SECTION 5.11
HYDROLOGY, DRAINAGE, AND WATER QUALITY

5.11 HYDROLOGY, DRAINAGE, AND WATER QUALITY

This section evaluates the hydrology, drainage, and water quality conditions within the City of San Bernardino and evaluates the potential for impacts associated with implementation of the proposed project. Mitigation measures to reduce the significance of impacts are recommended, as necessary. Information in this section is based on the following chapters of the *City of San Bernardino General Plan Public Facilities and Services*, *Utilities*, and *Safety* Elements, as well as the 2005 Urban Water Management Plan, and the *County of San Bernardino Multi-Jurisdictional Hazard Mitigation Plan* (April 2005).

5.11.1 REGULATORY SETTING

SAFE DRINKING WATER ACT

The Federal Safe Drinking Water Act (SDWA) provides regulations on drinking water quality in - San Bernardino. The SDWA gives the Environmental Protection Agency (EPA) the authority to set drinking water standards, such as the National Primary Drinking Water regulations (NPDWRs or primary standards). The NPDWRs protect drinking water quality by limiting the levels of specific contaminants that are known to occur or have the potential to occur in water and can adversely affect public health. All public water systems that provide service to 25 or more individuals are required to satisfy these legally enforceable standards. Water purveyors must monitor for these contaminants on fixed schedules and report to the EPA when a Maximum Contaminant Level (MCL) has been exceeded. MCL is the maximum permissible level of a contaminant in water that is delivered to any user of a public water system. Drinking water supplies are tested for a variety of contaminants, including organic and inorganic chemicals (e.g., minerals), substances that are known to cause cancer (e.g., carcinogens), radionuclide (e.g., uranium and radon), and microbial contaminants (e.g., coliform and Escherichia coli). Changes to the MCL list are typically made every three years, as the EPA adds new contaminants or, based on new research or new case studies, revised MCLs for some contaminants are issued. The California Department of Health Services, Division of Drinking Water and Environmental Management is responsible for implementation of the Safe Drinking Water Act in the State of California.

CLEAN WATER ACT

The principal law governing pollution of the nation's surface waters is the Clean Water Act (CWA), formerly known as the Federal Water Pollution Control Act. Originally enacted in 1948, it has been amended several times since. As amended in 1977, the law became commonly known as the CWA. The CWA is a Federal law that protects the nation's surface waters, including lakes, rivers, coastal wetlands, and "waters of the United States." The CWA includes provisions that authorize federal financial assistance for municipal sewage treatment plants and the regulatory requirements that apply to industrial and municipal dischargers. The law gave the authority to set effluent standards on an industry basis. In addition, the CWA requires states to adopt water quality standards that "consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses."

The CWA specifies that discharges to waters are illegal, unless authorized by an appropriate permit. The permits regulate the discharge of dredged and fill materials, construction-related stormwater discharges, and activities that may result in discharges of pollutants to waters of the U.S. Section 404 of the CWA establishes a permit program for the discharge of dredge or fill materials into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE). If waters of the U.S. are located on or downstream of a project site, the project may discharge to them, and if impacts on them are anticipated, the project must obtain a CWA Section 401 Water Quality Certification. Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredge or fill material) into waters of the U.S. This permitting program is administered by the Regional Water Quality Control Boards. In addition, Section 303 and 304 of the CWA provide for water quality standards, criteria, and guidelines.

PORTER-COLOGNE WATER QUALITY CONTROL ACT

The Porter-Cologne Water Quality Control Act acts in cooperation with the CWA to establish the State Water Resources Control Board (SWRCB). The SWRCB and nine Regional Water Quality Control Boards (RWQCB) are responsible for protecting California's surface waters and groundwater supplies. This act establishes Water Quality Control Plans (Basin Plans) for each of the nine regions overseen by the RWQCB that designate the beneficial uses of California's rivers and groundwater basins. The Santa Ana River Basin Plan gives direction on the beneficial uses of the state waters within Region 8, describes the water quality that must be maintained to support such uses, and provides programs, projects, and other actions necessary to achieve the standards established in the Basin Plan. The Santa Ana River RWQCB implements the Basin Plan by issuing and enforcing waste discharge requirements to persons, such as individuals, communities, or businesses whose waste discharges may affect water quality. These requirements are state Waste Discharge Requirements for discharge to land, or federally delegated NPDES permits for discharges to surface water. The Porter-Cologne Water Quality Control Act is also responsible for implementing CWA Sections 401-402 and 303(d) to SWRCB and RWQCBs.

NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM PERMIT

Under the National Pollutant Discharge Elimination System (NPDES), all facilities that discharge pollutants from any point source into waters of the United States are required to obtain an NPDES permit. The term pollutant broadly includes any type of industrial, municipal, and agricultural waste discharged into water. Point sources are discharges from publicly owned treatment works (POTWs), discharges from industrial facilities, and discharges associated with urban runoff. While the NPDES program addresses certain specific types of agricultural activities, the majority of agricultural facilities are defined as non-point sources and are exempt from NPDES regulation. Pollutant contributors come from direct and indirect sources. Direct sources discharge directly to receiving waters, whereas indirect sources discharge wastewater to a POTW, which in turn discharges to receiving waters. Under the national program, NPDES permits are issued only to direct point source dischargers. Municipal sources are POTWs that receive primarily domestic sewage from residential and commercial customers. Specific NPDES program areas applicable to municipal sources are the National Pretreatment Program, the Municipal Sewage Sludge Program, Combined Sewer Overflows (CSOs), and the Municipal Storm Water Program. Non-municipal sources include industrial and commercial facilities.

Specific NPDES program areas applicable to industrial sources are: Process Wastewater Discharges, Non-process Wastewater Discharges, and the Industrial Storm Water Program.

NPDES issues two basic permit types: individual and general. Also, the EPA has focused on integrating the NPDES program further into watershed planning and permitting. The NPDES has a variety of measures designed to minimize and reduce pollutant discharges. All counties with a storm drain system that serve a population of 50,000 or more, as well as construction sites one acre or more in size, must file for and obtain an NPDES permit. The Santa Ana RWQCB has issued an individual NPDES municipal storm water (MS4) permit for San Bernardino County. The City of San Bernardino is listed as a participating co-permittee of the County NPDES permit and the Public Works Department is the local enforcing agency of the NPDES within the City. Another measure is the EPA's Storm Water Phase II Final Rule. The Phase II Final Rule requires an operator of a regulated small MS4 to develop, implement, and enforce a program (e.g., Best Management Practices, ordinance or other mechanism) to reduce pollutants in post-construction runoff to their MS4 from new development and redevelopment projects that result in the land disturbance of greater than or equal to one acre.

STATE REGIONAL WATER QUALITY CONTROL BOARD, STORMWATER GENERAL CONSTRUCTION PERMIT

In 1999, the SWRCB adopted Order No. 99-08-DWQ, NPDES General Permit No. CAS000002, Waste Discharge Requirements (WDR) for Discharges of Stormwater Runoff Associated with Construction Activity (General Construction Permit). This permit was subsequently amended to include smaller construction sites. The General Construction Permit requires that construction sites with 1.0 acre or greater of soil disturbance or less than 1.0 acre, but part of a greater common plan of development, apply for coverage for discharges under the General Construction Permit by submitting a Notice of Intent (NOI) for coverage, developing a Stormwater Pollution Prevention Plan (SWPPP), and implementing Best Management Practices (BMPs) to address construction site pollutants.

COUNTY OF SAN BERNARDINO

In partial implementation of CWA Section 402(p), the Phase I and Phase II Storm Water Regulations and the CWC, the Santa Ana RWQCB issued Waste Discharge Requirements for the County of San Bernardino and the Incorporated Cities of San Bernardino County, Order No. R8-2010-0036, NPDES Permit No. CAS618036, Areawide Urban Stormwater Runoff on January 29, 2010. The City of San Bernardino is a permittee under the 2001 Permit and therefore is required by federal and state law to implement all requirements of the 2001 Permit. The goal of the 2001 Permit is to have discharges from land uses in San Bernardino County drainage basins meet water quality standards suitable for the protection of the beneficial uses of the receiving waters (lakes, rivers, ground water, and the ocean).

FEDERAL EMERGENCY MANAGEMENT AGENCY

On March 1, 2003, the Federal Emergency Management Agency (FEMA) became part of the U.S. Department of Homeland Security (DHS). FEMA's primary mission is to reduce the loss of life and property and protect the Nation from all hazards, including flooding, among others.

Flood is a general and temporary condition of partial or complete inundation of two or more acres of normally dry land area or of two or more properties. The term "100-year flood" is defined by FEMA, as the flood elevation that has a one percent chance of being equaled or exceeded each year. A "500-year flood" is one which has a 0.2 percent chance of occurring each year. A 500-year flood event would be slightly deeper and cover a greater area than a 100-year flood event.

Flood zones are geographic areas that FEMA defines, based on studies of flood risk. The zone boundaries are shown on flood hazard maps, also called Flood Insurance Rate Maps (FIRM). High Risk Zones or Special Flood Hazard Areas (Zone A) are high-risk flood areas where special flood, mudflow, or flood-related erosion hazards exist and flood insurance is mandatory. Low-to-Moderate Risk Zones or Non-Special Flood Hazard Areas (Zones B, C, X) are areas that are not in any immediate danger from flooding caused by overflowing rivers or hard rains. Insurance purchase is not required in these zones.

FEMA is responsible for administering the National Flood Insurance Program (NFIP), which enables property owners in participating communities to purchase insurance as protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. In communities that participate in the NFIP, mandatory flood insurance purchase requirements apply to all Zones A, which are communities subject to a 100-year flood event. In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps the Nation's floodplains on Flood Insurance Rate Maps (FIRM).

CITY OF SAN BERNARDINO MUNICIPAL CODE

The purpose of the City's Storm Water Drainage System chapter in the *Municipal Code* is to ensure the health, safety, and general welfare of the residents of the City by administering regulations to effectively prevent non-storm water discharges into the City's storm water drainage system and to specifically achieve the following objectives:

1. Control discharges form spills, dumping or disposal of materials other than storm water;
2. Reduce the discharge of pollutants in all storm water discharges to the maximum extent practicable;
3. Protection Enhance the water quality of local, state, and federal watercourses, water bodies, ground water and wetlands in a manner pursuant to an consistent with the Clean Water Act;
4. Establish penalties for violations of the provisions of Chapter 8.80;
5. Provide for the equitable distribution of the cost of the storm water drainage system and storm water pollution abatement

NATIONAL FLOOD INSURANCE PROGRAM

FEMA is responsible for the evaluation of flood hazards under the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. To foster appropriate and land use and floodplain development FEMA provides Flood Insurance Rate Maps (FIRMs) for local and regional agencies. The intent of FIRMs is to identify potential flood zones based on existing

conditions at the time of the study. They do not, however, take into account the impacts of future development.

FEMA conducts engineering studies known as Flood Insurance Studies (FISs) to assist in preparing FIRMs that depict the extent of flood hazards in a community susceptible to flooding. FEMA delineates Special Flood Hazard Areas (SFHAs) on FIRMs utilizing technical data compiled in these studies. SFHAs are zones subject to inundation by a base flood; FEMA designates the 100-year flood as the base flood. The 100-year recurrence interval represents only the long-term average period between floods of a specific magnitude. However, it is possible for rare floods to occur at much shorter intervals or even in the same year. In addition to the 100-year base flood, the 500-year flood is shown to further illustrate areas of flood hazard risk.

The National Flood Insurance Program (NFIP) uses the base flood as the regulatory threshold and as the basis for nationwide insurance requirements. Under Flood Disaster Protection Act owners of all structures in identified SFHAs are mandated to purchase flood insurance as a – pre-condition for obtaining Federal or federally related financial assistance, such as mortgage loans from federally insured lending institutions.

Special Flood Hazard Areas (SFHAs) are used by federal agencies, in addition to most county and state agencies, to oversee floodplain management programs. The purpose of floodplain management programs is to attenuate losses related to flood hazards, meanwhile protecting ecological resources and functions of the floodplain.

The concept of floodplain management is fundamentally based on the floodway. FEMA described the floodway as the channel of a river or other watercourse, and adjacent land that must be kept free and clear of encroachment in order to discharge the base flood without cumulatively raising the water surface elevation above a particular height. The purpose is not to prohibit development, rather it is to aid communities in developing appropriate development management guidelines within flood-prone areas. The lead agency is responsible for prohibiting encroachments into the floodway, unless it can be shown through detailed hydrologic and hydraulic analyses that the proposed development will not raise the flood levels downstream.

The NFIP is required to offer federally subsidized flood insurance to property owners in communities where floodplain management ordinances meeting minimum criteria established by FEMA have been adopted and are being actively enforced.

Under the National Flood Insurance Reform Act of 1994, NFIP offers a grant program for state and community flood mitigation projects. In addition, the Act also instituted the Community Rating System (CRS), which is a system for crediting communities that implement measures to protect the natural and beneficial functions of their floodplains, as well as managing the erosion hazard.

Since July 16, 1979, the City of San Bernardino has participated as a regular member in the NFIP. The City's most-recent effective FIRM maps are dated January 17, 1997. Based on the City's participation in the NFIP, subsidized flood insurance is accessible to any property owner in the City. In fact, property owners are required to obtain flood insurance to receive secured financing to buy, build, or improve structures in SFHAs. If a lending institution is federally

regulated or federally insured, it must determine if the structure is located in a SFHA and it must provide written notice requiring flood insurance.

5.11.2 ENVIRONMENTAL SETTING

SURFACE WATERS

Existing Regional Drainage System

As discussed in the *San Bernardino General Plan EIR*, the City of San Bernardino is located within the Santa Ana River Basin (Region 8) of the Regional Water Quality Control Board. The Santa Ana River Basin reaches from the San Bernardino and San Gabriel Mountains in the north and east to Newport Bay along the coast. This Basin is geographically RWQCB's smallest region, totaling approximately 2,800 square miles; however, it covers one of the largest populations with nearly five million people. The region contains 460 miles of streams, 21,090 acres of lakes and 24 miles of coastline.

The Santa Ana River is the largest stream system in southern California. In addition, it is the region's main surface water body. The Orange County Groundwater Basin uses recharge supplies from the Santa Ana River, which carries more than 125 million gallons per day of reclaimed water from Riverside and San Bernardino Counties. Approximately 40 percent of Orange County's water demand is met through the Santa Ana River.

The Santa Ana River has a number of tributaries in the vicinity of San Bernardino that contribute flow to the main stem of the river including Lytle Creek, East Twin Creek, East Warm Creek, and San Timoteo Creek. In the San Bernardino Area, the San Jacinto Fault (Bunker Hill Dike) forces groundwater to the surface. Under present conditions, perennial flows in the middle Santa Ana River begin at the confluence with East Warm Creek, located a short distance upstream. The areas with the rising water which surround the fault are now relatively small, but were historically a more expansive swampy area with many large springs. San Timoteo Creek, which the Army Corps of Engineers (ACOE) plans to line with concrete in the near future, confluences with the river in this area, and its flows consist mainly of reclaimed wastewater from Yucaipa and other upstream dischargers.

East Warm Creek near San Bernardino transports small amounts of water from various non-point sources as well as some rising groundwater. The river passes under several major highways and railroads in this area, and portions of the river bottom are lined with concrete. West Warm Creek (an ephemeral creek), fully improved by the ACOE for flood control, also joins the river in this area.

The Santa Ana River's main stem is divided into six reaches. Each reach is generally a hydrologic and water quality unit described as follows:

> ***Reach 6*** includes the river upstream of Seven Oaks Dam. Flows consist largely of snowmelt and storm runoff. Water quality tends to be very high.
>
> ***Reach 5*** extends from Seven Oaks dam to San Bernardino, to the San Jacinto Fault, which marks the downstream edge of the Bunker Hill Groundwater Basin. Most of this reach tends to be dry, except as a result of storm flows, and the channel is largely

operated as a flood control facility. The extreme lower end of this reach includes rising water and intermittently receives San Timoteo Creek flows. Stormwater run-off from the City of San Bernardino would primarily discharge into the lower end of this reach.

Beneficial uses of water in the reach have been determined to be Municipal and Domestic Supply (MUN), Agricultural Supply (AGR), Groundwater Recharge (GWR), Hydropower Generation (POW), Water Contact Recreation (REC1), Non-contact Water Recreation (REC2), Warm Freshwater Habitat (WARM), Wildlife Habitat (WILD), and Rare, Threatened and Endangered Species (RARE). The beneficial use classifications help define and establish water quality standards which are detailed in the *Water Quality Control Plan* for the Santa Ana River Basin.

Reach 4 includes the river from the Bunker Hill Dike down to Mission Boulevard Bridge in Riverside. That bridge marks the upstream limit of rising water induced by the flow constriction in the Riverside Narrows. Until about 1985, rising water from upstream and wastewater discharges percolated and the lower part of the reach was dry. Flows are now perennial, but may not remain so as new projects are built. Much of this reach is also operated as a flood control facility.

Reach 3 includes the river from Mission Bridge to Prado Dam. In the Narrows, rising water feeds several small tributaries (Sunnyslope Channel, Tequesquite Arroyo, and Anza Park Drain) which are important breeding and nursery areas for native fish. Temescal, Chino, and Mill/Cucamonga Creeks in Prado Basin are also important river tributaries.

Reach 2 carries all the upstream flows down through Santa Ana Canyon to Orange County, where as much of the water as possible is recharged into the Orange County groundwater basin. The downstream end of the forebay/recharge area and, therefore, the ordinary limit of surface flows, are at 17th Street in Santa Ana.

Reach 1 is normally a dry flood control facility, presently being expanded and improved even further as part of the ACOE Santa Ana River Project. This reach extends from 17th Street to the tidal prism at the ocean.

The primary water quality issue for the Santa Ana River watershed is degradation due to high concentrations of nitrogen (primarily from past agricultural practices) and total dissolved solids (TDS).[1]

Existing Local Drainage System

Within the Project Area and surrounding vicinity are natural drainage courses, man-made channels, storm drains, street waterways, dams, basins, and levees. These facilities are administered by the City of San Bernardino, San Bernardino County Flood Control District, Army Corps of Engineers, and San Bernardino International Airport and Trade Center. The City Public Works Department is responsible for the design and construction of storm drain and flood control facilities. The operation and maintenance of storm drain and flood control facilities,

[1] City of San Bernardino, *General Plan Update and Associated Specific Plans EIR*, Hydrology and Water Quality Section.

however, are the responsibility of the Public Services Department. Much of the Project Area is impervious to stormwater.

In accordance with the District's Comprehensive Storm Drain Plans No. 3, 4, 6, and 7, the San Bernardino County Flood Control District divides the City of San Bernardino into subareas for planning purposes. The City uses the Flood Control District's Comprehensive Storm Drain Plans for the development of the City's storm drain system. All 10-year frequency storm waters, except for street flows at intersection points, are required to be contained in the underground drain system. Storm flows greater than 10-year frequency storm flows, but less than or equal to the 25-year storm flow, are to be carried in the curbed portion of the street. Storm flows associated with 100-year events may be carried in the street right-of-way. Flows from a 100-year storm event may also be conveyed through a combination of storm drains sized for a 25-year event in the curbed part of the street with the remaining flows conveyed in the street right-of-way.

The City of San Bernardino has instituted design specifications for both major and local drainage facilities within the City. Major drains include 36-inch or larger pipes (or equivalent channels) and are shown on the comprehensive storm drain plans. Local drains include conduits smaller than or equal to 36 inches in diameter (or equivalent channel). Some streets in the City are specifically designed to accommodate storm flows. Flows carried within the street right-of-way may cause localized flooding during storms, possibly making some roads impassable during these events.[2]

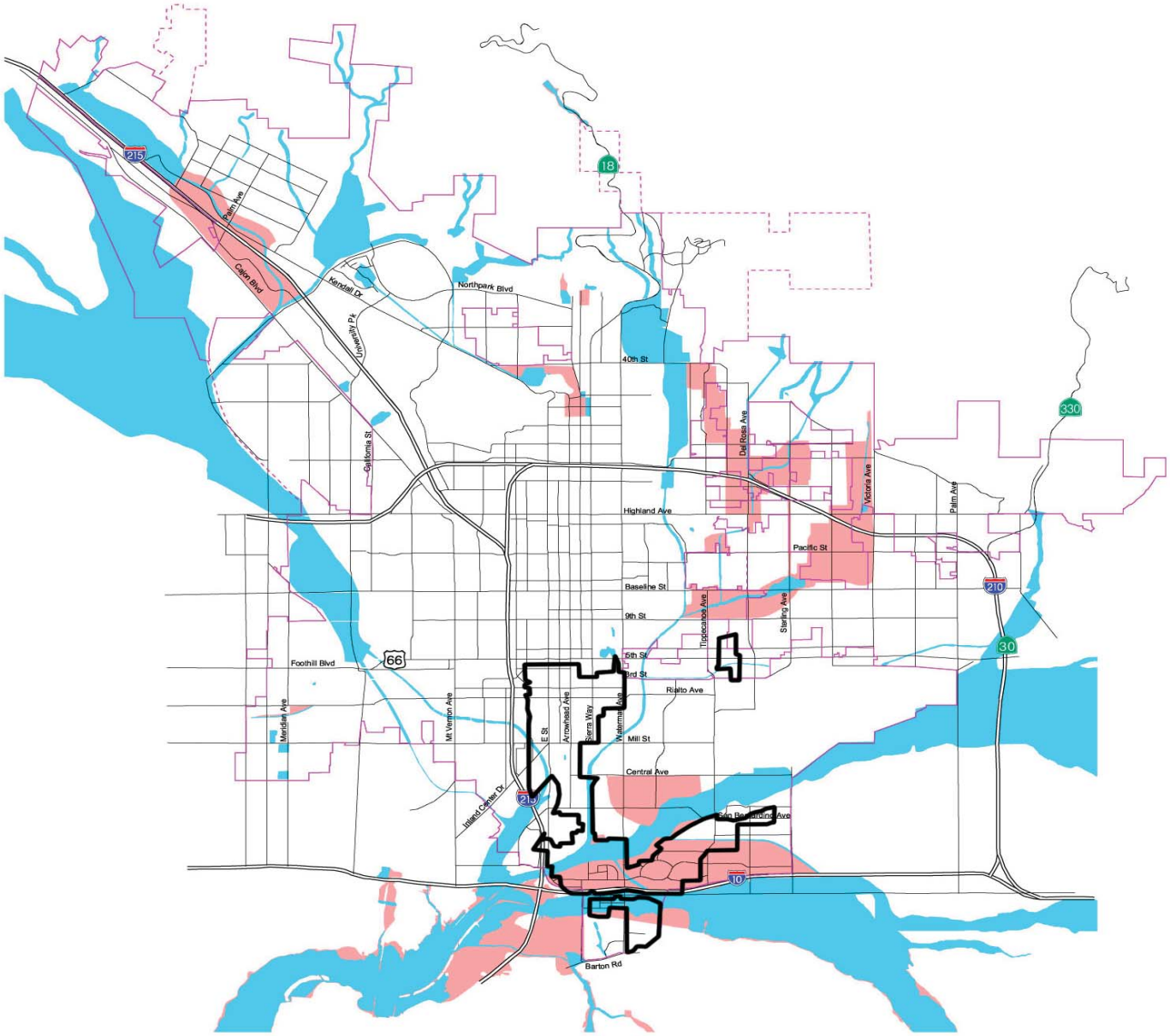
Floodplain Mapping

Like the majority of southern California, San Bernardino is subject to fluctuating seasonal rainfall. During most years, winter rains are scarce. However, every few years the region experiences periods of intense and sustained precipitation, which results in flooding. Floods are natural and cyclical events. However, they become hazardous when humans and structures encroach into floodplains and modify the natural landscape, increasing the area of impervious surface and building structures in areas meant to convey excess water during flood events.

Under the NFIP, Flood Insurance Rate Maps (FIRMs) have been prepared which contain official delineation of flood insurance zones and base flood elevation lines. Within the project vicinity, the 100-year floodplain is confined to storm channels, debris basins, and between levees with a few minor exceptions. A few isolated areas, including the Baseline Street and Sterling Avenue area, Mountain View Avenue area, and south of Redlands Boulevard, east of Hunts Lane, are identified as low areas within the 100-year floodplain. The 100-year flood plain within the City of San Bernardino is illustrated in *Exhibit 5.11-1*, *100-Year Floodplain*.

In addition to storm events, basements and underground utility vaults may also incur flooding in areas between the Santa Ana River and downtown due to the City's existing high groundwater table.

[2] City of San Bernardino, *General Plan Update and Associated Specific Plans EIR*, Hydrology and Water Quality Section.



100-Year Flood Zone

500-Year Flood Zone

City Boundary

Sphere of Influence Boundary

Project Area

Note: The Project Area boundary is approximate. Refer to Exhibit I-2 in the *San Bernardino Merged Area A Merger & Amendments Preliminary Report* for the Merged Area A boundary.

Source: Federal Emergency Management Agency Flood Insurance Rate Maps. Date: 1990

SOURCE: City of San Bernardino General Plan, November 1, 2005.

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ENVIRONMENTAL IMPACT REPORT
SAN BERNARDINO MERGED AREA A – MERGER AND AMENDMENTS

100-Year Floodplain

Exhibit 5.11-1

The Santa Ana River Mainstem Project was designed to provide flood protection to the growing urban communities in Orange, Riverside, and San Bernardino Counties. The proposed improvements cover a stretch of 75 miles, from the headwaters of Santa Ana River east of San Bernardino to the mouth of the Pacific Ocean between the cities of Newport Beach and Huntington Beach. The project increases levels of flood protection to more than 3.35 million residents within the three counties. The project includes seven independent features, including Seven Oaks Dam, Mill Creek Levee, San Timoteo Creek, Oak Street Drain, Prado Dam, Santiago Creek, and Lower Santa Ana River.

Dam Inundation

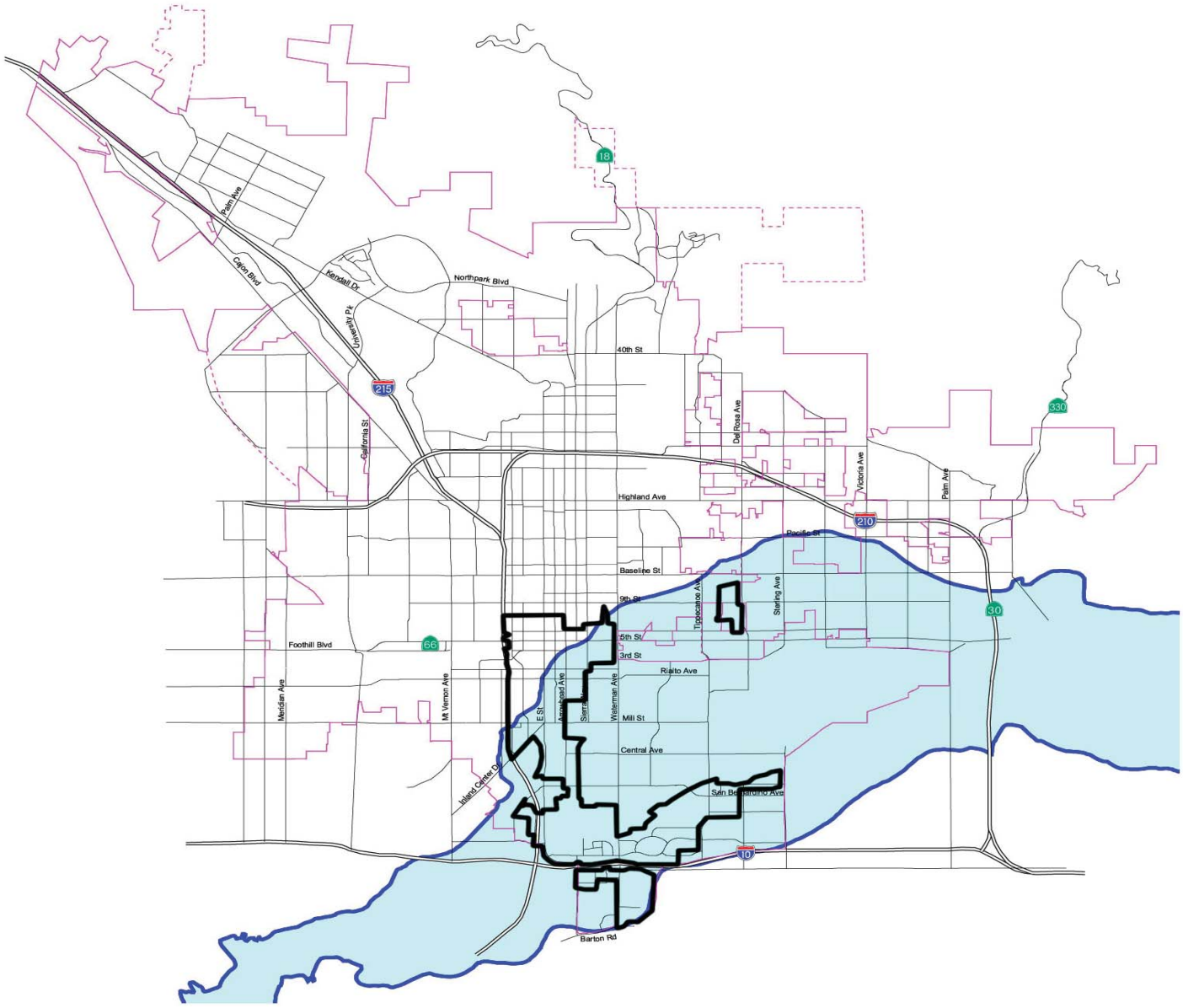
Flooding can occur when water retention structures (e.g., dams, levees) fail due to seismic events. The California Division of Dam Safety is responsible for administering the statutes contained within the *California State Water Code* which govern dam safety. These statutes relate to the structural safety of dams that are greater than 25 feet in height or have a storage capacity greater than 50 acre-feet.

Seven Oaks Dam is a single-purpose flood control project constructed by the USACE. The dam is located on the Santa Ana River in the upper Santa Ana Canyon nine miles northeast of the easternmost limit of the Project Area. The 550-foot tall, 2,600-foot wide dam consists of earth and rock-filled construction.

The Dam operates in conjunction with Prado Dam, which is located downstream of the City of San Bernardino, to provide flood protection to the inland region. During the early part of each flood season, runoff is retained behind the dam in order to build a debris pool to protect the outlet works. Small controlled releases are then made on a continual basis in order to maintain a steady water supply downstream of Prado Dam. The dam is designed to provide flood protection during a 350-year event and withstand an 8-plus magnitude earthquake. During flood conditions, the dam creates a pool 500 feet deep extending three miles upstream. In the unlikely event of dam failure the inundation zone for the Seven Oaks Dam is shown on *Exhibit 5.11-2*, *Seven Oaks Dam Inundation*. The southeastern portion of the City of San Bernardino and a large portion of the Project Area would be affected.

Aboveground Water Reservoirs

If strong ground shaking causes structural failure to aboveground water reservoirs, seismically induced inundation can also occur. Sloshing water can lift a water tank off its foundation if the tank is not adequately braced and baffled. This disturbance could split the shell, damage the roof, and/or bulge the bottom of the tank. Disruption can also shear off pipes connected to the tank releasing water. Similar events occurred during southern California's Landers (1992), Big Bear (1992), and Northridge earthquakes (1994). New regulations were adopted in 1994 to improve the resistance to earthquake damage for steel water tanks.



Limit of Flooded Area with Dam Failure

City Boundary

Sphere of Influence Boundary

Project Area

Note: The Project Area boundary is approximate. Refer to Exhibit I-2 in the *San Bernardino Merged Area A Merger & Amendments Preliminary Report* for the Merged Area A boundary.

Source: U.S. Army Corps of Engineers
Note: The inundated areas shown on this map reflect events of an extremely remote nature. These results are not in any way intended to reflect upon the integrity of the Seven Oaks Dam. Flooded areas shown are based on dam failure at full pool elevation 2,580 feet, NGVD.

SOURCE: City of San Bernardino General Plan, November 1, 2005.

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ENVIRONMENTAL IMPACT REPORT
SAN BERNARDINO MERGED AREA A – MERGER AND AMENDMENTS

Seven Oaks Dam Inundation

Exhibit 5.11-2

GROUNDWATER

Groundwater Supply

An aquifer is a formation of saturated rock through which groundwater can easily be conducted. Aquifers must be permeable and include such rock types as sandstone, conglomerate, fractured limestone and/or unconsolidated sand and gravel in order to yield significant quantities of water to wells and springs. Perched groundwater can occur above a permanent groundwater zone if it is separated by soil or bedrock zones of low permeability.

Groundwater basins are generally broad tracts of land with highly permeable soils which allow for recharge of the aquifers. Typically, these basins are situated along river or streambeds or within alluvial fans where soils tend to be highly permeable. The specific geologic and hydrologic conditions in an area determine the quantity of groundwater found in an aquifer. The majority of the readily accessible groundwater is extracted from aquifers consisting of recent alluvium, with lesser quantities of groundwater found in jointed bedrock and residuum.

The San Bernardino region is composed of extensive groundwater basins which overly the Upper Santa Ana Valley Groundwater Basin, Bunker Hill Subbasin. Alluvial materials are found within the Bunker Hill Basin which underlies the San Bernardino Valley. The limits of this Basin are delineated by the consolidated rock of the San Gabriel Mountains, San Bernardino Mountains, Crafton Hills, and by several faults. The Santa Ana River, Mill Creek, and Lytle Creek are the primary watercourses in the Basin.

The Basin groundwater is supplied from rain and snow pack melt that filters down through the San Bernardino Mountain canyons. Historically, recharge of the Bunker Hill Basin has been the result of percolation of runoff from the San Gabriel and San Bernardino Mountains. The region's three main watercourses, Santa Ana River, Mill Creek, and Lytle Creek, supply more than 60 percent of the total recharge to the groundwater system. Additionally, smaller contributors such as Cajon Creek, San Timoteo Creek, and most of the creeks flowing southward out of the San Bernardino Mountains, including East Twin Creek, add recharge to the system. Total groundwater storage of the Basin is 5,976,000 acre-feet,[3] while in 1998 the total storage was 5,890,300 acre-feet.

The water-bearing material in the Basin is classified as Holocene and Pleistocene-age alluvial deposits of sand, gravel, and boulders interspersed with deposits of silt and clay. The water-bearing material has been divided into upper and lower aquifers. In the central portion of the Basin, a clay layer exhibiting low permeability separates the two aquifers, creating confined groundwater within the lower aquifer under approximately 25 square miles of the Valley. The upper aquifer has a maximum thickness of approximately 350 feet, while the maximum thickness of the lower aquifer is approximately 650 feet. Groundwater generally converges in the southwestern part of the Basin as it approaches the Santa Ana River and discharges over the San Jacinto fault at Colton Narrows.

The Bunker Hill Basin provides San Bernardino with 100 percent of its water supply. San Bernardino Municipal Water Department (SBMWD) owns a total of 60 wells in the basin, some of which are 1,200 feet deep and tap into the aquifer.

[3] California Department of Water Resources, *California's Groundwater Bulletin 118*, February 27, 2004.

Groundwater Quality

According to the *General Plan EIR*, the Bunker Hill Basin contains contamination from trichloroethylene (TCE) and tetrachloroethylene (PCE) above acceptable California State Action levels of five parts per billion (ppb) for TCE and four ppb for PCE (also known as perchloroethylene or PERC). Nitrates have also been identified in concentrations above State action levels for nitrates of 45 parts per million (ppm).

Groundwater Contamination Clean-Up Sites (Cortese List)

The Cortese list database identifies hazardous waste sites selected for remedial action and underground storage tank (UST) properties having a reportable release and is maintained by the EPA/Office of Emergency Information. According to the California Department of Toxic Substances Control, there are two sites within the City's planning area for remedial clean up on the Cortese list: the former Norton Air Force Base is a 2,208 acres site southeast of the planning area, but outside of the proposed Project Area; and the Newmark Groundwater Contamination site in the northern portion of the Bunker Hill Ground Water Basin.[4]

Newmark Groundwater Contamination

The Newmark Groundwater Contamination site underlies a portion of the City's planning area with two groundwater plumes on either side of Shandin Hills. The Newmark Plume area stretches 5 miles on the east side of the Shandin Hills and on the west side lies the Muscoy Plume area, extending 4 miles north. Contaminants found in these plumes include chlorinated solvents, PCE and TCE, resulting in the closure of 20 water supply wells within a 6-mile radius. The Newmark Groundwater Contamination Site was listed on the National Priorities List in 1989. Through treatment approved by the EPA and administered by the San Bernardino Municipal Water Department using conventional activated carbon adsorption technology, contaminants are prevented from entering this part of the Valley. However, this site is located approximately 4 miles to the north of proposed Project Area.

Spills, Leaks, Investigations, and Cleanups

California Environmental Protection Agency's (Cal EPA), Spills, Leaks, Investigations, and Cleanups (SLIC) Section has oversight authority on non-underground storage tank (UST) sites where soil or groundwater has been contaminated. Many of these sites are former industrial facilities and dry cleaners, where chlorinated solvents were released, or have leached into the soil or groundwater. The Santa Ana Regional Water Quality Control Board's Spill, Leaks, Investigation and Cleanup (SLIC) List has identified a number of businesses within the City's boundaries; refer to Section 5.10, Hazards/ Risk of Upset, for a discussion on Cal EPA, SLIC sites within the Project Area.

[4] Department of Toxic Substances Control, *DTSC's Hazardous Waste and Substances Site List (Cortese List), San Bernardino County,* http://www.dtsc.ca.gov/database/Calsites/Cortese_List.cfm?county=36.

STORMWATER QUALITY

Stormwater quality is a significant concern in Southern California. This section discusses typical pollutants found in stormwater runoff and discusses the types of contaminants that may be found in existing stormwater runoff.

Nonpoint Source Pollutants

A net effect of urbanization can be to increase pollutant export over naturally occurring conditions. The impact of this increased export on adjacent streams and downstream receiving waters is an important consideration in evaluating a project's stormwater quality. If a beneficial use to the receiving waters is impaired then an impact has occurred. Receiving waters can assimilate a limited quantity of various constituent elements, however, there are thresholds beyond which the measured amount becomes a pollutant and results in an undesirable impact. The backgrounds of these standard water quality categories provide an understanding of typical urbanization impacts. Nonpoint source pollutants have been characterized by the following major categories in order to assist in determining the pertinent data and its use.

Sediment. Sediment is made up of tiny soil particles that are washed or blown into surface waters. It is the major pollutant by volume in surface water. Suspended soil particles can cause the water to look cloudy or turbid. The fine sediment particles also act as a vehicle to transport other pollutants including nutrients, trace metals, and hydrocarbons. Construction sites are the largest source of sediment for urban areas under development. Another major source of sediment is streambank erosion, which may be accelerated by increases in peak rates and volumes of runoff due to urbanization.

Nutrients. Nutrients are a major concern for surface water quality, especially phosphorous and nitrogen can cause algal blooms and excessive vegetative growth. Of the two, phosphorus is usually the limiting nutrient that controls the growth of algae in lakes. The orthophosphorous form of phosphorus is readily available for plant growth. The ammonium form of nitrogen can also have severe effects on surface water quality. The ammonium is converted to nitrate and nitrite forms of nitrogen in a process called nitrification. This process consumes large amounts of oxygen, which can impair the dissolved oxygen levels in water. The nitrate form of nitrogen is very soluble and is found naturally at low levels in water. When nitrogen fertilizer is applied to lawns or other areas in excess of plant needs, nitrates can leach below the root zone, eventually reaching ground water. Orthophosphate from auto emissions also contributes phosphorus in areas with heavy automobile traffic. As a general rule of thumb, nutrient export is greatest from development sites with the most impervious areas. Other problems resulting from excess nutrients are: 1) surface algal scums; 2) water discolorations; 3) odors; 4) toxic releases; and 5) overgrowth of plants. Common measures for nutrients are total nitrogen, organic nitrogen, total Kjeldahl nitrogen (TKN), nitrate, ammonia, total phosphate and total organic carbon (TOC).

Trace Metals. Trace metals are primarily a concern because of their toxic effects on aquatic life and their potential to contaminate drinking water supplies. The most common trace metals found in urban runoff are lead, zinc and copper. Fallout from automobile emissions is also a major source of lead in urban areas. A large fraction of the trace metals in urban runoff are attached to sediment and this effectively reduces the level, which is immediately available for biological uptake and subsequent bioaccumulation. Metals associated with the sediment settle out rapidly and accumulate in the soils. In addition, urban runoff events typically occur over a

shorter duration, which reduces the amount of exposure, which could be toxic to the aquatic environment. The toxicity of trace metals in runoff varies with the hardness of the receiving water. As total hardness of the water increases, the threshold concentration levels for adverse effects increases.

Oxygen-Demanding Substances. Aquatic life is dependent on the dissolved oxygen (DO) in the water and when organic matter is consumed by microorganisms then DO is consumed in the process. A rainfall event can deposit large quantities of oxygen demanding substance in lakes and streams. The biochemical oxygen demand of typical urban runoff is on the same order of magnitude as the effluent from an effective secondary wastewater treatment plant. A problem from low dissolved oxygen results when the rate of oxygen-demanding material exceeds the rate of replenishment. Oxygen demand is estimated by direct measure of DO and indirect measures such as biochemical oxygen demand (BOD), chemical oxygen demand (COD), oils and greases, and TOC.

Bacteria. Bacteria levels in undiluted urban runoff exceed public health standards for water contact recreation almost without exception. Studies have found that total coliform counts exceeded EPA water quality criteria at almost every site and almost every time it rained. The coliform bacteria that are detected may not be a health risk in themselves, but are often associated with human pathogens.

Oil and Grease. Oil and grease contain a wide variety of hydrocarbons some of which could be toxic to aquatic life in low concentrations. These materials initially float on water and create the familiar rainbow-colored film. Hydrocarbons have a strong affinity for sediment and quickly absorb to it. The major source of hydrocarbons in urban runoff is through leakage of crankcase oil and other lubricating agents from automobiles. Hydrocarbon levels are highest in the runoff from parking lots, roads, and service stations. Residential land uses generate less hydrocarbons export, although illegal disposal of waste oil into stormwaters can be a local problem.

Other Toxic Chemicals. Priority pollutants are generally related to hazardous wastes or toxic chemicals and can be sometimes detected in stormwater. Priority pollutant scans have been conducted in previous studies of urban runoff, which evaluated the presence of over 120 toxic chemicals and compounds. The scans rarely revealed toxins that exceeded the current safety criteria. The urban runoff scans were primarily conducted in suburban areas not expected to have many sources of toxic pollutants (with the possible exception of illegally disposed or applied household hazardous wastes). Measures of priority pollutants in stormwater include: 1) phthalate (plasticizer compound); 2) phenols and creosols (wood preservatives); 3) pesticides and herbicides; 4) oils and greases; and 5) metals.

Physical Characteristics of Surface Water Quality

Standard parameters, which assess the quality of stormwater, provide a method of measuring impairment. The backgrounds of these typical characteristics assist in understanding water quality requirements. The quantity of a material in the environment and its characteristics determine the degree of availability as a pollutant in surface runoff. In an urban environment, the quantity of certain pollutants in the environment is a function of the intensity of the land use. For instance, a high density of automobile traffic makes a number of potential pollutants (such as lead and hydrocarbons) more available. The availability of a material, such as a fertilizer, is

a function of the quantity and the manner in which it is applied. Applying fertilizer in quantities that exceed plant needs leaves the excess nutrients available for loss to surface or groundwater.

The physical properties and chemical constituents of water traditionally have served as the primary means for monitoring and evaluating water quality. Evaluating the condition of water through a water quality standard refers to its physical, chemical, or biological characteristics. Water quality parameters for stormwater comprise a long list and are classified in many ways. In many cases, the concentration of an urban pollutant, rather than the annual load of that pollutant, is needed to assess a water quality problem. Some of the physical, chemical, or biological characteristics that evaluate the quality of the surface runoff are outlined below.

Dissolved Oxygen. Dissolved oxygen in the water has a pronounced effect on the aquatic organisms and the chemical reactions that occur. It is one of the most important biological water quality characteristics in the aquatic environment. The dissolved oxygen concentration of a water body is determined by the solubility of oxygen, which is inversely related to water temperature, pressure, and biological activity. Dissolved oxygen is a transient property that can fluctuate rapidly in time and space. Dissolved oxygen represents the status of the water system at a particular point and time of sampling. The decomposition of organic debris in water is a slow process and the resulting changes in oxygen status also respond slowly. The oxygen demand is an indication of the pollutant load and includes measurements of biochemical oxygen demand or chemical oxygen demand.

Biochemical Oxygen Demand (BOD). The biochemical oxygen demand (BOD) is an index of the oxygen-demanding properties of the biodegradable material in the water. Samples are taken from the field and incubated in the laboratory at 20°C, after which the residual dissolved oxygen is measured. The BOD value commonly referenced is the standard five-day values. These values are useful in assessing stream pollution loads and for comparison purposes.

Chemical Oxygen Demand. The chemical oxygen demand (COD) is a measure of the pollutant loading in terms of complete chemical oxidation using strong oxidizing agents. It can be determined quickly because it does not rely on bacteriological actions as with BOD. COD does not necessarily provide a good index of oxygen demanding properties in natural waters.

Total Dissolved Solids (TDS). TDS concentration is determined by evaporation of a filtered sample to obtain residue whose weight is divided by the sample volume. The TDS of natural waters varies widely. There are several reasons why TDS is an important indicator of water quality. Dissolved solids affect the ionic bonding strength related to other pollutants such as metals in the water. TDS are also a major determinant of aquatic habitat. TDS affects saturation concentration of dissolved oxygen and influences the ability of a water body to assimilate wastes. Eutrophication rates depend on total dissolved solids.

pH. The pH of water is the negative log, base 10, of the hydrogen ion (H+) activity. A pH of seven is neutral; a pH greater than seven indicates alkaline water; a pH less than seven represents acidic water. In natural water, carbon dioxide reactions are some of the most important in establishing pH. The pH at any one time is an indication of the balance of chemical equilibrium in water and affects the availability of certain chemicals or nutrients in water for uptake by plants. The pH of water directly affects fish and other aquatic life and generally toxic limits are pH values less than 4.8 and greater than 9.2.

Alkalinity. Alkalinity is the opposite of acidity, representing the capacity of water to neutralize acid. Alkalinity is also linked to pH and is caused by the presence of carbonate, bicarbonate, and hydroxide, which are formed when carbon dioxide is dissolved. A high alkalinity is associated with a high pH and excessive solids. Most streams have alkalinities less than 200 mg/l and ranges of alkalinity of 100-200mg/l seem to support well-diversified aquatic life.

Specific Conductance. The specific conductivity of water, or its ability to conduct an electric current, is related to the total dissolved ionic solids. Long-term monitoring of a project's waters can develop a relationship between specific conductivity and TDS. Its measurement is quick and inexpensive and can be used to approximate TDS. Specific conductivities in excess of 2000 µohms/cm indicate a TDS level too high for most freshwater fish.

Turbidity. The clarity of water is an important indicator of water quality that relates to the alkalinity of photosynthetic light to penetrate. Turbidity is an indicator of the property of water that causes light to become scattered or absorbed. Turbidity is caused by suspended clays and other organic particles. It can be used as an indicator of certain water quality constituents such as predicting sediment concentrations.

Nitrogen (N). Sources of nitrogen in stormwater are from the additions of organic matter to water bodies or chemical additions. Ammonia and nitrate are important nutrients for the growth of algae and other plants. Excessive nitrogen can lead to eutrophication since nitrification consumes dissolved oxygen in the water. Nitrogen occurs in many forms. Organic Nitrogen breaks down into ammonia, which eventually becomes oxidized to nitrate-nitrogen, a form available for plants. High concentrations of nitrate-nitrogen (N/N) in water can stimulate growth of algae and other aquatic plants, but if phosphorus (P) is present, only about 0.30 mg/l of nitrate-nitrogen is needed for algal blooms. Some fish life can be affected when nitrate-nitrogen exceeds 4.2 mg/l. There are a number of ways to measure the various forms of aquatic nitrogen. Typical measurements of nitrogen include Kjeldahl nitrogen (organic nitrogen plus ammonia); ammonia; nitrite plus nitrate; nitrite; and nitrogen in plants. The principal water quality criteria for nitrogen focus on nitrate and ammonia.

Phosphorus (P). Phosphorus is an important component of organic matter. In many water bodies, phosphorus is the limiting nutrient that prevents additional biological activity from occurring. The origin of this constituent in urban stormwater discharge is generally from fertilizers and other industrial products. Orthophosphate is soluble and is considered to be the only biologically available form of phosphorus. Since phosphorus strongly associates with solid particles and is a significant part of organic material, sediments influence concentration in water and are an important component of the phosphorus cycle in streams. The primary methods of measurement include detecting orthophosphate and total phosphorus.

Existing Stormwater Quality

In the absence of existing site-specific stormwater runoff data, expected stormwater quality can be qualitatively discussed by relating typical pollutants to specific land uses. The City of San Bernardino is primarily built out (approximately 80.6 percent). These conditions are similar to the Project Area, with approximately 465 acres of vacant land (approximately 19.percent). Existing development within the City includes residential, commercial, office, industrial, school/civic/institutional, and public facilities uses, as well as vacant land. Expected pollutants from stormwater runoff are oil and grease from automobile use. Other pollutants associated

with residential, commercial, and school/civic/institutional development include trash, nutrients, bacteria, oil and grease, and household hazardous wastes. Undeveloped areas could add suspended solids into stormwater runoff.

Residential Activities and Development

Residential and urban development is often a significant source of stormwater pollution. Residential development is an abundant land use within the City. Development and redevelopment activities have two primary effects on water quality; they are sources of erosion and sedimentation during the construction phase and long-term effects on runoff once the development is complete. Residential and urban development can affect water quality in three ways:

- Impervious surfaces associated with development increase the rate and volume of stormwater runoff, which increase downstream erosion potential;
- Urban activities generate dry-weather ("nuisance") flows, which may contain pollutants and/or may change the ephemeral nature of streams and the degradation of certain habitats; and,
- Impervious surfaces increase the concentration of pollutants during wet weather flows.

The potential for negative water quality effects is generally correlated to the density of development and the amount of impervious area associated with development. Residential development has the potential to generate sediments such as nutrients and organic substances (including fertilizers), pesticides (from landscape application), trash and debris (including household hazardous waste), oxygen demand, oil and grease (from driveways and roads), and bacteria and viruses.

Municipal Activities and Development

Infrastructure and facilities (roads, streets, highways, parking facilities, storm drains, and flood management facilities) present a threat to water quality. Other facilities such as parks, airfields, water treatment plants, wastewater reclamation plants, landfills and transfer centers, and corporate yards also present water quality issues. Municipalities may also own and administer areas and activities tributary to impaired water bodies and/or water quality sensitive areas that might be harmful to water quality.

Commercial and Industrial Activities and Development

Certain commercial activities have the potential to generate pollutants that can negatively affect stormwater quality. Auto repair shops, for instance, have the potential to generate heavy metals, oils, toxic chemicals and other oxygen-demanding substances. In addition, restaurants have the potential to generate pollutants such as grease, trash and other oxygen-demanding substances.

Light and heavy industrial activities can significantly affect water quality, depending on the type of pollutants and activity. In general, industrial activity is associated with effects on ambient water temperature, alkalinity levels of total suspended solids and oxygen demand. Certain industrial uses may entail the generation of heavy metals, nutrients, toxic chemicals, and other

pollutants. Industrial uses that take place indoors do not have stormwater pollutant exposure and present little threat to stormwater quality.

Industrial and commercial activities within the City have the potential to significantly affect water quality. Multiple industrial and commercial properties within the City are listed as large-quantity and small quantity hazardous materials generators. Many sites have reported releases of hazardous materials to the soil and groundwater. Approximately 142 Leaking Underground Fuel Tanks (LUFT) have been reported in the City of San Bernardino[5]; refer to Section 5.10, Hazards and Hazardous Materials for additional discussion on leaking underground fuel tanks.

5.11.3 SIGNIFICANCE THRESHOLD CRITERIA

The environmental analysis in this section is patterned after the Initial Study Checklist recommended by the *CEQA Guidelines*, as amended, and used by the City of San Bernardino in its environmental review process, and is contained in Appendix A of the EIR. The Initial Study includes questions relating to hydrology, drainage, and water quality. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may create a significant environmental impact if it causes one or more of the following to occur:

- Violate any water quality standards or waste discharge requirements.
- 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) (refer to Section 8.0, Effects Found Not To Be Significant).
- Substantially alter the existing drainage pattern of the site or 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.
- 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 (refer to Section 8.0, Effects Found Not To Be Significant).
- 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, such as from areas of material storage, vehicle or equipment maintenance (including washing or detailing), waster handling, hazardous materials handling or storage, delivery areas, loading docks, or other outdoor areas.
- Otherwise substantially degrade water quality.

[5] City of San Bernardino, *General Plan Update and Associated Specific Plans EIR*, Hydrology and Water Quality Section

- 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 (Panel No. 06071C7930 F).

- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

- 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,

- Inundation by seiche, tsunami, or mudflow (refer to Section 8.0, Effects Found Not To Be Significant).

Based on these standards, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant unavoidable impact.

5.11.4 PROJECT IMPACTS AND MITIGATION MEASURES

WATER QUALITY STANDARDS

◆ **IMPLEMENTATION OF THE PROPOSED PROJECT COULD VIOLATE ANY WATER QUALITY STANDARDS OR WASTE DISCHARGE REQUIREMENTS.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: Impacts to water quality would range over three different periods: (1) during the earthwork and construction phase, when the potential for erosion, siltation, and sedimentation would be the greatest; (2) following construction, prior to the establishment of ground cover, when the erosion potential may remain relatively high; and (3) following completion of any projects undertaken in the proposed Project Area, when impacts related to sedimentation would decrease markedly, but those associated with urban runoff would increase.

Short-Term Water Quality Impacts

Construction grading, excavation, and other construction activities associated with implementation of the proposed project could impact water quality due to sheet erosion resulting from exposed soils and subsequent deposition of particles and pollutants in drainage areas. Construction of future development projects has the potential to produce typical pollutants such as nutrients, heavy metals, pesticides/herbicides, toxic chemicals, oils/fuels, lubricants, and solvents. Additionally, waste materials such as wash water, paints, wood, paper, concrete, food containers and sanitary wastes may be transported from the Project Area to nearby drainages, watersheds and groundwater in storm water runoff, wash water and dust control water. The significance of these water quality impacts would vary depending upon the level of construction activity, weather conditions, soil conditions, and increased sedimentation of drainage systems within the area.

Construction controls to minimize water quality impacts are not necessarily the same measures utilized for long-term water quality management, since construction-related water quality control measures are temporary in nature and specific to the type of construction. Future development projects would be subject to compliance with the City's *Municipal Code*, Chapter 8.80, "Storm Water Drainage System", and NPDES requirements.

The purpose of Chapter 8.80 is to effectively prevent non-storm water discharges into the City's storm water drainage system and to specifically achieve the following water quality objectives:

1. Control discharges from spills, dumping or disposal of materials other than storm water;
2. Reduce the discharge of pollutants in all storm water discharges to the maximum extent practicable; and,
3. Protect and enhance the water quality of local, state and federal watercourses, water bodies, ground water and wetlands in a manner pursuant to and consistent with the Clean Water Act;

In addition, construction sites with 1.0 acre or greater of soil disturbance or less than 1.0 acre, but part of a greater common plan of development, would be required to apply for coverage of discharges under the General Construction Permit. As part of its compliance, a Notice of Intent (NOI) would need to be prepared and submitted to the Santa Ana RWQCB providing notification and intent to comply with the General Permit. Prior to grading or construction, a SWPPP would be required for the construction activities on-site. Implementation of recommended mitigation (i.e., compliance with the NPDES requirements) would reduce construction-related impacts to water quality to a less than significant level. Compliance with goals and implementation actions identified in the proposed project would further reduce potential short-term water quality impacts to a less than significant level.

Long-Term Water Quality Impacts

Development associated with implementation of the proposed project would have long-term effects on runoff once development is complete. Runoff from disturbed areas would likely contain silt and debris, resulting in a long-term increase in the sediment load of the storm drain system serving the City. Substances such as oils, fuels, paints, and solvents may be transported to nearby drainages, watersheds, and groundwater in stormwater runoff and wash water. The significance of these water quality impacts would vary depending upon weather conditions, soil conditions, and increased sedimentation of drainage systems within the area.

Any activity or operation in the City associated with the proposed project that could potentially cause or contribute to storm water pollution or a discharge of non-storm water would be required to comply with all applicable Best Management Practices (BMPs) as listed in the *California Storm Water Best Management Practice Handbooks* or the current, San Bernardino County Storm Water Program's *Report of Waste Discharge*, to reduce pollutants in storm water runoff and reduce non-storm water discharges to the City's storm water drainage system to the maximum extent practicable or to the extent required by law.

A Storm Water Quality Management Plan would be required for all future development within the City. The SWQMP shall identify all Best Management Practices (BMPs) that will be

incorporated into the project to control storm water and non-storm water pollutions during and after construction.

Construction BMPs include, but are not necessarily limited to the following:

- Scheduling or limiting activities to certain times of the year
- Prohibiting certain construction practices
- Implementing equipment maintenance schedules and procedures
- Implementing a monitoring program
- Other management practices to prevent or reduce pollution, such as using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils
- Storing materials and equipment to ensure that spills or leaks do not enter the storm drain system or surface waters
- Developing and implementing a spill prevention and cleanup plan
- Installing traps, filters, or other devices at drop inlets to prevent contaminants from entering storm drains
- Using barriers, such as straw bales or plastic, to minimize the amount of uncontrolled runoff that could enter drains or surface water

Operational BMPs include, but are not necessarily limited to the following:

- Controlling roadway and parking lot contaminants by installing oil and grease separators at storm drain inlets
- Cleaning parking lots on a regular basis
- Incorporating peak-flow reduction and infiltration features (such as vegetated swales, infiltration trenches, and vegetated filter strips) into landscaping
- Implementing educational programs
- Utilizing dead storage in detention basins for groundwater infiltration

Future development in the City would increase impervious areas and overall levels of activity. As a result, impacts to stormwater quality would occur. Future development would increase pollutant loadings immediately off the respective development sites and would potentially violate water quality standards. The pollutants that would be expected with future development/redevelopment projects include pollutants typically found in stormwater runoff. Without mitigation, future development would be expected to increase pollutant loadings, including hydrocarbons, fertilizers, pesticides, trash, and sediment.

The specified mitigation requires preparation of a comprehensive Storm Water Quality Management Plan for each future development project. The Plan would be required to include both construction and post-construction, structural and non-structural BMPs, and comply with NPDES permits. New development projects would be required to meet Federal, State, and local water quality standards and implement mitigation (as necessary) to reduce impacts to less

than significant levels. Further, the *General Plan* goals and policies and required mitigation would reduce long-term water quality impacts to less than significant levels.

General Plan Goals and Policies: The following goals and policies address hydrology and water quality.

LAND USE ELEMENT

Goal 2.6 **Control development and the use of land to minimize adverse impacts on significant natural, historic, cultural, habitat, and hillside resources.**

Policy 2.6.3 Capitalize on the recreational and environmental resources offered by the Santa Ana River and Cajon Wash by requiring the dedication and development of pedestrian and greenbelt linkages.

Goal 2.7 **Provide for the development and maintenance of public infrastructure and services to support existing and future residents, businesses, recreation, and other uses.**

Policy 2.7.2 Work with the San Bernardino Valley Municipal Water District to create additional water storage capacity and take advantage of the abundant water supplies.

UTILITIES ELEMENT

Goal 9.3 **Provide water supply, transmission, distribution, storage, and treatment facilities to meet present and future water demands in a timely and cost effective manner.**

Policy 9.3.1 Provide for the construction of upgraded and expanded water supply, transmission, distribution, storage, and treatment facilities to support existing and new development.

Goal 9.4 **Provide appropriate storm drain and flood control facilities where necessary.**

Policy 9.4.1 Ensure that adequate storm drain and flood control facilities are provided in a timely manner to protect life and property from flood hazards.

Policy 9.4.2 Upgrade and expand storm drain and flood control facilities to eliminate deficiencies and protect existing and new development.

Policy 9.4.4 Require that adequate storm drain and flood control facilities be in place prior to the issuance of certificates of occupancy. Where construction of master planned facilities is not feasible, the Mayor and Common Council may permit the construction of interim facilities sufficient to protect present and short-term future needs.

Policy 9.4.5 Implement flood control improvements that maintain the integrity of significant riparian and other environmental habitats.

Policy 9.4.6 Minimize the disturbance of natural water bodies and natural drainage systems.

Policy 9.4.7 Develop San Bernardino's flood control system for multi-purpose uses, whenever practical and financially feasible.

Policy 9.4.8 Minimize the amount of impervious surfaces in conjunction with new development.

Policy 9.4.9 Develop and implement policies for adopting Sustainable Stormwater Management approaches that rely on infiltration of stormwater into soils over detention basins or channels. Sustainable Stormwater Management techniques include use of pervious pavements, garden roofs, and bioswales to treat stormwater, and reusing stormwater for non-potable water uses such as landscape irrigation and toilet/urinal flushing.

Policy 9.4.10 Ensure compliance with the Federal Clean Water Act requirements for National Pollutant Discharge Elimination System (NPDES) permits, including requiring the development of Water Quality Management Plans, Erosion and Sediment Control Plans, and Storm Water Pollution Prevention Plans for all qualifying public and private development and significant redevelopment in the City.

Policy 9.4.11 Implement an urban runoff reduction program consistent with regional and federal requirements, which includes requiring and encouraging the following examples of Best Management Practices (BMPs) in all developments:

- Increase permeable areas, install filtration controls (including grass lined swales and gravel beds), and divert flow to these permeable areas to allow more percolation of runoff into the ground;
- Use natural drainage, detention ponds, or infiltration pits to collect and filter runoff;
- Prevent rainfall from entering material and waste storage areas and pollution-laden surfaces; and
- Require new development and significant redevelopment to utilize site preparation, grading, and other BMPs that provide erosion and sediment control to prevent construction-related contaminants from leaving the site and polluting waterways.

SAFETY ELEMENT

Goal 10.4 Minimize the threat of surface and subsurface water contamination and promote restoration of healthful groundwater resources.

Policy 10.4.1 Promote integrated inter-agency review and participation in water resource evaluation and mitigation programs.

Policy 10.4.2 Protect surface water and groundwater from contamination.

Policy 10.4.3 Eliminate or remediate old sources of water contamination generated by hazardous materials and uses.

Policy 10.4.4 Develop programs and incentives for prevention of groundwater contamination and clean up of known contaminated sites.

Goal 10.5 Reduce urban run-off from new and existing development.

Policy 10.5.1 Ensure compliance with the Federal Clean Water Act requirements for National Pollutant Discharge Elimination System (NPDES) permits, including developing and requiring the development of Water Quality Management Plans for all new development and significant redevelopment in the City.

Policy 10.5.2 Continue to implement an urban runoff reduction program consistent with regional and federal requirements, which includes requiring and encouraging the following:

- Increase permeable areas to allow more percolation of runoff into the ground;
- Use natural drainage, detention ponds or infiltration pits to collect runoff;
- Divert and catch runoff using swales, berms, green strip filters, gravel beds and French drains;
- Install rain gutters and orient them towards permeable surfaces;
- Construct property grades to divert flow to permeable areas;
- Use subsurface areas for storm runoff either for reuse or to enable release of runoff at predetermined times or rates to minimize peak discharge into storm drains;
- Use porous materials, wherever possible, for construction of driveways, walkways and parking lots; and
- Divert runoff away from material and waste storage areas and pollution-laden surfaces such as
- parking lot.

Policy 10.5.3 Cooperate with surrounding jurisdictions and the County to provide adequate storm drainage facilities.

Policy 10.5.4 Require new development and significant redevelopment to utilize site preparation, grading and foundation designs that provide erosion control to prevent sedimentation and contamination of waterways.

Policy 10.5.5 Ensure compliance with the requirements for Storm Water Pollution Prevention Plans or Water Quality Management Plans for all new development or construction activities.

Policy 10.5.6 Coordinate with appropriate federal, state, and local resource agencies on development projects and construction activities affecting waterways and drainages.

Goal 10.6 Protect the lives and properties of residents and visitors of the City from flood hazards.

Policy 10.6.1 Maintain flood control systems and restrict development to minimize hazards due to flooding.

Policy 10.6.2 Use natural watercourses as the City's primary flood control channels whenever feasible.

Policy 10.6.3 Keep natural drainage courses free of obstructions.

Policy 10.6.4 Evaluate all development proposals located in areas that are subject to flooding to minimize the exposure of life and property to potential flood risks.

Policy 10.6.5 Prohibit land use development and/or the construction of any structure intended for human occupancy within the 100-year flood plain as mapped by the Federal Emergency Management Agency (FEMA) unless adequate mitigation is provided against flood hazards.

Policy 10.6.6 Encourage new development to utilize and enhance existing natural streams, as feasible.

Policy 10.6.7 Utilize flood control methods that are consistent with Regional Water Quality Control Board Policies and Best Management Practices (BMPs).

Policy 10.6.8 Review development proposals for projects within the City's Sphere of Influence and encourage the County to disapprove any project that cannot be protected with an adequate storm drain system.

Policy 10.6.9 Ensure major drains in developed areas have a pipeline capacity to comply with the Flood Control District's Comprehensive Storm Drain Plans for development of the City's storm drain system.

Policy 10.6.10 Design local drains in foothill areas to convey 25-year storm flows where downstream systems are lacking and street systems are not present.

Policy 10.6.11 Design major drains in foothill to convey 100-year flows within a pipe or channel areas where downstream systems are lacking and street systems are not present.

Policy 10.6.12 Develop a process to study flooding issues and create appropriate regulations. This could include the creation of "alluvial districts," local quasi-government entities designed to inform homeowners of flood risks as well as advise the floodplain land use decisions of the City.

ENERGY AND WATER CONSERVATION ELEMENT

Goal 13.2 **Manage and protect the quality of the City's surface waters and ground water basins.**

Policy 13.2.1 Coordinate and monitor the City's water conservation efforts on an annual basis and modify or expand them as necessary to ensure their effectiveness.

Policy 13.2.2 Require that development not degrade surface or groundwater, especially in watersheds, or areas with high groundwater tables or highly permeable soils.

Policy 13.2.3 Consider the establishment of incentives, funding programs, or a rebate program for projects that implement water conservation measures, such as replacing aging, leaking, and/or inefficient plumbing with more efficient, water-saving plumbing.

Policy 13.2.4 Require the use of reclaimed water for landscape irrigation and other non-contact uses for industrial projects, golf courses, and freeways.\

Policy 13.2.5 Mitigate degradation of the groundwater basins that may have already occurred by existing commercial, industrial, and other uses.

Policy 13.2.7 Require that new development incorporate improvements to channel storm runoff to public storm drainage systems and prevent discharge of pollutants into the groundwater basins and waterways.

Policy 13.2.8 Require that development in the City's watersheds incorporate adequate landscape and groundcover to prevent slope erosion and significant sedimentation of canyon drainages.

Mitigation Measures:

HYD-1 Prior to the issuance of any grading or building permit, all qualifying land development/redevelopment projects, shall submit and have approved a Storm Water Quality Management Plan (SWQMP) to the City Engineer. The SWQMP shall identify all Best Management Practices (BMPs) that will be incorporated into the project to control storm water and non-storm water pollutants during and after construction and shall be revised as necessary during the life of the project. The SWQMP submittal applies to construction projects covered by the NPDES General Construction Permit as well as construction projects less than one acre in size. Also, a Stormwater Pollution Prevention Plan (SWPPP) shall be reviewed and approved by the City Engineer for water quality construction activities on-site. All recommendations in the Plan shall be implemented during post construction/operation phase. The project applicant shall comply with each of the recommendations detailed in the Plan, and other such measure(s) as the City deems necessary to mitigate potential water quality impacts.

HYD-2 Any developer/owner engaging in construction activities which disturb one acre or more of land shall apply for coverage under the General Storm Water Permit

for Construction Activity with the State Water Resources Control Board (SWRCB). Any developer/owner engaging in construction activities which disturb less than one acre, but are part of a larger common plan of development or sale that is greater than one acre, must also apply for coverage under the General Storm Water Permit for Construction Activity with the State Water Resources Control Board (SWRCB).

"Construction activity" includes, but is not limited to: clearing, grading, demolition, excavation, construction of new structures, and reconstruction of existing facilities involving removal and replacement that results in soil disturbance. The owner of the land where the construction activity is occurring is responsible for obtaining coverage under the permit. Owners may obtain coverage under the General Permit by completing a "Notice of Intent" form (NOI) and mailing the form along with a vicinity map and the appropriate fee to the office of the California State Water Resources Control Board. The NOI form and checklist of items to submit to the state is available from the State Water Resources Control Board in Sacramento, California or from the City's Development Services Department. In addition, the owner shall also prepare a Storm Water Pollution Prevention Plan (SWPPP) in accordance with State requirements.

Prior to obtaining any City-issued grading and/or construction permits the developer/owner shall provide evidence of compliance with the General Construction Permit by providing a copy of the Waste Discharger's Identification Number (WDID) to the City's Community Development Department.

Level of Significance After Mitigation: Less Than Significant Impact.

EROSION AND SILTATION

- **IMPLEMENTATION OF THE PROPOSED PROJECT COULD SUBSTANTIALLY ALTER THE EXISTING DRAINAGE PATTERN OF THE SITE OR 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.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: The proposed project would not significantly alter existing drainage patterns within this part of the City. As part of the proposed project, infrastructure improvements may be constructed which could improve drainage conditions within the Project Area. Implementation of the proposed project could improve drainage conditions within the area affecting future developments as they occur.

Any site development or construction of new facilities has the potential to alter existing drainage patterns, primarily due to runoff from construction activities, increase in impervious surfaces, and vegetation removal. Naturally and artificially induced changes to the characteristics of a drainage basin or floodplain of a stream or river can affect the extent and severity of events that result in erosion and/or siltation.

Short-term construction impacts of runoff due to alteration of existing drainage patterns could be reduced with the implementation of BMPs during planned construction activities on-site. During construction preventative measures, such as sandbag barriers which are typically placed around the perimeter of an area being graded, would be included to prevent dirt and sediment-laden storm runoff from exiting a site. Sandbags could also be placed along swales, at the toe of slopes, and around storm drain inlets to reduce the erosive velocity of storm runoff and to promote the settling of sediment out of the flow. Storm runoff is directed to inlets that are protected by filter fabric to screen out sediment before it enters the storm drain system. For larger areas of disturbed earth, a sediment basin may be installed in which storm runoff ponds allow for the hydrostatic settlement of sediment to occur. An outlet pipe is set at the top of the ponded water for discharge of clean storm water. A stabilized construction entrance usually consists of a layer of heavy gravel that drains well to prevent mud conditions and helps to knock mud off the construction vehicle tires as they exit the site. A wheel wash may also be installed to remove mud from tires.

Long-term impacts of runoff due to alteration of existing drainage patterns would occur as a result of the proposed project. Individual development components, such as paved parking lots, building structures, and rights-of-way would increase the rate and amount of surface runoff. Flows currently received by the Project Area and flows from the Project Area would be directed into County of San Bernardino master plan drainage facilities.

Implementation of BMPs would prevent or minimize impacts to drainage due to runoff and ensure that discharges during the construction and post-construction phase would not cause or contribute to any exceedances of water quality standards in the receiving waters. BMP selection is ultimately guided by the *California Stormwater Best Management Practice Handbooks for Construction Activity*, *American Society of Civil Engineers Urban Runoff Quality Management*, and the *Water Environment Federation Manual of Practice No. 23 and 87*. In addition, a Notice of Intent (NOI) would be prepared and submitted to the RWQCB providing notification and intent to comply with the General NPDES Permit. Preparation and approval of a project-specific SWPPP is also included as mitigation to address construction-related drainage impacts.

In addition to implementation of the mitigation measures identified above, BMPs and regulatory compliance, multiple on-site and off-site infrastructure may be constructed to mitigate the impacts to drainage (refer to Impact Analysis, “Water Quality Standards”). Drainage facilities would contribute to the reduction of pollutants in runoff by allowing sedimentation of particles and infiltration, thus reducing flows as well as pollutant load. The proposed project would mitigate the effect of increased runoff from project development to downstream property owners. Increased runoff would be mitigated with implementation of Mitigation Measures HYD-1 and HYD-2, which would reduce potential impacts to a level of less than significant.

General Plan Goals and Policies: Refer to the goals and policies identified above.

Mitigation Measures: Refer to Mitigation Measures HYD-1 and HYD-2. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

POLLUTED RUNOFF

- **IMPLEMENTATION OF THE PROPOSED 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, SUCH AS FROM AREAS OF MATERIAL STORAGE, VEHICLE OR EQUIPMENT MAINTENANCE (INCLUDING WASHING OR DETAILING), WASTE HANDLING, HAZARDOUS MATERIALS HANDLING OR STORAGE, DELIVERY AREAS, LOADING DOCKS, OR OTHER OUTDOOR AREAS.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: Within the Project Area, most stormwater is conveyed via street curb and gutters to existing San Bernardino County Flood Control District (SBCFCD) storm drains. The SBCFCD storm drain system generally collects water from streets, pipelines, and Caltrans drains within the Project Area and transports it to the Santa Ana River or its tributaries. The northern and western section of the Project Area is located within SBCFCD Flood Control Zone 2, while the southern and eastern section is located within Zone 3.

The project proposes the consolidation of seven Project Areas into one Project Area. As part of this activity, several storm drain infrastructure improvements may be constructed, which would coincide with other improvements as part of the City's Capital Improvement Program. These improvements will be constructed to reduce existing deficiencies and improve current conditions. In addition, all future developments within the Project Area would be required to comply with all applicable City, County, State, and Federal water quality rules and regulations.

Redevelopment Action 10 in the *Merged, Amended, and Restated Development Plan for the San Bernardino Merged Redevelopment Project Area A* states that the Agency would acquire, install, develop, construct, reconstruct, redesign, plan, re-plan, or reuse streets, curbs, gutters, flood control facilities, and other public improvements and public facilities. This effort would achieve the identified goal of eliminating environmental deficiencies and inadequate public improvements.

Approximately 465 acres of vacant land within the Project Area could potentially be developed with the following (in accordance with the *General Plan*):

- Approximately 3.22 million square feet of commercial and office uses
- Over 500,000 square feet of industrial uses
- 788 multi-family residential units.

In addition to the development of vacant parcels, the development potential of identified redevelopment projects within the Project Area is as follows:

- 667,000 square feet of retail/general commercial use
- 1.49 million square feet of commercial office use

- 300,000 square feet of commercial lodging uses
- 355 multi-family residential units

Future development could result in alterations to the existing drainage patterns of the development sites. Drainage patterns could change slightly due to project-related grading and increases in the amount of impermeable surfaces on the site from structures (i.e., residential, industrial, commercial, and institutional/civic uses) and other ancillary uses (i.e., parking lots, driveways, walkways, etc.). However, the proposed project would not substantially alter existing drainage patterns within the City through the alteration of the course of a stream or river. In addition, the proposed development/redevelopment sites would be serviced by existing stormdrain facilities/ infrastructure. In cases where inadequate infrastructure is available, future developments would be required to construct the necessary infrastructure to support the proposed activity and upgrade any facilities downstream of the development site to ensure adequate stormdrain facilities are available to support existing and new developments.

*General Pla*n goals and policies would further ensure adequate drainage system capacity is available within the City. Mitigation Measure HYD-3 requires new development projects be designed to reduce impacts related to the drainage system capacity to less than significant levels. Thus, drainage and runoff impacts associated with implementation of the proposed project would be reduced to a less than significant level.

In addition, the proposed project as discussed under the Impact Analysis for "Water Quality Standards" would not contribute significant amounts of polluted runoff with implementation of Mitigation Measures HYD-1 and HYD-2. Thus, less than significant impacts related to polluted runoff would occur with implementation of the proposed project.

General Plan Goals and Policies: Refer to the goals and policies identified above.

Mitigation Measures: Refer to Mitigation Measures HYD-1 and HYD-2.

HYD-3 Prior to approval of project grading or construction plans, the project owner/developer(s) shall be required to coordinate with the City's Public Works Department to determine requirements necessary to mitigate impacts to drainage improvements required to accommodate storage volumes and flood protection for existing and future runoff. Proposed projects shall implement mitigation measures, if required, to the satisfaction of the City Engineer and Public Works Department.

Level of Significance After Mitigation: Less Than Significant Impact.

DEGRADATION OF WATER QUALITY

- **IMPLEMENTATION OF THE PROPOSED PROJECT COULD OTHERWISE SUBSTANTIALLY DEGRADE WATER QUALITY.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: As previously discussed in the Impact Analysis for "Water Quality Standards," the proposed project would provide effective water quality treatment. The implementation of BMPs that filter pollutants from stormwater would reduce impacts to water quality associated with polluted stormwater compared to existing conditions.

City *Municipal Code* regulations and Federal, State, and local water quality standards are in place to protect groundwater resources and surface water quality from construction and post-construction impacts. The implementation of Mitigation Measures HYD-1 through HYD-3 would reduce potential impacts on water quality and stormwater discharge to a less than significant level and reduce pollutants in stormwater discharges from project site to the maximum extent practicable.

However, the Santa Ana RWQCB's Spill, Leaks, Investigation and Cleanup (SLIC) List has identified a number of businesses in the City of San Bernardino that may be contaminated. The property owner/developer would be required to ensure proper environmental analysis and clean-up are conducted prior to development or redevelopment on these sites. In addition, RWQCB, in cooperation with the Office of Emergency Services (OES), maintains an inventory of leaking underground fuel tanks (LUFTs) in a statewide database. Additional discussion regarding impacts associated with SLIC and LUFTs can be found in Section 5.10, Hazards and Hazardous Materials of this EIR and the *General Plan EIR* Hazards and Hazardous Materials Section. All property owners/developers would be required to provide proper environmental analysis and clean-up for sites listed with these conditions prior to development/ redevelopment. With implementation of Mitigation Measures HYD-1 through HYD-3 and HAZ-1, less than significant impacts are anticipated.

General Plan Goals and Policies: Refer to the goals and policies identified above.

Mitigation Measures: Refer to Mitigation Measures HYD-1 through HYD-3, and Mitigation Measure HAZ-1. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

HOUSING WITHIN A 100-YEAR FLOOD HAZARD

- **IMPLEMENTATION OF THE PROPOSED PROJECT COULD 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 (PANEL NO. 06071C7930F).**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: According to *General Plan* Figure S-1, portions of the Project Area are located within a 100-year flood hazard area. The placement of temporary or permanent residential structures may occur within these areas upon project implementation.

The City of San Bernardino *Hazard Mitigation Plan* indicates that flooding is an issue within the City of San Bernardino, based on the City's geographical location, topography, and terrain. Moderate to severe flood events typically result in road closure, utility damage, contamination of the potable water supply, mudslides, and extensive property damage. Severe flooding generally requires the evacuation of residents from inundation areas. Past and reasonable foreseeable flooding areas have been delineated based on FEMA flood information and historical data (refer to *Exhibit 5.11-1*). Flooding in San Bernardino is a problem due mainly to the topography of the area and the proximity to the mountains to the north. The mountain drainages can contribute to flash flooding, the most-recent event occurred on Christmas Day in 2003. Most drainages that are tributary to the Santa Ana River within the City have been confined to lined channels where flooding can be reasonably controlled.

The entire City is at risk of seasonal temporary urban flooding. Sections of the City are occasionally prone to urban flooding, especially low lying areas. This occurs because of debris accumulation in storm drains and flood control basins, and overburdened pumping stations and aged drainage systems. Although development associated with implementation of the proposed project would increase impermeable surfaces within the Project Area, the increased potential for urban flooding in the City would not be significant as a majority of the City is considered built-out (80.6 percent).

According to the *General Plan EIR*, development of structures for human occupancy is restricted or prohibited within the 100-year flood zone and critical facilities are restricted or prohibited within the 500-year flood zone, contingent on whether acceptable engineering measures can reduce the flooding hazard. Critical facilities such as schools would be required to have evacuation plans in place that cover the possibility of flooding. Facilities using, storing, or otherwise involved with substantial quantities of on-site hazardous materials would not be permitted in flood zone areas, unless all standards of elevation, anchoring, and flood proofing have been satisfied, and hazardous materials are stored in watertight containers that will not float. Campgrounds and other similar types of activities should also be prohibited in high-risk flood areas, at least during the rainy season.

Although flooding within the Project Area is focused within open space, commercial, and industrial areas within the southern part of the City, a few small areas of residential use may experience some localized flooding during 100 year storm events. However, the proposed project does not include the addition of new residential uses within these areas. In addition, the guidelines developed and enforced through the *Municipal Code*, *Development Code*, Hillside

Management Overlay District, and Building Safety Enhancement Zone are intended to ensure that any real-property projects approved in the City consider mitigation efforts to reduce flooding impacts. With adherence to the *Municipal Code*, the City's *Hazard Mitigation Plan*, *General Plan* goals and policies, and Mitigation Measure HYD-3 impacts related to placement of housing within a 100-year flood hazard area would be reduced to a less than significant level.

General Plan Goals and Policies: Refer to the goals and policies identified above.

Mitigation Measures: Refer to Mitigation Measure HYD-3. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

STRUCTURES WITHIN A 100-YEAR FLOOD HAZARD

- **IMPLEMENTATION OF THE PROPOSED PROJECT COULD PLACE WITHIN A 100-YEAR FLOOD HAZARD AREA STRUCTURES WHICH WOULD IMPEDE OR REDIRECT FLOOD FLOWS.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: According to *General Plan* Figure S-1, portions of the Project Area are located within a 100-year flood hazard area. Implementation of the proposed project has limited potential to expose people or structures to the risk of flooding due to the confinement of most drainages in flood control devices and land use designations that restrict residential development in flood-prone areas. Flood-prone areas (100-year flood plain) outside of the existing flood control devices are limited to a few isolated areas (as shown in *Exhibit 5.11-1*) that are surrounded by development. Development in these isolated flood-prone areas would increase impervious surfaces, such as asphalt, and reduce the absorption rate of water into the ground, which results in runoff to downstream areas. However, any additional development in these areas would be required to improve the site (such as raising the elevation) and provide on-site storm drain systems to avoid the risk of isolated flooding.

Also, refer to the Impact Analysis for "Housing within a 100-Year Flood Hazard" for impacts related to potential flooding events. With implementation of Mitigation Measure HYD-3, less than significant impacts are anticipated.

General Plan Goals and Policies: Refer to the goals and policies identified above.

Mitigation Measures: Refer to Mitigation Measure HYD-3. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

FAILURE OF A LEVEE OR DAM

- **IMPLEMENTATION OF THE PROPOSED PROJECT COULD 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.**

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis: *General Plan* Figure S-2 identifies dam inundation areas within the City as a result of failure of the Seven Oaks Dam upstream. A large portion of the Project Area (Tri-City, South Valle, Meadowbrook/Central City, Central City South, Central City North, Central City East, and Southeast Industrial Park) would be affected if dam failure occurred. People or structures within these areas could be exposed to a significant risk of loss, injury, or death involving flooding as a result of this failure.

However, the Seven Oaks Dam, located upstream of the reach of the Santa Ana River that traverses the City of San Bernardino and Project Area, is designed to provide flood protection during a 350-year event and withstand an 8-plus magnitude earthquake. During flood conditions, the dam would create a pool 500 feet deep extending three miles back into Upper Santa Ana Canyon. In the unlikely event of dam failure, an inundation zone for the Seven Oaks Dam has been determined as shown on *Exhibit 5.11-2*. However, according to the Army Corps of Engineers, this inundated area reflects events of an extremely remote nature as a seismic event large enough to damage the structure would have to occur at the same time as the maximum amount of water is impounded by the dam. The frequency of these two events coinciding at the same time is extremely low. The potential areas of flooding identified in *Exhibit 5.11-2* are based on a failure event at a full pool elevation of 2,580 feet (NGVD). Due to the extremely remote nature of these impacts, the proposed project would result in less than significant impacts in regard to dam failure.

General Plan Goals and Policies: Refer to the goals and policies identified above.

Mitigation Measures: No mitigation measures beyond the goals and policies identified in the General Plan are required.

Level of Significance After Mitigation: Not Applicable.

5.11.5 CUMULATIVE IMPACTS AND MITIGATION MEASURES

- **IMPLEMENTATION OF THE PROPOSED PROJECT COULD RESULT IN CUMULATIVELY CONSIDERABLE HYDROLOGY, DRAINAGE, AND WATER QUALITY IMPACTS.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: For this topic, the cumulative impacts are analyzed in terms of impacts within the City of San Bernardino, along with impacts to the regional drainage facilities under the jurisdiction of the Santa Ana RWQCB (Region 8).

The proposed project would potentially impact drainage courses and hydrologic flows throughout this portion of the City. However, because the City, which includes the Project Area, is over 80 percent built-out, development resulting from implementation of the proposed project would not significantly increase impermeable surfaces citywide, which would not substantially increase regional drainage flows.

Future development projects in the County or City of San Bernardino would be required to mitigate specific hydrologic and water quality impacts on a project-by-project basis. Additionally, the City's *Municipal Code* incorporates federal and state regulations and guidelines pertaining to storm water runoff to reduce or eliminate regional water quality impacts. Impacts associated with future development resulting from implementation of the proposed project would be addressed at a site-specific level to ensure their cumulative impact would be less than significant. Thus, implementation of the proposed project would not result in cumulatively considerable hydrology or water quality impacts.

General Plan Goals and Policies: Refer to the goals and policies identified above.

Mitigation Measures: Refer to Mitigation Measures HYD-1 through HYD-3 and HAZ-1. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

5.11.6 SIGNIFICANT UNAVOIDABLE IMPACTS

Hydrology, drainage, and water quality impacts associated with implementation of the proposed project would be less than significant with compliance with the *General Plan* goals and policies and the recommended mitigation measures. Therefore, no significant unavoidable hydrology, drainage, or water quality impacts would occur as a result of the proposed project.

5.11.7 SOURCES CITED

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City of San Bernardino, *San Bernardino General Plan*, November 1, 2005.

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City of San Bernardino, *Hazard Mitigation Plan*, adopted March 21, 2005.

San Bernardino County Flood Control District, *System Number Index and General File Codes,* updated January 2010.

City of San Bernardino Municipal Water Department*, 2005 Urban Water Management Plan, December 2005.*

Redevelopment Agency of the City of San Bernardino, *Merged, Amended, and Restated Redevelopment Plan for the San Bernardino Merged Redevelopment Project Area A*, February 26, 2010.

Rosenow Spevacek Group, Inc., *Preliminary Report: San Bernardino Merged Area A Merger and Amendments*, April 5, 2010.

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