CHAPTER 12
HYDROLOGY AND WATER QUALITY

This chapter describes the existing hydrology, water quality, and drainage of the Alpine Sierra Subdivision (proposed project) site, identifies associated regulatory requirements, evaluates potential impacts, and identifies feasible mitigation measures. The analysis considers both Alternative A and Alternative B, as described in Chapter 3, Project Description.

In response to the Notice of Preparation for this Draft Environmental Impact Report (EIR), comments were received from the Lahontan Regional Water Quality Control Board (RWQCB) requesting that the EIR provide information on:

- Measures to avoid or minimize degradation of water quality
- Low-Impact Development principles incorporated into the project (see Figure 12-1)
- Cumulative impacts to watershed hydrology from existing and planned development in the watershed
- Impacts to Bear Creek due to increased use of groundwater
- Potential impacts within the 100-year floodplain

The Placer County (County) Flood Control and Water Conservation District submitted comments requesting that the EIR evaluate if the proposed project would increase peak flow runoff downstream of the project site, the potential for the proposed project to overload capacity of existing stormwater facilities, and any changes to the 100-year floodplain. Comments from the public raised concerns associated with changes in runoff patterns and volume, adverse water quality impacts from increased erosion and sedimentation, potential impacts to groundwater, increased runoff and potential impacts to Bear Creek, and how runoff from roadways will be addressed. These concerns are addressed in this section.

The Notice of Preparation and the letters received in response to it are included in Appendix A. The proposed project’s Preliminary Drainage Report (December 2012), Supplement to “Preliminary Drainage Report” Dated December 2012 (March 2013), and memorandum (January 2015) from TLA Engineering & Planning Inc. evaluating Alternative B are included in Appendix I.

12.1 ENVIRONMENTAL SETTING

Regional Hydrology

The project site is located in the unincorporated Placer County community of Alpine Meadows, and is within the Truckee River Basin (basin), which encompasses an area of approximately 3,060 square miles (1,958,400 acres) in the States of California and Nevada (State of Nevada
Division of Water Resources 2013). The basin stretches from Lake Tahoe to Pyramid Lake in the desert of northwestern Nevada. The 105-mile-long Truckee River connects the two lakes. Approximately 25% of the basin is in California and 75% of the basin is in Nevada.

The 15-mile-long Upper Truckee River is one of the principal tributaries to Lake Tahoe. Downstream of Lake Tahoe, the Truckee River system is typically divided into five major river reaches: (1) the 15-mile reach beginning at the Truckee River’s origin at the Lake Tahoe Dam in Tahoe City, California; (2) the 20-mile reach, which cuts through the Carson Range of the Sierra Nevada mountains, flowing through the upper Truckee River canyon between Truckee, California, and Verdi, Nevada; (3) the 15-mile reach through the Truckee Meadows and the Cities of Reno and Sparks, Nevada, to Vista, Nevada; (4) the 30-mile reach from Vista, Nevada to Wadsworth, Nevada, through the lower Truckee River canyon, cutting through the Virginia Range; and (5) the 25-mile reach below Wadsworth, Nevada, traversing a broad alluvial valley to Pyramid Lake” (State of Nevada Division of Water Resources 2013). The watershed between Lake Tahoe and Pyramid Lake includes 1,190 square miles within portions of Nevada; Placer and Sierra Counties in California; and portions of Washoe, Storey, and Lyon Counties and Carson City in Nevada. In California, the watershed includes the drainage areas surrounding the Truckee River between Lake Tahoe and the Town of Truckee, the Donner Creek drainage area west of Truckee, the Martis Creek drainage south and east of Truckee, the Prosser Creek and Little Truckee River drainage areas north and east of Truckee, and the upper Truckee River canyon below Hirschdale to the Nevada state line in Verdi.

The project site is located within the first of these major river reaches, on the western side of the Truckee River, approximately 12 miles north of Tahoe City and 5 miles south of the Town of Truckee. Along the reach between Lake Tahoe and the Town of Truckee, numerous small streams enter the Truckee River, including Bear Creek (4.2 miles downstream of Lake Tahoe), Squaw Creek (5.8 miles downstream), Deer Creek (6.6 miles downstream), Pole Creek (7.7 miles downstream), Silver Creek (8.8 miles downstream), Deep Creek (9.4 miles downstream), and Spring Cabin Creek (10.8 miles downstream).

The approximately 47.3-acre project site is located within the Bear Creek Valley, a 3,600-acre sub-watershed within the Truckee River Hydrologic Area. Elevations at the project site range from 6,620 to 7,080 feet above mean sea level. The project site supports two primary drainage systems: Bear Creek at the western end of the project site, and an unnamed seasonal stream in the eastern area of the project site that flows from south to north into Bear Creek. Other minor ephemeral drainages are located in the northeast end of the project site. Runoff from the site flows to the northwest toward Bear Creek.
Regional Water Quality

Regional water quality is governed by the *Water Quality Control Plan for the Lahontan Region* (the Basin Plan; Lahontan RWQCB 2005). The Lahontan Region is expansive—it stretches 570 miles from Modoc County in the north to Mono County in the south, and covers 33,131 square miles. The project site is within the Bear Creek sub-watershed of the Truckee River Hydrologic Area in the North Lahontan Basin. While there is little quantitative information available on most of the water bodies in the Lahontan Region, the Basin Plan states that water quality is generally good in high elevation areas. The Basin Plan also states that “water quality problems in the Lahontan Region are largely related to nonpoint sources (including erosion from construction, timber harvesting, and livestock grazing), stormwater, acid drainage from inactive mines, and individual wastewater disposal systems.” The Basin Plan notes that “reasons for concern include projected increases in population and consequent demands for water, and possible future water shortages due to drought, global climate change, and contamination of some water supplies by toxic substances.”

The Basin Plan identifies the following beneficial uses of water for Bear Creek:

- Municipal and domestic supply
- Agricultural supply
- Industrial service supply
- Cold freshwater habitat
- Groundwater recharge
- Wildlife habitat
- Rare, threatened, or endangered species
- Migration of aquatic organisms
- Spawning, reproduction, and development
- Water contact recreation
- Noncontact water recreation
- Commercial and sportfishing

Regional Surface Water Quality

The *Truckee River Water Quality Monitoring Plan* (2NDNATURE LLC 2008) provides the following description of the Bear Creek sub-watershed:

Bear Creek begins in and flows through undeveloped land in the south west portion of the sub-watershed. It then passes through the Alpine Meadows Ski
Resort and a developed residential area prior to its confluence with the main stem of the Truckee River. All runoff in the sub-watershed discharges directly to Bear Creek, and is generated by two main developed areas:

- Upland natural surface runoff joins with runoff from the ski resort and discharges to Bear Creek at the upslope end of the residential development.
- Runoff generated in the residential area is primarily conveyed to Bear Creek via natural drainage channels, road shoulders, and roadside ditches.

The land uses within the Beak Creek sub-watershed are potential sources of urban pollutants that could affect surface waters. In the project site, existing and planned residential and commercial uses may contribute to nonpoint source pollution as a result of stormwater runoff containing hydrocarbons and other pollutants resulting from automotive use (brake lining dust, tire particles, coolant), sediment from erosion of exposed soils, chemicals (pesticides, fertilizers, herbicides, paints, paint thinners, solvents), heavy metals, and coliform bacteria and nitrates (pet waste, septic contamination). Runoff generated in the residential area is primarily conveyed to Bear Creek via natural drainage channels, road shoulders, and roadside ditches. In the Truckee River Water Quality Monitoring Plan, the Bear Creek sub-watershed was identified as one of seven “high disturbance” sheds. However, the density of the existing and planned land uses is relatively less than the other high disturbance watersheds in the vicinity (2NDNATURE LLC 2008). This could indicate a reduced potential to contribute substantial sources of pollution.

During development of the Total Maximum Daily Load for Sediment, Amorfini and Holden (2008) estimated total suspended sediment loading from Bear Creek to be approximately 66 tons during the 2003–2004 rainfall year, and measured the annual average suspended sediment concentration from Bear Creek to be 4.9 milligrams per liter. With a relatively small watershed and limited disturbance, these values place Bear Creek as the sixth-highest (out of 10 identified sub-watersheds) producer of suspended sediment in the Middle Truckee River watershed. Under the Total Maximum Daily Load for Sediment, the total assigned allocated load for Bear Creek is 321 tons/year.

12.1.1 Precipitation

The climate in the proposed project region consists of long, relatively mild winters with short, dry summers, though afternoon thunderstorms are not uncommon during the summer months. Local meteorological conditions are recorded at the Truckee Ranger Station, roughly 11 miles north of the project site. Precipitation measured at the Tahoe City Cross SNOTEL site averaged 36.3 inches annually, ranging from 11.4 inches to 64.3 inches from 1981 to 2014. Precipitation occurs predominantly as snowfall during winter months, generally increasing with elevation. Snowpacks in the Sierra Nevada have been observed year-round, and snowfall has
occurred as late as July. Snowfall averages 208.2 inches annually, but has been recorded as high as 401.4 inches at the Truckee Ranger Station (www.wrcc.dri.edu).

Average temperatures range from a minimum of 19°F in January to a maximum of 77.9°F in July. The annual predominant wind direction is from the south–southwest at 12 miles per hour. Most of the area’s precipitation comes in the form of snow, with occasional thunderstorms during the summer months.

12.1.2 Regional Soils

Soils at the project site have been mapped by Hanes (2002) and are published and viewable on the National Resource Conservation Service’s Web Soil Survey (USDA 2015). With respect to hydrology, soils are classified in one of four hydrologic soil types. Group A soils typically have less than 10% clay (more than 90% sand or gravels) and low runoff potential, and transmit water freely. Group D soils typically have greater than 40% clay and high runoff potential, and water movement through these soils is restricted. Group B soils typically have between 10% and 20% clay and a moderately low runoff potential, and water movement through the soil is unimpeded. Some upland areas where rock outcrops are present are classified as Group D soils. The predominant soils in the Bear Creek sub-watershed are Group B soils, although soils in each of the four classifications are present in the watershed.

The predominant soil series mapped within the project site are the Meiss-Waca complex soils (30%–50% slopes); Jorge-Waca-Cryumbrepts, wet complex (30%–50% slopes); and Jorge-Waca-Tahoma complex (30%–50% slopes). The Meiss-Waca complex soils are in Hydrologic Soil Group D, while the Jorge-Waca complex soils are classified in Hydrologic Soil Group B.

12.1.3 Groundwater

The Alpine Springs County Water District provides potable water within the Bear Creek sub-watershed. Existing water supplies for the Alpine Springs County Water District are provided by seven groundwater wells, six of which are suitable for potable water, with a combined production capacity of 567 gallons per minute (Stantec 2013).

The U.S. Geological Survey, in cooperation with the State Water Resources Control Board (SWRCB), carried out groundwater monitoring activities in the Martis Valley groundwater basin (MVGB) as part of the California Groundwater Ambient Monitoring and Assessment Program (Fram et al. 2009), and found concentrations of most constituents detected in these samples to be below drinking-water thresholds, with some elevated levels of arsenic, iron, manganese, and/or total dissolved solids found in regional groundwater wells.
According to the Geotechnical Engineering Report for Alpine Sierra Subdivision prepared for the proposed project (Appendix H), the project site is generally underlain by 4 to 18 inches of silty sand, which is likely underlain by medium-dense to very-dense silty sand with gravel containing varying amounts of cobbles and boulders. Gravel soils, cobbles, and boulders suggest a limited ability of site soils to support groundwater recharge via percolation of surface water. Groundwater was not encountered in test pits excavated during the on-site investigation conducted for the geotechnical report.

### 12.1.4 Drainage

The project site is located within the Bear Creek Valley, a 3,600-acre sub-watershed that drains to the Truckee River. The Bear Creek sub-watershed drains the Alpine Meadows Ski Resort area, and flows northeast from its headwaters to the confluence with the Truckee River, approximately 3 miles downstream, north of the intersection of Alpine Meadows Road and State Route 89. Within the Bear Creek sub-watershed, the topography varies from nearly level to 100% slopes and natural streams with channel gradients ranging from 2% to 33%. The Bear Creek sub-watershed ranges in elevation from approximately 6,180 feet at Bear Creek and the Truckee River to 8,637 feet at Ward Peak in the southwest (TLA 2012).

#### Project Site Drainage

Bear Creek crosses the western portion of the project site while the eastern portion of the project site is traversed by natural drainage channels that are tributary to Bear Creek. Drainage runoff is conveyed from and through the project site via overland sheet flow and natural drainage channels. Slopes throughout the site range from approximately 10% to over 30%.

The Preliminary Drainage Report evaluates existing hydrologic conditions on the project site under 2-, 10-, and 100-year storm events under both summer and winter conditions. The report evaluated three locations that collect on-site drainage and four locations along Bear Creek prior to its confluence with the Truckee River, and the Supplement to the Preliminary Report evaluated design flows at nine points where runoff exits the project site. The Preliminary Drainage Report shows that winter runoff conditions result in the highest amount of runoff.

### 12.1.5 Floodplains

The project site is not located within the boundary of a 100-year flood hazard area as mapped by the Federal Emergency Management Agency (FEMA) or Placer County. The project site is identified on two FEMA flood insurance rate maps: 06061C0200 F and 06061C0182 F. The boundaries of a delineated 100-year flood hazard map do not extend to the project site (FEMA 1998a, 1998b). In addition, the project site does not appear to be located within the boundaries of a FEMA floodplain, as shown in the Placer County Local Hazard Mitigation Plan (Placer...
County 2010). While the site is not located within a 100-year flood hazard area as mapped by FEMA, two drainage ways (Bear Creek and an unnamed seasonal stream) traverse the proposed project site and support a tributary area of more than 20 acres.

### 12.1.6 Debris Flows

Debris flows are generally caused when saturated soils overlying very steep slopes are transported in a fluid state into stream channels. Debris flows generally stay within the stream channel unless the stream gradient changes and becomes blocked or the channel is no longer confined. Thick soil overlying rock is another contributing factor of debris flows. The soils within the project site were reported as being well drained and not usually saturated, and the slopes above the site do not have thick soil overlying the rock (Appendix I). These conditions decrease the risk of debris flows within the project site. However, debris flows and evidence of debris flows were identified in the steep area to the south of the site and in the north-central portion of the project site, where debris piles and hummocky topography were found (Appendix I).

Additionally, Holdrege & Kull identified the northeast portion of the project site as an area that may be subject to small stream flooding and debris flows associated with a nearby stream channel situated northeast of the project site. This stream channel forms a rough alluvial fan, and associated alluvial deposits were identified under the northeastern portion of the project site (Appendix I).

### 12.2 REGULATORY SETTING

#### 12.2.1 Federal and State Regulations

**Clean Water Act**

The Clean Water Act, which establishes the basic structure for regulating discharges of pollutants to waters of the United States, is a 1977 amendment to the Federal Water Pollution Control Act of 1972. Section 303 of the Clean Water Act requires states to adopt water quality standards, which are discussed in the following text as part of the National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permits.

The U.S. Army Corps of Engineers (Corps) regulates the placement of fill or dredged materials that affect waters of the United States, which include stream courses and jurisdictional wetlands. The Corps regulates these activities under the authority of Section 404 of the Clean Water Act. The Corps would regulate any development within the project site that affects jurisdictional wetlands.
In the State of California, the SWRCB and the RWQCBs regulate activities in waters of the United States through Section 401 of the Clean Water Act. A 401 certification is required to obtain a 404 permit for construction of wetlands/habitat where waters of the United States are impacted.

**National Pollutant Discharge Elimination System**

The NPDES program was developed by the U.S. Environmental Protection Agency in accordance with Section 303 of the Clean Water Act. This program regulates all discharges to waters of the United States, including stormwater discharges associated with municipal drainage systems, construction activities, industrial operations, and “point sources” (such as wastewater treatment plant discharges and other direct discharges to water bodies). The intent of the NPDES program is to protect surface water quality. In California, the NPDES program is administered by the SWRCB and implemented and enforced by the RWQCBs.

Placer County is designated within the NPDES Phase II General Permit, which the SWRCB adopted in April 2003. This general permit applies to the discharge of stormwater from small municipal separate storm sewer systems (MS4s). Under this permit, stormwater discharges must not cause or contribute to an exceedance of water quality standards contained in a Statewide Water Quality Control Plan, the California Toxics Rule, or the applicable RWQCB Basin Plan. For the County, the applicable Basin Plan is the *Water Quality Control Plan for the Lahontan Basin* (Lahontan RWQCB 2005). This Basin Plan establishes water quality objectives and implementation programs to meet stated objectives and to protect the beneficial uses of water in the basin, in compliance with the federal Clean Water Act and the state Porter-Cologne Water Quality Control Act (Porter-Cologne Act; discussed in the following text).

The Lahontan RWQCB required the Placer County Department of Public Works to develop a stormwater management program for compliance with the NPDES Phase 2 (small MS4) municipal stormwater permit. The initial stormwater management program described how six Minimum Control Measures will be implemented to control pollutants from construction sites, residential development, and municipal activities. Oil and grease, trace metals and nutrients in urban runoff, fine sediment, and road sand and salts are particular concerns. Hydromodification of stream channels due to increased impermeable surface coverage is another major focus of the stormwater management program.

The SWRCB Water Quality Order 2009-0009-DWQ, NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities, authorizes a general permit for stormwater discharges associated with construction activities that disturb more than 1 acre. Construction activities subject to the permit include clearing, grubbing, grading, stockpiling, and excavation activities. The general permit requires submittal of a Notice of Intent.
to comply with the permit and the development of a stormwater pollution prevention plan (SWPPP) that must address the following:

- Plans for implementation of structural and operational best management practices (BMPs) to prevent and control impacts to surface water during construction
- Inspection and maintenance of BMPs throughout all phases of construction
- Monitoring of runoff quality during all phases of construction
- Prevention and control of post-construction impacts to runoff quality

The Central Valley Region RWQCB Order R5-2008-0081/NPDES Permit No. CAG995001, Waste Discharge Requirements General Order for Dewatering and Other Low Threat Discharges to Surface Waters, addresses potential discharges of low water quality threat wastewater. Discharges included under this permit are those that are of short duration (4 months or less) or low flow (average dry weather discharge does not exceed 0.25 million gallons per day). Types of discharges covered by this permit that could occur as part of the proposed project include construction dewatering, pipeline pressure testing, and pipeline flushing or dewatering.

**Flood Protection**

FEMA is responsible for determining flood elevations based on available studies pursuant to the National Flood Insurance Program Final Rule (CFR Parts 59 and 61). FEMA is also responsible for developing the flood insurance rate maps, which are used in the National Flood Insurance Program. No FEMA-mapped floodplains occur on the project site.

**12.2.2 State Regulations**

**Porter-Cologne Water Quality Control Act of 1969**

The Porter-Cologne Act is the principal law regulating water quality in California. This statute established enforcement and implementation measures for the SWRCB and the nine RWQCBs, which are charged with implementing this law. The Porter-Cologne Act establishes a comprehensive program for the protection of water quality and the beneficial uses of water. It applies to surface waters, wetlands, and groundwater, and to both point- and nonpoint-sources.

The Porter-Cologne Act also incorporates many provisions of the Clean Water Act, such as delegating the NPDES permitting program to the SWRCB and the RWQCBs.
Groundwater Quality Regulations

The SWRCB regulates activities that could result in adverse impacts to groundwater quality. Policies and regulations promulgated by the SWRCB (either under its Clean Water Act authority or state-derived authority) are implemented and enforced by the RWQCBs. None of the groundwater-related activities governed by NPDES permits or waste discharge requirements (WDRs) issued by the Lahontan RWQCB are included in the proposed project.

In general, SWRCB policy prohibits degradation of groundwater quality. In cases where impacts occur, the Lahontan RWQCB typically requires restoration of impacted aquifers so residual concentrations do not exceed the U.S. Environmental Protection Agency’s Maximum Concentration Limits for drinking water. Regulations related to drinking water quality are discussed in Chapter 14, Public Services and Utilities.

Lahontan Regional Water Quality Control Board

The Lahontan RWQCB is one of the nine RWQCBs in California. The Lahontan RWQCB maintains the Water Quality Control Plan for the Lahontan Region (2005), or Basin Plan. The Basin Plan recognizes natural water quality, existing and potential beneficial uses, and water quality problems associated with human activities in the County. The Lahontan RWQCB regulates waste discharges under the California Water Code, Division 7, Chapter 4, Article 4 (Waste Discharge Requirements) and Chapter 5.5 (Compliance with the Provisions of the Federal Water Pollution Control Act as Amended in 1972). The Basin Plan includes waste discharge prohibitions, including the “discharge or threatened discharge, attributable to human activities, of solid or liquid waste materials (including, but not limited to, soil, silt, clay, sand and other organic and earthen materials) to lands within the 100-year floodplain of the Truckee River or any tributary to the Truckee River is prohibited” (Lahontan RWQCB 2005).

The Total Maximum Daily Load for Sediment establishes sediment load allocations for particular sub-watersheds and intervening areas along the Middle Truckee River watershed, from Tahoe City to the California/Nevada state line. The total sediment load allocation for the entire Middle Truckee River watershed is set at 40,300 tons per year. The Total Maximum Daily Load for Sediment consists of a number of indirect indicators and target values for each indicator. The only direct indicator is suspended sediment concentration in the Truckee River, with a target of less than or equal to 25 milligrams per liter as an annual 90th percentile loading, as measured in the Truckee River at Farad (U.S. Geological Survey Station 10346000). Additional indirect indicators include successful implementation and maintenance of BMPs for road sand application; BMPs for ski runs; and restoration activities, such as decommissioning of dirt roads and repair of legacy sites.
12.2.3 Local Regulations

Placer County General Plan

The goals and policies listed in the following text summarize the priorities of the Placer County General Plan (Placer County 2013) related to hydrology and water quality, and Appendix C of this Draft EIR provides an evaluation of the proposed project’s consistency with applicable General Plan policies.

Stormwater Drainage

Goal 4.E: To collect and dispose of stormwater in a manner that least inconveniences the public, reduces potential water-related damage, and enhances the environment.

Policies

4.E.1: The County shall encourage the use of natural stormwater drainage systems to preserve and enhance natural features.

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.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.10: The County shall strive to improve the quality of runoff from urban and suburban development through use of appropriate site design measures including, but not limited to vegetated swales, infiltration/ sedimentation basins, riparian setbacks, oil/ grit separators, rooftop and impervious area disconnection, porous pavement, and other best management practices (BMPs).

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.12: The County shall encourage project designs that minimize drainage concentrations and impervious coverage and maintain, to the extent feasible, natural site drainage conditions.
4.E.13: The County shall require that new development conforms with the applicable programs, policies, recommendations, and plans of the Placer County Flood Control and Water Conservation District.

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, evapotranspiring, infiltrating, harvesting/using, and biotreating stormwater, and/or for the incorporation of mitigation measures for water quality impacts related to urban runoff.

4.E.15: The County shall identify and coordinate mitigation measures with responsible agencies for the control of storm drainage systems, monitoring of discharges, and implementation of measures to control pollutant loads in urban storm water runoff (e.g., California Regional Water Quality Control Board, Placer County Environmental Health Division, Placer County Department of Public Works, CDRA Engineering and Surveying Division, Placer County Flood Control and Water Conservation District).

Water Resources

Goal 6.A: To protect and enhance the natural qualities of Placer County's rivers, streams, creeks and groundwater.

Policies

6.A.5: The County shall continue to require the use of feasible and practical best management practices (BMPs) to protect streams from the adverse effects of construction activities and urban runoff and to encourage the use of BMPs for agricultural activities.

6.A.10: The County shall discourage grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of creeks and damage to riparian habitat.

6.A.13: The County shall protect groundwater resources from contamination and further overraft by pursuing the following efforts:

   a. Identifying and controlling sources of potential contamination;
   b. Protecting important groundwater recharge areas;
   c. Encouraging the use of surface water to supply major municipal and industrial consumptive demands;
d. Encouraging the use of treated wastewater for groundwater recharge; and

e. Supporting major consumptive use of groundwater aquifer(s) in the western part of the County only where it can be demonstrated that this use does not exceed safe yield and is appropriately balanced with surface water supply to the same area.

Alpine Meadows General Plan

The Alpine Meadows General Plan (Placer County 1968) provides guidance for future development within the Alpine Meadows area. The general concepts relevant to the analysis of impacts related to hydrology and water quality include the following (Placer County 1968):

11. Open Space: As much land as possible should be preserved in perpetual open areas under the multiple use concept for activities such as timbering, grazing, recreation, watershed protection, etc. by the use of the following devices.

- Exclusive low density zoning practices.
- Averaging population densities.
- Utilizing advanced forms of subdivision techniques (clusters, etc.).
- Scenic easements and development rights.
- Assessment practices.
- Acquisition in title by fee, bequest, dedication.

C. Assumptions:

4. Curbs and gutters should not be required, but either drainage “V” channels (rocked) or berms should be provided.

7. Areas for snow storage must be considered and built in to the plan.

D. Land Use:

1. Open Space and the watershed classifications provide the first essential step in preserving the natural resource base and appearance…

   c. The protection of the water supply.

7. Park and Recreational Uses: The proposed plan call for a major portion of the valley to remain in open space (or low density) uses on both public and private lands for recreation uses. In addition, scenic easements (or fee lands acquisition) should be established the length of Bear Creek to the Truckee River. A distinguishing feature is the intended preservation of Bear Creek in a native and
natural state … All new subdivisions bordering the creek should be required to reserve adequate pedestrian accessibility and drainage protection to this end.

**Stormwater Management Manual**

The Placer County Flood Control and Water Conservation District formulates regional strategies for flood control management. According to the Placer County Flood Control and Water Conservation District website, “the primary purpose of the District is to protect lives and property from the effects of flooding by comprehensive, coordinated flood prevention planning” (Placer County FCWCD 2014). This is frequently accomplished with the use of BMPs and engineered structures. The Placer County Flood Control and Water Conservation District’s *Stormwater Management Manual* (Placer County FCWCD 1990) presents policies, guidelines, and specific development criteria for stormwater management. The manual addresses the following elements that must be included in a construction project to mitigate impacts related to stormwater (Placer County FCWCD 1990):

- Drainage structure planning and design to avoid damages to structures or improvements during the 100-year event and prevent inundation of developed or to-be-developed portions of private property during the 10-year event
- Use of detention basins to reduce post-project runoff rates and/or volumes to up to 90% of pre-project levels
- Floodplain Management Plan
- System Monitoring Program
- Operations and Maintenance Program

The *Placer County Land Development Manual* (Placer County 1996) contains a storm drainage section that supplements the *Stormwater Management Manual*. This section of the Land Development Manual provides objectives and standards that seek to provide a uniform drainage system throughout the County, with primary consideration for avoiding property damage and maintaining natural conditions. The Land Development Manual’s storm drainage section identifies minimum requirements for drainage reports and Improvement Plans, and establishes minimum criteria and standards for drainage infrastructure design and maintenance.

Placer County Flood Damage Prevention Ordinance (Placer County Code Article 15.52) addresses floodplain management. The ordinance limits construction within the 100-year floodplain to prevent damage to structures and to limit the effect of development on base flood elevations.
Erosion Prevention

The Placer County Grading and Erosion Prevention Ordinance (Placer County Code Article 15.48) requires implementation of measures to protect water quality by controlling erosion and sediment discharge during and following construction activities. This ordinance specifies permitting requirements and design standards for projects that involve grading of more than 1 acre or earthwork affecting more than 250 cubic yards of soil. Grading permit conditions are detailed in Placer County Code Section 15.48.240. These conditions include requirements for erosion and sediment control, safeguarding watercourses from excessive deposition of sediment or debris, and mitigation of adverse environmental impacts identified in any environmental review document. The grading ordinance also specifies that grading projects cannot violate the NPDES program or interfere with the natural flow of stormwater. Grading plans must be designed to address long-term erosion and sediment control. Grading plans must also include measures to be implemented to control erosion and prevent off-site discharge of sediments during construction activities, such as grading and stockpiling of soils. An erosion control plan showing all facilities and measures to be implemented to control erosion and prevent off-site discharge of sediment must be submitted for review and approval by the Engineering and Surveying Division (ESD).

The Land Development Manual provides additional guidance on developing and designing erosion/sediment control features that are intended to be employed in concert with measures required under the Grading Ordinance (Placer County 1996).

12.3 IMPACTS

12.3.1 Significance Criteria

The analysis conducted for the Initial Study (see Appendix A) determined that the proposed project would have less-than-significant impacts with respect to the following significance criteria:

- Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lessening of local groundwater supplies (i.e., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?
- Would the project substantially degrade groundwater quality?
- Would the project alter the direction or rate of flow of groundwater?
- Would the project expose people or structures to flood risks from a levee or dam failure?

Therefore, these topics are not discussed further in this Draft EIR.
The analysis in the following text evaluates the potential for the proposed project to result in significant land use impacts related to the following criteria:

- Would the project violate water quality standards or WDRs (such as through soil erosion or runoff of polluted water), or degrade surface water quality?
- Would the project substantially alter drainage patterns, increase rate or amount of surface runoff, or require construction of new stormwater drainage facilities or expansion of existing facilities?
- Would the project place housing or improvements within the 100-year floodplain and place housing within a 100-year floodplain that would impede or redirect flood flows?
- Would the project impact the watershed of important surface water resources?

### 12.3.2 Project Impacts

#### Impact 12.1

Would the project violate water quality standards or WDRs (such as through soil erosion or runoff of polluted water) or degrade surface water quality during project construction?

<table>
<thead>
<tr>
<th>Significance and Mitigation</th>
<th>Alternative A</th>
<th>Alternative B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significance before mitigation:</td>
<td>Potentially significant</td>
<td>Potentially significant</td>
</tr>
<tr>
<td>Mitigation measures:</td>
<td>Mitigation Measures 12.1a through 12.1c</td>
<td>Mitigation Measures 12.1a through 12.1c</td>
</tr>
<tr>
<td>Significance after mitigation:</td>
<td>Less than significant</td>
<td>Less than significant</td>
</tr>
</tbody>
</table>

**Alternative A Impacts**

Localized site clearing, grading, and project construction under Alternative A would range over approximately 25.9 acres of the 47.3-acre site. Construction and installation of subdivision improvements, including the roadways, utility infrastructure, and drainage improvements, would result in grading and construction over 11.9 acres of the site. Construction of improvements within common areas would affect 2.6 acres, development of the individual lots on the east side of the development would affect 8.7 acres, and development of the halfplex units on the west side would affect 2.7 acres. Details of proposed site grading, including total area of grading disturbance and volume of soil excavation, are provided in Chapter 11, Geology and Soils.

Site grading and construction activities would increase the potential for soil erosion and sediment transport and delivery to Bear Creek and the Truckee River by decreasing vegetative cover, breaking up consolidated soils, and modifying site drainage. Further impacts to water quality during construction could potentially result from leaks or spills of fuel or hydraulic fluid used for grading and construction equipment, or leaks or spills of construction materials, such as paints and solvents.
Alternative A is required to submit Improvement Plans for review and approval by the Placer County ESD. Mitigation Measure 12.1a identifies minimum requirements for the Improvement Plans, including revegetation of disturbed areas and erosion control. Alternative A is also required to submit a Final Drainage Report for review and approval by the Placer County ESD. As stipulated in Mitigation Measure 12.1b, the drainage report must include BMPs to minimize erosion, water quality degradation, and discharge of pollutants to stormwater. Some of the BMPs that could be implemented during construction include silt fencing, sand bags, fiber rolls, stabilized construction entrances, sedimentation basins, drain inlet protection, stabilized construction accesses and material management, and other soil stabilization measures.

The proposed Development Standards (see Appendix B) require that homes must provide temporary and permanent BMPs in compliance with the County’s guidelines (see Figure 12-2). As a part of the site and building planning process for the Final Design submittal, engineering calculations for the project site’s drainage to accommodate the runoff from all impervious surfaces for a 20-year/1-hour storm event as defined by the Lahontan RWQCB must be provided. The Development Standards prepared for the proposed Alternative A discuss Low-Impact Development (LID) design features that would limit the amount of impervious surface area, and provide on-site filtration for surface drainage (other than for driveways sloping into the street).

Because the project site is larger than 1 acre, Alternative A is subject to the NPDES program requirements, as identified in Mitigation Measure 12.1c. As part of NPDES compliance, Alternative A would be required to prepare and implement a SWPPP. The SWPPP would include the following four major elements:

1. Identify pollutant sources, including sources of sediment, that may affect the quality of stormwater discharges from the construction site.
2. Identify non-stormwater discharges.
3. Identify, construct, implement in accordance with a time schedule, and maintain BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges, from the construction site during construction.
4. Identify, construct, implement in accordance with a time schedule, and assign maintenance responsibilities for post-construction BMPs, which are measures to be installed during construction that are intended to reduce or eliminate pollutants after construction is completed.

The SWPPP for construction activities is required to include site-specific structural and operational BMPs to prevent and control impacts to runoff quality, measures to be implemented before each storm event, inspection and maintenance of BMPs, and monitoring of runoff quality by visual and/or analytical means. The *California Stormwater BMP Handbook for Construction*
(California Stormwater Quality Association 2004), the *Stormwater Quality Design Manual for the Sacramento and South Placer Regions* (California Stormwater Quality Association 2007), and the TRPA BMP Handbook (TRPA 2014) also provide examples of BMPs that could be used. BMPs that could be included in the SWPPP are as follows:

- Scheduling materials deliveries to provide for minimal on-site storage and/or providing covered storage for materials wherever practical
- Designating specific areas for overnight construction equipment storage and maintenance, and providing runoff control around those areas to minimize the potential for runoff to contact spilled materials
- Establishing procedures for daily work site cleanup and immediate cleanup of spilled materials and contaminated soil
- Establishing a program of site inspections to ensure that BMPs are consistently implemented and effective
- Conducting visual monitoring of on-site runoff quality
- Placing fiber rolls around drain inlets to prevent sediment and construction-related debris from entering the inlets
- Placing fiber rolls along the perimeter of the site to reduce runoff flow velocities and prevent sediment from leaving the site, and sandbags around potentially affected off-site inlets to prevent sediments from entering the inlets
- Placing silt fences downgradient of disturbed areas to slow down runoff and retain sediment
- Specifying that all disturbed soil will be seeded, mulched or otherwise protected by October 15

Compliance with these mitigation measures would ensure that potentially significant impacts to water quality during proposed construction activities would be less than significant under Alternative A.

**Alternative B Impacts**

Under Alternative B, site clearing, grading, and project construction would affect approximately 23.8 acres of the 47.3-acre site. Construction and installation of subdivision improvements, including the roadways, utility infrastructure, and drainage improvements, would result in grading and construction over 11.6 acres of the site. Construction of improvements within common areas would affect 2.6 acres, development of the individual lots on the east side of the development would affect 7.7 acres, and development of the units on the west side would affect 1.9 acres. Details of proposed site grading, including total area of grading disturbance and
volume of soil excavation, are provided in Chapter 11, Geology and Soils. As with Alternative A, site grading and construction activities would increase the potential for soil erosion and sediment transport, and delivery to Bear Creek and the Truckee River by decreasing vegetative cover, breaking up consolidated soils, and modifying site drainage. Further impacts to water quality during construction could potentially result from leaks or spills of fuel or hydraulic fluid used for grading and construction equipment, or leaks or spills of construction materials, such as paints and solvents.

The proposed Alternative B Development Standards discuss LID design features that would limit the amount of impervious surface area, and provide on-site filtration for surface drainage (other than for driveways sloping into the street). As with Alternative A, under Alternative B, the project applicant would be required to submit Improvement Plans and a Final Drainage Report for review and approval by the Placer County ESD. Mitigation Measure 12.1a identifies minimum requirements for the Improvement Plans, including revegetation of disturbed areas and erosion control, and Mitigation Measure 12.1b requires that the Final Drainage Report include BMPs to minimize erosion, water quality degradation, and discharge of pollutants to stormwater. Additionally, the requirements for compliance with the NPDES program, including preparation of a SWPPP, as identified in Mitigation Measure 12.1c, are applicable to Alternative B.

Compliance with these mitigation measures would ensure that potentially significant impacts to water quality during proposed construction activities would be less than significant under Alternative B.

**Mitigation Measures**

**MM 12.1a:** The project applicant shall implement Mitigation Measures 11.2d and 11.4c, which require that all proposed drainage improvements and vegetation removal be shown on Improvement Plans; that the project applicant revegetate all disturbed areas and provide financial assurance for implementation of the erosion control plan; and that all site grading and construction activities conform to the approved Improvement Plans.

**MM 12.1b:** As part of the Improvement Plan submittal process, the preliminary Drainage Report provided during environmental review shall be submitted in final format. The final Drainage Report may require more detail than that provided in the preliminary report, and will be reviewed in concert with the Improvement Plans to confirm conformity between the two. The report shall be prepared by a Registered Civil Engineer and shall, at a minimum, include: A written text addressing existing conditions, the effects of the proposed improvements, all appropriate calculations, watershed maps, changes in flows and patterns, and proposed on- and off-site improvements and drainage easements to accommodate flows from
this project. The report shall identify water quality protection features and methods to be used during construction, as well as long-term post-construction water quality measures. The final Drainage Report shall be prepared 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 improvement plan submittal.

**MM 12.1c:** The project applicant shall implement Mitigation Measure 11.4e, which requires the project applicant to obtain a State Water Resources Control Board/Regional Water Quality Control Board National Pollutant Discharge Elimination System (NPDES) construction stormwater quality permit and provide appropriate documentation to the Placer County ESD prior to issuance of grading permits for any construction activity on site.

**MM 12.1d:** The project applicant shall implement Mitigation Measure 11.4d, which requires the Improvement Plans to show that water quality treatment facilities/BMPs shall be designed according to the guidance of the California Stormwater Quality Association’s Stormwater Best Management Practice Handbooks for Construction, for New Development/Redevelopment, and for Industrial and Commercial.

**Impact 12.2**

Would the project violate water quality standards or WDRs or degrade surface water quality during project operation?

<table>
<thead>
<tr>
<th>Significance and Mitigation</th>
<th>Alternative A</th>
<th>Alternative B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significance before mitigation:</td>
<td>Potentially significant</td>
<td>Potentially significant</td>
</tr>
<tr>
<td>Mitigation measures:</td>
<td>Mitigation Measures 12.2a through 12.2d</td>
<td>Mitigation Measures 12.2a through 12.2d</td>
</tr>
<tr>
<td>Significance after mitigation:</td>
<td>Less than significant</td>
<td>Less than significant</td>
</tr>
</tbody>
</table>

**Alternative A Impacts**

Following project construction, site soils and slopes would be stabilized by revegetation, asphalt paving, landscaping, and building coverage. These features would reduce potential for erosion and sediment generation from the project site. However, runoff flowing over these surfaces could carry water contaminants, such as automobile fluids, to downstream surface waters.

Runoff from new impervious surfaces in the developed condition could transport typical urban pollutants (automotive fluids, chemicals from landscape and structural maintenance, soil particles, and solid waste) into drainages during storm events and could degrade surface water quality in receiving waters. The drainage analysis also notes that portions of the site contain soils
and rock that have little to no permeability. In those areas, new impervious surfaces would not result in an increase in runoff. These areas would require LID design and treatment such as swales and buffer strips, rather than infiltration.

Alternative A includes several permanent types of BMP measures. The proposed permanent BMPs would treat storm water runoff from new paved and hardscape areas to minimize pollutants from the initial runoff resulting from any storm event. The permanent BMPs would be designed for a 20-year/1-hour storm event flow that falls on hard surface areas. The depth of the 20-year/1-hour storm event approximately equals 0.80 inch of rainfall at this location. The preferred treatment method would be infiltration of the resulting volume runoff from new impervious area. All permanent BMPs would be periodically checked to assure they can pass greater flows (10-year peak runoff) without damage to the facilities. These BMPs could include rock riprap, bypass openings for larger flows, and larger inlet openings.

Consistent with the *Total Maximum Daily Load for Sediment*, the NPDES Phase II MS4 Permit, and the *Placer County Low Impact Development (LID) Guidebook*, BMPs would be constructed to reduce the volume of sediment and other pollutants transported to Bear Creek and the Truckee River. Small-scale natural and constructed features will be integrated with landscaping and grading along roadways. Individual home sites would include elements such as drip-line trenches and infiltration trenches located downslope of structures, disconnected roof drains, disconnected and separated pavement, grass swales and channels, and impervious surface reduction through the use of permeable pavers and/or porous pavements. Permanent facilities, such as a specially designed catch basins, vegetated swales, vaults, water quality basins, and filters, would be built into Alternative A to treat the stormwater and snowmelt runoff from new roadways so sediment, oil and grease, nutrients, and trace metals may be removed prior to discharge to natural waterways. In some areas, cut-off ditches would be used to keep the road runoff separate from runoff from undeveloped areas. Areas disturbed during construction that are not otherwise improved would be promptly revegetated. In addition, runoff from undeveloped areas would be kept separate from new impervious areas until after the BMP facilities are constructed.

Mitigation measures 12.2a and 12.2b identify additional requirements for the post-construction BMP plan, including that all BMPs be designed in accordance with the California Stormwater Quality Association’s *Stormwater Best Management Practice Handbooks for New Development and Redevelopment* and the County’s *Guidance Document for Volume and Flow-Based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection*; that the BMP plan meet applicable requirements of the County’s Phase II NPDES municipal stormwater quality permit; and that it meet specific content requirements. Additionally, Mitigation measure 12.2c requires that all storm drain inlets be marked with language to discourage illegal dumping of potential pollutants into storm drains and mitigation measure
12.2d requires that snow storage areas be identified on the Improvement Plans and that drainage from snow storage areas be directed towards onsite water quality facilities.

Implementation of BMPs as required by Mitigation Measures 12.2a through 12.2d would ensure that the potentially significant impacts to water quality from operation of Alternative A are reduced to less than significant.

**Alternative B Impacts**

Alternative B would result in a similar potential as Alternative A to adversely affect water quality following construction. Mitigation Measures 12.2a and 12.2b identify requirements for the post-construction BMP plan, including that all BMPs be designed in accordance with the California Stormwater Quality Association’s *Stormwater Best Management Practice Handbooks for New Development and Redevelopment* and the County’s *Guidance Document for Volume and Flow-Based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection*; that the BMP plan meet applicable requirements of the County’s Phase II NPDES municipal stormwater quality permit; and that it meet specific content requirements. Additionally, Mitigation Measure 12.2c requires that all storm drain inlets be marked with language to discourage illegal dumping of potential pollutants into storm drains.

BMPs implemented as required by Mitigation Measures 12.2a through 12.2d would ensure that the potentially significant impacts to water quality from operation of Alternative B are reduced to less than significant.

**Mitigation Measures**

**MM 12.2a:** The Improvement Plans shall show that water quality treatment facilities/BMPs shall be designed according to the guidance of the California Stormwater Quality Association’s *Stormwater Best Management Practice Handbooks for New Development and Redevelopment*, and for Industrial and Commercial (or other similar source as approved by the ESD. The *Stormwater Quality Design Manual for the Sacramento and South Placer Regions* is an additional guidance document that may be used as a reference for post-construction BMPs.

Storm drainage from on-site impervious surfaces shall be collected and routed through specially designed catch basins, vegetated swales, vaults, infiltration basins, water quality basins, filters, and others for entrapment of sediment, debris, and oils/greases, or other identified pollutants, as approved by the ESD. BMPs shall be designed at a minimum in accordance with the Placer County’s *Guidance Document for Volume and Flow-Based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection*. Post-development
permanent) BMPs for the project include vegetated swales (TC-30), detention basins (TC-22), and water quality inlets (TC-50). No water quality facility construction shall be permitted within any identified wetlands area, floodplain, or right-of-way, except as authorized by project approvals.

All BMPs shall be maintained as required to insure effectiveness. The project applicant shall provide for the establishment of vegetation, where specified, by means of proper irrigation. Proof of ongoing maintenance, such as contractual evidence, shall be provided to ESD upon request. 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 Placer County for maintenance. Prior to Improvement Plan or Final Map approval, easements shall be created and offered for dedication to Placer County for maintenance and access to these facilities in anticipation of possible County maintenance.

**MM 12.2b:** This project is located within the permit area covered by Placer County’s Small Municipal Separate Storm Sewer System (MS4) Permit (State Water Resources Control Board National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000004, Order No. 2013-0001-DWQ), pursuant to the NPDES Phase II program. Project-related stormwater discharges are subject to all applicable requirements of said permit.

The project shall implement permanent and operational source control measures as applicable. Source control measures shall be designed for pollutant generating activities or sources consistent with recommendations from the California Stormwater Quality Association Stormwater BMP Handbook for New Development and Redevelopment, or equivalent manual, and shall be shown on the Improvement Plans.

The project is also required to implement Low Impact Development (LID) standards designed to reduce runoff, treat stormwater, and provide baseline hydromodification management.

**MM 12.2c:** All storm drain inlets and catch basins within the project site shall be permanently marked/embossed with prohibitive language, such as “No Dumping! Flows to Creek” or other language as approved by Placer County ESD, and/or graphical icons to discourage illegal dumping. Message details, placement, and locations shall be included in the Improvement Plans. Placer County ESD-approved signs and prohibitive language and/or graphical icons, which prohibit illegal dumping, shall be posted at public access points along channels and creeks within the
MM12.2d The Improvement Plans shall show the snow storage areas from roadway snow removal. Snow storage shall not be plowed into or stored in a Stream Environment Zone (SEZ). Drainage from snow storage areas shall be directed towards onsite water quality facilities. This information shall be shown on the information sheet of the Final Map and shall be incorporated into the project CC&R’s.

Impact 12.3

Would the project substantially alter drainage patterns; increase rate or amount of surface runoff; require construction of new stormwater drainage facilities or expansion of existing facilities?

<table>
<thead>
<tr>
<th>Significance and Mitigation</th>
<th>Alternative A</th>
<th>Alternative B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significance before mitigation:</td>
<td>Potentially significant</td>
<td>Potentially significant</td>
</tr>
<tr>
<td>Mitigation measures:</td>
<td>Mitigation Measures 12.3a and 12.3b</td>
<td>Mitigation Measures 12.3a and 12.3b</td>
</tr>
<tr>
<td>Significance after mitigation:</td>
<td>Less than significant</td>
<td>Less than significant</td>
</tr>
</tbody>
</table>

**Alternative A Impacts**

Alternative A would alter existing drainage patterns through grading and modifying the on-site drainage sheds. The removal of existing vegetation and the addition of impervious surfaces to the project site would increase the rate and volume of stormwater runoff from the site. As indicated in the Preliminary Drainage Report, drainage from the site would generally follow historic and natural patterns northerly through adjacent areas to Bear Creek. New roads would intercept some sheet flows and collect them in storm drain systems. The storm drains would either discharge to an existing swale or channel, or to an erosion control device (level spreader) designed to reduce water pollution by converting high-velocity flows into sheet flow that disperses the water so it infiltrates into the soil.

Alternative A includes construction of rolled curbs, roadside ditches, and cross culverts at driveways to collect and convey stormwater to drainage ways. On-site minor culverts and drainage facilities would be designed and sized for the 10-year runoff winter flow condition, which generates a greater flow than summer conditions. In addition, per the Alpine Sierra Development Standards (Appendix B), site drainage shall be directed to the natural, modified, or improved drainage channels, infiltration trenches, or can be dispersed to shallow or sloping vegetated areas. Improvements made to minor existing drainage courses and/or the development of any new
drainage swales shall be constructed as natural grass-lined or rock swales with a minimum 2% gradient. Any exposed drainpipe or impervious constructed swale-lining material is unacceptable.

A Preliminary Drainage Report (see Appendix I) has been prepared for Alternative A. This report indicates that the addition of impervious surfaces to the project site would increase both the volume and rate of runoff on site, as less water would infiltrate into the soil and water flows faster over impervious surfaces than over vegetated earth.

Under current conditions, the majority of the site drains towards and through existing developed areas with drainage discharging ultimately to Bear Creek. Bear Creek is a southwest-to-northeast creek that drains approximately 5.12 square miles prior to its confluence with the Truckee River. Runoff conditions under Alternative A are predicted to be similar to pre-project conditions and are shown on the Preliminary Drainage Report’s Figure 2 for the Bear Creek drainage basin area and Figure 4 for the project site (see Appendix I). The range of flow calculations for the 100-year storm event under existing conditions in the 5.12-square-mile drainage basin is 534 cubic feet per second (cfs) to 867 cfs. Calculations in the Preliminary Drainage Report indicate flows of 606 cfs (summer flows with infiltration) and 862 cfs (winter flows with snow melt and no infiltration). The Supplement to the Preliminary Report indicates the increase in post-project peak flows varied by sub-watershed from 0% to 6% over existing conditions. The total increase in the design peak flow in Bear Creek was calculated to be 2 cfs (from pre-project flows of 1,661 cfs to post-project flows of 1,663 cfs).

The Preliminary Drainage Report indicates that on-site detention is not required and that drainage facilities would be designed and sized to accommodate anticipated flows from a 10-year storm, post-project, winter event, which results in the greatest amount of runoff. To ensure that the project would avoid the potentially significant effects of substantially altering drainage patterns, substantially increasing the rate or amount of surface runoff, or requiring expansion of existing facilities, Mitigation Measure 12.3a requires that Alternative A construct a new on-site stormwater drainage system that would discharge to either an existing swale or channel or to an erosion control device designed to create a sheet flow condition and Mitigation Measure 12.3b requires that the project’s Final Drainage Report demonstrates that the post-development stormwater runoff is no more than 2 cfs greater than the existing peak flows. With implementation of Mitigation Measures 12.3a and 12.3b, Alternative A would be designed to ensure that the effects of altering the on-site drainage patterns would be less than significant and that Alternative A would not increase the rate or volume of stormwater runoff from the project site. The impact would be less than significant.

**Alternative B Impacts**

The Supplement to the Preliminary Drainage Report (Appendix I) found that drainage analysis prepared for Alternative A is also applicable to Alternative B. The addition of impervious
surfaces to the project site under Alternative B would increase both the volume and rate of runoff on site, as less water would infiltrate into the soil and water flows faster over impervious surfaces than over vegetated earth. However, as with Alternative A, it is expected that the increase in the design peak flow in Bear Creek would be 2 cfs. Implementation of MMs 12.3a and 12.3b would be necessary to ensure that Alternative B is designed such that the project would not increase the rate or volume of stormwater runoff from the project site and the effects of altering the on-site drainage patterns would be **less than significant**.

**Mitigation Measures**

**MM 12.3a:** The Improvement Plans shall indicate construction of a new on-site stormwater drainage system that shall discharge to either an existing swale or channel or to an erosion control device designed to create a sheet flow condition.

**MM 12.3b:** The Improvement Plan submittal and final Drainage Report shall provide details showing that storm water run-off shall be reduced to pre-project conditions at all discharge points from the property. The ESD may, after review of the project final drainage report, delete this requirement if it is determined that drainage conditions do not warrant installation of this type of facility. Increased flows directly into Bear Creek shall be no more than 2 cubic feet per second. 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 Engineering and Surveying Division (ESD) and shall be shown on the Improvement Plans. Maintenance of detention facilities by the homeowner’s association, property owner’s association, property owner, or entity responsible for project maintenance shall be required. No retention/detention facility construction shall be permitted within any identified wetlands area, floodplain, or right-of-way, except as authorized by project approvals.

**Impact 12.4**

Would the project place housing or improvements within the 100-year floodplain and place housing within a 100-year floodplain that would impede or redirect flood flows?

<table>
<thead>
<tr>
<th>Significance and Mitigation</th>
<th>Alternative A</th>
<th>Alternative B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significance before mitigation:</td>
<td>Potentially significant</td>
<td>Potentially significant</td>
</tr>
<tr>
<td>Mitigation measures:</td>
<td>Mitigation Measures 12.4a through 12.4d</td>
<td>Mitigation Measures 12.4a through 12.4d</td>
</tr>
<tr>
<td>Significance after mitigation:</td>
<td>Less than significant</td>
<td>Less than significant</td>
</tr>
</tbody>
</table>
Alternative A Impacts

The project site is not located within the boundary of a 100-year flood hazard area as mapped by FEMA or Placer County. The project site is included on two FEMA flood insurance rate maps: 06061C0200 F and 06061C0182 F. The boundaries of a delineated 100-year flood hazard map do not extend to the project site (FEMA 1998a, 1998b). In addition, the project site does not appear to be located within the boundaries of a FEMA floodplain as identified in the Placer County Local Hazard Mitigation Plan (Placer County 2010). According to the Preliminary Drainage Report, FEMA is in the process of updating its map for this area, but it is not anticipated that Alternative A would be placed in a floodplain. A copy of the updated flood insurance rate map was obtained from FEMA, and the maps show the 100-year floodplain well downstream of the project site.

A 65-foot-long section of Bear Creek is located on the project site at the project site’s frontage along Alpine Meadows Road. The east side of the project site contains a seasonal stream that runs generally north–south through the site. Alternative A would establish a 100-foot wide easement centered on the stream centerline. This area would be held in common by the homeowner’s association. Due to the topography of the stream channel, the local floodplain for this stream is contained within the stream channel. While the project does not propose placement of any residences within a local or FEMA-designated floodplain, the project would create four road crossings of the seasonal stream and one crossing of Bear Creek. These crossings and the proposed development throughout the site could modify the floodplains. Alternative A would have a potentially significant impact associated with the potential for housing to be located within those modified post-development floodplains. To ensure that no housing is located in the post-development floodplain, Mitigation Measure 12.4a requires that the post-development floodplains be indicated on the project Improvement Plans and Mitigation Measure 12.4b requires that the Improvement Plans show all finished house pad elevations to be a minimum of two feet above the 100-year floodplain line or finished floor elevations a minimum of three feet above the 100-year floodplain. Additionally, Mitigation Measure 12.4c requires that roadway bridges must span the 100 year-floodplain limits, and Mitigation Measure 12.4d prohibits grading within the 100-year floodplain other than as approved as part of the subdivision improvements.

With implementation of Mitigation Measures 12.4a through 12.4d, the project would result in less-than-significant impacts associated with constructing housing or other infrastructure within the 100-year floodplain.
Alternative B Impacts

While the Alternative B also does not propose placement of any residences within a local or FEMA-designated floodplain, this alternative would create four road crossings of the seasonal stream and one crossing of Bear Creek. These crossings and the proposed development throughout the site could modify the floodplains, resulting in a potentially significant impact associated with the potential for housing to be located within those modified post-development floodplains. To ensure that no housing is located in the post-development floodplain, Mitigation Measure 12.4a requires that the post-development floodplains be indicated on the project Improvement Plans and Mitigation Measure 12.4b requires that the Improvement Plans show all finished house pad elevations to be a minimum of two feet above the 100-year floodplain line or finished floor elevations a minimum of three feet above the 100-year floodplain. Additionally, Mitigation Measure 12.4c requires that roadway bridges must span the 100 year-floodplain limits, and Mitigation Measure 12.4d prohibits grading within the 100-year floodplain other than as approved as part of the subdivision improvements.

With implementation of Mitigation Measures 12.4a through 12.4d, Alternative B would result in less-than-significant impacts associated with constructing housing or other infrastructure within the 100-year floodplain.

Mitigation Measures

MM 12.4a: On the Improvement Plans and Informational Sheet(s) filed with the appropriate Final Subdivision Map(s), show the limits of the future, unmitigated, fully developed, 100-year floodplain (after grading) for Bear Creek and the un-named tributary on the east side of the project and designate same as a building setback line unless greater setbacks are required by other conditions contained herein.

MM 12.4b: On the Improvement Plans and Informational Sheet(s) filed with the appropriate Final Subdivision Map(s) show finished house pad elevations to be a minimum of two feet above the 100-year floodplain line (or finished floor -three feet above the 100-year floodplain line). The final pad elevation shall be certified by a California registered civil engineer or licensed land surveyor and submitted to the Engineering and Surveying Department. This certification shall be done prior to construction of the foundation or at the completion of final grading, whichever comes first. No construction is allowed until the certification has been received by the Engineering and Surveying Department and approved by the floodplain manager. Benchmark elevation and location shall be shown on the Improvement Plans and Informational Sheet(s) to the satisfaction of Development Review Committee.
MM 12.4c: The Improvement Plans for the construction of the on site subdivision roads shall include the construction of a roadway bridges spanning the 100 year floodplain limits.

MM 12.4d: In order to protect site resources, no grading activities of any kind may take place within the 100-year flood plain of the seasonal stream and of Bear Creek, unless otherwise approved as a part of this project. All work shall conform to provisions of the County Flood Damage Prevention Regulations (Section 15.52, Placer County Code). A standard note to this effect shall be included on the Improvement Plans. The location of the 100-year flood plain shall be shown on the Improvement Plans.

Impact 12.5

Would the project impact the watershed of important surface water resources?

<table>
<thead>
<tr>
<th>Significance and Mitigation</th>
<th>Alternative A</th>
<th>Alternative B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significance before mitigation:</td>
<td>Potentially significant</td>
<td>Potentially significant</td>
</tr>
<tr>
<td>Mitigation measures:</td>
<td>Mitigation Measures 12.5a through 12.5c</td>
<td>Mitigation Measures 12.5a through 12.5c</td>
</tr>
<tr>
<td>Significance after mitigation:</td>
<td>Less than significant</td>
<td>Less than significant</td>
</tr>
</tbody>
</table>

**Alternative A Impacts**

As discussed under Impacts 12.1 and 12.2, development of the project site could result in the delivery of pollutants to receiving waters during construction and project operation under Alternative A. As evaluated under Impact 12.3, Alternative A would change drainage patterns across the project site and would include numerous temporary and permanent BMPs to ensure water quality is not affected in the creek. This could contribute to the pollutant load carried in the Bear Creek sub-watershed. Implementation of the post-construction BMP plan, as required under Mitigation Measure 12.5a, would reduce the potential for project operation to adversely affect water quality in Bear Creek and ultimately the Truckee River. Implementation of additional BMPs as required under Mitigation Measure 12.5b would further reduce the potential for Alternative A to impair water quality under project construction.

To ensure construction and operation of Alternative A has a less-than-significant impact on the watershed, Mitigation Measure 12.5c requires appropriate BMP design and maintenance, use of storm drain inlet markings, and design of trash storage areas to avoid allowing trash to affect stormwater. With implementation of Mitigation Measures 12.5a through 12.5c, potentially significant impacts associated with impaired water quality in the watershed as a result of Alternative A would be reduced to less than significant.
**Alternative B Impacts**

As discussed under Impacts 12.1 and 12.2, development of the project site could result in the delivery of pollutants to receiving waters during construction and operation under Alternative B. As evaluated under Impact 12.3, Alternative B would change drainage patterns across the project site and include numerous temporary and permanent BMPs to ensure water quality is not affected in the creek. This could contribute to the pollutant load carried in the Bear Creek sub-watershed. Implementation of the post-construction BMP plan, as required under Mitigation Measure 12.5a, additional BMPs as required under Mitigation Measure 12.5b, and the BMP design requirements identified in Mitigation Measure 12.5c would ensure that the potentially significant impacts to water quality in the Truckee River watershed under Alternative B would be reduced to less than significant.

**Mitigation Measures**

**MM 12.5a:** The project applicant shall implement Mitigation Measure 12.2a, which requires Improvement Plans to include water quality treatment features and BMPs.

**MM 12.5b:** The project applicant shall implement Mitigation Measures 12.1a and 12.1b, which stipulate compliance with Placer County’s requirements related to Improvement Plans, provision of a Final Drainage Report, and obtaining coverage under the NPDES program for site remediation and project construction activities.

**MM 12.5c:** The project applicant shall implement Mitigation Measures 12.2a through 12.2c, which identify requirements related to BMP design and maintenance, storm drain inlet markings, and design of trash storage areas.
Low Impact Development Road Sections

**Figure 12-1**

**LID Development Detail**

**Road Sections with Retaining Walls**

- Fill Section with Retaining Wall
- Cut Section with Retaining Wall

- Wall Type TBD
- Rock shown for illustration purposes only
- Perforated pipe located above "storage volume" required for infiltration
- Gutter to divert run-off from impervious road surface to a LID treatment area
- Cut-off ditch to intercept drainage from undeveloped areas

**LID Development Detail**

**Road Sections with Cut & Fill Slopes**

- Fill Section with 2:1 slope
- Cut Section with 2:1 slope

- AB shoulder or concrete sidewalk
- Rock slope protection (RSP) or revegetated slope
- Infiltration trenches or fill slope, set at level grade
- Divert or pipe gutter flow to a LID treatment facility
- Cut-off ditch at top and/or toe of slope to intercept run-off from undeveloped areas
INTENTIONALLY LEFT BLANK
Construction Site BEST MANAGEMENT PRACTICES

CONSTRUCTION SITE OVERVIEW
Protecting clean water improves our quality of life and preserves the local environment for our children and future generations. Unintentional spills at work sites can flow into storm drains and pollute waterways. These spills are prohibited by law. The drawing illustrates BMPs that must be used at all construction sites to protect storm drains and minimize pollution. All site BMPs must be checked and maintained daily.

CONCRETE TRUCKS/PUMPS
Pumpers should be surrounded by perimeter controls, such as gravel bags, sand bags or straw wattles. Tarps should be placed over concrete pumpers. Residual materials must be cleaned up as well. Debris should be disposed of properly.

WASHOUT AREA
The disposal of wet construction materials should be handled in a properly designed washout area. This includes stone, slurry and concrete. Use a sand bank or a large, mobile unit to collect washouts and prevent run-off.

DIRT AND GRADING
Mounds of dirt or gravel should be stored on-site and sprayed daily with water to prevent excessive dust. These materials should also be covered each day with a tarp, coconut mat or other form of protection.

EARTHMOVING EQUIPMENT
All earthmoving equipment should be stored on-site. Maintenance should also be conducted on the site in properly protected areas. Clean up all spills immediately using dry cleanup methods (i.e., sweeping, absorbent material). Do not toss down spills.

STORM DRAINS
Storm drains must be protected at all times with perimeter controls, such as sand bags, gravel bags or straw wattles.

DUMPSTERS
Spill containers and locate them away from drainage lines and gutters. Allow space to work safely. Perimeter controls should be installed around dumpsters.

For more information call Placer County Stormwater Quality Division at 530-745-7500, or speak to your jobsite inspector. Check out the Placer County Stormwater website at http://www placer ca gov/Departments/Water/StormWtr.aspx. Review BMP requirements in the link. Take the watershed as a whole in mind. Sites are connected.

SOURCE: DALE COX ARCHITECTS 2014

Alpine Sierra Subdivision - Environmental Impact Report
INTENTIONALLY LEFT BLANK