County shall encourage the performance of appropriate investigations to determine the 100-year water surface elevations for the San Joaquin River, taking into account recent storm events and existing channel conditions, to identify the potential extent and risk of flooding. New development, including public infrastructure projects, shall not be allowed along the river until the risk of flooding at the site has been determined and appropriate flood risk reduction measures identified.

Policy HS-C.5: Where existing development is located in a flood hazard area, the County shall require that construction of flood control facilities proceed only after a complete review of the environmental effects and a project cost/benefit analysis.

Policy HS-C.6: The County shall promote flood control measures that maintain natural conditions within the 100-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Existing irrigation canals shall be used to the extent possible to remove excess stormwater. Retention-recharge basins should be located to best utilize natural drainage patterns.

Policy HS-C.7: The County shall continue to participate in the Federal Flood Insurance Program by ensuring compliance with applicable requirements.

Policy HS-C.8: During the building permit review process, the County shall ensure project compliance with applicable Federal Emergency Management Agency (FEMA) standards pertaining to residential and non-residential development in the floodplain, floodway, or floodway fringe.

Policy HS-C.9: The County shall prohibit the construction of essential facilities in the 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

Policy HS-C.10: The County shall require that all placement of structures and/or flood proofing be done in a manner that will not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

Policy HS-C.11: The County shall encourage open space uses in all flood hazard areas. Land Conservation contracts, open space and scenic easements should be made available to property owners.
The participation of the Cities of Fresno, Clovis, and Fresno County in the FIP, their adoption of floodplain ordinances, and the implementation of their respective General Plan policies would not result in structures diverting or displacing floodwater. As a result, no cumulative long-term project impacts associated with structures in floodplains would occur, and therefore, implementation of the General Plan Update would not be cumulatively considerable. Thus, the proposed project would result in a less than significant cumulative impact.

**Mitigation Measures**

**Project Specific**
No mitigation measures are required.

**Cumulative**
No mitigation measures are required.

**Level of Significance After Mitigation**

**Project Specific**
Less than significant.

**Cumulative**
Less than significant.

**Flooding**

| Impact HYD-9 | The project would not 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. |

**Project Specific Impact Analysis**

Development could occur within flood inundation areas where a dam or levee failure could place structures and people at risk of damage, injury and death due to the sudden nature of the release of floodwater during a failure and the resulting depths and velocities of the floodwater. Sources of flooding due to the failure of a dam or levee within the Planning Area include the San Joaquin River floodplain as a result of the failure of Friant Dam, the Redbank Creek floodplain as a result of the failure of Redbank Creek Detention Basin Dam and levee, and the Fancher Creek floodplain as a result of the failure of Fancher Creek Detention Basin Dam and levee.

Annual inspections of the dams and detention basins are conducted by FMFCD personnel and by DSOD personnel of each jurisdictional dam and detention facility. Annual inspection by the U.S. Army Corps of Engineers and FMFCD are conducted of each facility constructed by the U.S. Army Corps of Engineers as part of the Redbank and Fancher Creeks Flood Control Project. Reports prepared for each inspection note deficiencies that are to be rectified. FMFCD personnel or contractors hired by FMFCD make the repairs noted in the inspection reports each year. In addition, annual maintenance operations include mowing of the dams and detention basins to aid in the visual inspection of the facilities, rodent abatement, and repair of eroded areas (FMFCD, 2013).
The City of Fresno has participated in the Federal Emergency Management Agency (FEMA) Flood Insurance Program (FIP) since its inception in the early 1970’s. Participation on the FIP requires that the community adopt the Flood Insurance Rate Maps (FIRMs), appoint a trained Floodplain Administrator, adopt a floodplain ordinance modeled after the FIP model ordinance, and enforce the ordinance and the requirements of Tile 40 of the Code of Federal Regulations, Part 60. The 40CFR60 regulations and the floodplain ordinance of the City of Fresno require that all new construction and substantial reconstruction of buildings located within an adopted floodplain be flood proofed and that the Community Floodplain Administrator review for conformance with the floodplain ordinance and 40CFR60 and approve the flood proofing. The City of Fresno has a Community Floodplain Administrator and has adopted a floodplain ordinance that complies with the model ordinance promulgated by FEMA.

FEMA has prepared and the City of Fresno has adopted the Flood Insurance Rate Maps (FIRMs) for the Planning Area. The effective FIRM maps were last revised February 18, 2009. Numerous Letters of Map Revision (LOMRs) have been issued since that revision date. The FIRMS show portions of the Planning Area are within numbered and un-numbered SPHA Zone A. SPHA Zone A means that these areas are within the floodplain of the base flood or 1 percent exceedence probability flood event. The 1 percent exceedence probability flood event is also known as the 100-year recurrence interval flood event.

The SFHA Zone A areas within the Planning Area are located below the bluff line of the San Joaquin River; along Redbank Creek between the Planning Area boundary and Redbank Detention Basin (North DeWolf Avenue and East Clinton Avenue alignment); northeast of State Route 99 between Ventura Avenue on the north, East Jensen Avenue on the south and South Orange Avenue on the east; and north of West Central Avenue between South Walnut Avenue and South East Avenue.

Development within dam inundation areas would be required to be flood proof in accordance with the City of Fresno floodplain ordinance and 40CFR60. Existing structures within these areas would be required to be flood proofed at such time as significant reconstruction of the structures occur. Significant reconstruction is defined as improving the structure to a value that meets or exceeds 50 percent of its assessed value.

Additionally, the General Plan Update includes the following policies designed to reduce potential flooding impacts to structures:

*Noise and Safety Element*

**Objective NS-3:** Minimize the risks to property, life, and the environment due to flooding and stormwater runoff hazards.

**Policy NS-3-f:** Flooding Emergency Response Plans. Work with responsible agencies to update emergency dam failure inundation plans, evacuation plans and other emergency response plans for designated flood-prone areas, including the San Joaquin riverbottom.
Policy NS-3-g: Essential Facilities Siting Outside of Floodplains. Avoid siting emergency response and essential public facilities, such as fire and police stations, within a 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

Policy NS-3-i: New Development Must Mitigate Impact. Require new development to not significantly impact the existing storm drainage and flood control system by imposing conditions of approval as project mitigation, as authorized by law. As part of this process, closely coordinate and consult with the FMFCD to identify appropriate conditions that will result in mitigation acceptable and preferred by FMFCD for each project.

Policy NS-3-j: National Federal Flood Insurance Program. Continue to participate in the National Flood Insurance Program (NFIP) by ensuring compliance with applicable requirements. Review NFIP maps periodically to determine if areas subject to flooding have been added or removed, and make adjustments to the Land Use Diagram Figure LU-1.

Policy NS-3-l: 200-Year Floodplain Protection. Promote flood control measures that maintain natural conditions within the 200-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Discourage construction of permanent improvements that would be adversely affected by periodic floods within the 200-year floodplain, particularly in the San Joaquin river bottom.

Policy NS-3-m: Flood Risk Public Awareness. Continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation. Remind households and businesses located in flood-prone areas of opportunities to purchase flood insurance.

Policy NS-3-n: Precipitation Changes. Work with FMFCD to evaluate the planned and existing stormwater conveyance system in light of possible changes to precipitation patterns in the future.

Implementation of the regulatory requirements to operate and maintain dams that are jurisdictional, annual inspections and ongoing maintenance of the dams, participation in the FIP, enforcement of the floodplain ordinance, and implementation of the aforementioned General Plan Update polices would reduce exposure of buildings and people to loss, injury, or loss of life to less than significant.

Cumulative Impact Analysis
There are additional sources of flooding due to levee and dam failure from flood control features that are located east of the Planning Area. These features include Big Dry Creek Dam and reservoir, Little Dry Creek Diversion Levee, Alluvial Drain Detention Basin, Redbank Dam and reservoir, and Fancher Creek Dam and reservoir. Potential failure of these flood control features could result in substantial inundation that could result in significant flooding impacts on existing structures and to people.

Annual inspections of the dams and detention basins are conducted by FMFCD personnel and by DSOD personnel of each jurisdictional dam and detention facility. Annual inspection by the U.S Army Corps of Engineers and FMFCD are conducted of each facility constructed by the U.S. Army Corps of Engineers.
Engineers as part of the Redbank and Fancher Creeks Flood Control Project. Reports are prepared for each inspection that note deficiencies that are to be rectified. FMFCD personnel or contractors hired by FMFCD make the repairs noted in the inspection reports each year. In addition, annual maintenance operations include mowing of the dams and detention basins to aid in the visual inspection of the facilities, rodent abatement, and repair of eroded areas (FMFCD, 2013).

The City of Fresno, the City of Clovis, and the County of Fresno are participants in the FIP and have adopted the FEMA FIRMs. They have adopted floodplain ordinances that conform to the model floodplain ordinance promulgated by FEMA and have appointed Community Floodplain Administrators to review and approve proposed developments within proposed floodplains in conformance with the floodplain ordinances and 40CFR60 (City of Clovis) (County of Fresno, 2011).

The City of Clovis has adopted the following polices regarding development in floodplains in the City’s 1993 General Plan (DCE The Planning Center, 1993):

**Policy 1.1:** Minimize risks of personal injury and property damage associated with natural hazards.

**Policy 1.2:** Provide flood protection for existing development and for areas planned for new development.

**Policy 1.3:** Utilize the unprotected 100-year floodplain for low density uses such as agriculture, open space, recreation, and for reclaiming water and wetlands.

The County of Fresno has adopted the following policies regarding development in floodplains in the 2000 General Plan Policy Document (County of Fresno, 2000):

**Policy HS-A.3:** The County shall ensure that the siting of critical emergency response facilities such as hospitals, fire stations, sheriffs’ offices and substations, dispatch centers, emergency operations centers, and other emergency service facilities and utilities are sited and designed to minimize their exposure and susceptibility to flooding, seismic and geological effects, fire, avalanche, and explosions as required by State regulations. Exception to this policy shall be allowed on the condition that the only alternative location would be so distant as to jeopardize the safety of the community, given that precautions are taken to protect the facility.

**Policy HS-C.1:** The County shall encourage the Fresno Metropolitan Flood Control District to control stormwater flows originating in the streams of the Fresno County Stream Group, generally located east and north of the Fresno-Clovis urban area, by dams or other storage means prior to entering the Fresno-Clovis Metropolitan area.

**Policy HS-C.2:** The County shall require that the design and location of dams and levees be in accordance with applicable design standards and specifications and accepted design and construction practices.
Policy HS-C.3: The County shall promote a floodplain management approach in flood hazard areas that are presently undeveloped by giving priority to regulation of land uses over development of structural controls as a method of reducing flood damage.

Policy HS-C.4: The County shall encourage the performance of appropriate investigations to determine the 100-year water surface elevations for the San Joaquin River, taking into account recent storm events and existing channel conditions, to identify the potential extent and risk of flooding. New development, including public infrastructure projects, shall not be allowed along the river until the risk of flooding at the site has been determined and appropriate flood risk reduction measures identified.

Policy HS-C.5: Where existing development is located in a flood hazard area, the County shall require that construction of flood control facilities proceed only after a complete review of the environmental effects and a project cost/benefit analysis.

Policy HS-C.6: The County shall promote flood control measures that maintain natural conditions within the 100-year floodplain of rivers and streams and, to the extent possible, combine flood control, recreation, water quality, and open space functions. Existing irrigation canals shall be used to the extent possible to remove excess stormwater. Retention-recharge basins should be located to best utilize natural drainage patterns.

Policy HS-C.7: The County shall continue to participate in the Federal Flood Insurance Program by ensuring compliance with applicable requirements.

Policy HS-C.8: During the building permit review process, the County shall ensure project compliance with applicable Federal Emergency Management Agency (FEMA) standards pertaining to residential and non-residential development in the floodplain, floodway, or floodway fringe.

Policy HS-C.9: The County shall prohibit the construction of essential facilities in the 100-year floodplain, unless it can be demonstrated that the facility can be safely operated and accessed during flood events.

Policy HS-C.10: The County shall require that all placement of structures and/or flood proofing be done in a manner that will not cause floodwaters to be diverted onto adjacent property, increase flood hazards to other property, or otherwise adversely affect other property.

Policy HS-C.11: The County shall encourage open space uses in all flood hazard areas. Land Conservation contracts, open space and scenic easements should be made available to property owners.

Policy HS-C.12: The County shall consider dam failure inundation maps of all reservoirs in making land use and related decisions.

Policy HS-C.13: The County shall continue public awareness programs to inform the general public and potentially affected property owners of flood hazards and potential dam failure inundation.
Implementation of the regulatory requirements to operate and maintain dams that are jurisdictional, annual inspections, and ongoing maintenance along with participation FIP and enforcement of the floodplain ordinance, and implementation of the aforementioned General Plan Update polices would reduce potential flooding impacts from dam or levee failure to structures to less than significant. As a result, less than significant cumulative long-term project impacts associated with the exposure of buildings and people to loss, injury, or loss of life to due to flooding or as the result of dam or levee failure would occur. Therefore, implementation of the General Plan Update would not be cumulatively considerable and cumulative impacts would be less than significant.

**Mitigation Measures**

*Project Specific*

No mitigation measures are required.

*Cumulative*

No mitigation measures are required.

**Level of Significance After Mitigation**

*Project Specific*

Less than significant impact.

*Cumulative*

Less than significant impact.

**Seiche, Tsunami, or Mudflow**

| Impact HYD-10 | The project would not create inundation by seiche, tsunami, or mudflow. |

**Project Specific Impact Analysis**

Official Statewide Tsunami Inundation Maps, coordinated by California Emergency Management Agency (CalEMA), are developed for all populated areas at risk to tsunamis in California. According to CalEMA’s MY HAZARD website and Official Statewide Tsunami Inundation Maps, the Planning Area is located outside a tsunami hazard zone.

A seiche is a “standing” wave oscillating in a body of water. This phenomenon occurs in large bodies of water such as bays and lakes. A seiche may occur in any semi- or fully-enclosed body of water. They can be caused by strong winds and earthquakes. The nearest body of water capable of producing a seiche is Big Creek Dry Dam and Reservoir located northeast of the Planning Area. The General Plan Update would not introduce new land uses near the reservoir that could be inundated. Additionally, this is a relatively small reservoir and would not be subject to strong oscillations during an earthquake event.

Fresno is not susceptible to soil erosion with the exception of the San Joaquin River Bluffs. The Bluffs steep slopes and soil composition predispose it to instability and erosion. Adoption of the General Plan Update would not result in a significant increase in development along the Bluffs. The
General Plan Update Noise and Safety Element includes the following objective and implementing policies that would minimize potentially hazardous conditions posed by geologic and soils risks:

**Noise and Safety Element**

**Objective NS-2:** Minimize risks of property damage and personal injury posed by geologic and seismic risks.

**Policy NS-1-a:** Seismic Protection. Ensure seismic protection is incorporated into new and existing construction, consistent with the Fresno Municipal Code.

**Policy NS-2-b:** Soil Analysis Requirement. Identify areas with potential geologic and/or soils hazards, and require development in these areas to conduct a soil analysis and mitigation plan by a registered civil engineer (or engineering geologist specializing in soil geology) prior to allowing on-site drainage or disposal for wastewater, stormwater runoff, or swimming pool/spa water.

**Policy NS-2-d:** Bluff Preservation Overlay Zone. Maintain the requirements of the Bluff Preservation Overlay Zone District, which will include provisions to:

- Require proposed development within 300 feet of the toe of the San Joaquin River bluffs to undertake an engineering soils investigation and evaluation report that demonstrates that the site is sufficiently stable to support the proposed development, or provide mitigations to provide sufficient stability; and

- Establish a minimum setback of 30 feet from the San Joaquin River bluff edge for all future structures and rear yards.

The implementation of the above objective and implementing policies would reduce impacts from mudflows to less than significant.

**Cumulative Impact Analysis**

Future development in areas outside of the Planning Area would not create a potential for inundation of the Planning Area by seiche, tsunami or mudflow. Since no impacts from seiche and tsunami hazards would occur and less than significant mudflow impacts would occur with the implementation of the proposed project, the project’s contribution to cumulative impacts would not be considerable. Therefore, no cumulative seiche or tsunami impacts would occur and less than significant cumulative mudflow impacts would occur with the project.

**Mitigation Measures**

*Project Specific*  
No mitigation measures are required.

*Cumulative*  
No mitigation measures are required.
Level of Significance After Mitigation

Project Specific
Less than significant impact.

Cumulative
Less than significant impact.