6.8 HYDROLOGY AND WATER QUALITY

6.8 HYDROLOGY AND WATER QUALITY

INTRODUCTION

This section addresses potential hydrologic effects related to drainage and water quality resulting from development and occupancy of the RUSP. Site characteristics such as regional and local drainage, and flooding conditions and water quality are described based on site-specific information developed for the proposed project and published technical information, as indicated in footnoted references. The primary sources of information referenced for this section regarding drainage and flooding conditions are listed below:

- Regional University Specific Plan Preliminary Drainage Master Plan, Civil Engineering Solutions, Inc. (March 15, 2006),
- County of Placer Stormwater Management Plan, Small Municipal Stormwater Program, Placer County (June 29, 2004), and
- Environmental Impact Report for the West Roseville Specific Plan and Sphere of Influence Amendment (State Clearinghouse No. 2002082057, September 15, 2003).

These documents are available for review at the Placer County Planning Department, 3091 County Center Drive, Auburn, California. The Preliminary Drainage Master Plan includes additional information on specific hydrologic and hydraulic assumptions (including figures and drainage calculations).

Comments raised in response to the Notice of Preparation (see Appendix B) included the need to address cumulative impacts of stormwater runoff, mitigate peak flow rates to pre-development levels for the 2-, 10-, and 100-year storm events, fully describe the roles of both surface and groundwater, and provide the appropriate amount of stormwater volume storage during each phase of the project.

Issues related to the groundwater and the availability of water supplies and potential environmental effects related to the use of existing and planned supplies, including those to groundwater, are addressed in Section 6.11, Public Utilities.

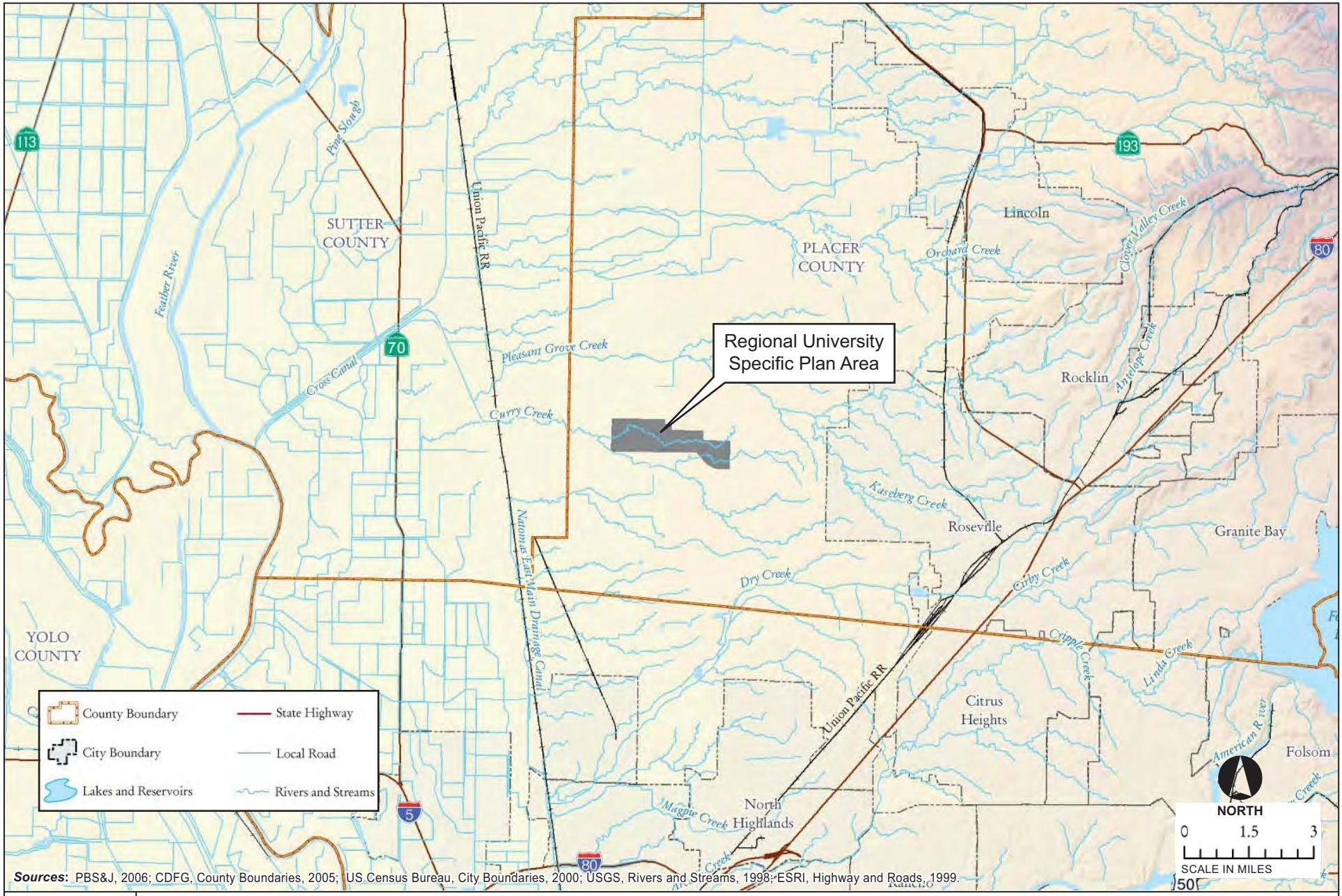
ENVIRONMENTAL SETTING

Regional Surface Water Hydrology

The proposed project site is situated within the Curry Creek watershed in the Sacramento Valley. Figure 6.8-1 illustrates the regional hydrology. The headwaters of Curry Creek are located about three-quarters of a mile east of Fiddyment Road. The Curry Creek watershed totals approximately 16.6 square miles and gently slopes from east to west (Figure 6.8-2). The elevation in the upper watershed is approximately 120 feet above mean sea level (msl), decreasing to approximately 45 feet in Sutter County.[1]

The Curry Creek watershed drains to the Pleasant Grove Creek Canal that flows northwestward to the Cross Canal watershed. The Cross Canal drains all water from upstream watersheds in Placer

1 Wood Rodgers Inc., *Fiddyment-Westpark Master Plan Drainage Analysis*, June 2003, page 7.



Sources: PBS&J, 2006; CDFG, County Boundaries, 2005; US Census Bureau, City Boundaries, 2000; USGS, Rivers and Streams, 1998; ESRI, Highway and Roads, 1999.

FIGURE **6.8-1**

Regional Hydrology

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Regional University Specific Plan EIR

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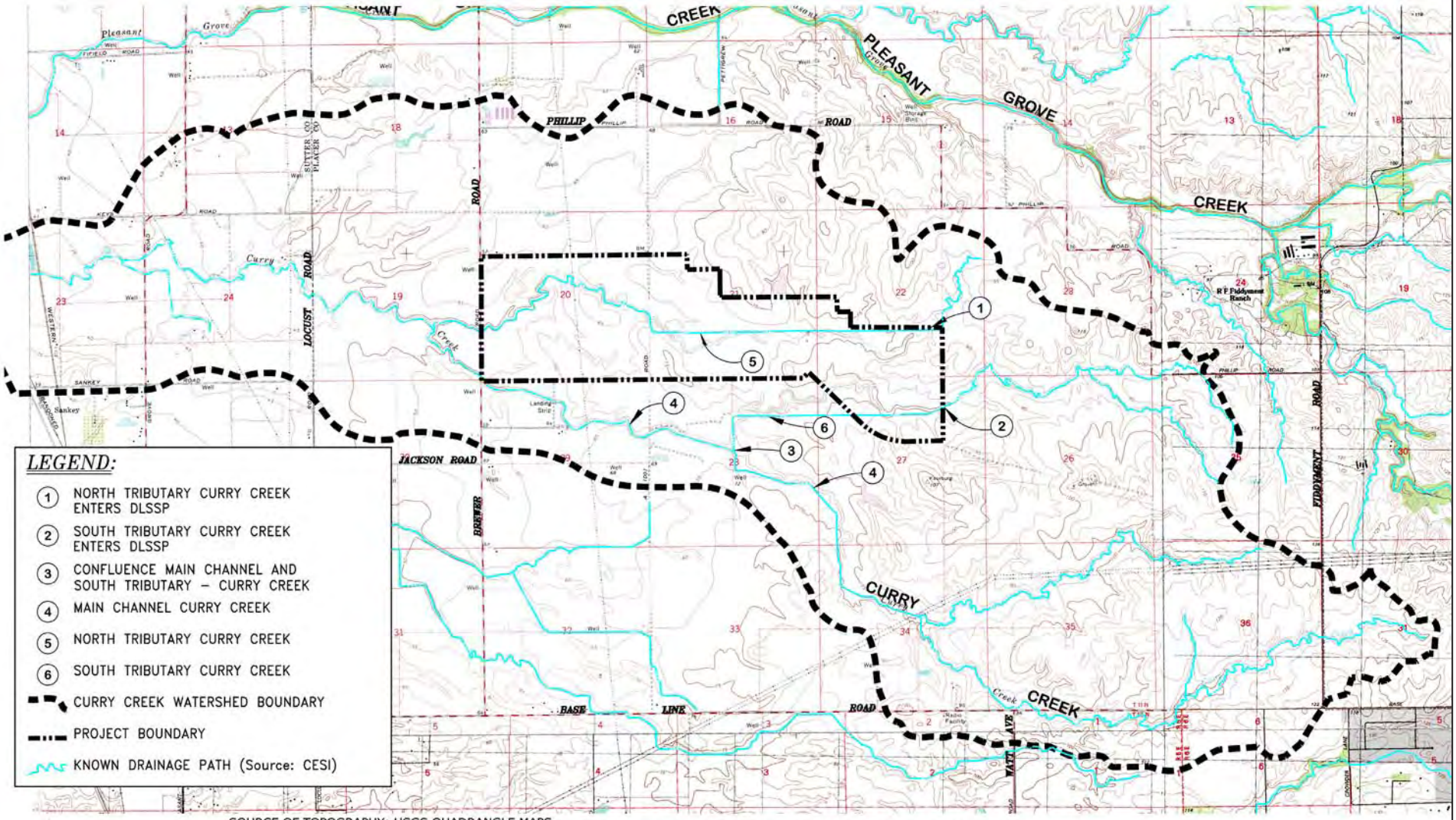

SOURCE OF TOPOGRAPHY: USGS QUADRANGLE MAPS.
CITRUS HEIGHTS, CALIFORNIA 1992 7.5 MINUTE SERIES (TOPOGRAPHIC) DMA 1761 III NE-SERIES V895
RIO LINDA, CALIFORNIA 1992 7.5 MINUTE SERIES (TOPOGRAPHIC) DMA 1761 III NW-SERIES V895
ROSEVILLE, CALIFORNIA 1992 7.5 MINUTE SERIES (TOPOGRAPHIC) DMA 1761 IV SE-SERIES V895
PLEASANT GROVE, CALIFORNIA 1967 SW/4 LINCOLN 15' QUADRANGLE 1967 PHOTO REVISED 1981 DMA 1761 IV SW-SERIES V895

0' 1500' 3000' 6000'

NORTH

***Sources*:** G.C. Wallace, 2006.

PBSJ

FIGURE **6.8-2**

Curry Creek Watershed

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Regional University Specific Plan EIR

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and Sutter Counties that flow through the East Side Canal, including Coon Creek, Markham Ravine, Auburn Ravine, Curry Creek, and Pleasant Gove Creek. Along with many other watersheds in Placer County, Curry Creek flows are conveyed downstream to the Cross Canal in Sutter County, and then through an extensive levee network into the Sacramento River just south of its confluence with the Feather River, approximately 14 miles west of Roseville.

The Cross Canal watershed is within the Sacramento River Basin (Basin), which covers approximately 26,500 square miles, and is bounded by the Sierra Nevada to the east, the Coast Ranges to the west, the Cascade Range and Trinity Mountains to the north, and the Delta-Central Sierra area to the south. The Sacramento River is the principal river in the basin. The principal tributaries to the Sacramento River include the Pit and McCloud Rivers, which join the Sacramento River from the north, and the Feather and American Rivers, which are tributaries from the east.[2] The average runoff from the Basin is estimated to be 21.3 million acre-feet per year.[3]

Stormwater

Sutter County and Reclamation District 1001 have expressed concerns with the potential for flooding as a result of increased stormwater volume generated by development in Placer County. In response to Sutter County's concerns, Placer County and the cities of Roseville, Rocklin, Lincoln, and Auburn participated in the Auburn Ravine, Coon, and Pleasant Grove Creek Watershed Study. The study, which was prepared in 1993, examined the Pleasant Grove and Curry Creek watersheds, and other regional drainages that affect Sutter County. The study concluded that all planned future development in Placer County, if unmitigated, could increase water surface elevations by less than 0.3 feet (3.6 inches) along tributary streams and approximately 0.1 feet (1.2 inches) in the ponding area upstream of the Cross Canal. These increases would inundate several hundred additional acres in Sutter County during a major flood.[4] Conclusions of this study recommended a combination of regional and local detention and retention basins, adoption of a regional floodplain management plan, and grading ordinances and policies.[5] To date, the City of Roseville has collected fees to construct a regional retention basin. Upon approval by the City Council in May 2003, these fees were used to purchase a 1,700-acre property west of Reason Farms on which the regional retention basin will be constructed and operated on Pleasant Grove Creek.

Preliminary estimates of the amount of retention that would be needed to reduce potential flooding impacts at downstream locations (e.g., Placer-Sutter County line) were developed in 1999-2000 for the Pleasant Grove Creek watershed (Pleasant Grove Creek Watershed Mitigation Fee Report prepared by Civil Solutions). The method used to estimate stormwater runoff volume was based on long-duration storms within the City of Roseville with development in place. The most recent analysis indicates that approximately 2,350 acre-feet of storage volume would be required to mitigate the increase in the amount (volume) of stormwater runoff for existing, entitled, and planned future projects in Roseville. The proposed project site is outside of the City limits, and runoff volumes for the project were not included in the 2,350 acre-feet volume when developing the basin design and storage capacity. However, flows from the proposed project site would drain into the Cross Canal, and combine with flows released from the storage basin.

2 City of Roseville, *North Roseville Specific Plan Phase 3 Draft Environmental Impact Report*, May 2000.
3 EIP Associates, *Stoneridge Specific Plan EIR*, December 3, 1997.
4 Placer County Flood Control and Water Conservation District, Auburn Ravine, Coon, and Pleasant Grove Creeks Flood Mitigation, June 1993, page ES-3.
5 CH2MHILL, *Auburn Ravine, Coon, and Pleasant Grove Creeks Flood Mitigation*, Volume 1, June 1993.

A portion of the Reason Farms site (about 560 acres) would contain the retention basin facilities required for the estimated runoff volumes, would be managed by the City of Roseville as public open space, and would accommodate other opportunities, such as habitat enhancement and restoration projects. The City published a Draft EIR for the retention basin facility in October 2002 (SCH No. 2002072084). The EIR analyzed construction and operation of full buildout of the retention basin to a capacity of 2,350 acre-feet and related features (e.g., maintenance/access roads, pumping facilities). The Final EIR was certified and the Reason Farms Retention Basin project was approved in January 2003. Current City documents indicate that construction of the first phase of the Reason Farms Retention Basin will not begin until 2010, while the second phase is planned for 2017. The City is in the early process stage of consulting permitting agencies for the Reason Farms project. Currently, funding for the project is solely by the City.

Project Site Characteristics and Hydrology

The proposed project site encompasses undeveloped and non-irrigated land in the western third of the project site, while the remaining two-thirds of the project site to the east are used for cultivating rice. The existing terrain is generally level, with natural drainage patterns running in a westerly direction along two tributaries of Curry Creek, the north and south tributaries, with a small portion of the Curry Creek main channel crossing the southwestern-most corner of the project site at Brewer Road. Small ephemeral drainages and irrigation ditches also traverse the project site. Vegetation on the site consists of native and non-native annual grasslands, a limited number of oak trees and riparian vegetation located along Curry Creek, and rice crops. The site is dotted with depressions, which are comprised of seasonal wetlands and vernal pools. The land surrounding the project site is generally composed of the same topography (i.e., flat and gently sloping to the southwest) with similar land uses.

The proposed project site lies entirely within the Curry Creek watershed (Figure 6.8-2). Two tributaries and the main channel of the Curry Creek watershed transect the project site and ultimately discharge to the Cross Canal in Sutter County and the Sacramento River. The north and south tributaries enter the project site from the east. The north tributary of Curry Creek nearly bisects the project site, while the south tributary traverses only a small portion of the southeastern section of the project site. The main channel crosses the southwest corner of the project site at Brewer Road. After exiting the project site, flows from the south tributary enter the main channel of Curry Creek south of the project site. The north tributary and the main channel of Curry Creek then convey water through culverts that pass under Brewer Road at the western boundary of the project site. All areas of the project site are tributary to Curry Creek and the analysis of existing conditions in Curry Creek at the project site indicates that significant shallow overbank flow (flooding) occurs through the project reach.[6]

100-Year Floodplain

The portions of Curry Creek traversing the project site are mapped by the Federal Emergency Management Agency (FEMA) in the Flood Insurance Rate Map (FIRM) for Placer County. The FIRM map dated June 8, 1998, includes the tributaries and main channel of Curry Creek that flow through the project site. The area of overbank flow and 100-year floodplain, as mapped by FEMA, is

6 Civil Solutions, Inc., *Regional University Specific Plan Preliminary Drainage Master Plan*, November 27, 2006.

illustrated on Figure 6.8-3. Approximately 500 acres of the project area are located in the 100-year floodplain (Zone A) along Curry Creek and its tributaries.[7] Flood Zone A is defined as follows:[8]

> Zone A is the flood insurance rate zone that corresponds to the 1-percent annual chance floodplains that are determined in the Flood Insurance Study by approximate methods of analysis. Because detailed hydraulic analyses are not performed for such areas, no Base Flood Elevations (BFEs) or depths are shown within this zone. Mandatory flood insurance purchase requirements apply. The BFEs on the FIRMs indicate the water surface elevation resulting from a flood that has a one percent chance of equaling or exceeding that level in any given year.

Runoff Characteristics

The type of soil in the watershed, including its infiltration and runoff characteristics, is a major factor in determining the rate and amount of stormwater runoff. There are four hydrologic soil groups defined by the Natural Resources Conservation Service (NCRS). Group A soils are characterized by high infiltration rates with low runoff. Group B, C, and D soils exhibit moderate to poor infiltration with moderate to high runoff potential, respectively. According to the preliminary drainage master plan,[9] the predominant soil type in the project site is Group D soils. Group D soils consist of soils with low infiltration rates when thoroughly wet, percolate water very slowly, and are associated with high stormwater runoff rates. Group D are typically clay soils with high shrink-swell properties, are located above a high water table, are typically shallow, and lie over impervious materials.[10]

Stormwater Runoff Rates and Volumes

Several developments upstream and east of the project site have either constructed or have planned regional detention storage basins along Pleasant Grove Creek and Curry Creek and its tributaries to mitigate post-development peak flows in the area. Each of these basins contributes to delays in downstream peak flows at the Cross Canal in Sutter County.[11] Pre-development peak flow rates and stormwater runoff volumes are presented in the impacts analysis section below.

Water Quality

Surface Water Quality

Surface water quality in the area is influenced by surrounding land uses. The historical land use along the segment and tributaries of Pleasant Grove Creek that pass through the area has been agricultural, primarily for grazing and pasture. Typical constituents in runoff from pasturelands include nitrogen, phosphorus, and coliform bacteria. Based on such uses, typical pollutant concentrations in runoff under existing conditions are estimated to be 3.0 milligrams per liter (mg/l) nitrogen, 0.3 mg/l phosphate, 0.02 mg/l lead, and 0.05 mg/l zinc.[12]

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7 Civil Solutions, Inc., *Regional University Specific Plan Preliminary Drainage Master Plan*, November 27, 2006.

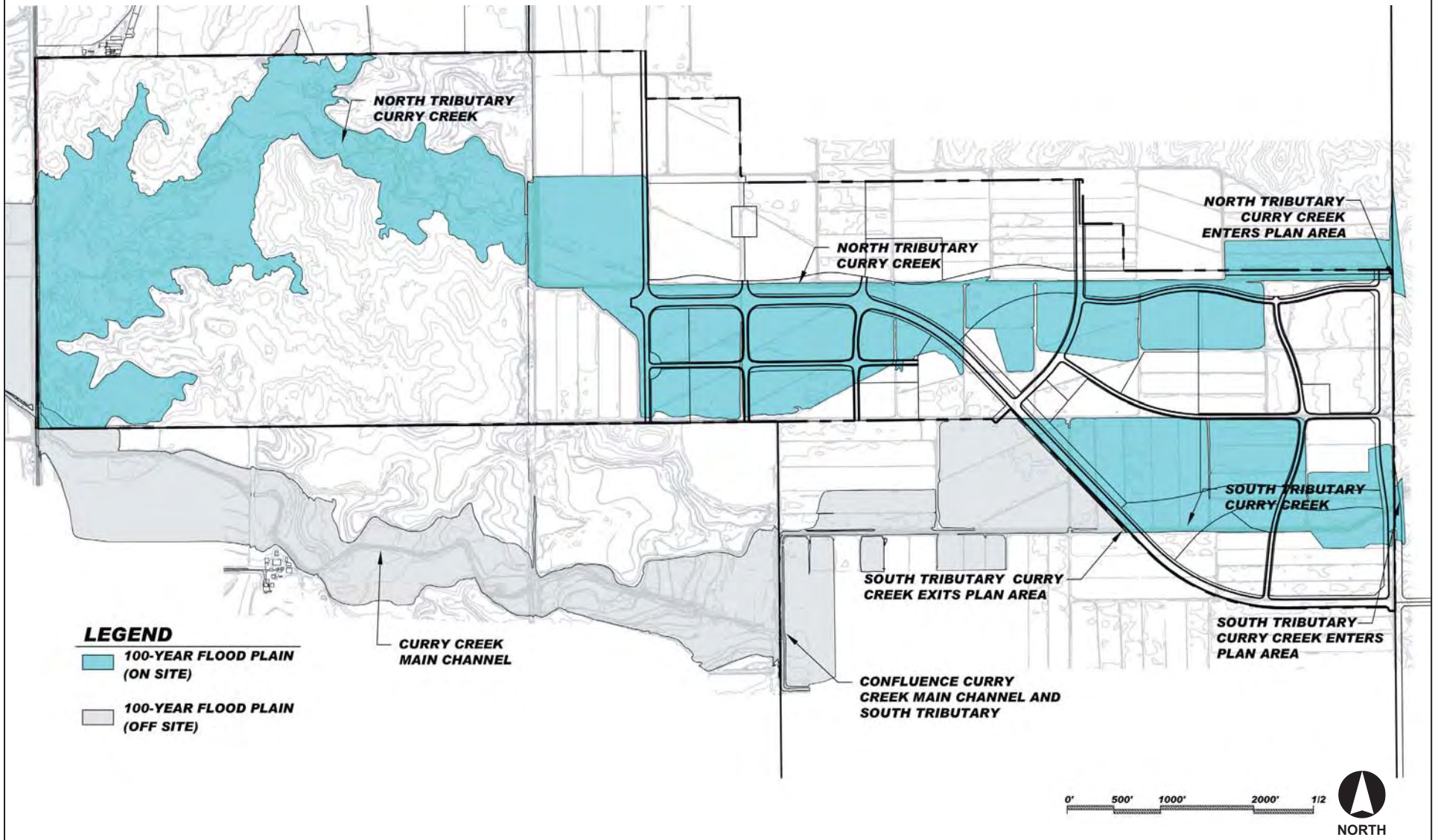
8 Federal Emergency Management Agency, Flood Hazard Mapping-- Frequently Asked Questions (Flood Hazard Zone Designations), website: www.fema.gov/fhm/fq_gen13.shtm, accessed on, January 19, 2005.

9 Civil Solutions, Inc., *Regional University Specific Plan Preliminary Drainage Master Plan*, November 27, 2006.

10 Civil Solutions, Inc., *Regional University Specific Plan Preliminary Drainage Master Plan*, November 27, 2006.

11 Wood Rodgers Inc., *Fiddyment-Westpark Master Plan Drainage Analysis*, June 2003, page 29.

12 City of Roseville, *Del Webb Specific Plan Draft Environmental Impact Report*, September 1993, page 14-7.



***Sources*:** G.C. Wallace, 2006.

FIGURE **6.8-3**

Pre-Project Floodplain

Stormwater runoff from urban development upstream of the project site (e.g., City of Roseville, Rocklin/Loomis, and a small portion of Lincoln) is assumed to contain urban pollutants such as oil, grease, metals, nitrogen and phosphorus from fertilizers, pesticides and herbicides, bacteria, and sediment. Nearby industrial uses (e.g., Hewlett-Packard and NEC to the east) could also contribute levels of heavy metals, petroleum, hydrocarbons and other constituents through runoff. Table 6.8-1 lists typical concentrations of chemical indicators of urban pollutants that could be expected in stormwater runoff.

TABLE 6.8-1

TYPICAL POLLUTANT CONCENTRATIONS FOUND IN URBAN STORM WATER

Typical Pollutants Found in Storm Water Runoff	Units	Residential	Mixed	Commercial	General Urban
Total suspended solids	mg/L	101	67	69	80
Total phosphorus	mg/L	383	263	201	0.30
Total nitrogen	mg/L	–	–	–	2.0
Total Kjeldahl nitrogen	mg/L	1.9	1.3	1.2	–
Nitrate + Nitrite	_g/L	736	558	572	–
Total organic carbon	mg/L	–	–	–	12.7
Biological oxygen demand	mg/L	10	7.8	9.3	–
Chemical oxygen demand	mg/L	73	65	57	–
Fecal coliform bacteria	MPN/100 mL	–	–	–	3,600
E. coli bacteria	MPN/100 mL	–	–	–	1,450
Petroleum hydrocarbons	mg/L	–	–	–	3.5
Oil and grease	mg/L	–	–	–	2 to 10
Cadmium	ug/L	–	–	–	2
Copper	ug/L	33	27	29	10
Lead	ug/L	144	114	104	18
Zinc	ug/L	135	154	226	140
Chlorides (winter only)	mg/L	–	–	–	230
Insecticides	ug/L	–	–	–	0.1 to 2.0
Herbicides	ug/L	–	–	–	1 to 5.0

Notes:

a These concentrations represent mean or median storm concentrations measured at typical sites and may be greater during individual storms. Also note that mean or median runoff concentrations from storm water "hotspots" are 2 to 10 times higher than those shown here. Units: mg/L = milligrams/liter, ug/L = micrograms/l, MPN = most probable number.

Source: USEPA, National Management Measures Guidance to Control Nonpoint Source Pollution from Urban Areas, July 2002, Page 1-26.

Comprehensive stormwater runoff water quality testing has not been performed to characterize existing water quality as a result of urban runoff, but the City of Roseville is initiating a program to demonstrate compliance with recently adopted stormwater quality regulations (see Regulatory Setting, below), which would include reviewing land use types to determine which urban pollutants may be affecting water quality. The City of Roseville does not discharge any wastewater effluent into Curry Creek, but the creek does receive surface runoff from the urban development east and southeast of the West Roseville Specific Plan (WRSP). Specific water quality data are unavailable for Curry Creek at this time.

REGULATORY SETTING

The following is a summary of the regulatory context under which issues associated with water quality, drainage, and on- and off-site flooding are managed at the federal, State, and local level.

Federal Regulations

Floodplain Development

FEMA is responsible for determining flood elevations and floodplain boundaries based on U.S. Army Corps of Engineers (Corps) studies. FEMA is also responsible for distributing the Flood Insurance Rate Maps (FIRMS), which are used in the National Flood Insurance Program (NFIP). These maps identify the locations of special flood hazard areas, including the 100-year floodplain.

FEMA allows non-residential development in the floodplain. However, construction activities are restricted within the flood hazard areas depending upon the potential for flooding within each area. Federal regulations governing development in a floodplain are set forth in Title 44, Part 60 of the Code of Federal Regulations (CFR).

Water Quality

Section 303 of the federal Clean Water Act (CWA) requires states to adopt water quality standards for all surface water of the United States. Where multiple uses exist, water quality standards must protect the most sensitive use. Water quality standards are typically numeric, although narrative criteria based upon biomonitoring methods may be employed where numerical standards cannot be established or where they are needed to supplement numerical standards.

Title 40 of the Code of Federal Regulations (40 CFR) includes U.S. Environmental Protection Agency (EPA) regulations to implement the National Pollutant Discharge Elimination System (NPDES) permit system, which was established in the CWA to regulate municipal and industrial discharges to surface waters of the U.S. Each NPDES permit contains limits on allowable concentrations and mass emissions of pollutants contained in the discharge. Sections 401 and 402 of the CWA contain general requirements regarding NPDES permits. Section 307 of the CWA describes the factors that EPA must consider in setting effluent limits for priority pollutants.

Two types of non-point source discharges[13] are controlled by the NPDES program – non-point source discharges caused by general construction activities and the general quality of urban runoff in municipal stormwater systems (either as part of a combined system or as a separate system in which runoff is carried through a developed conveyance system to specific discharge locations). The goal of the NPDES non-point source regulations is to improve the quality of stormwater discharged to receiving waters to the “maximum extent practicable” through the use of best management practices (BMPs). BMPs can include the development and implementation of various practices including educational measures (i.e., workshops informing the public of what impacts result when household chemicals are dumped into storm drains), regulatory measures (i.e., illicit discharge detection and elimination), public involvement measures (i.e., labeling storm drain inlets as to impacts of dumping on receiving waters) and structural measures (i.e., filter strips, grass swales and detention ponds).

The 1987 amendments to the CWA directed the federal EPA to implement the stormwater program in two phases, both of which are currently effective. Phase I, promulgated on November 16, 1990, addresses discharges from large (population 250,000 or above) and medium (population 100,000 to

13 Non-point sources are generally diffuse and originate over a wide area rather than from a definable point. Non-point pollution often enters receiving water in the form of surface runoff rather than by pipelines or discrete conveyances.

250,000) municipalities, as well as certain industrial and construction activities. Phase II, promulgated on December 8, 1999, addresses all other discharges defined by EPA that are not included in Phase I and construction activities that affect more than one acre.

State Regulations

Water Quality

The State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Board (RWQCB) are responsible for ensuring implementation and compliance with the provisions of the federal CWA, California's Porter-Cologne Water Quality Control Act, and NPDES programs. Along with the SWRCB and RWQCB, water quality protection is the responsibility of numerous water supply and wastewater management agencies, as well as City and County governments, and requires the coordinated efforts of these various entities.

The project site is situated within the jurisdiction of the Central Valley Region of the RWQCB (Region 5). The Central Valley RWQCB (CVRWQCB) has the authority to implement water quality protection standards through the issuance of permits for discharges to waters at locations within its jurisdiction. Water quality objectives for the Sacramento River and its tributaries (e.g., Pleasant Grove Creek and Curry Creek) are specified in The Water Quality Control Plan for the Sacramento River Basin and San Joaquin River Basin (Basin Plan) prepared by the CVRWQCB in compliance with the federal CWA and the State Porter-Cologne Water Quality Control Act.[14] The Basin Plan establishes water quality objectives and implementation programs to meet stated objectives and to protect the beneficial uses of water in the Sacramento-San Joaquin River Basin. Because the project site is located within the CVRWQCB's jurisdiction, all discharges to surface water or groundwater are subject to the Basin Plan requirements.

Beneficial uses for the Sacramento River include municipal and domestic supply, agricultural supply, recreation, and aquatic and wildlife habitat. These beneficial uses also apply to Pleasant Grove Creek and its tributaries and Curry Creek because these streams ultimately discharge to the Sacramento River.

Construction Site Runoff Management

The SWRCB adopted a state-wide general NPDES permit for stormwater discharges associated with construction activity (General Permit) in August 1999. Performance standards for obtaining and complying with the General Permit are described in NPDES General Permit No. CAS000002, Waste Discharge Requirements (WDR), Order No. 99-08-DWQ. The General Permit was modified in April 2001 (SWRCB Resolution No. 2001-046) to require permittees to implement specific sampling and analytical procedures to determine whether the BMPs used at the construction site are effective.

Under the General Permit, dischargers whose projects disturb one or more acres of soil, or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity in the State. Development within the RUSP would be required to comply with the General Permit.

14 California Regional Water Quality Control Board, Central Valley Region, *The Water Quality Control Plan (Basin Plan) [for] the Sacramento River Basin and the San Joaquin River Basin, 4th edition*, 1998.

General Permit applicants are required to submit a Notice of Intent (NOI), develop and implement a Stormwater Pollution Prevention Plan (SWPPP), eliminate or reduce non-stormwater discharges, and perform inspections of all BMPs. Examples of typical construction BMPs completed in SWPPPs include: using temporary mulching, seeding, or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter the storm drain system or surface water; 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; and using barriers, such as straw bales or plastic, to minimize the amount of uncontrolled runoff that could enter drains or surface water. The discharger must also install structural controls, such as sediment control, as necessary, which would constitute Best Available Technologies (BAT) to achieve compliance with water quality standards.

Urban Runoff Management

Placer County is required to operate under the NPDES Municipal Stormwater Phase II Permit (Phase II General Permit) requirements set forth in the County of Placer Stormwater Management Plan (SWMP) 2003-2008 (see under “Local Regulations”, below). Discharges of urban runoff are regulated under the SWMP through the promulgation of recently adopted regulations applicable to smaller dischargers and administered by the SWRCB in Water Quality Order (WQO) No. 2003-0005-DWQ, General Permit No. CAS0000054, Waste Discharge Requirements for Stormwater Discharges from Small Municipal Separate Stormwater Sewer Systems, and all attachments thereto. Under the Phase II General Permit, the County is required to develop, implement, and enforce a stormwater management program. The details of the development, implementation, and enforcement of the Phase II General Permit requirements are provided in the SWMP which was approved in 2004 and must be updated in 2008.

The SWMP identifies activities required to implement the following six minimum control measures required under the Phase II General Permit: public outreach, public involvement, illicit discharge detection and elimination, construction site runoff, new development and redevelopment, and municipal operations. Some typical types of outreach may include a stormwater hotline, website, storm drain stenciling, and other programs. Public meetings and presentations, volunteer water quality monitoring groups, and community cleanup days are some of the elements of the public involvement component.

Post-construction measures under the Phase II General Permit will require the County to implement structural and non-structural BMPs that would mimic pre-development quantity and quality runoff conditions from new development and redevelopment areas. Structural BMPs include engineered features that provide some treatment, such as vegetative drainage ways, detention infiltration ponds, constructed wetlands, or filtration basins and sand filters. A BMP may be applied throughout the County or site-specific. Non-structural BMPs are typically non-engineered management measures such as administrative and education programs focused on pollution prevention and source control. Under the Phase II General Permit, and specifically in Attachment 4 to WQO No. 2003-0005-DWQ, the RUSP would be required to incorporate structural BMPs appropriate to the type of development and land uses in the project site, taking into account local and regional drainage and water quality considerations.

Local Regulations

Placer County General Plan

The 1994 *Placer County General Plan* policies and implementation measures that pertain to hydrology and water quality are listed below.

Section 4 - Public Facilities and Services

Policies

4.A.1. Where new development requires the construction of new public facilities, the new development shall fund its fair share of the construction. The County shall require dedication of land within newly developing areas for public facilities, where necessary.

4.E.4. The County shall ensure that new storm drainage systems are designed in conformance with the Placer County Flood Control and Water Conservation District's Stormwater Management Manual and the County Land Development Manual.

4.E.5. The County shall continue to implement and enforce its Grading Ordinance and Flood Damage Prevention Ordinance.

4.E.6. The County shall continue to support the programs and policies of the watershed flood control plans developed by the Flood Control and Water Conservation District.

4.E.11. The County shall require new development to adequately mitigate increases in stormwater peak flows, and/or volume. Mitigation measures should take into consideration impacts on adjoining lands in the unincorporated area, and on properties in jurisdictions within and immediately adjacent to Placer County.

4.E.14. The County shall require projects that have significant impacts on the quantity and quality of surface water runoff to allocate land as necessary for the purpose of detaining post-project flows and/or for the incorporation of mitigation measures for water quality impacts related to urban runoff.

Section 6 - Natural Resources

Policies

6.A.2. The County shall require all development in the 100-year floodplain to comply with the provisions of the Placer County Flood Damage Prevention Ordinance.

Placer County Stormwater Management Plan

Placer County has prepared the *Placer County Stormwater Management Plan 2003-2008* (SWMP) in compliance with NPDES Phase II regulations. The Placer County SWMP is a comprehensive program designed to reduce pollution in stormwater runoff in the western portions of the County. The SWMP was submitted to the CVRWQCB as part of an application package and permitting requirements set forth under the state's jurisdiction of the NPDES Phase II program. Thereby, the County was granted a permit under the state's General NPDES Phase II program and the final version of the SWMP was published in March 2004. The SWMP is required to be updated every five years. The SWMP will help the County to reduce pollutants in local waterways by reducing pollutants in stormwater runoff through the following control measures:

- Public education and outreach on stormwater impact

- Public involvement/participation
- Illicit discharge detection and elimination
- Construction site stormwater runoff control
- Post-construction stormwater management in new development and redevelopment
- Pollution prevention/good housekeeping for municipal operations

In addition to these measures, the SWMP imposes discharge prohibitions, effluent limitation, receiving water limitations, new development design standards, and additional evaluation and reporting requirements. The SWMP also includes specific BMPs that support the programs main control measures.

Placer County Flood Control and Water Conservation District

The Placer County Flood Control and Water Conservation District (PCFCWCD) was formed by Senate Bill 1312, effective August 23, 1984. The PCFCWCD formulates regional strategies for flood control management. In 1990, the PCFCWCD developed a Stormwater Management Manual (SWMM) that presents policy, guidelines, and specific criteria for evaluating hydrologic and hydraulic conditions associated with new development within the context of regional stormwater issues. The manual was revised in 1992, 1994, and 1997. The following PCFCWCD SWMM policies were considered during preparation of the project drainage study and in the drainage analysis in this section, as further discussed in "Methods of Analysis."

Section VI – Drainage Systems, Item 2. Design Storms

Local Drainage – The 10-year event is the minimum design storm for new developments in all drainages and all dedicated drainage facilities will be sized for this event. The development plan will also identify the effects of the 100-year event and provision will be made in the plan to prevent the loss of life and damages to property during a 100-year event.

Regional Drainage – Regional drainage facilities are those identified as such in watershed plans, or have drainage areas greater than 200 acres.

Regional drainage systems will be planned and designed for a 100-year event except where the cost of the system is clearly unjustifiable economically. Variances from the design frequency will be approved by the Flood Control District.

Designs of major flood control facilities will consider the effects of events which are lesser in magnitude as well as greater than the design event.

Section VI – Drainage Systems, Allowable Street Encroachments

<u>10-year event</u>

Local Street	Traveled way remains clear and does not convey runoff.
Collector	Traveled way remains clear and does not convey runoff.

<u>100-year event</u>

Local Street	Maintain HGL [hydraulic grade line] minimum of 1 foot below building pads.
Collector	Flow is contained within the right of way. The center 12 feet of roadway shall remain clear.

Placer County Code

Chapter 15.48 of the Placer County Code contains ordinances that regulate grading and erosion. The ordinances under this chapter of the County Code were enacted to regulate grading on property within unincorporated areas of Placer County to:

> "safeguard life, limb, health, property and public welfare; to avoid pollution of watercourses with hazardous materials, nutrients, sediments, or other earthen materials generated on or cause by surface runoff on or across the permit area; and to ensure that the intended use of a graded site is consistent with the Placer County General Plan, and specific plans adopted thereto and applicable chapters of the California Building Ordinance (Chapter 18 Placer County Code) and applicable chapters of the California Building Code."
>
> §15.48.050 Water obstruction.
>
> No person shall do or permit to be done any grading which may obstruct, impede or interfere with the natural flow of stormwaters, in such manner as to cause flooding where it would not otherwise occur, aggravate any existing flooding condition or cause accelerated erosion. This section applies whether such waters are unconfined upon the surface of the land or confined within land depressions or natural drainage ways, unimproved channels or watercourses, or improved ditches, channels or conduits. (Ord. 5056-B (part), 2000)
>
> §15.48.5 70 Drainage--General.
>
> Any drainage structure(s) or device(s) carrying surface water runoff required by this article shall be designed and constructed in accordance with standards herein, the current Placer County Flood Control and Water Conservation District Stormwater Management Manual and criteria authorized by the Director of Public Works. (Ord. 5056-B (part), 2000)
>
> §15.48.5 80 Drainage discharge requirements.
>
> All drainage facilities shall be designed and engineered to carry surface and subsurface waters to the nearest adequate street, storm drain, natural watercourse, or other juncture, and shall be subject to the approval of the Director of Public Works. (Ord. 5056-B (part), 2000)
>
> §15.48.5 90 Drainage—Water accumulation
>
> All areas shall be graded and drained so that drainage will not cause erosion or endanger the stability of any cut or fill slope or any building or structure. (Ord. 5056-B (part), 2000)
>
> §15.48.600 Drainage protection of adjoining property.
>
> When surface drainage is discharged onto any adjoining property, it shall be discharged in such a manner that it will not cause erosion or endanger any cut or fill slope or any building or structure. (Ord. 5056-B (part), 2000)
>
> §15.48.630 Erosion and sediment control.
>
> The following shall apply to the control of erosion and sediment from grading operations:
>
> a) Grading plans shall be designed with long-term erosion and sediment control as a primary consideration.
>
> b) Grading operations during the rainy season shall provide erosion and sediment control measures except upon a clear demonstration, to the satisfaction of the Director of Public

Works, that at no stage of the work will there be any substantial risk of increased sediment discharge from the site.

c) Should grading be permitted during the rainy season, the smallest practicable area of erodible land shall be exposed at any one time during grading operations and the time of exposure shall be minimized.

d) Natural features, including vegetation, terrain, watercourses and similar resources shall be preserved wherever possible. Limits of grading shall be clearly defined and marked to prevent damage by construction equipment.

e) Permanent vegetation and structures for erosion and sediment control shall be installed as soon as possible.

f) Adequate provision shall be made for long-term maintenance of permanent erosion and sediment control structures and vegetation.

g) No topsoil shall be removed from the site unless otherwise directed or approved by the director of public works. Topsoil overburden shall be stockpiled and redistributed where appropriate within the graded area after rough grading to provide a suitable base for seeding and planting. Runoff from the stockpiled area shall be controlled to prevent erosion and resultant sedimentation of receiving water.

h) Runoff shall not be discharged from the site in quantities or at velocities substantially above those, which occurred before grading except into drainage facilities, whose design has been specifically approved by the Director of Public Works.

The permittee shall take reasonable precautions to ensure that vehicles do not track or spill earth materials into public streets and shall immediately remove such materials if this occurs. (Ord. 5056-B (part), 2000)

§15.48.670 Vehicular ways--Drainage.

Vehicular ways shall be graded and drained in such a manner that will not allow erosion or endanger the stability of any adjacent slope. Surface discharge onto adjoining property shall be controlled in such a manner that it does not cause erosion or endanger existing improvements. Bridges and culverts installed in watercourses may be reviewed by the Placer County Flood Control and Water Conservation District and must be approved by the Public Works Director, and any other required permitting agency. (Ord. 5056-B (part), 2000)

Ordinances in this chapter describe in detail standards for levees, obstructing natural flows of stormwater, drainage discharge requirements, water storage areas, drainage protection of adjacent properties, terraced drainage, erosion and sediment control, and drainage of roads. The County also enacted the Flood Damage Prevention Ordinance which limits construction in areas within the 100-year flood zone to prevent damage to property and limit the effect of development on loss of floodplain storage and flood water elevations. This ordinance uses the following methods to reduce flood losses:

§5.52.040 Methods of reducing flood losses.

In order to accomplish its purpose, this article includes methods and provisions for:

a) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increase in erosion or flood heights or velocities;

b) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

c) Controlling the alteration of natural floodplains, stream channels, and natural protective barriers, which help accommodate or channel floodwaters;

d) Controlling fill, grading, dredging, and other development which may increase flood damage; and

e) Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Placer County Land Development

In addition to these requirements, Section 5 of the *Placer County Land Development Manual* (1996) provides supplemental design considerations for drainage facilities, and includes specific criteria used for preparation of drainage reports identical to those in the SWMM (as described above under (*Placer County Flood Control and Water Conservation District*). The *Placer County Land Development Manual* states that in case of conflict with the SWMM, the most stringent requirement shall apply. The *Placer County Land Development Manual* also contains general information with regards to erosion control and BMPs for stormwater drainage.

IMPACTS AND MITIGATION MEASURES

Methods of Analysis

The proposed project would change the land use in the project site from undeveloped or agricultural to institutional, residential, and commercial/business. The changes in land use would result in changes in the topography and an increase in impervious surfaces. Consequently, the proposed project would also alter runoff from a storm event through changes in infiltration rates of incident rainfall and concentration of runoff into efficient conveyance facilities such as gutters and pipes. For example, an increase in impervious area from a change in land use would result in higher runoff quantities that would flow faster to gutters and drain pipes than as overland flow from undeveloped land.

The proposed project has been evaluated through the use of hydrologic computer models using the HEC-1 and HEC-RAS computer programs.[15] The computer model methodology is consistent with the approach used in the PCFCWCD *Stormwater Management Manual* (SWMM). A Preliminary Drainage Master Plan (*Regional University Specific Plan Preliminary Drainage Master Plan*, Civil Solutions, November 27, 2006) was prepared for the proposed project to ensure that post-project runoff does not increase the potential for on- or off-site flooding, and that flows into Curry Creek are capable of conveying project runoff volumes. The PCFCWCD SWMM was used to estimate peak flows and runoff volumes for the appropriate design storm through computer modeling, and included the proposed West Park and Placer Vineyards developments.

The drainage study was prepared per the guidelines for a “Preliminary Plan” as outlined in the PCFCWCD SWMM. Key elements of the study were the modification of HEC-1 (peak flows) and HEC-RAS (water surface elevations and volume) to reflect current planned and approved projects, as well as the proposed project, and to review whether previous detention improvements would affect the proposed project runoff characteristics. The study also evaluated floodplain elevations through the project site and at upstream and downstream locations for possible future improvement options, and computed volumetric changes.

15 Civil Solutions, *Regional University Specific Plan Preliminary Drainage Master Plan*, November 27, 2006.

Stormwater Peak Flows

Peak flow rates were estimated for the 2-, 10-, 25-, 100-, and 500-year storm events. Flow estimates were developed using HEC-1 hydrologic modeling methods and guidance set forth in the Placer County SWMM. Three modeled data sets were developed. The first model (pre-project conditions) represented peak flow rates for the RUSP to verify system-wide pre-project peak flows with the proposed project, including upstream improvements to Curry Creek, without the proposed project attenuation facilities. The second model was based on the proposed project land use buildout without attenuation facilities (post-project unmitigated). The third model represented the proposed project conditions with attenuation facilities (post-project with mitigation) based on the proposed project stormwater facilities.

Stormwater Volume

As described in the Preliminary Drainage Master Plan, a HEC-1 rainfall-runoff computer model with an 8-day, 100-year storm duration was used to estimate the volume increases in runoff from the proposed project. An 8-day duration storm was selected because the accumulated runoff volume from long-duration storms has affected low-lying areas of Sutter County. A 10-minute time step was used in the HEC-1 calculations to be consistent with previous analyses reviewed by Sutter County Public Works. Precipitation values were adjusted so the sum of the values for the 8-day period would equal the 100-year precipitation amounts specified in the Placer County SWMM.[16]

Floodplain Fill and Hydraulic Elevations

The post-project HEC-RAS model was used as a base model to predict floodplain elevations during storm events. This model included the proposed project channelization improvements and detention facilities, which would be designed to have three feet of freeboard for the 100-year storm event. Potential improvements assumed in the analysis include proposed culverts, on-site detention facilities, lake attenuation, channelized improvements throughout the project site, and water quality treatment basins.[17]

Water Quality

The analysis of potential water quality effects was based on a qualitative comparison of pre-developed and post-developed land uses. It would be speculative to identify specific post-development water quality impacts that could occur because the actual amount or type of development that could occur within any given proposed land use and the specific types of water quality BMPs (both construction and operational) have not been determined at this stage of project development. However, it is conservatively assumed for purposes of evaluation in this EIR that new or additional stormwater runoff generated by the proposed project is expected to contain some level of contaminants typically associated with urban development that could affect receiving water quality. Water quality treatment was developed using the requirements of Placer County and the Phase II NPDES requirements for post-project BMP standards. Impacts on water quality were evaluated qualitatively by comparing constituent loading in receiving waters contributed by existing versus future land uses, and assessing the increase in flows to the receiving waters.

16 Civil Solutions, *Regional University Specific Plan Preliminary Drainage Master Plan*, November 27, 2006, page 54.

17 Civil Solutions, *Regional University Specific Plan Preliminary Drainage Master Plan*, January 5, 2006, page 6.

The Preliminary Drainage Master Plan (available for review at the Placer County Planning Department) includes additional information on specific hydrologic and hydraulic assumptions (including figures and drainage calculations).

Standards of Significance

The following thresholds of significance are based on Appendix G of the CEQA Guidelines, the Placer County General Plan, and the Placer County Municipal Code. For the purpose of this EIR, impacts to hydrology and water quality are considered significant if the proposed project would:

- Substantially increase the rate of runoff in a manner that would result in localized flooding on- or off-site;
- Substantially increase the amount of runoff in a manner that would result in localized flooding on- or off-site;
- Substantially increase exposure of people and/or property to the risk of injury and damage in the event of a 100-year flood;
- Violate any water quality standards or waste discharge standards;
- Cause increases in sediment and other contaminants generated during construction or operation that would result in degraded surface water quality in violation of existing ambient water quality standards of the Sacramento-San Joaquin River Basin Plan adopted by the Regional Water Quality Control Board;
- 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 that 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;
- 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;
- Otherwise substantially degrade water quality;
- 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; or
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

Project-Specific Impacts and Mitigation Measures

6.8-1 The proposed project could increase peak runoff rates and volumes which could exceed the capacity of local drainages and result in on- and off-site flooding hazards.

Development of the proposed project would increase the amount of impervious surface coverage over that which currently exists by converting approximately 1,157.5 acres of undeveloped agricultural land to urban uses, approximately 316 acres of which would be dedicated to open space, parks, and landscape setbacks. The increase in the amount of impervious urban land use surfaces

such as roofs, parking lots, sidewalks, hardscape, and roads would increase the rate of surface runoff entering Curry Creek by limiting ground infiltration. In addition, development and grading would alter the existing runoff patterns and conveyance capacities on the project site. Figures 2-8 and 2-9 in Chapter 2, Project Description, show the proposed project drainage improvements. Increased flows and altered drainage patterns could increase the potential for localized and downstream flooding.

Consistent with PCFCWCD standards, peak flow runoff rates were determined for the proposed project to identify drainage features that would be necessary to mitigate post-development flows to acceptable levels, to the extent that such features would not exacerbate downstream peak flows. Table 6.8-2 summarizes the estimated pre-project peak flow rates in cubic feet per second (cfs) from modeled scenarios presented in the Preliminary Drainage Master Plan at points where Curry Creek sub-watersheds drain through the project site.

TABLE 6.8-2

ESTIMATED PRE-PROJECT PEAK FLOW RATES FOR CURRY CREEK (CFS) DURING SPECIFIED STORM EVENTS

Location	Node	2-year	10-year	25-year	100-year	500-year
Southern Reaches						
South Tributary Upstream of Watt Avenue	C10	148	333	460	664	977
Watt Ave. Crossing	CU2B1	157	366	481	682	1008
1st St Crossing	RR-1	156	343	454	643	936
University Blvd. Crossing	2B2BDC	185	385	501	698	966
At CU2B3 Shed	2B2BC	213	442	551	763	1045
At CU2A+ Combination Point	RR-3	384	994	1285	1715	2564
Add CP-2	RR-4	396	1040	1352	1785	2646
Add CP-3	RR-5	399	1054	1370	1797	2676
Combine Hydrographs	CU2C+	412	1103	1443	1886	2778
Northern Reaches						
North Shed – Upstream of Watt Ave.	C11-12	26	78	110	159	227
North Shed – 1st St	3B2ACC	47	112	150	207	289
North Shed – 8th St	3B2CR	71	202	282	399	564
North Shed – 12th St	3B3RR	67	124	240	415	574
North Shed – 14th St	3D2RR	71	142	250	437	614
North Shed – 16th St	3D5BCC	71	142	250	437	614
North Shed – University Crossing NE	3D6RR	75	162	267	467	660
North Shed – Channel	3E3RR	75	160	265	462	660
North Shed – Channel Discharge OS	3E4RR	95	236	335	548	845
North Shed – University Rd NW	3E4RR	106	279	389	617	954
Brewer Rd/Lower Lake Release	3HBRR	106	279	389	617	954
Combination with Main Branch	CU3C+	470	1283	1722	2361	3575
Downstream of Project	RCH8	443	1201	1691	2350	3571
Exit Placer County – Locust Rd	CU6+	598	1390	2016	2868	4689

Source: Civil Solutions, Inc., Regional University Specific Plan, Preliminary Master Drainage Plan, January 5, 2006, page 21.

As illustrated by the data in Table 6.8-3, the proposed project would result in peak flows increasing with greater storm events from each sub-watershed node modeled in the Preliminary Drainage Master Plan. Tables 6.8-3 and 6.8-4 show peak flow rates would be reduced through project design and through proposed drainage improvements, including designed channels, culverts, and detention features or lakes.

TABLE 6.8-3

ESTIMATED POST-PROJECT PEAK FLOW RATES FOR CURRY CREEK (CFS) DURING SPECIFIED STORM EVENTS WITHOUT PROPOSED DRAINAGE IMPROVEMENTS (UNMITIGATED)

Location	Node	2-year	10-year	25-year	100-year	500-year
Southern Reaches						
South Tributary Upstream of Watt Avenue	C10	148	333	460	664	977
Watt Ave. Crossing	CU2B1	157	366	481	682	1008
1st St Crossing	RR-1	161	349	456	646	940
University Blvd. Crossing	2B2BDC	173	369	472	661	971
At CU2B3 Shed	2B3BC	212	478	595	762	1051
At CU2A+ Combination Point	RR-3	370	1047	1415	1857	2653
Add CP-2	RR-4	385	1089	1471	1935	2772
Add CP-3	RR-5	388	1105	1493	1959	2806
Combine Hydrographs	CU2C+	401	1154	1564	2059	2915
Northern Reaches						
North Shed – Upstream of Watt Ave.	C11-12	26	78	110	159	227
North Shed – 1st St	3B2ACC	36	110	151	214	300
North Shed – 8th St	3B2CR	46	137	187	264	369
North Shed – 12th St	3B3RR	96	314	430	616	882
North Shed – 14th St	3D2RR	102	333	458	650	935
North Shed – 16th St	3D5BCC	119	399	561	788	1178
North Shed – University Crossing NE	3D6RR	133	443	631	899	1307
North Shed – Channel	3E3RR	151	507	720	1024	1499
North Shed – Channel Discharge OS	3E4RR	160	522	776	1207	1820
North Shed – University Rd NW	3E4RR	160	522	776	1207	1820
Brewer Rd/Lower Lake Release	3HBRR	124	344	498	698	1120
Combination with Main Branch	CU3C+	502	1361	1855	2562	3906
Downstream of Project	RCH8	473	1252	1798	2552	3903
Exit Placer County – Locust Rd	CU6+	634	1462	2158	3119	5142

Source: Civil Solutions, Inc., Regional University Specific Plan, Preliminary Master Drainage Plan, March 15, 2006, Page 20.

TABLE 6.8-4

ESTIMATED POST-PROJECT PEAK FLOW RATES FOR CURRY CREEK (CFS) DURING SPECIFIED STORM EVENTS WITH PROPOSED DRAINAGE IMPROVEMENTS (MITIGATED)

Location	Node	2-year	10-year	25-year	100-year	500-year
Southern Reaches						
South Tributary Upstream of Watt Avenue	C10	148	333	460	664	977
Watt Ave. Crossing	CU2B1	157	366	481	682	1008
1st St Crossing	RR-1	160	351	459	645	942
University Blvd. Crossing	2B2BDC	142	355	469	648	971
At CU2B3 Shed	2B3BC	181	471	598	791	1184
At CU2A+ Combination Point	RR-3	355	1049	1413	1907	2810
Add CP-2	RR-4	368	1079	1472	1983	2902
Add CP-3	RR-5	371	1096	1493	2006	2934
Combine Hydrographs	CU2C+	383	1144	1563	2102	3040
Northern Reaches						
North Shed – Upstream of Watt Ave.	C11-12	26	78	110	159	227
North Shed – 1st St	3B2ACC	36	110	151	214	300
North Shed – 8th St	3B2CR	42	117	159	219	300
North Shed – 12th St	3B3RR	88	268	371	527	744
North Shed – 14th St	3D2RR	93	281	389	550	777
North Shed – 16th St	3D5BCC	107	324	446	626	878
North Shed – University Crossing NE	3D6RR	117	346	473	657	917
North Shed – Channel	3E3RR	131	390	534	741	1034
North Shed – Channel Discharge OS	3E4RR	126	384	599	923	1437
North Shed – University Rd NW	3E4RR	126	384	599	923	1437
Brewer Rd/Lower Lake Release	3HBRR	103	277	389	611	1018
Combination with Main Branch	CU3C+	449	1237	1688	2303	3591
Downstream of Project	RCH8	428	1109	1580	2265	3587
Exit of Placer County – Locust Rd	CU6+	619	1322	1888	2774	4687

Source: Civil Solutions, Inc., Regional University Specific Plan, Preliminary Master Drainage Plan, March 15, 2006, Page 23.

The proposed project would use several types of drainage facilities to reduce peak flow discharges from the project site. The principle method of attenuating peak flows would be through the use of excavated and channelized detention basins adjacent to existing channels, and a lake storage area. Other types of attenuation facilities proposed include constructed wetland areas, water quality basins, and channelized detention areas upstream of peak flow regulating culverts.

Table 6.8-5 shows the difference between the pre-project unmitigated flows and the post-project mitigated runoff peak flows for the same sub-watershed nodes. The modeling results show that there would be localized increases in peak flows for the two- through 500-year storm events in a variety of post-project sub-watersheds. The data presented in Table 6.8-5 show that with the proposed project, peak flow rates would be reduced in Curry Creek for all storm events from the two- through 100-year storm events exiting the project site at Brewer Road, as required by the PCFCWCD. These decreases would also result in a measurable decrease in the peak flows at the confluence of Curry Creek and the Pleasant Grove Creek Canal, or at downstream locations exiting Placer County, such that increased flood risk would not occur downstream of the proposed project.

These proposed detention and volumetric drainage facilities, located within the boundaries of the project site and just west of Brewer Road, would not increase peak flow rates and flooding depths downstream of the project site, and would not increase water surface elevations at the upstream boundary of the project site. Further, the lake storage area provides conveyance and storage

TABLE 6.8-5

DIFFERENCE IN ESTIMATED PRE- AND POST-PROJECT PEAK FLOW RATES FOR CURRY CREEK (CFS) WITH PROPOSED DRAINAGE IMPROVEMENTS (MITIGATED) DURING SPECIFIED STORM EVENTS

Location	Node	2-year	10-year	25-year	100-year	500-year
Southern Reaches						
South Tributary Upstream of Watt Avenue	C10	0	0	0	0	0
Watt Ave. Crossing	CU2B1	0	0	0	0	0
1st St Crossing	RR-1	4	8	5	2	6
University Blvd. Crossing	2B2BDC	-43	-30	-32	-50	5
At CU2B3 Shed	2B3BC	-32	29	47	28	139
At CU2A+ Combination Point	RR-3	-29	55	128	192	246
Add CP-2	RR-4	-28	39	120	198	256
Add CP-3	RR-5	-28	42	123	209	258
Combine Hydrographs	CU2C+	-29	41	120	216	262
Northern Reaches						
North Shed – Upstream of Watt Ave.	C11-12	0	0	0	0	0
North Shed – 1st St	3B2ACC	-11	-2	1	7	11
North Shed – 8th St	3B2CR	-29	-85	-123	-180	-264
North Shed – 12th St	3B3RR	21	144	131	112	170
North Shed – 14th St	3D2RR	22	139	139	113	163
North Shed – 16th St	3D5BCC	36	182	196	189	264
North Shed – University Crossing NE	3D6RR	42	184	206	190	257
North Shed – Channel	3E3RR	56	230	269	279	374
North Shed – Channel Discharge OS	3E4RR	31	148	264	375	592
North Shed – University Rd NW	3E4RR	20	105	210	306	483
Brewer Rd/Lower Lake Release	3HBRR	-3	-2	0	-6	64
Combination with Main Branch	CU3C+	-21	-46	-34	-58	16
Downstream of Project	RCH8	-15	-92	-111	-85	16
Exit Placer County – Locust Rd	CU6+	21	-68	-128	-94	-2

Source: Civil Solutions, Inc., Regional University Specific Plan, Preliminary Master Drainage Plan, March 15, 2006, Page 24.

mitigation volumes necessary to contain the post-project peak flow rates for the two-, 10-, and 100-year events per PCFCWD standards. A dual detention/retention basin constructed on the western side of Brewer Road would receive flows directly from the lake storage area in the project site and operate at the same elevation and storage of the lake, thus extending the amount of storage for project site runoff before flowing downstream. Although the proposed project Preliminary Drainage Master Plan would meet the PCFCWCD SWMM criteria for peak discharge rates and included conveyance of fully developed off-site unmitigated flows, a comprehensive operation and maintenance plan and fee program for the proposed stormwater facilities has not been prepared or approved by Placer County. Therefore, the proposed project could result in a *potentially significant impact*.

Mitigation Measures

The following mitigation measures would ensure proper operation and maintenance of the proposed drainage facilities to reduce increased flows from post-project runoff. This would ensure a ***less-than-significant impact***.

6.8-1 a) *Prior to recordation of the first Large Lot, Final Map, or any improvement plan approval, a Final Project Drainage Master Plan shall be prepared and submitted to the Placer County Engineering and Surveying Department (ESD) for review and approval. Similarly, drainage plans for any off-site improvement areas shall be prepared and submitted for review. The Final Drainage Master Plan and other drainage plans (Drainage Plans) shall ensure that peak flows from developed areas do not exceed pre-development conditions and shall be in conformance with the requirements of Section 5 of the Land Development Manual and the Placer County Storm Water Management Manual that are in effect at the time of submittal. The drainage facilities shall be designed for future, fully developed, unmitigated flows from upstream development. Regional detention and retention basins, regional water quality basins, as well as regional drainage channel improvements, shall be incorporated with appropriate design information along with appropriate phasing information. The Drainage Plans shall include specific operation and maintenance responsibilities, inspection schedules, and reporting requirements. The Drainage Plans shall be prepared by a Registered Civil Engineer and shall include all drainage elements outlined in the Preliminary Drainage Master Plan used for analysis in this EIR or other elements determined by Placer County ESD to be equally effective.*

b) *New development applications (including backbone infrastructure) within the Plan Area shall be accompanied by site-specific project drainage reports consistent with the approved Final Project Drainage Master Plan. The project drainage reports shall be reviewed and approved by the ESD during the Subsequent Conformity Review Process and prior to improvement plan approval for new development. The drainage report shall be prepared by a Registered Civil Engineer and shall be in conformance with the Placer County Storm Water Management Manual and Placer County Code. The project applicant shall be financially responsible for all stormwater drainage facility maintenance requirements. The project drainage report shall include, at a minimum, written text addressing existing conditions, the effects of project improvements, all appropriate calculations, a watershed map, potential increases in downstream flows and volumes, proposed on-site improvements, and drainage easements, if necessary, to accommodate flows from the site. The drainage report shall demonstrate compliance with all mitigation measures included in this EIR.*

c) *Drainage facilities, for purposes of collecting runoff, shall be designed in accordance with the requirements of the Placer County Storm Water Management Manual that are in effect at the time of submittal, to the satisfaction of the ESD. These facilities shall be constructed with proposed project improvements, and easements provided as required by the ESD. Maintenance of these facilities shall be provided by a Master Homeowners Association, Community Services District, or other responsible entity to be determined by Placer County prior to any development approval.*

d) *New development applications within the Plan Area shall describe the location, size, and ownership of any stormwater conveyance facility in the Final Project Drainage Master Plan and shown on improvement plans. The developer shall submit a letter to the ESD from the entity controlling the canal describing any restrictions, requirements, easements, etc. relative to project construction. Said letter shall be provided to the ESD prior to the approval of improvement plans.*

e) *A County Service Area (CSA), Community Facilities District (CFD), or other entity for operation and maintenance of the stormwater facilities shall be formed for the Plan Area prior to recordation of the first Large Lot Final Map. This entity would have the ability to participate in design, inspect and accept facilities, and determine appropriate funding levels necessary to operate and maintain these facilities. A drainage facility operation and maintenance special tax or special assessment, with a provision for increases, indexed to the Consumer Price Index (CPI), shall be approved by the landowners (voters) of the Plan Area prior to recordation of the first Large Lot Final Map in the Plan Area. An indexing formula for operations and maintenance of drainage facilities shall also be in place prior to recordation of the first Large Lot Final Map.*

f) *New development shall not alter the post-development mitigated drainage shed boundaries identified in the Final Drainage Master Plan in any way that would increase the peak flow runoff or runoff volumes.*

g) *New development shall reduce post-development storm water run-off peak flows and volumes to pre-development levels through the installation of retention/detention facilities. Retention/detention facilities shall be designed in accordance with the requirements of the Placer County Storm Water Management Manual that are in effect at the time of submittal, and to the satisfaction of the ESD. Retention/detention facilities shall be designed to be consistent with the approved Master Drainage Plan. Construction of regional retention/detention facilities shall occur prior to or concurrent with the initial development of the Specific Plan. No retention/detention facility construction shall be permitted within any identified wetlands area, floodplain, or right-of-way, except as authorized by project approvals.*

6.8-2 The proposed project could increase the amount (volume) of stormwater which could exceed the capacity of Curry Creek, exacerbating on- or off-site flooding.

Increases in stormwater runoff flows generated by the proposed project, as described in Impact 6.8-1, would also increase the amount (volume) of stormwater runoff from the project site that would enter Curry Creek. Results of the hydrologic and hydraulic modeling for the proposed project indicate that the project site would generate a volume increase of approximately 168.7 acre-feet of runoff to Curry Creek during the 8-day 100-year design storm (the PCFCWCD SWMM required storm event for modeling post-project runoff volumes). The increase in stormwater volume, if not mitigated, could increase downstream and upstream water surface elevations and, in turn, exacerbate on- and off-site flooding. Accordingly, the proposed project would include drainage system improvements that would retain this increase in runoff volume in the lake storage area, in unmodified floodplain areas, in excess storage in the basin to the west of Brewer Road, and through a series of weirs to regulate the timing of volume releases from the storage areas beyond the 100-year design event as required by the PCFCWCD.[18] The proposed project could use off-site volumetric storage at the Reason Farms retention facility if it was operational in time for use by the proposed project and if the City of Roseville codified a formal fair-share fee system. Although these proposed facilities have been designed to reduce post-project increases in stormwater volume to pre-project conditions and convey flows from off-site developed and unmitigated areas upstream, an operation and maintenance plan for these facilities has not been prepared. Therefore, the proposed

18 Civil Solutions, Inc., *Regional University Specific Plan Preliminary Master Drainage Plan*, November 27, 2006, pages 30 to 32, and 44 to 48.

project could result in volumetric increases in Curry Creek and on- or off-site flooding. This is considered a *potentially significant impact*.

Mitigation Measure

The following mitigation measure would ensure that proposed project volumetric facilities would be operated properly and maintained regularly to contain the approximate 168.7 acre-foot volumetric increase from the proposed project. This would be a ***less-than-significant impact***.

6.8-2 a) *Implement Mitigation Measures 6.8-1(a) through (d).*

b) *As an option to on-site mitigation for volumetric increases resulting from the proposed project, the proposed project could mitigate for volumetric impacts through the purchase of volumetric storage capacity at a facility approved by PCFCWCD and ESD. The Reason Farms Facility is an approved facility that is planned to be constructed within the Pleasant Grove Creek watershed. If the proposed project were to use this facility for volumetric mitigation, construction of the Reason Farms Facility must be complete and the facility in operation before any phase of the proposed project is constructed.*

6.8-3 The proposed off-site infrastructure improvement areas could increase impervious surfaces which could affect stormwater runoff rates and volumes.

Construction of off-site infrastructure would result in an increase in impervious surfaces and stormwater runoff rates and volumes. Because the final design for off-site improvements are not available, the Preliminary Drainage Master Plan did not include the off-site improvements in the stormwater runoff models. Without adequate design for off-site infrastructure stormwater runoff, impacts would be *potentially significant*.

Mitigation Measures

The following mitigation measures would ensure that stormwater runoff from off-site infrastructure of off-site infrastructure drainage facilities would be adequately sized to reduce increased flows and volumes from post-project runoff to pre-development levels and include proper operation and maintenance of drainage features. This would ensure a ***less-than-significant impact***.

6.8-3 a) *Prior to approval of plans for off-site infrastructure areas or the recordation of the first Large Lot Final Map, the applicant shall prepare an addendum to the Preliminary Drainage Master Plan or include in the Final Project Drainage Master Plan modeling of runoff rates and volumes from off-site infrastructure areas. The modeling shall be used to adequately reduce post-project stormwater runoff flows and volumes.*

b) *Implement Mitigation Measures 6.8-1(a) through (g).*

6.8-4 The proposed project could increase the amount (volume) of treated wastewater discharged into Pleasant Grove Creek which could exceed the capacity of the creek, exacerbating on- or off-site flooding during the 100-year storm event.

The proposed project would result in an increase in the local population and, thus, an increase in wastewater treatment and discharge at the Pleasant Grove Wastewater Treatment Plant

(PGWWTP), if project wastewater is treated at PGWWTP. A discussion of the proposed project's impacts on capacity at the PGWWTP is discussed in detail in Section 6.11, Utilities. The proposed project would generate 1.2 million gallons per day (mgd) of wastewater that could be treated at the PGWWTP. At this time, the PGWWTP uses 6.5 mgd of its permitted 12 mgd of average daily dry weather flow (ADWF) capacity. Combined with the proposed project flows, the demand for treatment and discharge would increase to 7.6 mgd. Although the project site is currently outside the 1996 Wastewater Master Plan boundary, there is adequate capacity to serve the project. Further, the PGWWTP is permitted through a NPDES permit issued by the CVRWQCB (NPDES No. CA0084573, Order No. 5-00-075) to discharge treated wastewater up to the 12 mgd treatment and discharge capacity.

On January 15, 2006 a technical memorandum analyzing the impacts of increased future wastewater flows to and discharges from the PGWWTP was completed by Merritt Smith Consulting. The overall increase in flow to the PGWWTP analyzed was for a number of planned projects outside the current PGWWTP service area, including the proposed project. The projected increase of 7.6 mgd would result in increases in discharge volumes into Pleasant Grove Creek. Results of modeling of the increase in flows to Pleasant Grove Creek during the 100-year storm event showed that water surface elevations in downstream areas would rise approximately 0.01 foot approximately one mile upstream of the Sutter/Place County line, but would not result in any increase downstream of this point to the Pleasant Grove Canal.[19] Therefore, increases in discharges of treated wastewater to Pleasant Grove Creek from the proposed project would result in a ***less-than-significant impact*** to downstream flooding during the 100-year storm event.

Mitigation Measure

None required.

6.8-5 The proposed project could construct residences and other structures within the pre-construction 100-year FEMA floodplain, potentially exposing people and structures to flooding.

As shown in Figure 6.8-3, major portions of the project site (pre-construction) are within an area subject to 100-year flood hazards as defined by FEMA. Development of the proposed project under these conditions would place residential and institutional land uses in areas subject to the existing (pre-construction) 100-year floodplain.

The County requires that house pad elevations be two feet above the 100-year floodplain water surface elevation (or finish floors at three feet above the same elevation) to protect structures and occupants from flood hazards. To accommodate development in those areas and to provide required freeboard, the proposed project would construct stormwater drainage facilities that would prevent 100-year flows in Curry Creek from overtopping the banks of the channels, culverts, and lake storage areas and prevent flooding of occupied structures. The Preliminary Drainage Master Plan provides detailed HEC-RAS output tables showing that post-project drainage facilities would reduce all upstream and most on-site water surface elevations such that flooding limits would be confined within channels and generally provide three feet of freeboard to finish floor of adjacent proposed structures. The modeling results can be seen in the post-project floodplain shown in

19 Merritt Smith Consulting, *Technical Memorandum*: "Cumulative Analysis of UGA Impacts on Water Quality and Aquatic Resources in Pleasant Grove Creek, Roseville, California", to Steve Dalrymple, West Yost Associates on January 15, 2006.

Figure 6.8-4. Although the proposed project drainage improvements would reduce or maintain the 100-year water surface elevations and peak flows and would not increase on- or off-site flooding, an operation and maintenance plan for these facilities has not been prepared. Therefore, the proposed project could result in increases in water surface elevations resulting in on- or off-site flooding. This is considered a *potentially significant impact*.

Mitigation Measure

The following mitigation measure would ensure that proposed project drainage facilities would be operated properly and maintained regularly to contain increase in flows from the proposed project. This would be a ***less-than-significant impact***.

6.8-5 a) *Implement Mitigation Measures 6.8-1(a) through (g)*.

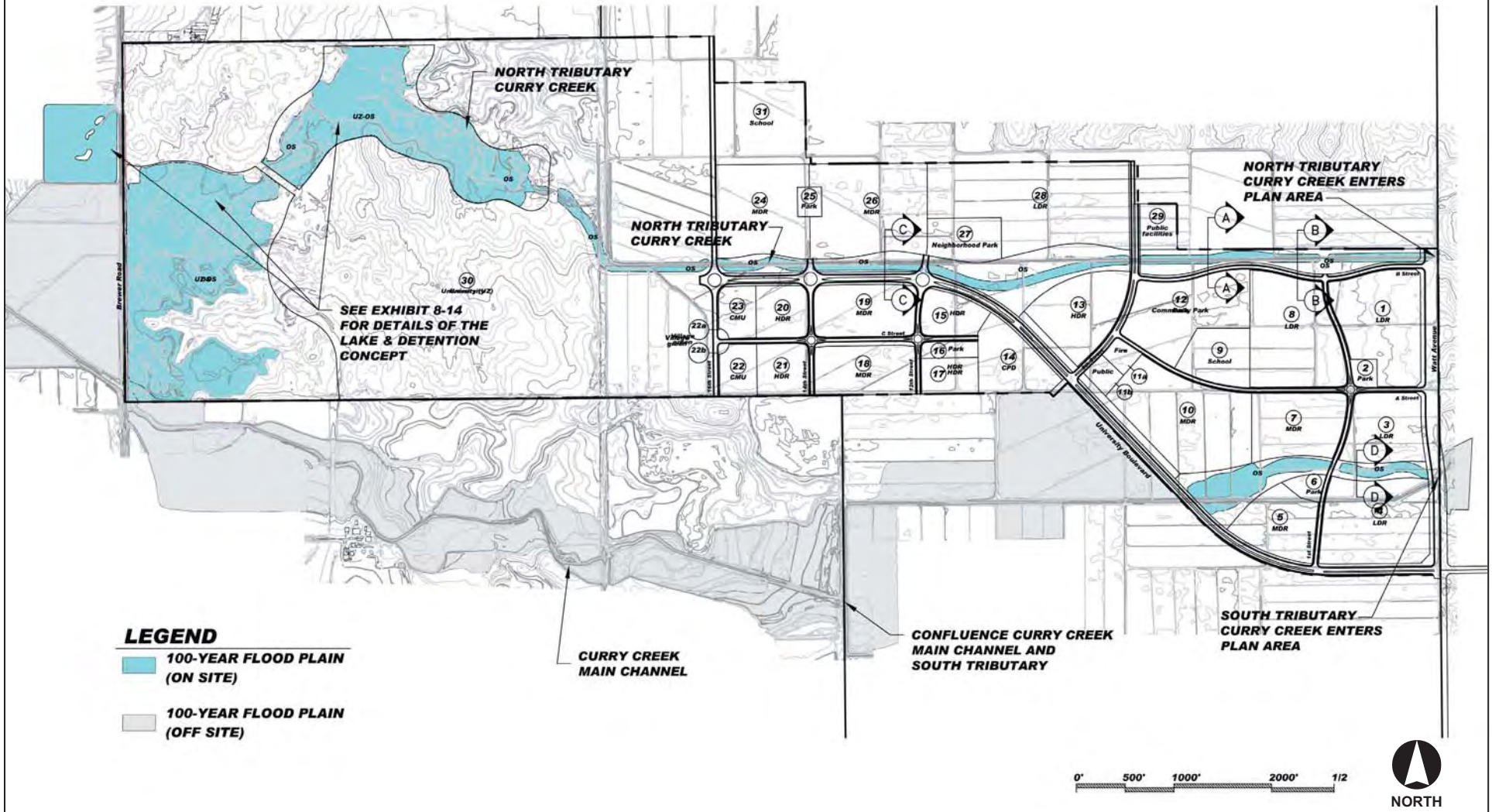
b) *No grading activities of any kind may take place within the post project 100-year floodplain as identified in the Final Drainage Master Plan, except as necessary to construct and maintain drainage improvements. The post-project 100-year floodplain shall be designated as a development setback line on improvement plans and final subdivision maps, unless greater setbacks are required by other mitigation measures or conditions of approval.*

c) *The Final Drainage Master Plan shall show the limits of the future unmitigated fully-developed 100-year floodplain (after development) for the North and South channel tributaries to Curry Creek on the Improvement Plans and Informational Sheet(s) filed with the appropriate Final Map(s) and designate same as a building setback line unless greater setbacks are required by other conditions contained herein. Channel construction and/or improvements with new development shall provide sufficient freeboard for the 100-year modeled storm event and shall be identified with floodplain delineations. Subsequent site specific developments shall identify the 100-year floodplain in the site specific drainage report and Improvement Plans.*

d) *The Final Drainage Master Plan shall demonstrate that the proposed project would not increase the 100-year floodplain water surface elevation upstream or downstream of the project area.*

e) *New development applications within the Plan Area shall identify the limits of existing and proposed floodplains in the Final Drainage Master Plan. Channel/swale construction and/or improvements with new development shall be designed in accordance with the PCFCWCD Storm Water Management Manual, shall provide sufficient freeboard for the 100-year event and shall be identified with floodplain delineations.*

f) *New development shall show finished house pad elevations two feet above the 100-year floodplain water surface elevation (or finished floor at three feet above same elevation) for lots near 100-year floodplain identified in the proposed channels for the North and South tributaries to Curry Creek on the Improvement Plans and Informational Sheet filed with the appropriate Final Map. Pad elevations shall be certified by the project engineer on "As-Built" plans submitted to the ESD following project construction. Benchmark elevation and location shall be shown on the Improvement Plans and Informational Sheet(s) to the satisfaction of DRC.*



***Sources*:** G.C. Wallace, 2006.

FIGURE **6.8-4**

Post-Project Floodplain

6.8-6 Construction activities for the proposed project could result in sediment and other construction-related pollutants entering local drainages.

Construction of the proposed project would involve earth-disturbing and building activities that could result in the discharge of sediment or other pollutants (e.g., petroleum products or building materials such as paints and cement) to Curry Creek and, ultimately, the Sacramento River via runoff from the construction site. Because activities associated with project development would disturb more than one acre of land, contractors would be required to obtain and comply with the State General Construction Activity Stormwater Permit. Performance standards for obtaining and complying with the General Permit are described in NPDES General Permit No. CAS000002, Waste Discharge Requirements, Order No. 99-08-DWQ. The General Permit is intended to ensure compliance with state water quality objectives and water protection laws and regulations, including those related to waste discharges.

General Permit applicants are required to prepare a SWPPP and retain it at the construction site. The County requires that contractors obtain and comply with the State General Construction Activity Stormwater Permit. The SWPPP must specify BMPs designed to minimize sedimentation and release of construction-related constituents into Curry Creek. Examples of BMPs that could be used during construction of the proposed project, which can be found in the California Stormwater Quality Association's (CASQA) *Stormwater Best Management Practices Handbook for Construction*, include, but are not limited to, geotextiles, silt fences, hydroseeding, hydraulic mulch, soil binders, straw mulch, fiber rolls, earthen dikes and drainage swales, velocity dissipation devices, streambank stabilization measures, sediment traps, inlet filters, and tire washes. The General Permit was modified in April 2001 (SWRCB Resolution No. 2001-046) to require permittees to implement specific sampling and analytical procedures to determine whether the BMPs used at construction sites are effective. Although implementation of these State requirements would reduce project-related construction impacts, Placer County administers the oversight of implementation of construction BMPs. Therefore, the timing of construction BMPs could result in *potentially significant impacts*.

Mitigation Measure

The following mitigation measure would ensure that BMPs are in place during construction, which would reduce the potential for sediment impacts to a ***less-than-significant level***.

6.8-6 a) *Any project within the Plan Area with ground disturbance exceeding one-acre that is subject to the State NPDES General Construction Permit shall obtain such permit from the CVRWQCB and shall provide to the ESD evidence of a State-issued NPDES General Construction Permit number or filing of a Notice of Intent and fees prior to start of construction.*

b) *During the Subsequent Conformity Review process and prior to Improvement Plan approval, new development shall submit to the ESD, for review and approval, an erosion control plan consistent with the County's Grading Ordinance. The erosion control plan shall indicate that proper control of siltation, sedimentation and other pollutants will be implemented per NPDES General Construction Permit requirements and County ordinance standards. The plan shall propose BMPs to reduce erosion and water quality degradation during construction to the maximum extent practicable.*

6.8-7 Implementation of the proposed project could result in urban pollutants entering local drainages, which could result in degradation of water quality from stormwater runoff.

As discussed in Impacts 6.8-1 and 6.8-2, the increase in impervious surfaces resulting from the construction of buildings and paved areas would increase the rate and amount of stormwater runoff. Activities that could increase the types or quantities of non-naturally occurring pollutants in stormwater runoff due to project development could include motor vehicle operations, littering, careless material storage and handling, landscaping, and pavement wear. Pollutants typically associated with urban uses, such as those that could be developed as a result of the proposed project, include oil and grease, coliform bacteria, petroleum hydrocarbons (gas and diesel fuels), nitrogen, phosphorus, and heavy metals such as lead, copper, and zinc. Pesticides, herbicides, and other landscape maintenance products typically used in landscaping activities could also be present.

The proposed water quality features described in the Preliminary Drainage Master Plan include the following treatment measures (see Figure 6.8-5 for a map of water quality basins):

- Directing some flows to sheet discharge across grassy or open spaces;
- The placement of water quality interceptor devices;
- The placement of water quality sediment basing within detention facilities and channels; and
- Use of rock-line ditches below pipe outlets.

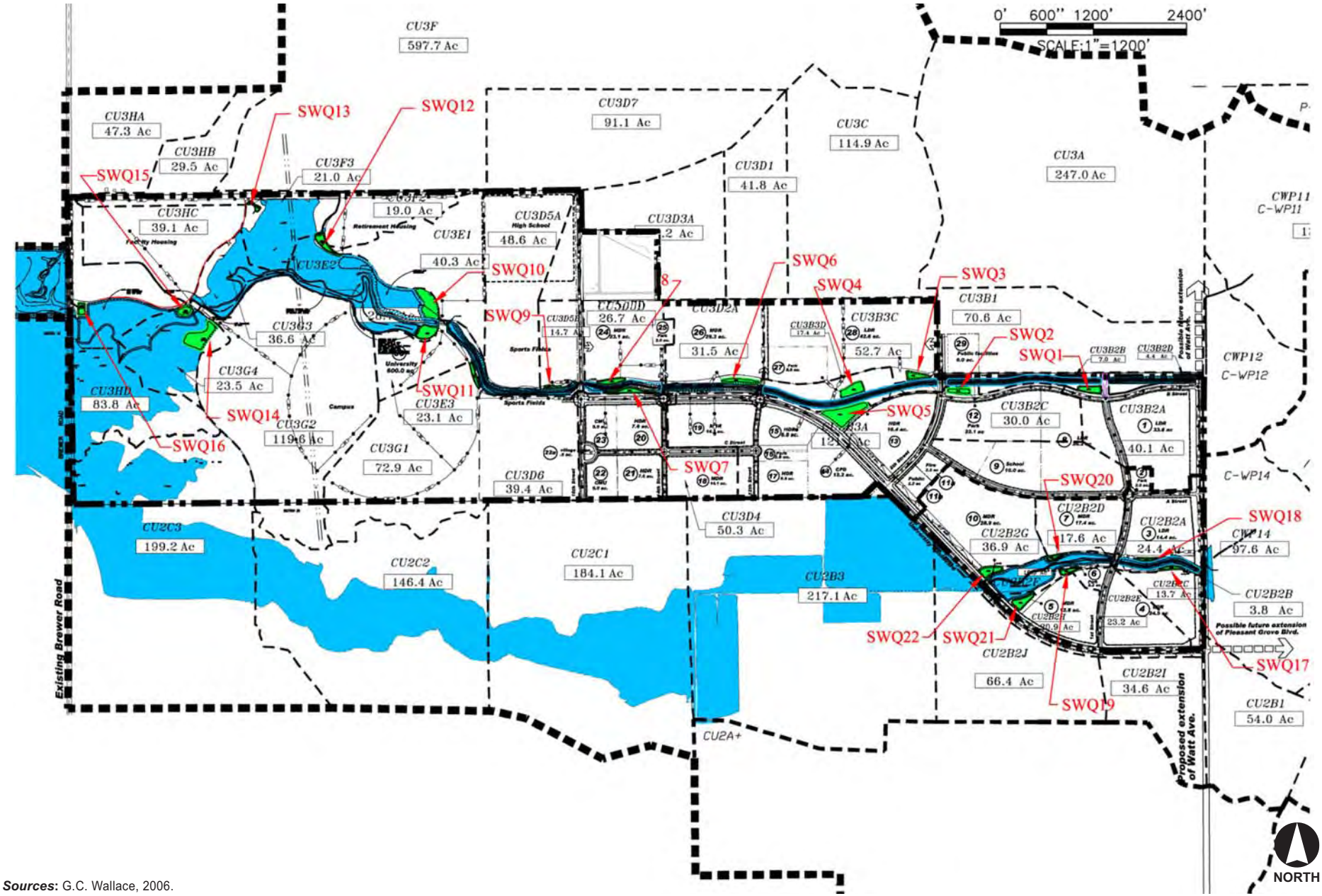
Other BMPs would include prompt re-vegetation of disturbed areas and sizing stormwater quality basins per the criteria developed by the Regional Stormwater Coordination Group, which incorporated flow-based volumetric treatment control BMPs from the CASQA Handbook Although implementation of the Preliminary Drainage Master Plan would include structural water quality BMPs, the absence of an operation and maintenance plan for these facilities could have a *potentially significant impact* on stormwater quality in Curry Creek or the Sacramento River.

Mitigation Measure

The following mitigation measures require that the Plan Area incorporate treatment control facilities into the design of the project and that the approach employ a variety of integrated BMPs to reduce storm water runoff to protect surface water quality, which would reduce the impact of water quality degradation that would occur after the development of improvements in the RUSP area. Through implementation of contemporary techniques for treatment and control of runoff, the direct water quality impacts of the project can be mitigated to a less-than-significant level. These measures would also ensure that proposed project stormwater quality facilities would be operated properly and maintained regularly to reduce urban pollutants in stormwater runoff entering Curry Creek. This would be a ***less-than-significant impact***.

6.8-7 a) *Implement Mitigation Measures 6.8-1(a) through (g)*.

b) *The proposed water quality facilities shall be identified and designed in the Final Drainage Master Plan and submitted to Placer County for review and approval. All water quality facilities identified in the Final Drainage Master Plan shall be constructed with the installation of the backbone infrastructure. The Final Drainage Master Plan shall also include the method or methods for funding the long-term maintenance of the proposed water quality facilities.*



Sources: G.C. Wallace, 2006.

FIGURE **6.8-5**

Stormwater Quality Basin Locations

c) *New development projects within the Plan Area shall submit a site-specific BMP plan to the County, for review and approval, showing the on-site locations and effectiveness of the BMP facilities proposed for long-term water quality impact reduction during the Subsequent Conformity Review process and prior to Improvement Plan approval. The plan shall include a method or methods for financing the long-term maintenance of the proposed site-specific facilities.*

d) *All BMPs for water quality protection, source control, and treatment control shall be developed in accordance with the California Stormwater Quality Association Stormwater Best Management Practice Handbook for Construction and New Development/Redevelopment (or other similar source approved by the ESD) for the applicable type of development and/or improvement. The BMPs shall be designed to mitigate (minimize, infiltrate, filter, or treat) stormwater runoff. Flow or volume based post-construction BMPs shall be designed at a minimum in accordance with the Placer County Guidance Document for Volume and Flow-Based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection. Provisions shall be included for long-term maintenance of BMPs. All BMPs shall reflect the Best Available Technologies (BAT) available at the time of implementation and shall reflect site-specific limitations. The County shall make the final determinations as to the appropriateness of the BMPs proposed for each project.*

e) *Stormwater runoff from the proposed project's on- and off-site impervious surfaces (including roads) shall be collected and routed through specially designed water quality treatment facilities (BMPs) for removal of pollutants of concern (i.e. sediment, oil/grease, etc.), as approved by the ESD. With the Improvement Plans, the applicant shall verify that proposed BMPs are appropriate to treat the pollutants of concern from this project. The applicant shall provide for the establishment of vegetation, where specified, by means of proper irrigation, for effective performance of BMPs. Maintenance of these facilities shall be provided by the project owners/permittees unless, and until, a County Service Area is created and said facilities are accepted by the County for maintenance. Prior to Improvement Plan or Final Map approval, easements shall be created and offered for dedication to the County for maintenance and access to these facilities in anticipation of possible County maintenance. No water quality facility construction shall be permitted within any identified wetlands area, floodplain, or right-of-way, except as authorized by project approvals.*

f) *This project is located within the area covered by Placer County's municipal stormwater quality permit, pursuant to the National Pollutant Discharge Elimination System (NPDES) Phase II program under the jurisdiction of the Central Valley RWQCB. Project-related stormwater discharges are subject to all applicable requirements of said permit. BMPs shall be designed to mitigate (minimize, infiltrate, filter, or treat) stormwater runoff in accordance with Attachment 4 of Placer County's NPDES Municipal Stormwater Permit (State Water Resources Control Board NPDES General Permit No. CAS000004).*

Cumulative Impacts and Mitigation Measures

Potential impacts on hydrology and water quality are attributed to development not only within the County limits, but in the watershed areas outside of the County limits (i.e., City of Roseville and

Sutter County limits). The context for the evaluation of potential cumulative impacts on hydrology and water quality is the Curry Creek watershed, including planned development in Roseville and Placer County, that is tributary to Pleasant Grove Creek and the Cross Canal watershed, which drains to the Sacramento River.

6.8-8 The proposed project, in combination with the buildout in the Curry Creek watershed, could result in stormwater peak flows that could result in on- or off-site flooding.

Cumulative development in Placer County and the City of Roseville, which includes the Curry Creek watershed, would increase the amount of impervious surface cover, which would, in turn, generate stormwater runoff peak flows. The increased runoff to the streams in the watershed would also increase the amount of stormwater runoff. This would result in a cumulatively significant impact. As noted previously in this section, several modifications to existing channels and structures are planned, and would be designed to convey the future increase in stormwater volume due to upstream developments.

As discussed above in Impact 6.8-1, the proposed project would result in a net decrease in peak flow rates for the two- through 100-year storm events, modeled pursuant to the PCFCWCD's SWMM, after the site is developed and with drainage improvements. As further described in Impact 6.8-1, the proposed project currently does not include an operation and maintenance plan to prevent future degradation of the planned drainage features and the Preliminary Drainage Master Plan does not account of the off-site improvement areas. Therefore, the proposed project could result in a considerable contribution to flow increases in Curry Creek and downstream reaches, which would be considered *significant*.

Mitigation Measure

The following mitigation measure would ensure proper operation and maintenance of the proposed drainage facilities and reduce the project's contribution to a ***less-than-significant level***.

6.8-8 a) *Implement Mitigation Measures 6.8-1(a) through (g)*.

b) *Implement Mitigation Measures 6.8-5(b) through (e)*.

6.8-9 The proposed project, in combination with the buildout of the Placer County and City of Roseville General Plan, could result in stormwater volumes that could result in on- or off-site flooding.

Cumulative development in Placer County and the City of Roseville, which includes the Curry Creek watershed, would also generate an increase in the amount (volume) of stormwater runoff. This is considered a significant cumulative impact. Results of the hydrologic and hydraulic modeling for the proposed project indicate that the proposed project would generate an increase of approximately 168.7 acre-feet of runoff for the 8-day 100-year design storm event that would be mitigated through designed retention and detention facilities on the project site. However, without a comprehensive operation and maintenance plan, the proposed project could result in volumetric increases in Curry Creek and on- or off-site flooding resulting in a considerable contribution to cumulative increases in runoff volumes in the watershed and downstream areas of Sutter County. This would be considered a *significant impact*.

Mitigation Measure

The following mitigation measure would ensure that proposed project volumetric facilities would be operated properly and maintained regularly to contain the approximate 168.7-acre-foot volumetric increase from the proposed project to meet pre-project runoff volumes. By containing the project's volumetric increase, the post-project condition would be the same as pre-project run-off volumes. This would ensure that the proposed project would not contribute to any cumulative increases; therefore, the project's contribution would be reduced to a ***less-than-significant level***.

6.8-9 a) *Implement Mitigation Measures 6.8-1(a) through (g)*.

b) *Implement Mitigation Measures 6.8-5(b) through (e)*.

6.8-10 The proposed project, in combination with the buildout of Placer County and the City of Roseville General Plans, could result in degradation of water quality from stormwater runoff.

The proposed project would drain to Curry Creek and its tributaries, which is part of a larger watershed. The changes in water quality that could occur as a result of construction activities and urban runoff in the proposed Plan Area would not be expected to differ substantially from other urban development that contribute flows to the Curry and Pleasant Grove Creeks and the Cross Canal watersheds.

Urban development results in increased impervious surfaces, which increase the rate and amount of runoff and can alter existing surface water quality. The primary sources of water pollution include runoff from roadways, parking lots, landscaped areas, industrial activities (including wastewater treatment plants), non-storm water connections to the drainage system, accidental spills and illegal dumping. Runoff from roadway and parking lots could contain levels of oil, grease, and heavy metals. Runoff from landscaped areas could contain concentrations of nutrients, i.e. fertilizers and pesticides.

As stated previously in this section, the County has developed the *Placer County Stormwater Management Plan 2003-2008* (SWMP) in compliance with NPDES Phase II regulations. The Placer County SWMP is a comprehensive program designed to reduce pollution in stormwater runoff in western portions of the County. Further, the City of Roseville has developed its own SWMP in compliance with NPDES Phase II regulations. Both the County and the City require that erosion control plans be prepared and approved to reduce water quality impacts during construction activities and that contractors obtain and comply with the State General Construction Activity Stormwater Permit. General Permit applicants are required to prepare a SWPPP. The SWPPP specifies BMPs designed to minimize sedimentation and release of products into Orchard Creek. Further, new development applications are required to include stormwater quality design features to prevent urban pollutants from entering natural drainages, though even state-of-the-art BMPs do not eliminate all pollutants from stormwater. Although these measures are in place, older urban development without modern water quality features can result in a cumulative significant impact to water quality.

Although implementation of the proposed project Preliminary Drainage Master Plan and RUSP Design Criteria and Guidelines would include water quality BMPs in compliance with NPDES Phase II regulations, lack of an operation and maintenance plan for these facilities and for the off-site

improvement areas could result in a considerable contribution to cumulative water quality impacts. This would be considered a *significant impact.*

Mitigation Measure

The following mitigation measure would ensure that Plan Area stormwater quality facilities would be operated properly and maintained regularly to reduce urban pollutants in stormwater runoff entering Curry Creek to continue to meet regulatory standards in the future to the maximum extent practicable. However, absent a showing of no adverse impact to downstream properties, the impact would not be reduced to a less-than-significant level. Due to the level of existing and proposed development within the watersheds affected by the Specific Plan, this would remain a *potentially significant cumulative impact* to which the project's contribution would be *cumulatively considerable*. Thus, this impact would remain ***significant and unavoidable***.

6.8-10 *Implement Mitigation Measures 6.8-7(a) through (f)*.

6.8-11 The proposed project, in combination with the buildout of Placer County and the City of Roseville General Plans, could result in the construction of residences and other structures within the pre-construction 100-year FEMA floodplain.

Development of the proposed project, in addition to buildout of Placer County and the City of Roseville General Plans would place residential and institutional land uses in areas subject to the existing (pre-construction) 100-year floodplain as mapped by FEMA. This is considered a significant cumulative impact.

The County requires that house pad elevations be two feet above the 100-year floodplain water surface elevation (or finish floors at three feet above the same elevation) to protect structures and occupants from flood hazards. To accommodate development in those areas and to provide required freeboard, the proposed project would construct stormwater drainage facilities that would prevent 100-year flows in Curry Creek from overtopping the banks of the channels, culverts, and lake storage areas and prevent flooding of occupied structures. The Preliminary Drainage Master Plan provides detailed HEC-RAS output tables showing that post-project drainage facilities would reduce all upstream and most on-site water surface elevations such that flooding limits would be confined within channels and generally provide three feet of freeboard to adjacent proposed structures.

Although the proposed project drainage improvements would reduce or maintain the 100-year water surface elevations and would not increase on- or off-site flooding, an operation and maintenance plan for these facilities has not been prepared. Therefore, without a comprehensive operation and maintenance plan and inclusion of off-site improvement areas in the Preliminary Drainage Master Plan, the proposed project could result in increases in water surface elevations resulting in a considerable contribution to cumulative impacts. This would result in a *significant impact*.

Mitigation Measure

The following mitigation measure would ensure that proposed project drainage facilities would be operated properly and maintained regularly to contain the approximate 168.7 acre-foot volumetric increase and reduce the proposed project's contribution to this impact. Due to the level of existing and proposed development within the watersheds affected by the Specific Plan, this would remain a

potentially significant cumulative impact to which the project's contribution would be *cumulatively considerable*. Thus, this impact would remain ***significant and unavoidable.***

6.8-11 a) *Implement Mitigation Measures 6.8-1(a) through (g)*.

b) *Implement Mitigation Measures 6.8-5(b) through (e)*.

6.8-12 The proposed project, in combination with buildout of Placer County and City of Roseville General Plans within the Pleasant Grove Creek watershed, could result in an incremental increase in the amount (volume) of treated wastewater discharged to Pleasant Grove Creek. This could exceed the capacity of the creek and exacerbate on- or off-site flooding during the 100-year storm event.

The proposed project, in combination with buildout of Placer County and City of Roseville General Plans within Pleasant Grove Creek watershed, would result in an increase in the local population and, thus, an increase in wastewater treatment and discharge at the Pleasant Grove Wastewater Treatment Plant (PGWWTP). An increase in treatment at the PGWWTP would result in an increase in discharge of treated wastewater in Pleasant Grove Creek. Although there is adequate capacity to serve the proposed project's flows, cumulative wastewater flows, including from the proposed project, would increase to a total of approximately 23.4 mgd. This increase was planned for in previous master plans and EIRs, as discussed in Section 6.11, Public Utilities, in this EIR. The cumulative increase in wastewater discharge would result in an increase in water surface elevations of 0.07 feet or less in the reach upstream of Reason Farms. Downstream of Reason Farms, the cumulative increase in water surface elevations would be 0.03 feet to zero just upstream of the transition to the Pleasant Grove Canal, and would remain at zero to the Sutter County line.[20] This slight increase in water surface elevation along a relatively short stretch of Pleasant Grove Creek would not exceed the capacity of the creek and would not exacerbate on- or off-site flooding. Therefore, this would be considered a ***less-than-significant*** cumulative impact to water surface elevations downstream of the PGWWTP during the 100-year storm event.

Mitigation Measure

None required.

6.8-13 The proposed project, in combination with the buildout of Urban Growth Areas that could be served by the Pleasant Grove Wastewater Treatment Plant, could result in degradation of water quality from increased wastewater discharge to Pleasant Grove Creek.

The following discussion is based upon the technical memorandum prepared to address the cumulative impacts on water quality and aquatic resources in Pleasant Grove Creek, that would occur at buildout of the Urban Growth Areas (UGAs) that would contribute wastewater flows to the PGWWTP (see Appendix D).[21] The assessment in the technical memorandum is based on the cumulative assessments included in the City's 1996 Master Plan EIR (which are inherently "cumulative" in nature) and the 2004 West Roseville Specific Plan EIR.

20 Merritt Smith Consulting, *Technical Memorandum*: "Cumulative Analysis of UGA Impacts on Water Quality and Aquatic Resources in Pleasant Grove Creek, Roseville, California", January 15, 2006.

21 Merritt Smith Consulting, *Technical Memorandum*: "Cumulative Analysis of UGA Impacts on Water Quality and Aquatic Resources in Pleasant Grove Creek, Roseville, California", January 15, 2006.

The technical memorandum contains some conservative assumptions, including the following:

- The total estimated future flow of 23.3 mgd from the PGWWTP is 6.2 mgd *less than* the 29.5 mgd future flow projected and evaluated in the 1996 Master Plan EIR.
- The analysis assumes all of the dry weather flow would be discharged. However, dry season discharge to Pleasant Grove Creek would be less than the average dry weather flow generated because a portion of the flow would be returned to the UGAs as recycled water for irrigation instead of being discharged to Pleasant Grove Creek.
- The West Roseville Specific Plan EIR includes Mitigation Measure 4.11-5, which conditions issuance of building permits on obtaining all the necessary permits to treat, discharge, and reuse flows from the specific Plan Area.

The 1996 Master Plan EIR identified significant impacts to Pleasant Grove Creek water quality resulting from an increase in water temperature and elevated levels of trace metals and organic pollutants. The impact of the UGAs with respect to these constituents is discussed below. Other constituents of potential concern (i.e., toxicity, mercury, pH, biostimulatory substances, dissolved oxygen, and taste and odors) are also discussed.

Temperature

The 1996 Master Plan EIR identified elevated temperature as being a significant impact to the water quality in Pleasant Grove Creek. The 1996 Master Plan EIR included the following to mitigate for this impact:

- Install cooling towers if necessary (Mitigation Measure 7-4)

Consistent with this mitigation measure, the City installed temperature cooling units at the Dry Creek Wastewater Treatment Plant (DCWWTP). The City has not installed cooling units at PGWWTP because salmonid fish are not present there (due to lack of habitat), which is reflected in the less stringent receiving water temperature limit in the PGWWTP NPDES permit relative to that in the DCWWTP NPDES permit.

During periods when flow is present in Pleasant Grove Creek (Pleasant Grove Creek is naturally a seasonal stream), additional flows from the PGWWTP (generated within the UGAs) would cause additional temperature increases in Pleasant Grove Creek, downstream of the PGWWTP outfall. The increase in water temperature in Pleasant Grove Creek would be directly related to the incremental increase in wastewater flow from the UGAs being treated and discharged at the PGWWTP. During those periods when flow (other than effluent from PGWWTP) is not present in Pleasant Grove Creek, incremental UGA flows would not affect water quality in Pleasant Grove Creek.

As the capacity of the PGWWTP is expanded to accommodate flows from the UGAs, cooling units would be added, if necessary, to address the increased wastewater flow needing cooling, thereby assuring continued compliance with the temperature objectives in the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan) and thermal protection of aquatic resources.

Trace Metals and Organic Pollutants

The 1996 Master Plan EIR identified the introduction of elevated levels of trace metals and organic pollutants as a significant impact to the water quality in Pleasant Grove Creek. The 1996 Master Plan EIR identified the following mitigation for this impact:

- Install advanced treatment facilities (Mitigation Measure 7-2)
- Institute metals source controls/pre-treatment (Mitigation Measure 7-3)

During those periods when flow is present in Pleasant Grove Creek, additional flows from the PGWWTP (generated within the UGAs) would cause the percentage of water in the Pleasant Grove Creek channel composed of treated effluent, downstream of the PGWWTP outfall, to be higher, all other factors (e.g., creek hydrology) remaining the same. Consequently, instream concentrations of trace metals and organic pollutants downstream of the outfall would increase in proportion to the incremental increase in wastewater flow from the UGAs being treated and discharged at the PGWWTP. During those periods when flow (other than effluent from PGWWTP) is not present in Pleasant Grove Creek, incremental UGA flows would not affect water quality in Pleasant Grove Creek.

Aquatic Life Toxicity

The PGWWTP currently performs three-species bioassay testing of its effluent quarterly. Based on the bioassays tests a No Observable Effect Concentration (NOEC) and an Inhibition Concentration for a set percentage effect (IC_{25}) were identified. The three-species bioassay results for the PGWWTP for all four quarterly tests performed since discharge and bioassay testing began in 2004, show that the undiluted effluent is non-toxic to aquatic life.

Mercury

The current NPDES permit contains a mercury mass-loading limit of 1.71 pounds per year for the combined discharge of the DCWWTP and the PGWWTP. The current NPDES permits have a combined permitted flow of 30 mgd, and the total incremental UGA flow (from areas outside the 1996 EIR area) is 12 mgd, for a total flow of 42 mgd or a 1.4-fold increase. This flow increase factor is less than 4.9, indicating that the combined incremental flow of all UGAs would not cause the mass loading limit to be exceeded.

pH

The NPDES permit for the PGWWTP has an effluent limitation that requires discharges to have a pH between 6.5 and 8.5 units. Based on the current science regarding pH requirements of freshwater aquatic life (the beneficial use most sensitive to creek pH) the Central Valley RWQCB is processing a Basin Plan amendment that would remove the 0.5-unit change requirement of the current pH objective, leaving a receiving water pH of between 6.5 and 8.5 units (RWQCB 2002). Once the PGWWTP is expanded to accommodate future cumulative flows, the higher rate of discharge would not cause Pleasant Grove Creek pH to fall below a pH of 6.5 or be raised above 8.5.

Biostimulatory Substances (Nutrients)

The 1996 Master Plan EIR indicated that algal growth in Pleasant Grove Creek is limited by factors other than nutrient availability. This indicates that nutrients in effluent would not stimulate algal growth in the creek. Consequently, nuisance level plant or algae communities are not expected to develop in Pleasant Grove Creek, downstream of the PGWWTP outfall, under the future cumulative condition when higher rates of effluent discharge, including UGA flows, result in a greater proportion of creek water being constituted by treated effluent.

Dissolved Oxygen

The 1996 Master Plan EIR mitigation measures to address receiving water quality degradation impacts are as follows:

- Install advanced treatment facilities (Mitigation Measure 7-2, which is assumed to include mitigation for oxygen-related impacts since dissolved oxygen impacts were not addressed in particular in the 1996 Master Plan EIR).
- Institute metals source controls/pre-treatment (Mitigation Measure 7-3).

As the capacity of the PGWWTP is expanded to accommodate flows from the UGAs, any advanced treatment facilities that the City constructs and operates to comply with its NPDES limitations would be expanded (or initially constructed for an expanded capacity) to address the increased wastewater flow from the UGAs, thereby assuring continued compliance with all Basin Plan objectives.

Tastes and Odors

The Basin Plan states that "Waters shall not contain taste or odor producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses." No history of taste and odor problems exists in Pleasant Grove Creek at locations downstream of the PGWWTP discharge. Municipal water supply taste and odor problems are often associated with algae production in source waters.

Effluent quality under the future cumulative condition would be maintained at essentially equivalent or possibly higher quality levels (if additional or more restrictive NPDES limits are permitted by the RWQCB), relative to current effluent quality. Therefore, no taste and odor problems would be expected in the future, once the PGWWTP is adequately expanded/upgraded, as necessary, and permitted to treat the incremental flows, including UGA flows.

Conclusion

The technical memorandum determined, after recent analysis, that continued compliance with 1996 Master Plan EIR Mitigation Measures 7-2, 7-3, and 7-4 would be sufficient to reduce cumulative impacts from PGWWTP discharges into Pleasant Grove Creek related to temperature change, introduction of trace metals and organics, and changes in dissolved oxygen to a ***less-than-significant level***.

Mitigation Measure

None required.