4.11 HYDROLOGY AND WATER QUALITY

4.11 HYDROLOGY AND WATER QUALITY

INTRODUCTION

This section of the EIR describes the existing drainage system in the Clover Valley area and the surrounding region and evaluates potential hydrologic and water quality impacts that would result from the approval of the proposed Large and Small Lot Tentative Subdivision Maps (LSLTSM) application and the anticipated buildout of the project site. The impact analysis in this section also addresses issues related to the potential for flooding and changes to existing sedimentation distribution.

Information for this section is taken from the *Rocklin General Plan EIR*[1], and the following reports by West Yost & Associates: *Clover Valley Groundwater Impact Analysis*[2] (see Appendix N of this Draft EIR), *Clover Valley EIR Hydrology Evaluation*[3] (see Appendix O of this Draft EIR), and the *Water Quality Analysis*[4] (see Appendix P of this Draft EIR). Additionally, pertinent comments received in response to the Notice of Preparation (NOP) for the proposed project have been considered in this analysis.

ENVIRONMENTAL SETTING

The following setting information provides an overview of the existing condition of the drainage systems and sedimentation distribution in the Clover Valley area. In addition, the regulatory agencies and permits associated with drainage and water quality are described.

Drainage

Clover Valley is a narrow and relatively undeveloped valley in the low foothills close to the urbanized Loomis and Rocklin areas. Ridges of up to 640 feet in elevation, forested hillsides, and grasslands bracket the Clover Valley Creek corridor, which traverses the site north to south. The valley floor is enclosed on the east and west by ridges, which rise 150 to 200 feet above the valley floor. Ridge slopes typically exceed 30 percent. Clover Valley Creek serves as a natural drainage system for the primarily undeveloped Clover Valley area.

Drainage within the regional planning area is dominated by a variety of watersheds flowing westward from the Sierra Nevada foothills east of Rocklin, which ultimately discharge into the Sacramento River southwest of the City. The urban drainage system in Rocklin consists of a combination of valley gutters, underground pipes and drop inlets, and open channels which in turn discharge into a variety of creeks, including Clover Valley Creek. These creeks discharge ultimately into Dry Creek. The Clover Valley Drainage Basin is located within the Dry Creek Watershed.

The Clover Valley watershed (mostly upstream of Midas Avenue) includes about 2,100 acres, of which about 200 acres are developed with residential land uses along Clover Valley Road and Rawhide Road (downstream of the proposed development). The remainder of the watershed is natural or rural. Overall, this watershed is only about 10 percent developed and maintains an overall impervious surface coverage of about four to five percent.

The designated floodplain along Clover Valley Creek has been established by the Federal Emergency Management Agency (FEMA) in its most recent Flood Insurance Rate Map (FIRM). The FIRM published by FEMA for Placer County, with an effective date of June 8, 1998, designates portions of Clover Valley, specifically along Clover Valley Creek, as within the 100-year floodplain. The 100-year floodplain is used to identify unacceptable safety hazards and indicates the geographic areas having a one percent chance of being flooded in any given year.

Prior to the preparation of the 1998 FIRMs, the City of Rocklin had annexed the Clover Valley area and approved the Clover Valley development plan. The approved Clover Valley development plan included five creek crossings, the creation of which resulted in the initiation of a Conditional Letter of Map Revision (CLOMR) request (January 2001) for the Clover Valley Area. The request for a CLOMR was based on new topographic data and the proposed design of the creek crossings (approved CLOMR maps are on file at the City of Rocklin). The CLOMR for this project was issued by FEMA on January 24, 2001, and accepted the proposed changes to the 100-year floodplain (see Figure 4.11-1, Conditional Letter of Map Revision).

Groundwater

According to the groundwater study conducted by West Yost & Associates (WYA), Groundwater in Clover Valley is expected to occur primarily in the weathered and fractured bedrock and in the alluvial soils along the creek. The permeability of the bedrock is expected to vary widely depending on the degree of fracturing and weathering. Weathering is likely confined to a near-surface portion of the bedrock, while the degree of fracturing at depth is unknown. Based on the information gathered through the use of test pits, there appears to be a continuum between coarse granitic sands near the surface that represent highly weathered bedrock, to more competent, less weathered materials at greater depths. The combination of fractured bedrock and the limited amount of alluvial material overlying it means that the amount of groundwater storage in the proposed project area is expected to be relatively small.

The available data is insufficient to determine whether groundwater discharges to the creek or the creek recharges groundwater. According to WYA, both situations may occur. The possibility that a perched groundwater zone may exist or develop in the alluvium as a result of lower permeability in the underlying granitic rocks is also a factor.

Figure 4.11-1
Conditional Letter of Map Revision

Currently, the overall groundwater flow in the Clover Valley site area is expected to follow the topography: from the ridges to the valley, and along the valley to the lower elevations. Groundwater recharge through infiltration of surface water into the bedrock along the ridges is likely limited due to the impermeable nature of the geology in the area.

During the rainy winter months, substantial surface runoff is likely. A small portion of the runoff is expected to seep into the bedrock, with the remainder draining into the creek or entering the alluvial soils along the valley floor.

Water Quality / Sedimentation

Clover Valley Creek and the Clover Valley drainage basin are located within the Dry Creek Watershed. Creek water naturally collects and carries along varying amounts of dirt and soil particles (sedimentation) as it travels along the creekbed. Because soils on the valley ridgelines and slopes are known to migrate downslope during large storm events, an excess accumulation of sediment descending into the creek water has the potential to cause congestion inside the filtration technologies typically designed to prevent sediment buildup.

The watershed upstream of the project site includes rural developments. Although not intensive development, this rural development does introduce pollutants into Clover Valley Creek. The watershed downstream of the project site includes the fully developed City, and residential areas along Rawhide Road, Clover Valley Road, and other streets. Runoff from this urban area drains to Clover Valley Creek and introduces additional pollutants into the creek water. Continuing downstream, Clover Valley Creek flows into Antelope Creek, which in turn flows into Dry Creek. These creeks receive runoff with urban pollutants from other areas, including the cities of Rocklin and Roseville. Clover Valley Creek water also naturally collects and carries along varying amounts of dirt and soil particles (sediment) as it travels along the creek bed.

Sediment loads along Clover Valley Creek have long been an issue, especially within the Sunset Whitney Country Club (SWCC). Since 1965, SWCC has detained water in Clover Valley Creek in a pond for their irrigation system headworks. Due to access constraints and permit requirements, sediment build-up in this area has created operational and maintenance problems for SWCC. Other localized areas of sediment impacts include the area adjacent to the culverts under Rawhide Road and Creekwood Drive and also within the Sunset Whitney golf course. According to the project information submitted to the City by the applicant's engineer, each location is in an environment that allows the creek velocity to slow down significantly. This reduced velocity allows sediment being carried in the stream to settle out of the flowing water and be deposited in the creek channel.

Erosion and transport of soil down the slopes or hillsides of Clover Valley is a natural process. Much of the eroded soil/sediment enters Clover Valley Creek and is transported downstream, which is also a natural process. At locations where the creek water velocity decreases, the sediment often settles out of the water and accumulates in the channel

bottom. The Soil Survey of Placer County, California, Western Part indicates that the soils in Clover Valley have soil erodibility factors (K factors) of 0.20 to 0.24, which represents a moderate susceptibility to erosion. The K factors range from 0.10 to 0.64, with the highest factors representing the highest susceptibility to erosion. Disturbances to vegetation and soils greatly increase the potential for erosion of the soil.

Existing Wells

A discussion of the wells currently on the site and their potential effects are included in the Hazards chapter (Chapter 4-10) of this Draft EIR.

Mosquito Abatement

A discussion of mosquito abatement issues with standing water on-site is included in the Hazards chapter (Chapter 4-10) of this Draft EIR.

REGULATORY CONTEXT

Existing policies, laws and regulations that would apply to the proposed project are summarized below.

Federal

Federal Emergency Management Agency (FEMA)

The Federal Emergency Management Agency (FEMA) operates the National Flood Insurance Program, which issues maps of Special Flood Hazard Areas (SFHA), based on water surface elevations of the one percent (100-year) flood event. For any project that would result in a change to the designated 100-year floodplain, a Conditional Letter of Map Revision (CLOMR) is required to be issued by FEMA prior to the initiation of any construction activities. FEMA issues CLOMRs to modify the elevations and/or boundaries of the Special Flood Hazard Areas (based on the 100-year flood event). FEMA requires assurance by the participating community that minimum floodplain management requirements are complied with, including minimum floor elevations above the "base flood," existing lands and structures or proposed structures are "reasonably safe from flooding," and that all supporting analysis and documentation used to make that determination is on file and available upon request. The supporting hydraulic analysis and documentation includes new topographic data and certification by a registered professional engineer or licensed land surveyor.

National Pollutant Discharge Elimination System (NPDES)

The National Pollutant Discharge Elimination System (NPDES) permit system was established in the federal Clean Water Act (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.

Nonpoint sources are diffuse and originate over a wide area rather than from a definable point. Nonpoint pollution often enters receiving water in the form of surface runoff, but is not conveyed by way of pipelines or discrete conveyances. As defined in the federal regulations, such nonpoint sources are generally exempt from federal NPDES permit program requirements.

However, two types of nonpoint source discharges are controlled by the NPDES program: nonpoint source discharge caused by general construction activities, and the general quality of stormwater in municipal stormwater systems. The 1987 amendments to the CWA directed the federal EPA to implement the stormwater program in two phases. Phase I addressed discharges from large (population 250,000 or above) and medium (population 100,000 to 250,000) municipalities and certain industrial activities. Phase II addresses all other discharges defined by EPA that are not included in Phase I.

U. S. Army Corps of Engineers: Waters of the United States

Areas meeting the regulatory definition of "Waters of the United States" are subject to the regulatory jurisdiction of the U.S. Army Corps of Engineers (Corps). The Corps, under provisions of Section 404 of the Clean Water Act (1972), has jurisdiction over "Waters of the United States" (jurisdictional waters). These waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sand flats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as "Waters of the U. S.," tributaries of waters otherwise defined as "Waters of the U. S.," the territorial seas, and wetlands adjacent to "Waters of the U.S." (33 CFR, Part 328, Section 328.3).

Construction activities within jurisdictional waters are regulated by the Corps. The placement of fill material into such waters must be in compliance with permit requirements of the Corps. Corps permits are not effective in the absence of State water quality certification pursuant to Section 401 of the Clean Water Act. The State Water Resources Control Board (SWRCB) is the State agency charged with implementing water quality certification in California.

Local

Placer County Flood Control and Water Conservation District (PCFCWCD)

The design of the drainage system for the Clover Valley area is based on the Placer County Flood Control Standards manual developed by the Placer County Flood Control and Water Conservation District (PCFCWCD). The Placer County Flood Control standards provide guidance to the development of flood control measures throughout the

County, particularly for stormwater drainage and sedimentation issues regarding new development.

City of Rocklin General Plan

Existing policies, laws, and regulations established in the 1991 City of Rocklin General Plan, as applicable:

Open Space, Conservation, and Recreation Element:[5]

Policy 6	To cooperate in a coordinated regional approach to the management of drainage basins and flood plains with regional agencies such as the Placer County Flood Control and Water Conservation District (PCFCWCD).
Policy 19	To minimize the degradation of water quality through requiring implementation of techniques such as, but not limited to, the prohibition of grading, placement of fill or trash or alteration to vegetation within designated stream setback buffer areas, and requiring the installation of measures which minimize runoff waters containing pollutants and sediments entering surface water. Measures for minimizing pollutants and sediments entering watercourses may include oil/grit separators, detention basins and flow reduction devices.

Community Safety Element[6]*:*

Policy 2	To cooperate with and support the formation of a coordinated city-wide and/or regional approach for the construction, operation, and maintenance of drainage and flood control facilities.
Policy 3	To require master drainage plans as a condition of approval for large development projects.
Policy 4	To require new residential construction to have its lowest habitable floor elevated at least two feet (2') above the base flood level elevation (i.e., the 100-year floodplain elevation).
Policy 5	To ensure that 100-year floodplain elevations, based upon the most current information, both up and downstream are not adversely affected by new development.
Policy 6	To require new developments to detain on-site drainage such that the rate of runoff flow is maintained at pre-development levels and to coordinate with other projects' master plans to ensure no adverse cumulative effects. In lieu of detention, the City may require off-site drainage improvements that are more beneficial to the community's overall drainage system.

City of Rocklin Zoning Ordinance

Chapter 8.30 – Stormwater Runoff Pollution Control Ordinance

This ordinance prohibits the discharge of any materials or pollutants that cause or contribute to a violation of applicable water quality standards, other than stormwater, into the municipal storm drain system or watercourses. Examples of materials that are not prohibited under this ordinance include the following:

- Motor oil
- Yard waste
- Animal waste
- Grease and oil from restaurants
- Commercial carpet cleaning waste
- Concrete washout
- Paint and associated equipment cleaning

Chapter 15.28 – Grading and Erosion and Sedimentation Control

The City's grading and erosion and sediment control ordinance requires that all grading in the City, unless exempt under the ordinance, must have a grading approval and provides for a separate grading permit. Plan check and issuance of grading permits is done by the Engineering Services Division and approved by the Engineering Services Manager, who is the designated City Engineer. The grading permit process is divided into a minor plan approval for smaller low impact jobs and a considerably more complex engineered grading plan approval for bigger jobs. The grading permit is a staff-level discretionary decision and more comprehensive CEQA environmental review is required for some applications.

IMPACTS AND MITIGATION MEASURES

The impacts to hydrology and water quality regarding the proposed project are analyzed and assessed in this section.

Standards of Significance

A hydrology/water quality impact would be considered significant if implementation of the proposed project would:

- Violate water quality standards or waste discharge requirements or substantially degrade water quality; or;
- Substantially alter the existing drainage pattern in a manner that would either result in substantial erosion or siltation on- or off-site, or increase the rate or amount of surface runoff resulting in flooding on- or off-site; or;
- Create or contribute runoff that would exceed the capacity of existing or planned stormwater drainage systems; or;
- Expose people or structures to increased risk of flooding by placing structures within a 100-year floodplain, mapped on a federal FIRM map or other flood hazard delineation map; or;
- Expose people or structures to risk of flooding by locating structures where they could impede or redirect flood flows.

Method of Analysis

For the *Groundwater Quality Report*, West Yost & Associates determined that a qualitative assessment using existing data sources was appropriate for this EIR and did not include any new field investigations or quantitative analysis in their research.

The *Hydrology Evaluation* for the proposed Clover Valley project is based primarily on the 2005 Clover Valley Preliminary Drainage Study by Stantec[7]. The *Hydrology Evaluation* includes hydrologic and hydraulic modeling that evaluates the proposed drainage facilities and provides the necessary data to ascertain the project's potential impacts. Additionally, this chapter utilizes the *Water Quality Analysis* by West Yost & Associates and the *Environmental Site Assessment* undertaken by Wallace·Kuhl & Associates, Inc. (March 2001)[8]. The 1999 *Clover Valley Lakes Drainage Study*[9] and the 2001 *Clover Valley Lakes Drainage Study Revisions*[10], prepared by Stantec Consulting, Ltd., were also used for this chapter, as was their request for Conditional Letter of Map Revision (CLOMR) in January 2001.

Project-Specific Impacts and Mitigation Measures

4.10-1 Impacts resulting in a change in peak stormwater flows.

The development of the proposed project would result in an increase in peak stormwater runoff volumes and rates due to the introduction of impervious surfaces, such as roads, sidewalks, parking areas and rooftops. Stormwater runoff from the developed areas of the project site and portions of open space on the project that would be subject to runoff, totaling approximately 259 acres, would be collected and conveyed to Clover Valley Creek via 17 storm drain systems that would collect the runoff from the developed areas within the project site and convey it to Clover Valley Creek. Water quality treatment structures are proposed at the end of each storm drain system. Some of the runoff from the undeveloped hillsides would be collected and conveyed to the creek through a system of ditches and culverts. These ditches would also collect and convey flow from five of the proposed storm drain systems that discharge at the top of the hillsides. Two detention basins, located at the Valley Clover Way and Natural Trail Way bridge crossings of Clover Valley Creek, are also included in the project drainage system.

The proposed storm drain systems were analyzed by Stantec Consulting, Inc., using the Rational Method with rainfall data from the Placer County Flood Control and Water Conservation District (PCFCWCD) Stormwater Management Manual. The storm drain system consists of relatively small diameter pipes, ranging in size from 12 to 24 inches, with a few larger pipes also included, ranging from 30 to 36 inches in diameter. Based on PCFCWCD design criteria, West Yost & Associates determined that these drainage systems appear adequate to convey storm runoff from the proposed project to Clover Valley Creek.

The proposed project includes roads that cross Clover Valley Creek at four locations. The two southern crossings would be used to create detention storage to mitigate the increased runoff that would result from the development and increased impervious surfaces within the proposed project area. The two northern crossings would be designed to convey the 100-year storm flows with little restriction of flow.

The two detention basins at the southern crossings would be created by the proposed road embankment and the existing topography of the creek. The culverts under the roadway would be designed to allow larger creek flows to back up behind the proposed roadway, holding back a portion of the flow in Clover Valley Creek. The result would be an increase in the water elevation upstream of the creek crossing, but the flow downstream of the creek crossing would be reduced (Table 4.11-1). During smaller, routine storm events, the flow in Clover Valley Creek would pass through the culverts with only a minor reduction in peak flows and minimal detention storage.

Table 4.11-1
Proposed Detention Basin Summary

Detention Basin/Location	Low-Flow Outlet		Overflow Structure		Detention Storage During 100-Year Event	
	Culvert	Upstream Flowline Elevation, feet	Type & Size	Upstream Flowline Elevation, feet	Storage, acre-feet	Peak Stage, feet
Basin 1/Upstream of Valley Clover Way (most upstream basin)	one – 54”	343.5	three – 7’ X 4’ Box Culverts	353.5	13.4	357.4
Basin 2/Upstream of Nature Trail Way (downstream basin)	one – 72”	321.5	five – 10’ X 4’ Box Culverts	328.5	34.3	331.1

Source: Clover Valley EIR Hydrology Evaluation, West Yost & Associates, 2005.

The proposed detention basins for this project are on-line basins, which consist of a restriction in the conveyance capacity of the creek that backs up the flow during large storm events. Small, routine storm event flows are not restricted. For the proposed project, flow restrictions from on-line basins would be provided by the Valley Clover Way and Natural Trail Way roadway crossings of Clover Valley Creek. Because the entire flow from a given drainage system is routed through on-line detention basins, the basins generally require a relatively large storage volume.

The two proposed on-line detention basins upstream of Valley Clover Way and Nature Trail Way would reduce post-development flows to pre-development levels (Table 4.11-2). Hydrologic and hydraulic computer models were developed by the project proponent to determine the size and location of the proposed culverts, which would provide the necessary detention to mitigate the increased flow resulting from the proposed development. The results show that the proposed detention basins would reduce the flows in Clover Valley Creek to below the flows under existing conditions, except at one location during the 100-year storm event and another downstream location during the two-year and ten-year events. Although these increases are less than one percent of the total flow, to fully mitigate the increased runoff resulting from development of the proposed project, the proposed release rates should be decreased, which would result in higher upstream surface elevation and a need for an increased volume of the storage basins.

Results from the hydraulic model show that that the areas just upstream of the road crossings should be added to the designated 100-year floodplain. The results were included as part of the request for a CLOMR from FEMA. FEMA has issued the CLOMR to the project applicant.

The approved CLOMR is based upon a drainage system that includes two detention basin areas along Clover Valley Creek working in combination to mitigate the increased flows from the proposed project area. Staggered construction of the crossings may result in temporary drainage impacts and could result in the potential for increased flows downstream of the project if only one crossing were constructed for an interim time period.

Additionally, if the proposed detention basins fill with sediment, their storage capacity would be reduced and consequently, the flows in Clover Valley Creek could increase, causing potential impact to downstream properties. However, operation and maintenance of the drainage basins are addressed in Mitigation Measure 4.11MM-6(F).

The Placer County Water Agency (PCWA) has indicated that there is a potential for stormwater runoff and overflow from Whitney Reservoir, located northwest of the proposed project. PCWA staff has indicated that at any time (particularly during large storms) the reservoir could spill up to 10 cfs into Clover Valley Creek. Although this flow is minor compared to high flows in Clover Valley Creek, the hydrologic and hydraulic modeling of the proposed detention basins of the Clover Valley Creek floodplain should include this flow.

Table 4.11-2
Summary of Existing and Post-Development Flows in Clover Valley Creek

Location	2-Year Storm		10-Year Storm		100-Year Storm	
	Existing, cfs	Proposed, cfs [b]	Existing, cfs	Proposed, cfs [b]	Existing, cfs	Proposed, cfs [b]
Valley Clover Way (Basin 1)	129	102	382	338	687	659
Nature Trail Way (Basin 2)	134	104	398	309	725	727
Confluence of Clover Valley Creek and Antelope Creek	562	521	1,653	1,537	3,047	2,992
Antelope Creek at the Confluence with Dry Creek [c]	611	579	1,736	1,629	3,274	3,211
Dry Creek at the Confluence with Antelope Creek [d]	1,654	1,619	4,982	4,875	10,612	10,512
Dry Creek at the Confluence with Cirby Creek [e]	2,195	2,168	6,341	6,245	13,728	13,618
Dry Creek at Vernon Street	2,203	2,177	6,340	6,249	13,679	13,573
Dry Creek at the Natomas East Main Drainage Canal	1,490	1,504	4,020	4,021	11,077	11,042

(a) Results are based on the hydrologic modeling developed for the *Dry Creek Watershed Flood Control Plan* [10], with modifications for the proposed project.
(b) Proposed flows include proposed detention storage.
(c) Antelope Creek Watershed (including Clover Valley Creek), just upstream of confluence with Dry Creek.
(d) Dry Creek just downstream of the confluence with Antelope Creek, includes Antelope Creek, Secret Ravine, and Miners Ravine Watersheds.
(e) Dry Creek, includes the Strap Ravine, Linda Creek, and Cirby Creek Watersheds.

Source: Clover Valley EIR Hydrology Evaluation, West Yost & Associates, 2005.

While the currently proposed project has only four creek crossings, the 2001 CLOMR modeled five creek crossings. Further, both the Preliminary Drainage Study and the *Clover Valley Project Overview Map* do not indicate which culverts would be installed at the creek crossings. Additionally, conceptual sketches of road crossings are not consistent with the culverts identified in the flood control and planning CLOMR application. It should be noted, however, that an updated LOMR is mandatory under FEMA and the LOMR process would resolve any inconsistencies between project design and FEMA requirements. Specifically, culvert sizes would be sized appropriately under the LOMR process. The LOMR process would also assess how elimination of the fifth creek crossing may impact the floodplain.

The proposed project would cause changes in peak flows and drainage patterns. The conceptual bridge designs are inconsistent with the CLOMR application, and the hydrologic/hydraulic modeling needs to be revised. Therefore, the proposed project would have a ***potentially significant*** impact.

Mitigation Measure(s)

The following mitigation measures would reduce this impact to a *less-than-significant* level.

4.11MM-1(a) The applicant shall prepare a final master drainage plan for City approval prior to approval of the final maps. The final master drainage plan shall include the final design of the roadway crossings of Clover Valley Creek. The Valley Clover Way and Nature Trail Way roadway crossings shall restrict flows slightly more than the proposed structures to ensure peak flows are not increased. The final LOMR must include the final design of the roadway crossings. The final hydrologic and hydraulic modeling for the final master drainage plan shall include the 10 cfs overflow from Whitney Reservoir.

The final master drainage plan shall establish an O&M program for drainage facilities not addressed in the City's standard maintenance program to ensure the proposed drainage facilities are free of obstructions, excess sediment deposition, and inappropriate vegetation. The program shall include the following:

- *The agency(s) and/or organization(s) responsible for maintenance for the following drainage facilities shall be clearly identified.*
  a. Detention basins and associated bridges.
  b. Drainage easements.
  c. Underground piped drainage systems
  d. Ditches and open channels
  e. Clover Valley Creek;
- *The project applicant shall form or enter into an existing Community Facilities District (CFD) or other approved funding mechanism that collects funds from the private property owners (not from City-owned park or open space lands) to fund the above maintenance and monitoring activities in perpetuity. The stormwater CFD or other approved funding mechanism and the collected funds shall be dedicated to these activities and not used for other activities. The City shall have the ability to increase or decrease the value of the assessment as needed to continue to fund these activities in perpetuity. The CFD or other*

approved funding mechanism shall be managed by the City. A Home Owners Association (HOA) is not an adequate mechanism for collecting these funds because the home owners can change the activities or assessments of the HOA;

- *Access easements to drainage facilities for agency(s) and organization(s) responsible for maintenance activities, including the ditches that will be located behind houses shall be provided; and*
- *The regulatory permits required for ongoing maintenance activities shall be obtained.*

4-11MM.1(b) Final maps shall include provisions to participate in the City-wide drainage program which may include payment of the Dry Creek Watershed drainage fee. The project shall pay the drainage fee being collected by the City for the Dry Creek Watershed. These fees are used to fund improvements that are planned by the PCFCWCD to address regional or cumulative flooding problems.

4-11MM.1(c) The applicant shall construct both the Nature Trail Way and Valley Clover Way crossings within the first phase of project construction.

4.11I-2 Impacts due to exposure of residents to flood hazard.

The potential for flooding along the Clover Valley Creek could expose houses or buildings to flood hazards. Further, the potential for increased flows in Clover Valley Creek as a result of the development of the proposed project and the proposed construction of two on-line detention basins within the creek could increase the risk of flooding of residences along the creek within the project area and downstream of the project area.

The proposed development increases the flow of the Clover Valley Creek at the location of the upstream detention basins from 687 cfs to 861 cfs without the detention basins; however, because the detention basin is proposed as part of the project, the actual flow rate after development with the construction of the detention basin would be 659 cfs, lower than current levels. The difference of 28 cfs between current and proposed flow would be detained in the in-line detention basins until flows have subsided, thereby not affecting off-site flows or flood stage.

The increased flow raises the 100-year water surface elevation on-site by up to four feet (higher than the existing FEMA 100-year floodplain) with an average increase of approximately three feet. At the detention basins, water is backed up by the roadway crossings and the water surface elevation increases

by an estimated five to seven feet. At the upstream and downstream ends of the project, the proposed floodplain is essentially unchanged from the existing FEMA 100-year floodplain designations, and off-site, the flood stage would remain the same as under existing conditions. Projects are prohibited from increasing off-site flood stage, and any on-site development is prohibited from occurring in the new 100-year flood zone. Additionally, a Letter of Map Revision (LOMR) is required from FEMA if on-site flood plains will change as a result of the proposed project.

The floodplain areas are identified on the Flood Insurance Rate Maps (FIRMs) published by FEMA. The maps for Placer County were effective June 1998. This project made application for a Conditional Letter of Map Revision (CLOMR) dated January 2001. The CLOMR was issued by FEMA on August 6, 2001. Under the current CLOMR, the proposed building pad elevations for the project are a minimum of five feet higher than the proposed 100-year water surface elevations in Clover Valley Creek, and project roadways are not located in the 100-year floodplain. In most cases, the building pads are more than 10 feet higher than the proposed 100-year water surface elevations.

However, as noted previously in Impact 4.11I-1, the current CLOMR is inconsistent with the project as currently proposed and would therefore need to be revised. Therefore, the potential to expose residences and motorists to flood hazards is considered ***potentially significant***.

Mitigation Measure(s)
Implementation of Mitigation Measure 4.11MM-1(a) would reduce impacts related to flooding to a *less-than-significant* level.

4.11I-3 Impacts as a result of construction-phase erosion.

Construction of the proposed project would involve incremental grading of the project site, which would substantially increase the amount of soil carried into nearby waterways via surface runoff. Approximately 309.6 acres, which equates to roughly 50 percent of the project site, would initially be graded to prepare roadways and future residential foundations. In addition, construction activities such as excavation and trenching for utilities would result in substantial disturbance of soils, which could increase sedimentation in stormwater runoff. Dust from project construction could also be transported to other nearby locations where it could enter surface water runoff and water bodies. Contaminated soil impacted by spills and leaks from heavy equipment and machinery, staging areas, or building sites, can also be a component of runoff that could degrade water quality. Typical pollutants contained in surface runoff include petroleum products and heavy metals (from equipment), and products such as paints, solvents, and cleaning agents that could contain hazardous constituents.

Although these impacts would be short-term, limited to the duration of construction, and would be subject to State and local construction regulations, including the City's grading and erosion and sediment control, and stormwater pollution control ordinances, the erosion and sedimentation impacts due to construction of the major infrastructure associated with the proposed project and anticipated development would be considered ***potentially significant***.

Mitigation Measure(s)
Implementation of the following mitigation measures would mitigate potential impacts related to construction-phase erosion and sedimentation to a *less-than-significant* level:

4.11MM-3(a) Construction shall be scheduled to minimize construction activities in "high-risk areas" and the amount of active disturbed soil areas during the rainy season (Oct. 15 to May 1). "High-risk areas" include those areas within 50 feet of USGS watercourses, 100-year flood plains, regulated wetlands, and where slopes exceed 16 percent.

Unless specifically authorized by the City Engineer or his designees during the rainy season, the developer shall not schedule construction activities in "high risk areas" or schedule to have more area of active disturbed soil than can be managed in conformance with the regulations of the City of Rocklin, the Water Quality Control Board, or any other agency having jurisdiction in this area.

4.11MM-3(b) Comply with, at minimum, the provisions of the State General Construction Activity Permit, which requires a Notice of Intent (NOI) to be filed with the SWRCB, the preparation of a Stormwater Pollution Prevention Plan (SWPPP), and the implementation of Best Management Practices (BMPs) and Best Available Technologies (BATs) to control construction-site runoff. Stormwater runoff BMPs selected from the Storm Water Quality Task Force (California Storm Water Best Management Practices Handbook 1993), the Bay Area Stormwater Management Agencies Association Start at the Source-Design Guidance Manual, or equally effective measures shall be identified prior to final design approval. To maximize effectiveness, the selected BMPs shall be based on finalized site-specific hydrologic conditions, with consideration for the types and locations of development. Mechanisms to maintain the BMPs shall also be identified in the plan for the review and approval of the City Engineer. BMPs that shall be

used during construction of the proposed project include, but are not limited to, the following:

- *Scheduling: Weather conditions shall be a factor in scheduling of construction activities. The contractor shall be required to obtain and have on site all required SWPPP materials no later than October 1st of any construction year. All areas with grading operations that have been completed shall be required to be provided with appropriate BMPs as that grading is completed. The exception to this requirement shall be placement of hydroseeding, which can take place at a time commensurate with germination;*
- *Preservation of Existing Vegetation: The project shall be required to limit all construction activities so as to preserve the maximum amount of existing vegetation;*
- *Hydraulic Mulch: Portions of the site that remain undisturbed during the wet season shall be hydro-mulched to prevent sediment migration. Locations of the project to receive a hydraulic mulch treatment shall be identified once clearing and grubbing of the project site has been completed;*
- *Hydroseeding: A City-approved hydroseed mix shall be applied to all disturbed slopes and graded areas not under construction based on manufacturers recommendations as to seed type and timing for seed germination;*
- *Soil Binders: Soil binders shall be required where identified by the soils engineer;*
- *Straw Mulch and Wood Mulch: Straw and wood mulch shall be added, if necessary, to areas disturbed by grading to retard erosion and sediment transfer on slopes steeper than three percent;*
- *Geotextiles and Mats: All slopes steeper than 3:1 shall be required to be protected with geotextiles and/or mats. The geotextiles/mats shall be fixed in place with manufacturers recommended anchors, staples and/or another approved approach;*
- *Earth Dikes and Drainage Swales: Winterization grading shall provide for use of earthen dikes and drainage swales to intercept runoff and direct it to controlled discharge locations where additional treatment can occur;*
- *Velocity Dissipation Devices: Graded roadways in excess of four percent slope shall require the use of velocity dissipation devices. These devices could include, but not be limited to, rip rap swales, chevrons and weirs. Erosion*

control plans prepared with the grading plans shall identify the location and nature of the velocity dissipation devices; and

- *Slope Drains: Slopes drains will be designed to prevent concentrated flows from leaving graded areas. Erosion control plans prepared with the grading plans shall identify the location and nature of the slope drains.*

Sediment Control

Sediment control BMPs shall be required at appropriate locations along the site perimeter and at all operational internal storm drain inlets at all times during the rainy season. During the non-rainy season, the discharger is responsible for ensuring that adequate sediment control devices are available to prevent sediment discharges at the downgrade perimeter and operational inlets in the event of a predictable storm. The following sediment control BMPs shall be implemented on this construction site:

- *Silt Fence: Silt fences shall be constructed along the perimeter of Clover Valley Creek. Fences shall also be included at the toe of slopes along ridge developments;*
- *Sediment Basin: The project shall be required to construct a series of temporary sediment basins that shall generally be sited based on low points along roadways. Erosion control plans prepared with the grading plans shall identify the location and nature of the sediment basins;*
- *Fiber Rolls. Fiber rolls shall be installed around the perimeter of the graded portions of the site to minimize the amount of sediment that discharges from the site and prevent any runoff from entering the site;*
- *Street Sweeping and Vacuuming. Any sediment discharged from the site shall be removed from the streets by the end of the day, and prior to anticipated storm events;*
- *Storm Drain Inlet Protection. Drain inlets shall be protected with gravel bags or other ponding device and filter bag inserts.*
- *Tracking Control. The following BMPs have been selected to reduce sediment tracking from the construction site onto private or public roads;*
- *Stabilized Construction Entrance. Stabilized construction entrances shall be constructed to limit the amount of sediment that is tracked on to public roadways from the site; and*

- *Stabilized Construction Roadway: Roadways within the project shall be required to be stabilized with an aggregate base materials as soon as practicable in order to reduce sediment transfer.*

Wind Erosion Control
The following BMP has been selected to control dust from the construction site.

- *Wind Erosion Control: Dust control practices shall be implemented as necessary in accordance with Placer County Air Pollution Control District construction requirements.*

Waste Management and Materials Pollution Control
The following BMPs have been selected to control waste and materials pollution.

- *Material Delivery and Storage: Construction materials shall be required to be stored in designated areas that have been designed to prevent any contaminants from leaving those areas. Anticipated BMP's would include use of earthen berms along the perimeter of storage areas and the requirement for providing protective covers over potentially sensitive materials;*
- *Stockpile Management. Temporary earthen stockpiles shall be protected during anticipated major rainstorms by use of fiber rolls, silt fences or other approved materials along the outer perimeter of stockpile areas;*
- *Spill Prevention and Control. Spill prevention shall be incorporated into all activities. Leaks and spills shall be cleaned up immediately. Small spills can be cleaned with a rag or absorbent material such as kitty litter or spill specific product. Minor spills that can be controlled by the first responder at the discovery of the spill can be cleaned with absorbent materials. Dispose of absorbent materials properly and never hose down or bury dry material spills;*
- *For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the contractor shall notify the local emergency response and the governor's Office of Emergency Services Warning Center at 916-845-8911. For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110, 119, and 302, the contractor shall notify the National Response Center at 800-424-8802. In the*

event of a significant spill, notification shall first be made by telephone and followed up with a written report;

- *Solid Waste Management. The contractor shall be responsible for the collection and proper disposal of all solid waste materials within the project area. A solid waste plan shall be prepared outlining the collection points and time of collection;*
- *Concrete Waste Management. A designated, centrally located concrete washout shall be used within the staging areas of the site; and*
- *Sanitary/Septic Waste Management. Sanitary facilities shall be located in the staging areas.*

4.11MM-3(c) For each phase or unit of the project, the stormwater collection and treatment system shall be constructed during the summer so that these facilities shall be in place and in operation during the wet season.

4.11I-4 Impacts relating to post-construction erosion.

The Storm Drain Systems D, G, H, J and P for the proposed project would discharge near the top of the eastern and western hillsides, and then the stormwater would flow down the hillsides to ditches or culverts and then to the Clover Valley Creek. The hillside slopes are quite steep at about 40 percent (flows are summarized in Table 4.11-3). Flows of 2 to 35 cfs down hillsides with slopes of 40 percent would cause significant erosion and scouring of the hillside. The sediment dislodged by that erosion could accumulate in the proposed ditches, storm drains and in the Clover Valley Creek, leading to a ***potentially significant*** impact**.**

Table 4.11-3
Summary of Flows from Strom Drains Discharging Near the Tops of Hillsides

Storm Drain System	2-Year Flow, cfs	10-Year Flow, cfs	100-Year Flow, cfs
D	7.9	15.7	25.1
G	10.2	19.6	35.1
H	6.6	12.9	21.7
J	6.1	11.9	20.9
P	2.2	4.0	7.1

Source: Clover Valley EIR Hydrology Evaluation, West Yost & Associates, 2005.

Mitigation Measure(s):
The following mitigation measures would reduce this impact to a *less-than-significant* level.

4.11MM-4 The final water drainage plan shall include a redesign of the storm drain systems to include piped systems down the hillsides (with energy dissipaters at the end of the pipes), or an extension of the storm drains system to the creek along the proposed roads, or an alternative design that meets erosion control and water quality standards. The final water drainage plan shall be submitted for the review and approval of the City Engineer prior to approval of the final maps.

4.11I-5 Impacts involving the degradation of water quality.

Runoff from Developed Areas

The proposed project plans to address concerns regarding the changes in runoff water quality from the development of the project site through the use of water quality treatment structures at the downstream end of each storm drain system. The treatment systems would be sized for the peak flow from a two-year storm event. The storm drains/treatment structures would collect, convey, and treat only the runoff from the areas that are developed. Runoff from the hillsides and other areas that are not disturbed would be directed around the storm drain/treatment systems using ditches and culverts.

The runoff from the developed areas would be treated with stormwater quality treatment structures before it flows to the Clover Valley Creek. These structures are flow-based treatment systems, and they would be sized to treat up to a specific flow rate. The California Stormwater Quality Association's (CSQA) *Stormwater Best Management Practices Handbook, New Development and Redevelopmen*t states that flow-based BMPs should typically be sized for a runoff rate from a storm with an intensity of twice the 85th percent cumulative frequency hourly rainfall intensity. For the Sacramento area (including the project site), this is equal to 2 times 0.1 inch per hour, or 0.2-inch per hour. The 2-year peak flows that are to serve as the basins for sizing the water quality treatment structures are based on rainfall intensities of 0.65 to 1.27 inches per hour. Thus, the proposed water quality treatment structures would be sized for flow rates that significantly exceed the recommended rate from CSQA handbook.

The specific treatment structures to be used have not yet been determined, but would likely be the Stormwater360's Vortechs System (note that the manufacturer previously called "Vortechnics" was recently renamed "Stormwater360"). These structures come in a range of sizes ranging from about 9 feet by 3 feet to as large as 18 feet by 12 feet. They treat peak flow rates ranging from 1.6 cfs to 25 cfs. The 2-year peak flow rates for the proposed storm drain systems range from 2 cfs to almost 20 cfs. Thus, the Vortechs systems can cover the range of 2-year design flows. If another

treatment system is ultimately selected, it would need to be sized appropriately.

The Vortechs Systems use hydrodynamic separation to remove sediment, but do not remove dissolved pollutants or very fine sediment (smaller than 50 microns) from the storm water. The CSQA handbook states that pathogens, nutrients, pesticides, sediments, trash and debris, oxygen demanding substances and oil/grease are potential pollutants generated by residential developments. Of these pollutants, the Vortechs Systems would not remove the pathogens, nutrients, pesticides, or many oxygen-demanding substances, except to the extent that these pollutants are attached to the sediment. Thus, even with the proposed treatment systems, there would be an increase in the pollutants reaching Clover Valley Creek. Stormwater360 also manufactures a filtration system called the StormFilter that can remove finer sediment (10 microns) and with the appropriate filter media (Zeolite, Perolite and Granular Activated Carbon) can also remove some dissolved pollutants. The StormFilter units are more expensive than the Vortechs units, but they are a practicable technology for this development. The sizing and design of the StormFilter units would be performed in cooperation with the Stormwater360's engineering support staff.

Both the Vortechs Systems and StormFilter systems require that the sediment and other pollutants removed from the stormwater be cleaned out of the treatment structures and filters for these facilities to continue to perform as designed/intended. The frequency of cleaning is dependent upon the amount of sediment and other pollutants in the stormwater. The City has required that Vortechs Systems be installed at other locations within the City. The City's Operations Manager (Michael Rock) said that they typically clean/maintain these units once per year. The Stormwater360 representative said that that the Vortechs units typically need to have sediment and trash cleaned out once per year, and that the StormFilter cartridges can last 2 to 3 years. However, high erosion/sedimentation rates have been observed on the project site, so quarterly inspection of the treatment structures should be performed for a few years to ensure that the structures are not filling with sediment between annual maintenance activities. Stormwater360 can provide inspection and maintenance services for their units or the units could be serviced by City staff or other contractors.

The stormwater flow leaving the stormwater treatment systems would flow across the valley floor and enter Clover Valley Creek. At the point of discharge from the structure, the flow would be concentrated and would have a relatively high velocity. The area around the outfall pipe should be lined with rock and planted with deep-rooted riparian vegetation to slow the water down before it flows across the valley floor. The location where the flow crosses the valley floor would likely not be a natural creek channel, and this flow pathway must be designed to prevent erosion. Additionally, the flow

pathway should be designed to function as a water quality vegetated swale. The flow path should be designed using native vegetation and visually appear as a natural feature of the valley floor.

Many Best Management Practices (BMPs) can reduce the level of pollutants that enter the stormwater runoff. Some of the BMPs that could be appropriate for the proposed development are listed below (see the California Stormwater Quality Association's *Stormwater Best Management Practices Handbook* (CSQA Manual)). Many of these BMPs also help reduce the peak runoff rates from the developed areas.

Runoff from the Undeveloped Areas

Runoff from the undeveloped hillsides within the project area is to be diverted around the storm drain collection and treatment systems, and is to flow to Clover Valley Creek through a series of ditches and culverts. The ditches would run along the backs of lots at the base of the hillsides. Some of the sediment eroded from the hillsides would likely settle out of the water in the ditches and some of the sediment would continue to reach Clover Valley Creek. Consequently, these ditches would need to be maintained and cleaned of deposited sediment periodically. The ditches must also be designed to be stable and prevent erosion of the ditch bottom and banks.

Water Quality Monitoring

The project would be subject to the requirements of the City's stormwater runoff pollution control ordinance. However, even with the stormwater runoff ordinance and the use of BMPs, the water quality of Clover Valley Creek may be impacted by the proposed project. Therefore, water quality monitoring should be implemented.

Seventeen separate storm drain systems are included in the proposed project. Different sets of BMPs could be used within the tributary areas of several of these storm drain systems. Water quality monitoring of the runoff from the systems could be performed, which would allow the determination of which sets of BMPs produce the best quality runoff. The best sets of BMPs could then be used in the remainder of this development or in other future development projects.

Development of the proposed project would result in additional pollutants entering the stormwater runoff and entering Clover Valley Creek, resulting in a ***potentially significant*** impact

Mitigation Measure(s)

Implementation of the following mitigation measures would mitigate potential impacts related to degradation of the water quality to a *less-than-significant* level.

4.11MM-5(a) For each storm drain outfall, the applicant shall plan, design, and construct a Stormwater360 StormFilter stormwater treatment system. The plan and design shall be submitted for the review and approval of the City Public Works Department prior to approval of final maps. Another manufacturer's treatment system may be used if it can be documented that it would provide the same level of treatment as the StormFilter system and would require an equivalent level of O&M.

4.11MM-5(b) The applicant shall design and construct the storm drain outfalls using rock and deep rooted native riparian vegetation to slow the water velocity without causing erosion of the valley floor. The plan and design shall be submitted for the review and approval of the City Public Works Department prior to approval of final maps. The flow pathway from the outfall to Clover Valley Creek shall be designed to prevent erosion of the valley floor and to function as a water quality vegetated swale. The flow path should be designed using native vegetation and visually appear as a natural feature of the valley floor.

4.11MM-5(c) The applicant shall work cooperatively with the City to identify which stormwater quality BMPs (from the CSQA Manual) shall be implemented and where they shall be implemented in the development project. The primary goal of this mitigation measure is to reduce the discharge of pollutants to the maximum extent praticable. BMPs could include, but are not limited to the following:

- *Provide information to the residents of the proposed project about managing use of pesticides, herbicides, fertilizers, and other pollutants. Also provide information about controlling landscape irrigation.*
- *Driveways could be paved with pervious pavement or un-grouted brick or stone pavers.*
- *Driveways could be sloped to drain onto landscape areas rather than directly onto streets.*
- *In the commercial areas, the parking lots could be designed to drain to grassy swales before entering the storm drain system.*

- *Roof runoff could be directed into cisterns or rain barrels and later used for yard irrigation. This BMP helps capture the first flush of highly polluted runoff from rooftops.*
- *Roof runoff could be directed into dry wells or infiltration trenches which allows the runoff to infiltrate into the ground. This BMP helps capture the first flush of highly polluted runoff from rooftops.*
- *Roof runoff could be directed to flow over lawns or landscape areas rather than being piped out to the street gutter. This BMP helps remove sediment and associated pollutants before they enter the storm drain systems and helps reduce peak runoff rates.*
- *Loading docks should be properly designed to control runoff and run-on of stormwater.*
- *Trash storage areas could be covered to reduce runoff and should be graded slightly above the adjacent ground to eliminate run-on.*
- *Storm drain signage could be installed at each drain outlet to educate people that the storm drains flow to Clover Valley Creek.*
- *Vegetated buffer strips could be used along some of the roadways in this development.*

Other BMPS that could be appropriate for this development are identified in the Bay Area Stormwater Management Agencies Association's Start at the Source – Design Guide Manual.

4.11MM-5(d) Water quality monitoring (including biological monitoring which includes monitoring of the species and their abundance within the Creek and monitoring the overall toxicity of the Creek water and sediment to living organisms.) shall occur in Clover Valley Creek at the upstream and downstream edges of the development and at the most downstream detention basin. The list of constituents monitored should be consistent with the monitoring performed by the City and by the Dry Creek Council. The applicant shall hire a qualified consultant to perform the water quality monitoring. Prior to construction, the consultant shall perform two rounds of water quality monitoring during wet weather events and one round of monitoring should occur during dry weather. During and after construction, the water quality monitoring shall be continued annually with at least two rounds of monitoring during wet weather events and one round of monitoring during dry weather. This ongoing monitoring shall be funded by the

project applicant. Monitoring shall also be implemented to document the benefit of the agreed upon BMPs at up to four storm drains systems. Monitoring results shall be made available to the public.

4.11MM-5(e) The project applicant shall determine the annual costs of the maintenance activities and water quality monitoring described in Mitigations Measures 1A through E. The project applicant shall form or enter into an existing Community Facilities District (CFD) or other approved funding mechanism to fund the above maintenance and monitoring activities in perpetuity. The CFD other approved funding mechanism and the collected funds shall be dedicated to these activities and not used for other activities. The City shall have the ability to increase or decrease the value of the assessment as needed to continue to fund these activities in perpetuity. The CFD or other approved funding mechanism shall be managed by the City. A Home Owners Association (HOA) is not an adequate mechanism for collecting these funds since the homeowners can change the activities or assessments of the HOA.

If the results of the water quality monitoring indicate stormwater discharges from the project site are contributing to water quality degradation in Clover Valley Creek, the City (as the manager of the CFD or other approved funding mechanism shall contract with a qualified professional to develop and implement a remediation plan to ensure no net change in water quality due to water entering Clover Valley Creek from the project site. The remediation plan shall be funded through the CFD or other approved funding mechanism. Plan actions could include, but would not be limited to: procedures for managing known or potential changes in water quality (e.g., additional physical or administrative source controls); structural improvements (additional treatment structures), and/or remediation.

4.11I-6 Impacts due to erosion or deposition of sediment in Clover Valley Creek at roadway crossings.

The Clover Valley project site consists of approximately 622 acres of an overall 1940-acre watershed. The project is required to address sediment as part of post-development design as well as during construction.

The proposed tentative map includes two road crossing design concepts. The first is for the road crossings that do not function as detention basins (Deercrest Road and Valley View Parkway). This concept includes two spans:

one over the main creek channel, which maintains a natural creek channel, and the other over a section of the creek floodplain. Because the bridge would be comprised of two spans, there would be a bridge footing in the center of the floodplain. The creek water velocity would increase as it passes through the narrowed spans, which results in the potential for erosion of the creek channel and floodplain. Use of a single-span bridge that crosses the entire floodplain would eliminate the potential increase in water velocity and the associated potential erosion and would also allow the creek channel to meander through the floodplain in a natural fashion.

The second road crossing design concept is for the Valley Clover Way and Nature Trail Way crossings, which are planned to create detention basins. This road crossing concept is designed with three spans, including one span over the main creek channel which would cause flow restriction, but maintain a natural creek channel (in contrast to concrete or steel culverts). The other two spans would be over the floodplain, and also include flow restrictions. The flow restrictions are what allow the bridge to create a detention basin. Because these road crossings would restrict the flow of the creek during large storms, the water velocity upstream of the bridges would decrease and sediment would be deposited in the creek channel and floodplain. However, having natural creek channels under the bridges (versus culverts) helps the creek to naturally convey sediment and prevent accumulation of sediment in the creek channel.

The proposed project would be subject to the requirements of the City's grading and erosion and sediment control, and stormwater pollution ordinances; however, due to the fact that the proposed bridge structures would alter the natural courses and flows of Clover Valley Creek, the project would result in a ***potentially significant*** impact on Clover Valley Creek.

Mitigation Measure(s)

Implementation of the following mitigation measures would mitigate potential impacts related to erosion or sedimentation in Clover Valley Creek due to roadway crossings to a *less-than-significant* level:

4.11MM-6 *Prior to approval of the final maps, the project applicant shall provide for the following measures within the final maps for the review and approval of the City Public Works Department and/or City Engineer:*

- *In the final design of all of the road crossings, the project developer shall maintain the use of bridges and not use culverts;*
- *The project developer shall use a single span (rather than two spans) bridge for the Deercrest Road and Valley View Parkway creek crossings;*

- *Maintenance access shall be provided for the detention basins for the Valley Clover Way and Nature Trail Way creek crossings for general maintenance purposes, including the removal of excess sediment; and*
- *The CFD or other approved funding mechanism shall include funding for maintenance of the detention basins.*

4.11I-7 Impacts regarding the deposition of sediment in Clover Valley Creek from underground utility creek crossings.

The proposed development project includes water pipes, sanitary sewers, storm drains, and other underground utilities. The proposed project plan indicates that these underground utilities would cross the Clover Valley Creek at a road crossing. Occasionally, underground utilities are buried under the creek bottom and may be encased in concrete. When the utilities are buried under a creek, an increased potential for creek erosion or deposition of sediment exists. An alternate approach to this situation is to attach the utility pipes to the sides of the bridge or to construct them within the structure of the bridge. The available planning documents do not clearly indicate which approach is intended for the proposed project. Therefore, although the proposed project would be subject to the requirements of the City's grading and erosion and sediment control ordinance, the impact due to the placement of underground utilities under the creek bed is ***potentially significant.***

Mitigation Measure(s)
Implementation of the following mitigation measures would mitigate potential impacts related to sedimentation from underground utility creek crossings to a *less-than-significant* level:

4.11MM-7 *Prior to approval of the final maps, the applicant shall show the final design of all of the road crossings and underground utilities to be attached or be within the road crossing structures, rather than buried under the Clover Valley Creek. These criteria shall be submitted for review and approval of the City Engineer.*

4.11I-8 Impacts caused by project construction that would result in fill and excavation within Clover Valley Creek.

Construction of the bridges over Clover Valley Creek may impact waters or recognized wetlands via excavation and placement of fill for the proposed bridge footings. Excavation or placement of fill material within the creek or associated wetlands would require acquisition of a Clean Water Act (CWA) Section 404 permit from the US Army Corps of Engineers (Corps) and a CWA Section 401 Water Quality Certification from the RWQCB. The CWA act requires the following (listed in preferential order):

- Avoidance – The project must be designed to avoid water and wetlands of the US and is the least environmentally damaging practical alternative.
- Minimization – The project must be designed to minimize any adverse effects.
- Mitigation – The project must mitigate any impacts that cannot be avoided or minimized.

The total loss of wetlands due to project construction is approximately 2.56 acres. The original wetland delineation was verified on December 20, 1990, and expired on December 20, 1992. On December 19, 1997, a request was submitted to the Corps to re-verify the original delineation. Sid Davis conducted a field with the Corps on February 27, 1998. As a result of that field visit, the Corps requested that the wetland acreage be increased to approximately 42 acres of stream, riparian wetland, and seasonal wetland. ECORP Consulting, Inc. has indicated that it is unknown if a re-verification letter was received for the project in 1998. ECORP has indicated that Mr. Davis recently performed a ground-truthing of the current wetland delineation and determined that the wetland delineation map sufficiently represents current conditions, and he will be requesting that the Corps re-verify the delineation.

Additionally, a Streambed Alteration Agreement (SAA) would be required from the California Department of Fish and Game (CDFG). Each of these permits would establish requirements and constraints to protect the Clover Valley Creek. Therefore, fill and excavation processes would have a ***potentially significant*** impact.

Mitigation Measure(s)
Implementation Mitigation Measures 4.8MM-4(a) through (c) would mitigate potential impacts related to indirect effects to a *less-than-significant* level.

4.11I-9 Degradation of water quality resulting from construction of the off-site sewer line extension.

Development of the off-site sewer line extension would affect existing waterways within and adjacent to the project site, by increasing the potential for erodible soil/siltation and impinging upon existing riparian vegetation and wetlands. The construction within Clover Valley Creek, Antelope Creek, and associated riparian areas would unavoidably loosen soil particles and therefore result in a temporary increase in siltation of the creek and downstream waterways. Likewise, construction within the golf course as a result of the off-site sewer would also loosen soil particles, some of which would be carried into the creek from the disturbed areas. Development within Rawhide Road would leave a residue of soil that would be carried into the storm drains and, from there, into the natural drainages (both Clover Valley Creek and

Antelope Creek). Within Antelope Creek, the construction would result in considerable disturbance within the main channel, also resulting in a temporary increase in siltation of this waterway.

Discharge by pollutants from construction activities into local waterways or drains that flow into local waterways would potentially cause an indirect impact as well. Options 1A, 2A, 2B and 3B propose crossing Clover Valley Creek and Antelope Creek (possibly several times). The construction of creek-crossings in an area distinguished by vegetation and used as a habitat for raptors and fish would potentially damage the existing environment. Additionally, construction of Option 1A, 2A, 2B, 3A and 3B would result in the direct impacts to waters of the United States, including wetlands. Therefore, although the proposed project would be subject to the City's grading and erosion and sediment control ordinance, given the potential effects on existing waterways, the impact of proposed development would be considered ***potentially significant***.

Mitigation Measure(s)
Implementation of the following mitigation measures would mitigate potential impacts related to water quality to a *less-than-significant* level.

4.11MM-9(a) Prior to the approval of the Improvement Plan for the construction of the off-site sewer line, the project developer shall prepare an erosion control plan for the review and approval of the City Engineer. The plan shall specify that appropriate Best Management Practices (BMPs) and Best Available Technologies (BATs) be incorporated into project design to reduce urban pollutants in runoff, consistent with goals and standards established under federal and State non-point source discharge regulations (NPDES permit) and Basin Plan water quality objectives. Stormwater runoff BMPs selected from the Storm Water Quality Task Force (California Storm Water Best Management Practices Handbook 1993), the Bay Area Stormwater Management Agencies Association's Start at the Source – Design Guidance Manual, *or equally effective measures shall be identified prior to final design approval. To maximize effectiveness, the selected BMPs shall be based on finalized site-specific hydrologic conditions, with consideration for the types and locations of development. Mechanisms to maintain the BMPs shall also be identified in the plan for the review and approval of the City Engineer.*

4.11MM-9(b) The developer shall comply with provisions of State General Construction Activity Permit, which at minimum requires the preparation of a Stormwater Pollution Prevention Plan (SWPPP) and implementation of site-specific BMPs/BATs.

4.11MM-9(c) The construction of the off-site sewer line shall ensure the avoidance of any net loss of seasonal wetlands and jurisdictional waters of the United States, or the bed, channel, or bank of any stream. Such avoidance may be achieved by implementing and complying with the provisions of the Clean Water Act, as administered by the U.S. Army Corps of Engineers (Corps), under Section 404 of the Clean Water Act, and under Sections 1600-1607 of the California Fish and Game Code, as administered by the California Department of Fish and Game (CDFG), which includes obtaining all required permits from the Corps and entering into a Streambed Alteration Agreement with CDFG and complying with all terms and conditions of those permits and agreements.

4.11MM-9(d) Final alignment and construction techniques shall be implemented as required by Corps, CDFG, and Sacramento Valley Regional Water Quality Control Board. Consideration of the alignment and construction techniques would include the following measures:

- *The number of creek-crossings shall be minimized;*
- *Construction shall occur during non-breeding times for raptors and fish;*
- *The creek-crossing area shall be restored at the time of the completion of the construction activities, including replanting with native grasses, shrubs and trees;*
- *Conditions of State and federal permits for impacts on waters of United States shall be obtained and implemented;*
- *Wetlands shall be protected during construction by use of orange mesh fencing to denote their boundaries. Once the location of any creek crossing is determined, the construction zone (corridor) shall be flagged to allow easy identification. Heavy equipment shall be operated only within this designated corridor;*
- *The project applicant shall design and implement a siltation and erosion control program for stream crossing areas prior to construction to the satisfaction of the City Engineer;*
- *Erosion and sediment control measures shall be monitored; and*
- *The design angle of all creek crossings shall minimize riparian disturbances.*

4.11MM-9(e) Prior to the approval of improvement plans for the off-site sewer line, a plan for pavement removal shall be submitted for

the review and approval of the Director of Public Works. The plan shall include that pavement removal is required to be saw-cut and that wastewater from saw-cutting operations not enter the storm drain system. The plan shall outline the use of BMPs to prevent saw-cut wastewater from entering the storm drain system to the satisfaction of the Director of Public Works.

Cumulative Impacts and Mitigation Measures

4.11I-10 Cumulative hydrological impacts related to the potential for localized flooding.

The following comments from the PCFCWCD[11] relate to regional hydrology and cumulative effects:

> This project is located within the Dry Creek Watershed …wherein incidence of flooding along Dry Creek and its tributaries were well documented. Major flooding has occurred periodically along Linda, Cirby and Dry Creeks in and near Roseville … areas in Loomis and Rocklin experience frequent flooding. Further downstream, in Rio Linda, flooding is a recurring problem. Streams also back up at culverts and bridges, blocking roads or making them unsafe. Continued development will only make the problems worse, unless adequate steps are taken to implement comprehensive watershed-wide solutions to the drainage problem.
>
> Local or on-site detention basins, while effective in reducing local flooding problems due to development, cannot completely mitigate the future regional impact of development within the watershed. Larger regional detention basins combined with local detention can substantially reduce existing problems and mitigate future problems. Any significant clearing of the vegetation in floodplains and channels within the watershed will cause an overall increase in the magnitude of flood flows.

The drainage proposal includes the provision of two detention ponds created by the culvert creek crossings at Valley Clover Way and Nature Trail Way. The anticipated development of these basins would restrict the rate of downstream flows and cause changes in the peak flows and drainage patterns. With the implementation of the mitigation measures identified in 4.11-1, these impacts would be reduced to less than significant and would reduce the overall height of the peak flows; however, they would extend the period of higher-than-normal peak flows. The CLOMR approved by FEMA reviewed the impacts of the two detention basins as well as the impacts of the modified flows downstream. The analysis concluded that an impact downstream would not occur after the application of mitigation measures 4.11MM-1(a-c). Therefore, the cumulative impact would be considered ***less-than-significant***.

Mitigation Measure(s)
None required.

4.11I-11 Cumulative impacts related to degradation of water quality.

Construction in the Clover Valley Creek watershed would contribute to the cumulative increase of urban pollutant loading, which would adversely affect water quality. Cumulative development along Clover Valley Creek (and within the Dry Creek Watershed), including the proposed project, would also result in increased impervious surfaces that could increase the rate and amount of runoff, thereby potentially adversely affecting existing surface water quality through increased erosion and sedimentation. The primary sources of water pollution include runoff from roadways and parking lots; runoff from landscaping areas; commercial activities; non-stormwater connections to the drainage system; accidental spills; and illegal dumping. Runoff from roadway and parking lots could contain oil, grease, and heavy metals; additionally, runoff from landscaped areas could contain elevated concentrations of nutrients, fertilizers, and pesticides.

The mitigation measures identified in 4.11MM-6(a-f) for the project-specific impacts would reduce the pollutants in the stormwater from this project to a level lower than in the runoff from most developed areas within the Dry Creek Watershed, because most of these areas were constructed before stormwater quality best management practices (BMPs) were required. Additionally, future development projects would be required to implement BMPs comparable to the BMPs identified in this project. However, even with BMPs, this project and other future projects would result in the continued decrease of the water quality of Clover Valley Creek and other creeks in the Dry Creek System. Therefore, the cumulative impact from the proposed project on water quality is ***potentially significant***.

Mitigation Measure(s)
Implementation of Mitigation Measures 4.11MM-1, 3, 5 through 7, and 9 would reduce potential impacts related to cumulative degradation of water quality to a *less-than-significant* level.

Endnotes

[1] Rocklin General Plan EIR, 1991.
[2] Clover Valley Groundwater Impact Analysis, West Yost & Associates, 2005.
[3] Clover Valley EIR Hydrology Evaluation, West Yost & Associates, 2005.
[4] Water Quality Analysis, West Yost & Associates, 2005.
[5] City of Rocklin General Plan, 1991 (pp. 61)
[6] City of Rocklin General Plan, 1991 (p. 88)
[7] Stantec, *Clover Valley Preliminary Drainage Study*, August 2005.
[8] Wallace Kuhl & Associates, Inc. *Environmental Site Assessment*, March 2001.
[9] Stantec Consulting, Inc. *Clover Valley Lakes Drainage Study*, 1999.
[10] Stantec Consulting, Inc. *Clover Valley Lakes Drainage Study Revisions*, 2001.
[11] Letter from the Placer County Flood Control and Water Conservation District (Dec. 30, 1993), as cited in the 1995 Clover Valley Annexation EIR (p. Y-7)