

3.6 Hydrology and Water Quality

This section discusses hydrology and water quality issues related to the implementation of the proposed General Plan, including its consistency with applicable local, State, and federal plans, policies, and regulations. Lemoore's position within the regional watershed system, its groundwater basin and surface water drainage system are described, and existing water quality and flooding issues associated with these water bodies are assessed. The potential for future development under the proposed General Plan to cause flooding due to the creation of impervious surface areas, and the potential to affect water pollutant levels and water runoff are analyzed. Water supply and conservation measures are addressed in *Section 3.3 Public Utilities and Services*.

ENVIRONMENTAL SETTING

PHYSICAL SETTING

Hydrology

The Planning Area is located in the San Joaquin Valley Groundwater Basin and the Tulare Lake Subbasin, at the northern end of the former Tulare Lakebed. The northern portion of the San Joaquin Valley drains toward the Delta by the San Joaquin River and its tributaries, the Fresno, Merced, Tuolumne, and Stanislaus Rivers. The southern portion of the valley is internally drained by the Kings, Kaweah, Tule, and Kern Rivers that flow into the Tulare drainage basin including the beds of the former Tulare, Buena Vista, and Kern Lakes. The Tulare Lake Subbasin is bounded on the south by the Kings-Kern county line, on the west by the California Aqueduct, the eastern boundary of Westside Groundwater Subbasin, and Tertiary marine sediments of the Kettleman Hills. It is bounded on the north by the southern boundary of the Kings Groundwater Subbasin, and on the east by the westerly boundaries of the Kaweah and Tule Groundwater Subbasins. The southern half of the Tulare Lake Subbasin consists of lands in the former Tulare Lake bed in Kings County. Average annual precipitation is seven inches throughout most of the subbasin and nine inches at the northern margin.

Well Water Quality

Water quality has been a continuing issue due to the existence of colored water and hydrogen sulfide produced in various in-town wells. Many wells at the City's north well field have arsenic concentrations between 16 and 25 µg/l. The in-town wells have slightly better levels between 3 and 11 µg/l. Most wells are in non-compliance with the latest Environmental Protection Agency (EPA) rule restricting maximum contaminate level (MCL) to 10 µg/l. At present, the Public Works Department is able to control these issues through blending water from different wells and treating them with gaseous or hypochlorite systems. The City has until February, 2009 to meet the State's arsenic requirements.

Groundwater Recharge

Groundwater recharge occurs primarily through the wetlands in the western portion of the Planning Area, and from deep percolation of applied irrigation water and rainfall. The rate of recharge depends on the permeability of the surface and subsurface materials. As land is covered with roads, buildings and parking lots, the amount of rainfall that can infiltrate into the soil is reduced. At this time, the City does not have a specific groundwater recharge program.

Surface Water Features

Major water features located within the Planning Area are portrayed in **Figure 3.6-1**, along with the flooding hazards. These features are primarily irrigation ditches and canals which provide important water conveyance and drainage for the City (some may be in pipes below ground). Lemoore Canal, a prominent irrigation and drainage feature in the region, runs north-south, forming the eastern border of the Planning Area. The Kings River, which flows between the City and Naval Air Station Lemoore and is the primary source of irrigation water for the Planning Area, is regulated by the Pine Flat Dam, located east of Fresno. The wetlands in the western portion of the Planning Area are another important surface water feature, particularly as concerns the maintenance of groundwater quality. These wetlands are described in more detail in Section 3.5.

The surface water supplies are managed by the following irrigation companies and water districts:

- *Lemoore Canal and Irrigation Company.* Although not a water district or public agency, the Lemoore Canal and Irrigation Company owns, maintains and operates surface water canals near and within the City of Lemoore. The activities of this company affect groundwater levels and usage in the Lemoore area. The City maintains a minor share of the company which allows it to discharge stormwater into its canals for transport to city-owned wetlands and other agriculture areas. Additionally, this ownership gives the City water rights for irrigation of the municipal golf course.
- *Kings County Water District.* The Kings County Water District (KCWD) manages surface water supply east of the City and groundwater directly up-gradient of the Planning Area. It is a legal entity formed to provide water management in the northeast portion of Kings County. Since 1954, the KCWD has monitored groundwater levels, implemented programs to recharge basins, conserve water, increase water supply, and prevent water waste in the County.
- *Laguna Irrigation District.* The Laguna Irrigation District (LID) is located up-gradient of the Planning Area. LID manages the 80-acre well field north of the City. The City has an agreement with the District which limits the City's pumping to 3,380 acre-feet per year (the 1994 base year amount); prohibits the City from building a second distribution pipe from the field; prohibits additional wells to be drilled; and describes a jointly-held fund to be used to purchase groundwater recharge supplies.

Erosion and Water Quality

In the Lemoore Planning Area the majority of soils are moderately or highly susceptible to erosion. (See *Section 3.9 Seismic and Geologic Hazards* for more information). Soil-disturbing activities such as construction and agriculture increase the risk of erosion. When soils are loosened and bare of vegetation, they become sediment which can enter the water system as a

pollutant. This causes degradation of aquatic and riparian ecosystems; pollutant transport; and sedimentation within waterways and public facilities (i.e. storm drains).¹

Nonpoint Pollution Sources

During periods of wet weather, rain carries pollutants and sediments from all parts of a watershed into surface water bodies such as storm drains, streams, rivers, reservoirs, or marshes. In an urban setting, natural drainage patterns have been altered and storm water runoff, as well as non-storm discharge (irrigation water, accidental spills, wash-down water, etc.), picks up sediments and contaminants from land surfaces, and transports these pollutants into surface and ground water. The diffused sources of pollutants range from: parking lots, bare earth at construction sites, agricultural sites, and a host of many other sources. Therefore, storm water discharged to surface waters may carry pollution from “nonpoint” sources. The total amount of pollutants entering aquatic systems from these diffused, nonpoint sources is now generally (nationally) considered to be greater than that from any other source, such as pipe discharges (point source). This source of pollution will increase in Lemoore as the City paves more roadway, generates more traffic, and creates more impermeable building surfaces.

Storm and Surface Water Drainage

As land areas are developed, natural drainage patterns are modified as runoff is channeled into road gutters, storm sewers and paved surfaces. These changes concentrate the volume of runoff in drainage systems and increase the speed of flow.² Higher runoff rates also increase the erosion risk in the drainage system.

In the Planning Area, storm and urban runoff drainage is provided by irrigation ditches, canals, storm drains, and temporary storage basins. *Title 8, Chapter 4, Storm and Surface Water Drainage Systems*, of the City Code details the City’s rules, regulations and impact fees. The Lemoore Public Works Department generally maintains drainage facilities within the public right of way, on public easements and on property owned in fee by the City. Components of the drainage system on private property, or within private drainage easements, are maintained by the underlying property owner or other private party.

Storm Drainage Master Plans: Compilation of Various Sub-Area Studies was published for the City of Lemoore in 1999. The analysis contained in this report was completed between 1987 and 1998. The City is broken down into thirteen sub-areas in order to properly design or modify facilities more effectively. However, the southern portion of the City has not been studied. The report contains standards for hydrologic design, including a 10-year, 10-day storm capacity for detention ponds. At the time of analysis, most of the sub-areas did not provide sufficient capacity. However, the recommended improvements have been implemented as new development has been built. Much of the new development is drained through detention basins prior to ultimate disposal. The City has, additionally, acquired and developed a 600-acre wetlands storm drainage

¹ California Stormwater Quality Association, *Construction Handbook*, 2004.

² California Stormwater Quality Association, *Construction Handbook*, 2004.

disposal area to which most of the City's stormwater is routed via irrigation canals and ditches.³ The Storm Drainage Master Plan will be updated after the General Plan is adopted.

Flooding

Storm water disposal capacity is a function of the volume of discharged water and the rate at which the water moves through a particular system. When the capacity of the ditches, canals and/or pipelines of a drainage system are not sufficient or flow rates are low, drainage system efficiency is reduced and flooding can occur. Flooding can cause drowning, destroy buildings, and wash away public facilities, roads, crops, and soil. The disruption of sewage treatment services during flooding is a particular concern, since it can cause deterioration of drinking water quality and severely impact public health. Floodwaters may facilitate the proliferation of mildew, bacteria, and other disease vectors.

Historically, floods have been the major cause of disaster in Kings County. The primary cause of local flooding is the drainage pattern in the Tulare Lake Basin, in southern Kings County. This area has no outlet to the ocean unless the water is pumped by artificial means out of the Tulare Lake Basin.⁴ Near Lemoore the floodplains are on the western edge of Planning Area near the wetlands. There are 1,710 acres of the Planning Area in the 100-year floodplain, and only 764 acres in the 500-year floodplain.⁵ In 2006, four percent of the total urban uses were in the 100-year floodplain. There was no development in the 500-year floodplain.

Inundation Hazards

A flood inundation analysis performed for the Pine Flat Dam by the U.S. Army Corps of Engineers indicates the potential effects of dam failure on the downstream floodplain covers the entire Planning Area. However, potential flood waters would not reach the Planning Area for hours. The extremely low probability of dam failure, large volume of flood water available for dilution of potential pollutants, and the relatively long warning period to prepare, indicate that inundation due to dam failure would not have a significant impact to the Planning Area.

³ Linda Norton, Quad Knopf, personal communication, August 7, 2007.

⁴ Kings County, General Plan Safety Element, Website: http://ceres.ca.gov/planning/genplan/kings/safety_elem.html, August 2, 2007.

⁵ The City has submitted an application to FEMA for a change in the 100-year floodplain boundary to reflect City improvements. This proposed change has not been incorporated into FEMA published maps and is not included in the acreage calculation. When GIS digital files are available, the flood hazard maps will be updated.

Figure 3.6-1: Water Resources and Flooding Hazards

BACK

REGULATORY SETTING

Water in California is managed by a complex network of federal and state regulations. California administers rights to surface water at the state level, but not rights to groundwater, which is managed under a variety of authorities, including local governments. Major regulatory policies pertaining to domestic water management are summarized below.

Federal Regulations

U.S. Environmental Protection Agency. The U.S. EPA is responsible for researching and setting national standards for a variety of environmental programs, and delegates to states the responsibility for issuing permits and for monitoring and enforcing compliance.

Clean Water Act. The Clean Water Act is the principal federal law that addresses water quality. The objective of the act is “to restore and maintain the chemical, physical, and biological integrity of the nation’s waters.” This includes the regulation of pollutant discharges to surface water, financial assistance for public wastewater treatment systems, technology development, and non-point source pollution prevention programs. The Clean Water Act also requires that states adopt water quality standards to protect public health and welfare and enhance the quality of water.

Section 303(d) of the Clean Water Act - Total Maximum Daily Load (TMDL). California has identified waters that are polluted and need further attention to support their beneficial uses. These water bodies are listed pursuant to Clean Water Act Section 303(d), which requires states to identify these polluted waters. Specifically, Section 303(d) requires that each state identify water bodies or segments of water bodies that are “impaired” (i.e., not meeting one or more of the water quality standards established by the state). Approximately 500 bodies of water or segments have been listed in California. Once the water body or segment is listed, the state is required to establish “Total Maximum Daily Load” (TMDL) for the pollutant causing impairment. The TMDL is the quantity of a pollutant that can be safely assimilated by a water body without violating water quality standards. Listing a water body as impaired does not necessarily suggest that the pollutants are at levels considered hazardous to humans or aquatic life or that the water body segment cannot support beneficial uses. The intent of the 303(d) list is to identify the water body as requiring future development of a TMDL to maintain water quality and reduce the potential for continued water quality degradation.

Water Pollution Control Act. The Water Pollution Control Act requires discharges from point and non-point sources into navigable water to meet stringent NPDES permit standards. The U.S. EPA has published regulations establishing requirements for application of stormwater permits for specified categories of industries, municipalities, and certain construction activities. The regulations require that discharges of stormwater from construction activity of one acre or more must be regulated and covered by a NPDES permit and that the applicant must develop and implement a Storm Water Pollution Prevention Plan (SWPPP) to control non-point pollution.

Federal Safe Drinking Water Act. The Safe Drinking Water Act (SDWA), administered by the U.S. EPA in coordination with the states, is the main federal law that ensures the quality of drinking water. Under the SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards.

US EPA's California Toxics Rule (CTR) was promulgated in 2000. The criteria largely reflect the existing criteria contained in US EPA's 304(a) Gold Book (1986) and its National Toxics Rule (NTR) adopted in December 1992 [57-Federal Register 60848], and those of earlier state plans (the *Inland Surface Waters Plan* and the *Enclosed Bays and Estuaries Plan* of April 1991 has since been rescinded). With promulgation of the Final CTR, these federal criteria are legally applicable in the State of California for inland surface waters, enclosed bays and estuaries for all purposes and programs under the Clean Water Act.

California State Regulations

The State (SWQCB) and Regional Water Quality Control Boards (RWQCB) hold the primary responsibility for the protection and enhancement of water quality in California. The SWRCB provides state-level coordination of the water quality program and establishes statewide policies and plans for the implementation of State and federal laws and regulations. SWRCB has recently released the *California Water Plan Update 2009*.

NPDES Permit Program. The SWRCB administers the National Pollution Discharge Elimination System (NPDES) Permit Program through its General NPDES Permit. Construction activities of one-acre or more are subject to the permitting requirements of the NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction Activity (General Construction Permit). A project sponsor must submit a Notice of Intent to the SWRCB in order to be covered by the General Permit prior to the commencement of construction. The General Construction Permit requires the preparation and implementation of a storm water pollution prevention plan (SWPPP), which must be prepared before construction begins. Components of SWPPPs typically include specifications for best management practices (BMPs) that must be implemented during project construction in order to minimize the discharge of pollutants in storm water from the construction area. In addition, a SWPPP includes measures to minimize the amount of pollutants in runoff after construction is completed, and identifies a plan to inspect and maintain project BMPs and facilities.

NPDES C.3 Permit Requirements. Provision C.3 of the General NPDES Permit governs storm drain systems and regulates post-construction stormwater runoff. The provision requires new commercial, industrial and residential development projects that create one or more acres of impervious areas to reduce the pollutant load in stormwater discharges and to manage runoff flows. This can be accomplished by incorporating treatment measures and other appropriate source control and site design features. Redevelopment projects on previously developed sites that result in the addition or replacement of 10,000 square feet or more of impervious surface are also subject to the C.3 permit requirements. C.3 provisions also require preparation of a hydrograph modification management plan (HMP) to ensure that post-project runoff does not exceed pre-project discharge rates.

Water Code. Division 7 of the California Water Code (Porter-Cologne Act) establishes a program to protect water quality and beneficial uses of state water resources and includes groundwater and surface water. The State Water Resources Control Board and the Regional Water Quality Control Boards (RWQCBs) are the principal state agencies responsible for control of water quality.

Health and Safety Code. The Health and Safety Code provides for protection of ground and surface waters from hazardous waste and other toxic substances.

Fish and Game Code. The Fish and Game Code has provisions to prevent unauthorized diversions of any surface water and discharge of any substance that may be deleterious to fish, plant, animal, or bird life. The CDFG, through provisions of the California Fish and Game Code (Sections 1601 through 1603), is empowered to issue agreements for any alteration of a river, stream, or lake where fish or wildlife resources may be adversely affected. The presence of a channel bed and banks, and at least an intermittent flow of water define streams (and rivers). CDFG regulates wetland areas only to the extent that those wetlands are part of a river, stream, or lake as defined by CDFG.

Food and Agriculture Code. The Food and Agriculture Code provides for the protection of groundwater that may be used for drinking water supplies.

Code of Regulations (CCR). The California Code of Regulations also contains administrative procedures for the State and RWQCBs in Title 23 and for water quality for domestic uses, wastewater reclamation, and hazardous waste management in Title 22. Surface water quality is the responsibility of the RWQCB, water supply and wastewater treatment agencies, and city and county governments. The principal means of enforcement by the RWQCB is through the development, adoption, and issuance of water discharge permits.

Department of Health Services. A major component of the State Department of Health Services, Division of Drinking Water and Environmental Management, is the Drinking Water Program which regulates public water systems. Regulatory responsibilities include the enforcement of the federal and state Safe Drinking Water Acts, the regulatory oversight of public water systems, issuance of water treatment permits, and certification of drinking water treatment and distribution operators.

Department of Water Resources. The State Department of Water Resources (DWR) is responsible for preparing and updating the California Water Plan, which is a policy document that guides the development and management of the State's water resources. The plan is updated every five years to reflect changes in resources and urban, agricultural, and environmental water demands. Besides human consumption, the DWR oversees the utilization of water for habitat management, recreation, groundwater recharge, and the maintenance of water quality.

Local and Regional Regulations

Regional Water Quality Control Boards (RWQCB). The RWQCBs adopt and implement water quality control plans that recognize the unique characteristics of each region. The Lemoore Planning Area is within the jurisdiction of the Central Valley RWQCB. To implement the State Water Plan, the RWQCB regulates all municipal wastewater discharges to protect the quality and beneficial uses of ground water and surface water resources, to maximize reclamation and reuse, and to eliminate waste associated health hazards.

Kings County Floodplain Management Program. Kings County maintains a floodplain management program which is implemented through Chapter 5A of the Kings County Code of Ordinances (Flood Damage Prevention)

City of Lemoore Storm Drainage Master Plan: Compilation of Various Sub-Area Studies 1999. This plan compiles various studies from 1987 to 1999 which analyze the existing storm drainage facilities and establishes design guidelines.

City of Lemoore Municipal Code, Title 7, Chapter 7, Water and Sewer Regulations; Title 8, Chapter 4, Storm and Surface Water Drainage System; Title 8, Chapter 8, Flood Damage Prevention contain the City's regulations regarding hydrology, storm drainage, and flooding.

IMPACT ANALYSIS

SIGNIFICANCE CRITERIA

Implementation of the proposed General Plan would have a potentially significant impact if it would:

- Violate water quality standards;
- Alter existing drainage patterns of the area, including stream or river course, in a manner which would result in substantial erosion or siltation on- or offsite or increase sediment loads thereby affecting water quality;
- Increase substantially nonpoint-source pollution entering storm water runoff and entering the regional storm drain system or surrounding water resources (from either construction or long-term development);
- Increase substantially construction-related erosion (including erosion from cut-and-fill slopes) and sedimentation into surface waters;
- Disrupt a creek or stream channel;
- Increase rates and amounts of runoff due to additional impervious surfaces, higher runoff values, or alterations to drainage systems that could cause potential flood hazards;
- Result in the construction of new storm water drainage facilities or expansion of existing facilities, which could cause significant environmental effects;
- Reduce rates of groundwater recharge due to the increased amount of impervious surfaces;
- Make storm drainage systems inadequate to accommodate 100- year flood flows; or
- Result in development within the 100-year flood zone.

METHODOLOGY AND ASSUMPTIONS

This analysis evaluated buildout under the proposed Lemoore General Plan and effects on hydrologic conditions within the Planning Area after accounting for applicable State and federal laws, regulations and guidelines. The proposed General Plan will facilitate development and growth in the Planning Area which will affect water quality, storm drainage, and groundwater recharge. Also evaluated are potential increases in hazardous materials use, creation of new impervious surface area, erosion associated with future construction activities, and other results of growth. The analysis assumes physical impacts and indirect effects are attributable to new

residential, commercial, and industrial development and its associated infrastructure, as mitigated by “best practices” for environmental protection.

SUMMARY OF IMPACTS

Construction and post-construction activities associated with the buildout of the proposed General Plan could result in specific water quality, stormwater drainage, and flooding impacts, such as dewatering, increased nonpoint source pollutant discharges, erosion, and alterations to drainage patterns and reductions to groundwater recharge by increasing impervious surfaces. These impacts are considered less than significant given the regulatory requirements and standards to which existing and future development must comply. Additionally, General Plan policies have been proposed to ensure potential environmental effects remain less than significant.

IMPACTS AND MITIGATION MEASURES

Impact

3.6-1 Implementation of the proposed General Plan could indirectly contribute to violations of water quality standards. (*Less than Significant*)

Implementation of the proposed General Plan would increase the population through urban development over the next 23 years. This increase in population as well as increase in employment would result in a greater demand for water supplies, increased wastewater generation, and increased need for effluent disposal. The City has been given until February 2009 to meet the State’s arsenic requirements for its existing wells.

To accommodate continued growth while meeting arsenic standards, the City has undertaken several steps after determining that treatment of the north wellfield supply was not economically feasible. The City:

- Drilled a “substitute” well in the north wellfield designed to draw from lower-arsenic strata, albeit with lower production capacity.
- Planned for modification of an existing north wellfield well to reduce arsenic concentrations in its produced water.
- Planned for the construction of additional deep wells in the southwest area of the City, an area in which low-arsenic water production has resulted in new wells.
- Authorized funding and design for a cross-town transmission main to enable the entire community to be served by southwest area wells.

Implementation of the above mentioned steps will assure the long-term supply of groundwater meet EPA and State water quality standards.

Another possibility to improving water quality is to use surface water to supplement groundwater. Mixing filtered surface water with existing water supplies dilutes the arsenic to within the State allowable standard. The City has a continuing agreement with the City of

Hanford and Kings County Water District, and has gained the informal support of Lemoore Naval Air Station, to identify new water resources.

In addition to existing water contamination issues, runoff from dewatering and new development could contain additional contaminants that may infiltrate the aquifer. In some locations particularly near the wetlands, construction or excavation activities could encounter saturated soil conditions and require dewatering. Dewatering could result in the temporary draw-down of the localized water table.

Proposed General Plan Policies that Reduce the Impact

The following proposed General Plan policies will ensure that Lemoore’s water supplies meet all federal and State standards, so that impacts on water quality are less than significant. No additional mitigation is needed.

PU-I-2 Provide and maintain a system of water supply distribution facilities capable of meeting existing and future daily and peak demands, including fire flow requirements, in a timely and cost effective manner.

PU-I-3 Monitor the demands on the water system and, as necessary, manage development to mitigate impacts and/or facilitate improvements to the water supply and distribution systems.

COS-I-16 Develop programs to monitor the quality of local groundwater and runoff that discharges directly into waterways to prevent pollution, in conjunction with federal, State, local agencies, and the private sector.

COS-I-17 Protect groundwater recharge areas by carefully regulating the type of development within and adjacent to these areas.

Conditions of approval may include the limitation of structural coverage and impervious surfaces and prohibition of uses with the potential to discharge harmful pollutants, increase erosion, or create other impacts degrading water quality.

COS-I-21 Require developers to construct and maintain permanent water control facilities (storm water basins or retention ponds) for new development in the Westside and other areas deemed necessary by the City Engineer, to control storm water and protect areas from flooding. Facilities shall incorporate the following:

- A fenced “low-flow” area to contain potential contaminants;
- Regularly-tilled top soil to maintain good percolation;
- When feasible, storm drainage facilities to channel water into the re-created wetlands which currently lack sufficient water to survive; and
- Other design features consistent with the Regional Water Quality Control Board’s Best Management Practices.

Soils at the bottom of retention ponds will be periodically checked for concentrations of contaminants. Contaminated soil will be disposed in an environmentally-friendly manner.

- COS-I-23 Continue to prohibit septic tanks and drain fields to prevent pollution of subsurface water resources.
- COS-I-45 Utilize more plants and trees in public area landscaping, focusing on those that are documented as more efficient pollutant absorbers.

Impact

3.6-2 Implementation of the proposed General Plan would result in substantially increased nonpoint source pollution entering storm water runoff and entering the regional storm drain system or surrounding water resources (from either construction or long-term development). (*Less than Significant*)

At buildout, the area designated for urban uses will increase 67 percent over existing conditions. Along with construction-related activities, landscaping chemicals, cleaning solvents, paint, litter, pet waste, accumulation of petroleum products and metals in parking lots and streets, and other debris are all sources of pollutants in stormwater and surface water runoff. Nonpoint source pollution has a cumulative negative impact on water quality in urban areas. However, compliance with Central Valley RWQCB standards and permit requirements on the use of best management practices (BMPs) and prohibitions of uncontrolled dumping will minimize the effects of these nonpoint sources.

Proposed General Plan Policies that Reduce the Impact

The following proposed General Plan policies will ensure that Lemoore's water quality is not substantially affected by increased nonpoint source pollution, so that the non-point source impacts of General Plan buildout are less than significant.

- PU-I-7 Require all major new development projects with more than 200,000 square feet of floor area overall to have a water management plan, in accordance with State law:
- Large projects will be required to submit planting plans, irrigation plans, schedules, and water use estimates for City approval prior to issuance of building permits;
 - Industrial projects will be required to submit water recycling plans and irrigation plans for proposed landscaping.

Pursuant to policies under Water Conservation in Chapter 7: Conservation and Open Space, the City will establish water conservation standards and guidelines so that conservation efforts are addressed early in the design process. This requirement will apply to phased development where the total floor area would exceed 200,000 square feet.

- COS-I-24 Control use of potential water contaminants through inventorying hazardous materials used in City operations, listing possible changes that can be made, educating City employees, and designing and implementing a replacement/reduction program.
- COS-I-25 Reduce the use of pesticides, insecticides, herbicides, or other toxic chemical substances by households and farmers by providing education and incentives for Integrated Pest Management (IPM) practices.

IPM is an approach to plant care that uses biological controls instead of, or in conjunction with, chemical controls. IPM does not eliminate the use of pesticides and other chemical controls, but it strives to use them as sparingly as possible. Utilize regional resources such as the UC Davis Extension for informational materials and technical support.

In addition to the above, Policy COS-I-16 mentioned in Impact 3.6-1 also help to reduce this impact to a less than significant level. No additional mitigation is needed.

Impact

3.6-3 Implementation of the proposed General Plan would result in storm drainage systems being inadequate to accommodate 100-year flood flows. (Less than Significant)

According to the 1999 Storm Drain Master Plan, most areas of the City have inadequate storm drainage to accommodate 100-year flood flows. Improvements have been implemented as new development is built, but additional improvements and expansions of the storm drain system will be necessary to provide adequate services to new development in the Planning Area. These improvements will require excavation and trenching, which, in turn, could have project-specific environmental effects.

Proposed General Plan Policies that Reduce the Impact

The following proposed General Plan policies will ensure that adequate storm drainage systems are built to accommodate new growth in the Lemoore Planning Area, and that potential impacts on storm drainage systems are less than significant.

- COS-I-18 Update, monitor, and implement the City's Storm Drainage Master Plan.

As part of the Master Plan, the City will update storm drain maps to identify locations where easements should be reserved for the eventual installation of pipes and structures to ensure appropriate system management.

- COS-I-19 Establish and implement a storm drainage fee in conjunction with the recreation impact fee to acquire and develop combined pond basin/park sites and/or other drainage facilities to mitigate growth impacts.

- COS-I-20 Require temporary on-site storm drainage basins in subdivisions and other development proposals, if needed, until storm drainage plans for that area are completed and formal connections are implemented. Design should take into consideration the properties of soils on the site.
- COS-I-22 Require on-site storm drainage to drain away from the streets in areas with no curbs and gutters.
- SN-I-8 Require all new development within a flood zone to comply with the City's Flood Damage Prevention Ordinance.
- SN-I-9 Identify and remedy deficiencies in the existing storm drainage infrastructure in partnership with regional and federal agencies.
- The City will continually plan for and upgrade storm drainage facilities to meet future drainage needs in cooperation with the Lemoore Canal and Irrigation Company, California Department of Transportation, and other regional and federal agencies.*
- LU-I-6 Create, maintain, or upgrade Lemoore's public and private infrastructure to support future land use and planned development under the General Plan.
- Infrastructure needs include fiber optic and/or wireless communication systems, along with streets, water, sewer, storm drainage, electricity, natural gas, telephone, and cable.*
- LU-I-7 Require new development to pay its fair share of the costs of public infrastructure, services and transportation facilities, in accordance with State law.
- These may include parks, fire and police stations, schools, utilities, roads or other needed infrastructure.*
- LU-I-8 Allow development only when adequate public facilities and infrastructure are available or planned in conjunction with use, consistent with the traffic level of service (LOS) standards and other standards for public facilities and services established in this Plan.

No additional mitigation is needed.

Impact

- 3.6-4 Implementation of the proposed General Plan would result in increased rates and amounts of runoff due to additional impervious surfaces, higher runoff values, or alterations to drainage systems that could cause potential flood hazards. (*Less than Significant*)**

Impervious cover is defined as the sum total of all hard surfaces within a watershed including rooftops, parking lots, streets, sidewalks, driveways, and surfaces that are impermeable to infiltration of rainfall into underlying soils/groundwater. New development results in additional

hard surfaces which prevent or slow stormwater infiltration and cause increased runoff discharge rates and flow durations. Development may also cause erosion resulting in siltation of natural and manmade water channels and reduction of their capacity to accommodate storm water. Changes in existing drainage patterns through grading can also alter sheetflow and surface water flow levels and patterns potentially overwhelming downstream capacity and resulting in flooding.

At buildout, the area designated for urban uses will increase 67 percent over existing conditions. However, the proposed General Plan also increases parkland by more than 160 percent, plus 207 acres are designated as greenways, 655 acres designated as wetlands and about 3,240 acres of agricultural lands are preserved. In addition, 186 acres are designated as Rural/Agriculture which should have limited impervious coverage even though this designation is considered part of the urban area. Improvements and expansions of the storm drain system required by the General Plan (see Impact 3.6-3) would likely be sufficient to ensure increased runoff does not result in flooding.

Proposed General Plan Policies that Reduce the Impact

The following proposed General Plan policies will ensure that the Planning Area is not subject to substantially increased runoff and related flood hazards. These policies, in addition to those listed under Impact 3.6-3, will help ensure that the impact from increased runoff is less than significant.

CD-I-59 Require new development to reduce storm water run-off, control water pollution, and promote water recharge through sustainable hydrological design. Measures should include, but are not limited to, the following:

- Reducing imperviousness by limiting building footprint, using permeable paving or landscaping to break up expanses of impervious surfaces;
- Using canopy trees or shrubs to absorb rainwater and slow water flow;
- Removing curbs and gutters from streets and parking areas, where appropriate, to allow storm water sheet flow into vegetated areas;
- Incorporating drainage design into the infrastructure, including roof downspouts, retention cells, or infiltration trenches, to filter and direct storm water into vegetated areas or water collection devices; and
- Requiring the installation of sub-surface water retention facilities (for large development) to capture rainwater for use in landscape irrigation and non-potable uses.

No additional mitigation is needed.

Impact

3.6-5 Implementation of the proposed General Plan would result in reduced rates of groundwater recharge due to the increased amount of impervious surfaces. (*Less than Significant*)

The majority of groundwater recharge comes from precipitation and the wetlands in the western portion of the Planning Area, with incidental percolation occurring in unlined irrigation canals. Efficient recharge from precipitation depends on a variety of conditions, including large areas of permeable surfaces free from oil and grease and relatively slow flow of water across that surface so that infiltration of water into groundwater basins can occur.

Urban uses generally limit groundwater recharge. Areas with 75 percent impervious surface coverage allow less deep infiltration of water to the aquifer than areas with natural groundcover (five percent vs. 25 percent) and less shallow infiltration (10 percent vs. 25 percent)⁶ Increased development reduces the amount of permeable surfaces suitable for recharge, increases runoff and the subsequent flow of water in streams, and increases the amount of oil and grease and other non-point source pollutants that enter streambeds and other recharge areas.

At buildout, the area designated for urban uses will increase 67 percent over existing conditions. Areas that usually allow groundwater recharge, such as parks, wetlands, greenways, and agriculture/rural residential, and agriculture lands will total approximately 4,400 acres or about 36 percent of the Planning Area. While the area for groundwater recharge will be more limited, it should not significantly affect the aquifer or cause an overdraft of groundwater resources (see Section 3.3: Public Utilities and Services for analysis of water supply).

Proposed General Plan Policies that Reduce the Impact

The following proposed General Plan policies, in addition to policies listed under impacts above, will ensure that impacts from General Plan buildout on groundwater recharge are less than significant.

- PU-I-4 Continue to support the Laguna Irrigation District's ground water recharging (water banking) efforts, in consultation with the State Department of Water Resources and county water management authorities.

Water banking is a technique where water that is not immediately needed is stored – typically in underground aquifers – for future use. The Laguna Water District currently stores excess water from the Kings River.

- CD-I-32 Promote the innovative treatment of parking areas in order to reduce their negative environmental impact and avoid the appearance of a “sea of asphalt”. Strategies include but are not limited to:

⁶ California Water & Land Use Partnership, “How Urbanization Affects the Water Cycle,” <http://www.coastal.ca.gov/nps/watercyclefacts.pdf>

- Maximize shading with large trees planted throughout the parking area as well as along streets, sidewalks, and pathways;
- Separate pedestrian pathways from car lanes where possible; and
- Use porous paving and a variety of drainage features according to the site.

No additional mitigation is needed.

Impact

3.6-6 Implementation of the proposed General Plan would result in development within the 100-year flood zone. (*Less than Significant*)

At buildout, 449 acres of urban uses (six percent of all urban uses) will be in the 100-year floodplain.⁷ This represents a 147 percent increase from the amount of urban uses in the floodplain in 2006 (182 acres). This proposed development includes an industrial expansion of Leprino Foods and some residential development north of Cinnamon Drive and east of SR-41. It is anticipated that over 100 acres of parkland in West Lemoore will also serve as flood detention basins in order to minimize adverse impacts. There is no planned development within the 500-year floodplain. All development within the FEMA-designated floodplains is subject to *Title 8, Chapter 8: Flood Damage Prevention* of Lemoore’s Municipal Code.

Table 3.6-1 Urban Uses within Floodplains

Floodplain	2006 Urban Uses in Floodplain (Acres)	2030 Urban Uses in Floodplain (Acres)	Percent of All Urban Uses (2030)
100-year	182	449	6.0
500-year	-	-	0

Source: Federal Emergency Management Agency, 1995. Dyett & Bhatia, 2007.

Proposed General Plan Policies that Reduce the Impact

The following proposed General Plan policies will ensure that new development within the 100-year floodplain will meet all State and federal regulations for minimizing impacts on people, hydrology, and local drainage patterns, so that the impact from General Plan buildout is less than significant.

- SN-I-10 Require new development to prepare hydrologic studies and implement appropriate mitigation measures to minimize surface water runoff and reduce the risk of flooding.

⁷ The City has submitted an application to FEMA for a change in the 100-year floodplain boundary to reflect City improvements. This proposed change has not been incorporated into FEMA published maps and is not included in the acreage calculation. When GIS digital files are available, the flood hazard maps will be updated.

Chapter 3: Settings, Impacts, and Mitigation Measures

Developers will be required to provide an assessment of a project's potential impacts on the local storm drainage system as part of the development review process. If development is found to have a negative impact on storm drainage, mitigation measures such as the creation of permanent or temporary detention or retention basins, provision of additional landscaped areas, installation of pump stations, and the use of permeable paving in driveways and parking areas, may be required.

SN-I-11 Require developers to provide for the ongoing maintenance of detention basins.

Maintenance may be by the City under contract or by a private entity. If wetlands are affected, maintenance of detention basins will include mitigation monitoring in compliance with regulatory requirements.

Policy SN-I-8 and SN-I-9 listed under Impact 3.6-3 also helps to reduce this impact. No additional mitigation is needed.

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