

# 14 GEOLOGY, SOILS, LAND CAPABILITY, AND COVERAGE

## 14.1 INTRODUCTION

This chapter contains an evaluation of the potential impacts to geology, soils, land capability, and coverage associated with the implementation of the Placer County Tahoe Basin Area Plan alternatives. The analysis includes a description of existing conditions and an analysis of changes to geologic conditions, relevant soil properties, and associated elements of land capability and coverage. Comments received on the Notice of Preparation related to geology, soils, land capability and coverage addressed the following topics:

- ▲ detailed land coverage and Stream Environment Zone (SEZ) analysis of areas affected by changes to development standards or the proposed lodge project, and
- ▲ existing and proposed land coverage limits.

Regulations and guidelines established by the Tahoe Regional Planning Agency (TRPA) and local jurisdictions, along with the California Environmental Quality Act (CEQA) statute and guidelines, provide the regulatory background that guides the assessment of potential environmental effects to these resources. Potential environmental effects related to water quality resulting from soil erosion and other stormwater issues are addressed in Chapter 15, “Hydrology and Water Quality.” Cumulative impacts to geology, soils, land capability and coverage are addressed in Chapter 19, “Cumulative Impacts.” Other sources of information used in the preparation of this chapter include California Geological Survey (CGS) and U.S. Geological Survey (USGS) technical guides, the NRCS 2007 Soil Survey, TRPA’s 2010 aerial LIDAR data, TRPA regulations and planning documents, environmental impact reports for projects previously proposed within the Plan area, background reports prepared for plans and projects in the vicinity, and other published geologic literature.

As discussed in Chapter 4, “Approach to Environmental Analysis,” this analysis is provided to fully document the environmental effects of the four Area Plan and lodge alternatives. The broad geography and long timeframe to which the Area Plan applies and the policy-oriented nature of its guidance is such that the EIR/EIS is prepared at a programmatic level, i.e., a more general analysis of each resource area with a level of detail and degree of specificity commensurate with the overall planning level of the Area Plan. Similarly, because the Kings Beach Center design concept lacks sufficient detail for definitive impact analysis, that portion of the project is also evaluated in a programmatic fashion. The proposed Tahoe City Lodge represents a project that contains a greater level of detail and specificity such that a project-level analysis is included in this chapter.

Because the extraction of mineral resources is not permitted within the Tahoe Basin, this analysis does not address potential impacts to mineral resources. Similarly, the proposed project would not affect regulations governing development or alteration of the shoreline of Lake Tahoe, and the analysis does not evaluate changes to natural littoral processes. Additionally, this analysis does not evaluate the potential for the proposed project to create instability in the underlying geologic materials, resulting in off-site landslides, lateral spreading, subsidence, or liquefaction. The Tahoe City and Kings Beach Town Centers, where the action alternatives contemplate land use changes and new development, are located on alluvial fans with low slope angles that do not have the potential to generate landslides. Furthermore, the types of human activities proposed by the action alternatives do not have the potential to create subsidence or liquefaction of soils. The potential impacts related to surface instability and erosion are analyzed under Impact 14-2 and the potential to expose people and property to slope instability related to seismic or geologic hazards is considered under Impact 14-3.

## 14.2 REGULATORY SETTING

Regulations protecting the soil resources in the Tahoe Region are enforced by TRPA, the Lahontan Regional Water Quality Control Board (RWQCB) (through water quality regulations), and Placer County. Other regulations aid in the establishment of safe structures to ensure minimal, if any, impact on earth resources. The following discussion provides the background for applicable earth resource requirements in the Tahoe Region.

### 14.2.1 Federal

#### National Earthquake Hazards Reduction Act

The National Earthquake Hazards Reduction Act was passed to reduce the risks to life and property resulting from earthquakes. To accomplish this, the act established the National Earthquake Hazards Reduction Program (NEHRP). The mission of NEHRP includes improved understanding, characterization, and prediction of hazards and vulnerabilities; improved building codes and land use practices; risk reduction through post-earthquake investigations and education; development and improvement of design and construction techniques; improved mitigation capacity; and accelerated application of research results. NEHRP designates the Federal Emergency Management Agency as the lead agency of the program and assigns several planning, coordinating, and reporting responsibilities. Other NEHRP agencies include the National Institute of Standards and Technology, National Science Foundation, and USGS.

### 14.2.2 Tahoe Regional Planning Agency

#### ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

TRPA has established threshold carrying capacity standards and indicators for soil conservation. TRPA threshold standards are minimum standards of environmental quality to be achieved in the Tahoe Region. Every four years, TRPA evaluates the attainment status of all TRPA threshold standards. The 2011 Threshold Evaluation contains the most current information on the status of the threshold standards (TRPA 2012a).

TRPA has two soil conservation threshold standard indicator reporting categories, as follows:

- ▲ Land Coverage (impervious cover) Threshold Standard to comply with allowable land coverage limitations established in the Land Capability Classification of the Tahoe Basin. This threshold standard indicator reporting category consists of nine different standards for the nine separate land capability districts (LCDs). All soils within the region have been assigned an LCD based on their ability to tolerate disturbance and development while retaining their natural function. LCDs 1a to 3 are considered sensitive and LCD 7 is considered the most tolerant. Additional discussion of land coverage and LCDs is included in Section 14.3, “Environmental Setting.”
- ▲ SEZ Threshold Standard to restore 25 percent of the SEZ lands that have been identified as disturbed, developed or subdivided to attain a 5 percent increase in the area of naturally functioning SEZ lands.

See Table 14-1 for the 2011 status of the soil conservation threshold standards.

**Table 14-1 2011 Status of the Soil Conservation Threshold Standards**

Threshold Standard	Status
<b>Land Coverage</b>	
Land Capability District 1a	Considerably Better than Target
Land Capability District 1b	Considerably Worse than Target
Land Capability District 1c	Somewhat Better than Target
Land Capability District 2	Somewhat Better than Target
Land Capability District 3	Considerably Better than Target
Land Capability District 4	Considerably Better than Target
Land Capability District 5	Considerably Better than Target
Land Capability District 6	Considerably Better than Target
Land Capability District 7	Somewhat Better than Target
Stream Environment Zone Restoration	Considerably Worse than Target
Source: TRPA 2012a	

## WATER QUALITY MANAGEMENT PLAN

The Lake Tahoe Water Quality Management Plan (also known as the “208 Plan,” in reference to the pertinent section of the Clean Water Act) is a framework that sets forth the components of the water quality management system in the Tahoe Region, the desired water quality outcomes for the Tahoe Basin, and the mechanisms adopted by all the relevant entities to achieve and maintain those outcomes. The Handbook of Best Management Practices (BMPs) provides technical guidance and assistance to engineers, architects, consultants, builders, homeowners, and other agencies who are proposing a project in the Tahoe Basin that may affect water quality. It identifies and recommends BMPs for various situations. Elements of the 208 Plan relevant to Geology, Soils, Land Capability and Coverage are as follows.

**Best management practices:** Use of BMPs is mandatory for all new development and resource management uses (e.g., timber harvest, livestock grazing). Existing development must be retrofitted to include BMPs.

**Land coverage restrictions:** The land capability system limits the amount of allowable impervious surface coverage, especially on high erosion hazard lands and in SEZs. This element contains limited exceptions for public projects, coverage transfer, and coverage relocation (see Code of Ordinances, Chapter 30, below).

**Roads and rights-of-way:** RWQCB requires controls for potential erosion from new and existing roads, road maintenance activities, and snow and ice control.

## LAKE TAHOE REGIONAL PLAN

Several components of the Lake Tahoe Regional Plan address policies and regulations pertaining to geology, soils, land capability, and coverage: Goals and Policies, Code of Ordinances, and 208 Plan.

### Goals and Policies

Goals and policies applicable to geology, soils, land capability, and coverage are included in several elements and subelements of the Goals and Policies document of the Regional Plan. The Natural Hazards Subelement addresses risks from natural hazards (e.g., flood, fire, avalanche, and earthquake). Specifically, Goal 1, Policy 2 prohibits new construction on, or disturbance of land within, the 100-year floodplain and in the area of wave run-up except as necessary to implement the goals and policies of the Plan; and requires all public utilities, transportation facilities, and other necessary public uses located in the 100-year floodplain and area of wave run-up to be constructed or maintained to prevent damage from flooding and to not cause flooding. The Water Quality Subelement includes goals to reduce loads of sediment and algal nutrients to Lake Tahoe; meet sediment and nutrient objectives for tributary streams, surface runoff, and subsurface runoff; and restore 80 percent of the disturbed lands and specifies that the implementation of

BMPs shall be required as a condition of approval for all projects. The Soils Subelement addresses soil erosion and loss of soil productivity through policies pertaining to coverage, including allowable coverage for categories of land uses in specific LCDs. This subelement also addresses special regulations regarding construction and soil disturbing activities occurring between October 15 and May 1.

Goals and policies of the Regional Plan that are related to erosion and coverage are located in the Conservation Element. Relevant excerpts are included below.

**Soils GOAL 1:** Minimize soil erosion and the loss of soil productivity.

- ▲ **Policy S-1.1.** Allowable impervious land coverage shall be consistent with the Threshold Standard for impervious land coverage.
- ▲ **Policy S-1.2.** No new land coverage or other permanent disturbance shall be permitted in land capability districts 1-3 (exceptions provided for some single family dwellings, public outdoor recreation, and public service uses).
- ▲ **Policy S-1.6:** Maintain seasonal limitations on ground disturbing activities during the wet season (October 15 to May 1) and identify limited exceptions for activities that are necessary to preserve public health and safety or for erosion control.
- ▲ **Policy S-1.7:** All existing natural functioning stream environment zones shall be retained as such and disturbed stream environment zones shall be restored whenever possible and may be treated to reduce the risk of catastrophic wildfires.

## Code of Ordinances

The TRPA Code of Ordinances implements the Regional Plan Goals and Policies. The following TRPA ordinances are most relevant to the geology, soils, and land capability and coverage aspects of the proposed project.

### Chapter 30 – Land Coverage Standards

Since the late 1970s, TRPA has used the land capability classification system known as the Bailey System (*Land-Capability Classification of the Lake Tahoe Basin, California-Nevada: A Guide to Planning* [Bailey 1974]) to guide land use planning, policy formulation related to the impacts of development on soil erosion and permitting of development. The Bailey System was developed as a threat assessment and planning tool to identify and mitigate adverse impacts to water quality and stream systems that occur from surface runoff and erosion related to development. The Bailey System is the basis of the land coverage standards and limitations set forth in Chapter 30 of the TRPA Code of Ordinances.

Coverage is defined by TRPA as a human-built structure or other impervious surface that prevents normal precipitation from directly reaching the surface of the land underlying the structure, therefore precluding or slowing the natural infiltration of water into the soil (Chapter 90 of the Code). TRPA further defines coverage as impervious surface (hard coverage) or compacted soil (soft coverage). Research has established the connection between impervious surfaces and water quality. Specifically, coverage may affect water quality as it reduces the amount of soil available to infiltrate water and has the potential to result in surface runoff, erosion, and delivery of pollutants to receiving waters.

To determine the level of coverage that would be appropriate in the Region, TRPA adopted the Bailey Land Classification system (Bailey 1974). The system assigns Land Capability Districts (LCDs) based primarily on soil characteristics and slope. The LCDs reflect the amount of development the site can support without experiencing soil or water quality degradation. The LCDs range from 1 to 7, with 1 being the most environmentally sensitive and 7 being most suitable for supporting development (see Table 14-2). Under this system, TRPA allows landowners to cover 1, 5, 20, 25 or 30 percent of their parcel with impervious surfaces

depending on its environmental sensitivity as defined by the Bailey classification system. Higher amounts of land coverage are allowed in town centers for which area plans have been adopted.

**Table 14-2 Land Capability Districts for Lake Tahoe Region**

Capability Levels	Tolerance for Use	Slope Percent	Relative Erosion Potential	Runoff Potential	Disturbance Hazards
7	Most	0-5	Slight	Low to moderately low	Low hazard
6		0-16		Moderately high to high	
5		0-16		Low to moderately low	
4		9-30	Moderate	Moderately high to high	Moderate hazard lands
3		9-30			
2		30-50	High	Low to moderately low	High hazard lands
1a	30+	Moderately high to high			
1b	(Poor Natural Drainage, Fragile Flora and Fauna)	Varies			
1c		-			

Source: Bailey 1974

In general, for a parcel of up to 20 acres a project site used to determine the amount of allowable coverage is based on the parcel size. However, as described in Code Section 30.4.1.C.3.b.i, highways, streets, roads, and the easements or right-of-ways allowing potential land coverage for linear public facilities, highways streets, and roads is not included within a project site.

Property owners who have used less than their allotted amount of coverage (or none at all) may sell that “potential” coverage to other property owners. In some instances, coverage in excess of the allowable coverage amount can be verified as legally existing, thereby becoming a marketable right. In other words, such coverage is “grandfathered in” because it was established prior to the existence of TRPA. Property owners who have already exceeded their allocated amount (i.e., base allowable coverage) and seek new permits from TRPA are said to have “excess coverage” and are required to remove a portion of the excess coverage, retire coverage off site, or pay an excess coverage mitigation fee.

**Chapter 53 – Individual Parcel Evaluation System**

Chapter 53 of the TRPA Code describes the Individual Parcel Evaluation System (IPES) and related procedures. In accordance with Chapter 53, vacant residential parcels within the region are evaluated, assigned a numerical IPES score, and ranked within each local jurisdiction from most suitable to least suitable for development.

IPES was developed and implemented to respond to the inability to construct new single-family dwellings on sensitive lands (LCDs 1–3). IPES was created through a consensus process and applies to all new single-family residential development from May 27, 1987, onward. The ability to develop on what would be the equivalent of LCDs 1–3, or sensitive lands, is based on the determination that the local jurisdiction has met numerous other environmental criteria (e.g., the retirement of a specified percentage of sensitive parcels, installation of water quality improvements) that collectively provide enough environmental improvements to offset any impacts. IPES further differs from the Bailey System in that it examines a host of site-specific soil and parcel development criteria and can result in allowable coverage ranging from 1 to 30 percent. Although, at the individual parcel level, allowable coverage under IPES may differ from the Bailey System, the two systems are intended to be equivalent when considered in the aggregate and therefore to meet coverage threshold standard criteria.

TRPA Code Section 30.4.2(A)(1) specifies the maximum amount of coverage (base plus transferred) allowed on residential parcels up to four units. Under this provision, additional coverage may be allowed on an IPES parcel that would be the equivalent of LCDs 1–3.

### **Chapter 60 – Water Quality**

Chapter 60 of the TRPA Code of Ordinances sets forth requirements for installation of BMPs for the protection or restoration of water quality and attainment of minimum discharge standards. Projects shall comply with temporary and permanent BMP programs as a condition of project approval.

### **Chapter 33 – Grading and Construction**

Chapter 33 of the TRPA Code describes the various standards and regulations that protect the environment against significant adverse effects from excavation, filling, and clearing, because of such conditions as exposed soils, unstable earthworks, or groundwater interference.

## **Community Plans and Plan Area Statements**

After adoption of the 1987 Regional Plan, TRPA developed community plans and plan area statements (PASs) as localized implementation documents. The Plan area contains 51 plan area statements and five community plans. In general, the PASs focus on land use and do not contain policies or goals specific to geology, soils, and land coverage. However, the five community plans contain land coverage reduction goals for each respective area. An implementation measure referred to as the “5 percent rule” is incorporated into the Tahoe City, Carnelian Bay, King Beach, and Kings Beach Industrial Community Plans. The “5 percent rule” is policy requiring projects with existing coverage in excess of 75 percent of their project area to provide an increase in landscaping equal to 5 percent of the project area. The landscaping requirement must be met within the project area if feasible, or otherwise in an off-site related area. The California North Stateline Community Plan contains a similar policy that requires that projects with existing coverage to reduce land coverage within the project area to 70 percent or less.

## **14.2.3 State**

### **LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD**

The nine regional water quality control boards within California provide regional specific water quality standards and control measures to implement the federal Clean Water Act. The Lahontan Regional Water Quality Control Board is responsible to surface and ground water quality within the project site. The water quality control plan for the Lahontan region (Lahontan RWQCB 2015) establishes water quality objectives enforced through federal National Pollutant Discharge Elimination System (NPDES) permits. NPDES permits are intended to address land uses and activities that could create erosion or sediment transportation and potentially degrade water quality. Compliance with these permits requires implementation of erosion control BMPs and preparation of a storm water pollution prevention plan (SWPPP) to minimize erosion and sediment transport adjacent to waterbodies. Refer to Chapter 15, “Hydrology and Water Quality,” for a more detailed discussion.

### **CALIFORNIA TAHOE CONSERVANCY**

The mission of the California Tahoe Conservancy (CTC) is to preserve, protect, restore, enhance and sustain the unique and significant natural resources and recreational opportunities of the Tahoe Region (California Government Code - Title 7.42 Sections 66905. to 66908.3). CTC’s jurisdiction extends throughout the California side of the Lake Tahoe Region, as defined in California Government Code Section 66905.5. In 1987, CTC authorized staff to develop and implement a Land Coverage (Land Bank) Program. Through this program, CTC acquires properties eligible for purchase through willing sellers. The development potential on these properties is retired. All rights and credits acquired by CTC are stored in a Land Bank. Through a Memorandum of Understanding (MOU) with TRPA, CTC is authorized to receive disbursements of TRPA excess coverage mitigation fees to perform coverage reduction through its Land Bank. The MOU also authorizes CTC to sell coverage rights on the open market and conduct SEZ restoration or mitigation for private or public service projects through the Land Bank.

The benefits of CTC's Land Coverage Program include: acquisition and restoration of developed areas that have become degraded and that to contribute, or have the potential to contribute to water quality problems; protecting land before development activity generates the need for mitigation; ongoing management to ensure that resource benefits are sustained; assisting property owners in complying with Regional land coverage policies so they may construct or rehabilitate homes and businesses; and simplifying and expediting public and private projects.

## **SEISMIC HAZARDS MAPPING ACT**

The Seismic Hazards Mapping Act of 1990 (Public Resources Code Sections 2690–2699.6), addresses earthquake hazards from non-surface fault rupture, including liquefaction and seismically induced landslides. The act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. The Act also specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

## **NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT**

In California, the State Water Resources Control Board (SWRCB) administers regulations promulgated by the U.S. Environmental Protection Agency (55 Code of Federal Regulations [CFR] 47990) requiring the permitting of stormwater-generated pollution under NPDES. In turn, the SWRCB's jurisdiction is administered through nine regional water quality control boards. Under these federal regulations, an operator must obtain a General Permit through the NPDES Stormwater Program for all construction activities with ground disturbance of one acre or more. The General Permit requires the implementation of BMPs to reduce sedimentation into surface waters and control erosion. One element of compliance with the NPDES permit is preparation of a SWPPP that addresses control of water pollution, including sediment, in runoff during construction. (See Chapter 15, "Hydrology and Water Quality," for more information about the NPDES and SWPPPs.)

## **CALIFORNIA BUILDING STANDARDS CODE**

The state of California provides minimum standards for building design through the California Building Standards Code (California Code of Regulations, Title 24). The California Building Standards Code (CBC) applies to building design and construction in the state and is based on the federal Uniform Building Code used widely throughout the country (generally adopted on a state-by-state or district-by-district basis). The CBC has been modified for California conditions with more detailed and/or more stringent regulations.

The state earthquake protection law (California Health and Safety Code Section 19100 et seq.) requires that structures be designed to resist stresses produced by lateral forces caused by wind and earthquakes. Specific minimum seismic safety and structural design requirements are set forth in Chapter 16 of the CBC. The CBC identifies seismic factors that must be considered in structural design.

Chapter 18 of the CBC regulates the excavation of foundations and retaining walls, and Chapter 33 regulates grading activities, including drainage and erosion control and construction on unstable soils, such as expansive soils and areas subject to liquefaction.

### **14.2.4 Local**

#### **PLACER COUNTY**

Land use plans in Placer County that are relevant to the Plan area and lodge project site include the Placer County General Plan and several planning documents specific to the Tahoe Basin portion of Placer County.

The following summarizes relevant policies from the Placer County General Plan. The consistency of the proposed project with these goals and policies is discussed in Impact 5-2 in Chapter 5, "Land Use."

### **Placer County General Plan**

The Natural Resources Element and Health and Safety Element of the Placer County General Plan include a number of goals and policies intended to reduce soil erosion and to minimize injury to people and damage to property from exposure to seismic and geologic hazards. Specific policies require that development projects near stream environments do not cause or worsen erosion or sedimentation (Policies 6.A.4 and 6.A.10). The Placer County General Plan also requires projects to include a variety of technical reports and plans that demonstrate that the project will minimize the risk of exposure of people or property to seismic hazards, unstable soils, landslides, and avalanche (Policies 8.A.1, 8.A.2, 8.A.4, 8.A.5, 8.A.6, 8.A.9, 8.A.10, 8.A.11, 8.A.12, and 8.H.2)

### **Placer County Grading Ordinance**

Placer County Code Article 15.48, "Grading, Erosion and Sediment Control," contains ordinances enacted for the purpose of regulating grading on property within the unincorporated area of Placer County to safeguard life, limb, health, property and public welfare; to avoid pollution of watercourses with hazardous materials, nutrients, sediments, or other earthen materials generated on or caused by surface runoff on or across the permit area; and to ensure that the intended use of a graded site is consistent with the Placer County General Plan, any specific plans, and applicable Placer County ordinances. The most common activities requiring a grading permit within the Placer County portion of the Tahoe Basin include the following: fill or excavation greater than three cubic yards, cuts exceeding four feet in depth; fills exceeding three feet in depth; cuts or fills exceeding 200 square feet in area; structural retaining walls exceeding four feet in total height, as measured from the bottom footing to the top of the wall and/or supporting a surcharge; soil or vegetation disturbances exceeding 1,000 square feet; grading within or adjacent to a drainage course or wetland; or grading within a floodplain.

### **Placer County Avalanche Management Ordinance**

Article 12.40 of the Placer County Code addresses Avalanche Management Areas and establishes the Placer County Avalanche Management Ordinance. The article describes potential avalanche hazard areas (PAHA) as those areas where, after investigation and study, the county finds that an avalanche potential exists because of steepness of slope, exposure, snow pack composition, wind, temperature, rate of snowfall, and other interacting factors. PAHA zones are established to identify those areas with avalanche potential and include areas where the annual probability of avalanche occurrence is greater than one in 100 based on the approved studies, or where avalanche damage is documented.

## **14.3 ENVIRONMENTAL SETTING**

### **GEOLOGY**

The Tahoe Basin is located in the northern Sierra Nevada geomorphic province, between the Sierra crest to the west and the Carson Range to the east, and is one of the most prominent mountain ranges in California. Faulting and volcanism created the Tahoe Basin over 2 million years ago, and as a result, the basin contains granitic, metamorphic, and volcanic rock (Saucedo 2005). The predominant bedrock in the Tahoe Basin is Cretaceous granodiorite of the Sierra Nevada batholith. Cretaceous rock formed during the later period of the Mesozoic Era, characterized by the development of flowering plants and ending with the sudden extinction of the dinosaurs and many other forms of life. Pre-Cretaceous metamorphic rocks are found in localized areas.

Over the past 1.5 million years, the Tahoe Region has been altered by glacial activity, and most of the landforms surrounding the lake are a result of glaciation. During glacial activities, valley glaciers dammed the Truckee River Canyon, raising the water level of Lake Tahoe. Lakebed sediments were deposited in the bays and canyons around the lake as a result of the rising lake levels. The faulting, folding, and in some

cases overturning of rock formations that has taken place during various periods of geologic activity, in combination with erosion, deposition, and subsequent cementation of rock materials that occurred during relatively quiet periods, have left a complex arrangement of geologic rock types and structures in the area. However, the extraordinary clarity of Lake Tahoe is related to the prevalence of resistant granitic bedrock in the Tahoe Basin and the unusually small drainage basin relative to the size of Lake Tahoe.

The Plan area encompasses the portion of the Tahoe Basin that has been most strongly influenced by volcanic eruptions. The dominant geologic materials extending from California North Stateline to Homewood are ancient lava and mud flows. These materials are overlain by more recent glacial till and alluvial deposits along the Truckee River, Ward Creek, and Blackwood Creek. Near Ellis Peak, the extruded volcanic geologic material is replaced by the Rockbound Valley granodiorite with glacial till and glacial outwash in the lower elevations surrounding General Creek and McKinney Creek. Large ancient lakebed deposits are found in the Kings Beach and Tahoma.

## TOPOGRAPHY

The Plan area encompasses the entire north-western portion of the Lake Tahoe basin. The highest elevations and steepest slopes are at the crest of the basin, becoming moderate in the mid-slope region with gentle slopes near the edge of Lake Tahoe. The mountains are dissected by streams in moderately steep sided canyons including the Truckee River Canyon, Ward Creek Canyon, and Blackwood Canyon. Elevations range from 8740 feet above mean sea level (msl) at Ward Peak and Ellis Peak, to 6,224 feet above msl at lake level and approximately 6,100 feet about msl along the Truckee River.

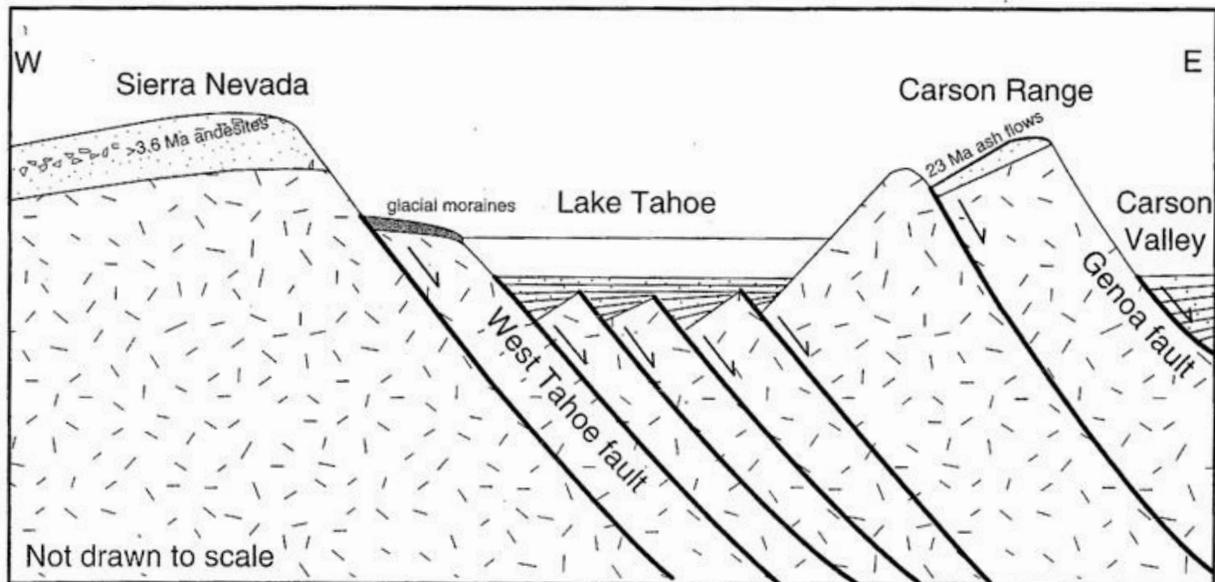
## SEISMIC SETTING

An earthquake is classified by the amount of energy released, which traditionally has been quantified using the Richter scale. Recently, seismologists have begun using a moment magnitude (M) scale because it provides a more accurate measurement of the size of large earthquakes. For earthquakes of less than M 7.0, the moment and Richter magnitude scales are nearly identical. For earthquakes greater than M 7.0, readings on the moment magnitude scale are slightly higher than the corresponding Richter magnitude.

The intensity of seismic shaking, or strong ground motion, during an earthquake is dependent on the distance and direction from the epicenter of the earthquake, the magnitude of the earthquake, and the geologic conditions of the surrounding area. Ground shaking could potentially result in the damage or collapse of buildings and other structures. Most earthquakes occur along faults, which are fractures or geological areas of weakness, along which rocks on one side have been displaced with respect to those on the other side. Most faults are the result of repeated displacement that may have taken place suddenly and/or by slow creep (Bryant and Hart 2007: p. 3).

Faulting was a key element in the formation of Lake Tahoe. The Tahoe Basin lies in a graben (a trench between two faults) between the Sierra Nevada and the Carson Range (as shown in Exhibit 14-1). The outlet of the Tahoe Basin was repeatedly dammed by volcanic eruptions and glacial ice dams (Schweickert et al. 2000).

The nature of the seismic hazard in the Tahoe Region was not appreciated for many years because the active faults within the Tahoe Basin are covered by the lake itself. The portions of the Tahoe Basin faults that show the greatest activity and strain are underwater, with activity diminishing as they move on-shore (Seitz and Kent 2004). Additionally, recent work analyzing sediment cores from the bottom of Lake Tahoe show that local earthquakes trigger landslides in the Lake (Seitz 2013). It is likely that many of the landslides evident with the Tahoe Basin (including the ancient, catastrophic, 5-mile wide landslide that formed McKinney Bay) were triggered by earthquakes (Dingler 2007).



Source: Schweickert et al. 2000

#### Exhibit 14-1

#### Model of Lake Tahoe Basin Half-Graben

The State Mining and Geology Board defines an active fault as one that has had surface displacement within the last 11,000 years (CGS 2008). Three active faults occur within the Tahoe Basin: The West Tahoe-Dollar Point Fault (the longest at 45 km long); the Stateline-North Tahoe Fault; and the Incline Village Fault (Brothers et al. 2009). Recent studies indicate that all three of these faults have experienced large rupture events within recent geologic time (Dingler 2007; Seitz and Kent 2004). Of the three faults, the West Tahoe-Dollar Point Fault has the fastest slip rate (the rate at which two faults pass each other or build tension) and its most recent confirmed rupture event was approximately 4,000 years ago (Brothers et al. 2009). The high slip rate, the height of scarps (earthquake generated breaks in topography) and the length of time since the last event indicate that the West Tahoe-Dollar Point Fault could generate an earthquake with a magnitude greater than 7 (Brothers et al. 2009). The height of scarps along the Incline Village fault show that this fault has experienced several magnitude 7 events and that it last ruptured approximately 575 years ago. (Schweickert et al. 2000; Seitz et al. 2005).

East of the Tahoe Basin, the Carson Range fault system, one of the Region's largest, runs for 60 miles along the east face of the Carson Range from Reno to Markleeville. The probability of at least one magnitude  $\geq 6.0$  event occurring in the Reno-Carson City urban corridor over a 50-year period is estimated to be between 34 percent and 98 percent, the probability of a magnitude  $\geq 6.6$  event between 9 percent and 64 percent, and the probability of a magnitude  $\geq 7.0$  event between 4 percent and 50 percent. These probabilities are relatively high and are similar to many parts of California (dePolo et al. 1997: p. 3).

The nearest mapped Alquist-Piolo Earthquake Fault Zone is located in the Minden-Gardnerville, NV area, approximately 30 miles south-east of the project site (CGS 2010).

#### Tsunami and Seiche

A tsunami is a wave or series of waves that may result from a major seismic event that involved the displacement of a large volume of water (such as rupture of a major fault), and may occur in any large body of water. A seiche is a periodic oscillation of an enclosed or restricted water body, typically a lake or reservoir, produced by seismic shaking. The action of a seiche is similar to the sloshing of a bathtub, with waves bouncing back and forth across the water body. Seiche waves can continue for hours following a tsunami inducing earthquake, causing extensive damage. Modeling of potential earthquakes occurring beneath Lake Tahoe indicate that a fault rupturing seismic event of magnitude 7.0 could trigger a tsunami,

followed by seiche with waves of up to 30 feet high along the shoreline of Lake Tahoe (Ichinose et al. 2000). Exhibits 14-2 and 14-3 show the land area within 30 vertical feet of the Lake Tahoe high water elevation in the Tahoe City and Kings Beach Town Centers.

### **Ground Failure/Liquefaction**

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid. Factors determining the liquefaction potential are soil type, the level and duration of seismic ground motions, the type and consistency of soils, and the depth to groundwater. Loose sands and peat deposits are susceptible to liquefaction, while clayey silts, silty clays, and clays deposited in freshwater environments are generally stable under the influence of seismic ground shaking (CGS 2008: pp. 35-37). Liquefaction poses a hazard to engineered structures. The loss of soil strength can result in bearing capacity insufficient to support foundation loads, increased lateral pressure on retaining or basement walls, and slope instability. Within the Plan area, sites underlain by relatively loose sandy soils and saturated deposits of fill combined with a shallow groundwater table, which typically are located in alluvial basins, floodplains, and beaches may be susceptible to liquefaction.

### **Subsidence**

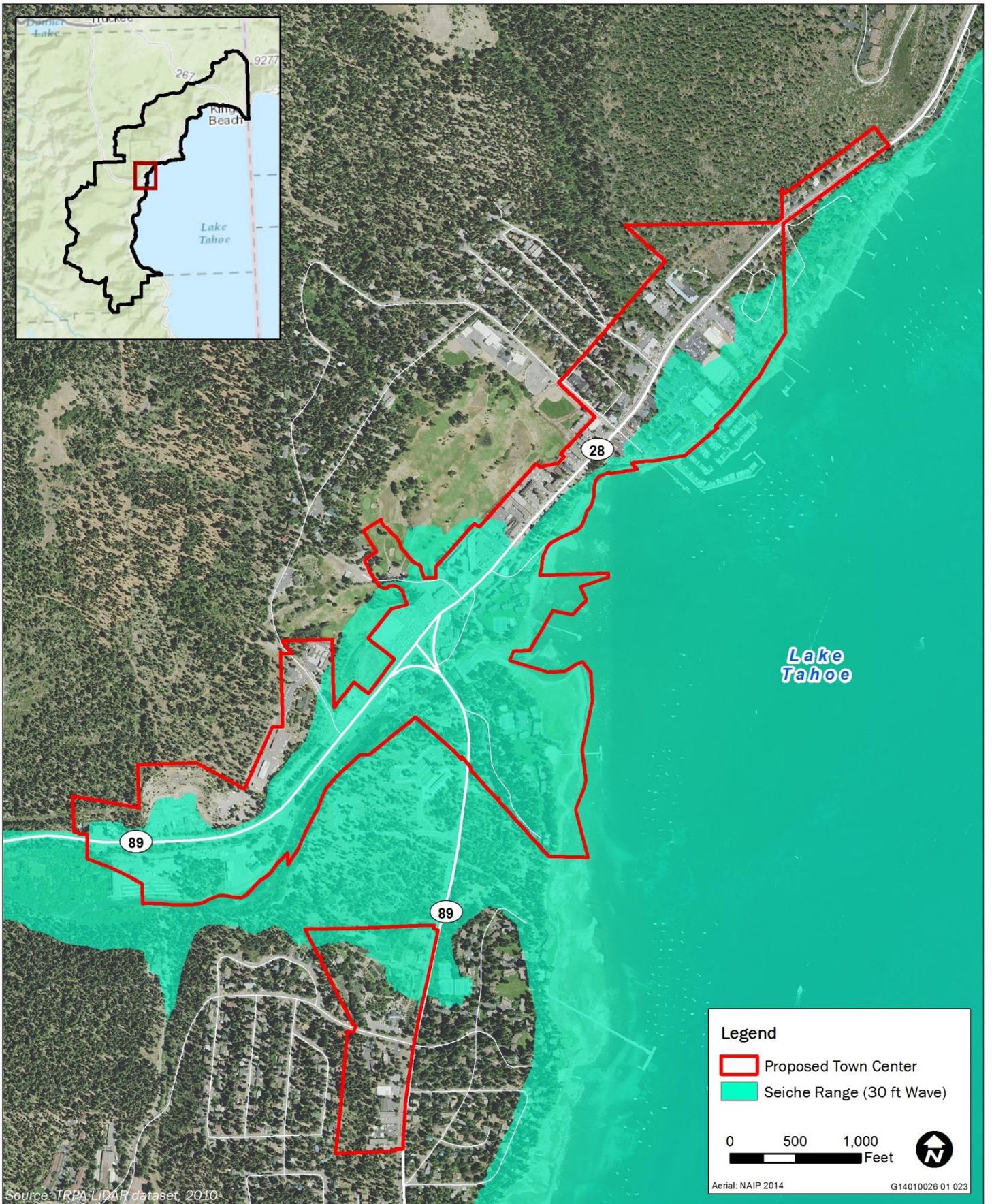
Land surface subsidence can be induced by both natural and human phenomena. Natural phenomena include: subsidence resulting from tectonic deformations and seismically induced settlements; soil subsidence from consolidation, hydrocompaction, or rapid sedimentation; subsidence from oxidation or dewatering of organic rich soils; and subsidence related to subsurface cavities. Subsidence related to human activity includes subsurface fluid or sediment withdrawal. Pumping of water for residential, commercial, and agricultural uses from subsurface water tables causes more than 80 percent of the identified subsidence in the United States (USGS 2000: p. 1). Lateral spreading is the horizontal movement or spreading of soil toward an open face, such as a streambank, the open side of fill embankments, or the sides of levees. The potential for failure from subsidence and lateral spreading is highest in areas where there is a high groundwater table, where there are relatively soft and recent alluvial deposits, and where creek banks are relatively high. There is no evidence that the region has experienced subsidence from groundwater extraction, however the project area contains alluvial deposits and areas of high groundwater that could be susceptible to subsidence and lateral spreading.

### **Slope Stability**

A landslide is the downhill movement of masses of earth material under the force of gravity. The factors contributing to landslide potential are steep slopes, unstable terrain, and proximity to earthquake faults. This process typically involves the surface soil and an upper portion of the underlying bedrock. Expansive soil on slopes tends to shrink and swell in response to moisture content changes. During this shrinking and swelling process, gravity tends to work the soil downslope. Movement may be very rapid, or so slow that a change of position can be noted only over a period of weeks or years (creep). The size of a landslide can range from several square feet to several square miles. The terrain within the project area is highly variable and contains slopes that may be susceptible to landslide or rockfall. These slopes are predominately located in undeveloped areas and are not present in the vicinity of the proposed Tahoe City Lodge.

## **SOILS**

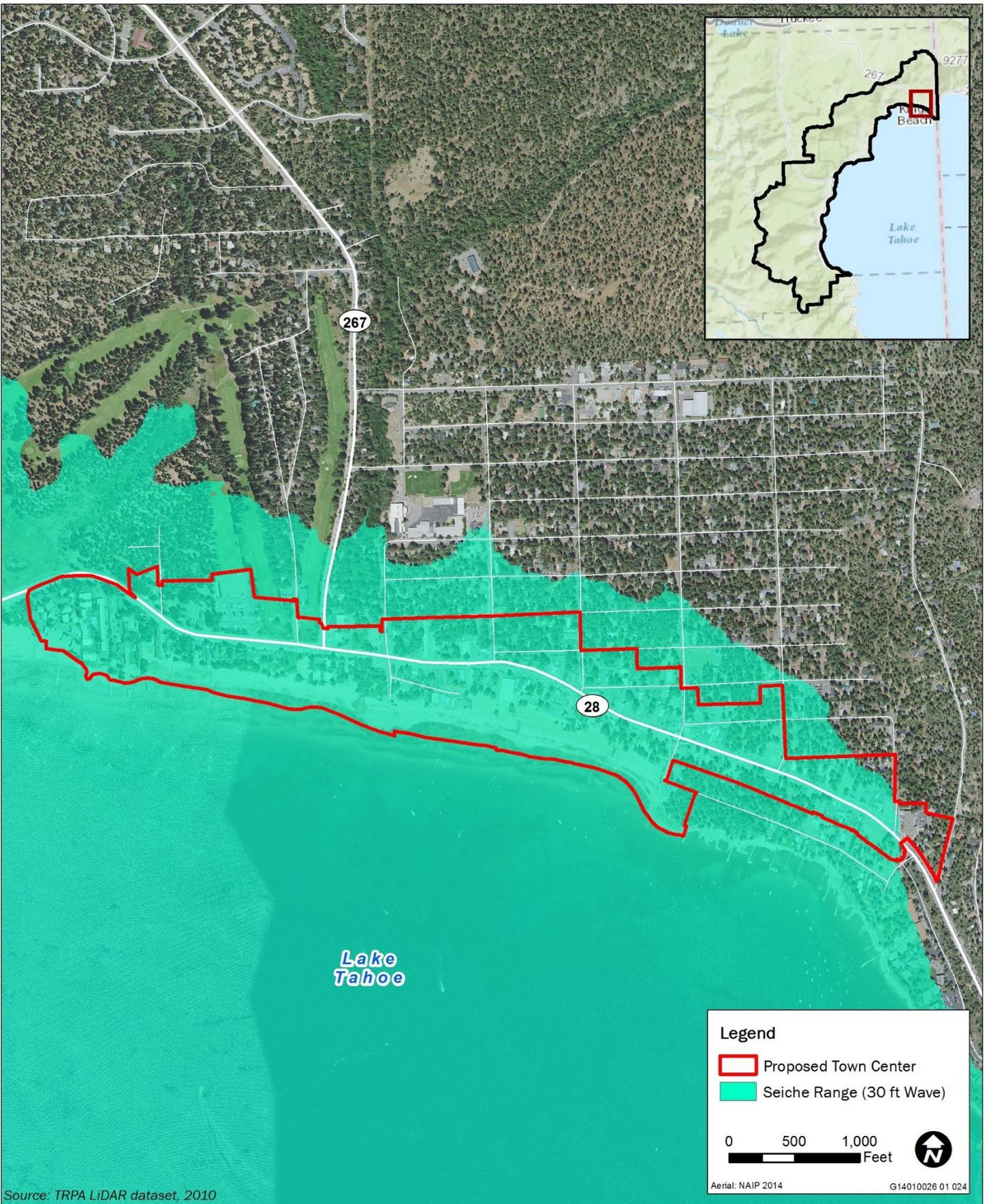
Soils are a critical element in land-use planning and environmental analysis in the Tahoe Basin. Many soil types occur within the project area. They are differentiated from each other by characteristics such as parent material, landscape position, texture, structure, organic matter content, depth to bed rock, depth to groundwater, and hydrologic function. Volcanic eruptions blanketed much of the project area in layers of ash, mud, and rubble. Over time these materials developed into the deep nutrient rich soils which dominate the landscape from Crystal Bay down to Homewood. Some portions of the project area south of Homewood contain granitic soil which formed from the hardened remnants of volcanic material that cooled in place without erupting. Granitic soils tend to be nutrient poor, and generally more susceptible to erosion. Overall, granitic soils account for only 2.7 percent of the project area. Because over 97 percent of project area soils



**Exhibit 14-2**

**Area within 30 Vertical Feet of the Lake Tahoe High Water Elevation in Tahoe City**





**Exhibit 14-3**

**Area within 30 Vertical Feet of the Lake Tahoe High Water Elevation in Kings Beach**



originated in extrusive (erupted) volcanic material, soils in similar landscape positions have similar qualities. Exhibit 14-4 shows the distribution of broad classes of soil types organized by landscape position, with further discussion provided in Table 14-3.

The soils on mountain slopes have generally formed in place, aside from the gradual erosive action of gravity which has thinned the upper slope soils, and deepened the mid slope and toe slope soils. The glaciers that followed Tahoe's volcanic period carved out the west shore canyons, leaving behind deep, rubbly, deposits of Glacial till. Soils in till or glacial outwash tend to have a great deal more gravels and cobbles than the alluvial soils often found adjacent to them.

After glaciers disappeared from the Tahoe Basin, the rivers and streams became the strongest soil altering force. The alluvial soils in the project area are the product of sediments that were carried by waterbodies and deposited in floodplains. These soils are very different from mountain slope and glacial soils because of the presence of a high water table that supports an abundance of moisture loving vegetation. Many sensitive ecosystems such as wetlands, meadows, and riparian areas are associated with alluvial soils.

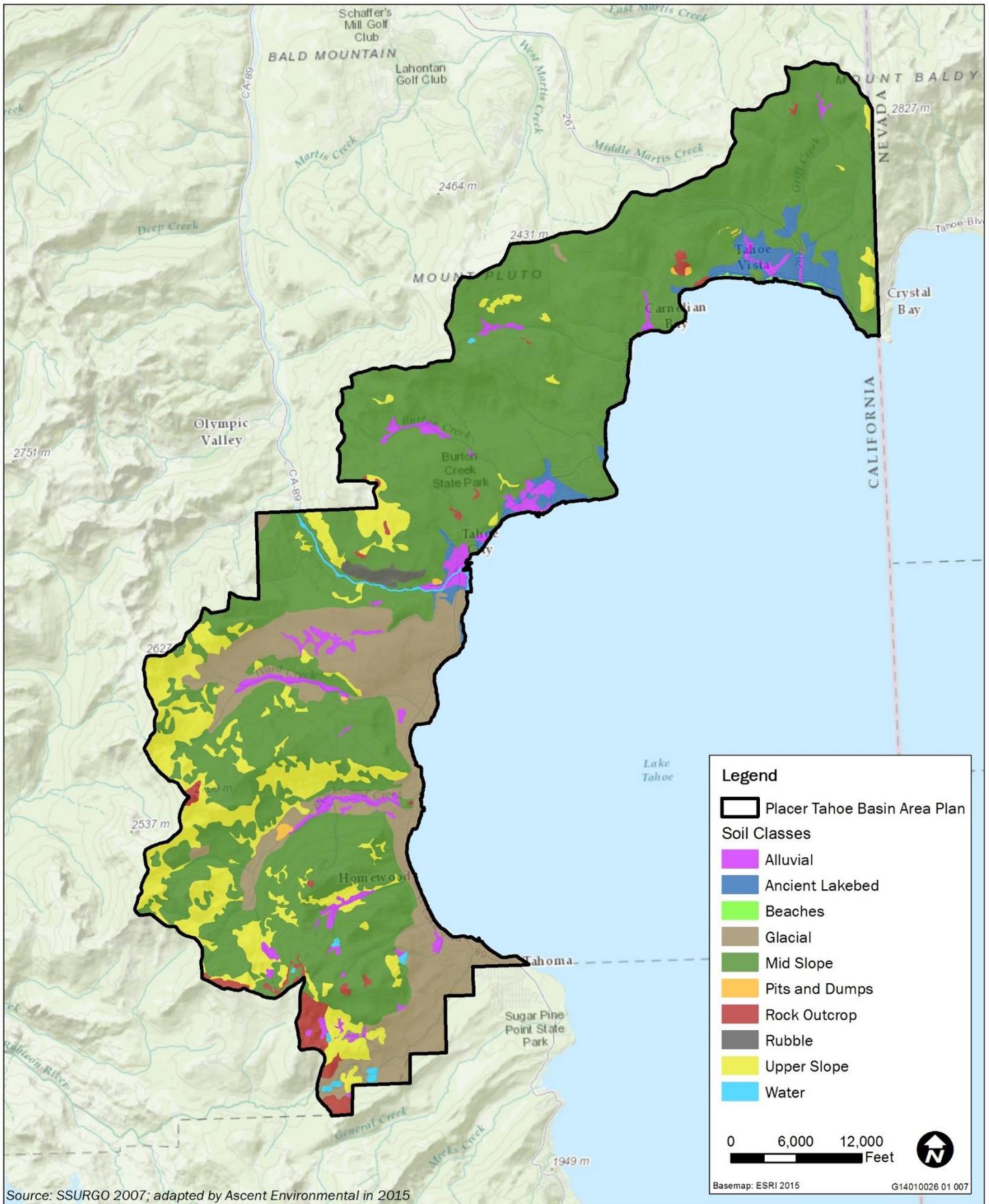
The final soil class in the project area is the Ancient Lakebed soils. These soils are the result of fluctuations in the water level in Lake Tahoe and consist of an upper profile of coarse textured volcanic material, which abruptly changes to dense, clay textured lakebed sediments. Although water moves easily through the upper portion of the soil profile, infiltration into the lakebed sediments is very slow creating a "perched" or artificially high water table. As a result, these soils are usually dry for 45 to 75 consecutive days in late summer and are moist for the rest of the year (NRCS 2007). Ancient Lakebed soils are typically associated with alluvial soils and support similar vegetation.

The Tahoe City Lodge site is underlain by a complex of soils dominated by the Tahoe soil type (Tahoe complex, 0-5 percent slopes, gravelly). As described in Table 14-3, the Tahoe soil type is made of deep alluvial deposits and is found on floodplains or outwash areas. This soil typically has a shallow seasonally high water table and for this reason has poor drainage. Approximately 20 percent of the Tahoe complex soil mapping unit is made up of similar alluvial soils such as Marla and Watah.

## Erosion Potential and Hazard Rating

Erosion is the process by which surface soils are detached and transported by water and/or wind. Erosion has a detrimental effect on soil productivity because erosion begins with the upper horizons of a soil profile, which contain organic matter and microbial communities vital to supporting plant growth. Factors that influence the erosion potential of a soil include: vegetative cover; soil properties such as soil texture, structure, rock fragments and depth; steepness and slope length; and climatic factors such as the amount and intensity of precipitation. The NRCS soil surveys provide a rating of Erosion Hazard resulting from disturbance of non-road areas. This rating is based on slope and soil erosion factor (K). The predicted soil loss is caused by sheet or rill erosion (which occurs when shallow flows of water causing sheet erosion coalesce into rills and thus increase both in velocity and scouring capacity) in off-road or off-trail areas where 50 to 75 percent of the surface has been exposed by some kind of disturbance. The hazard is described as "slight," "moderate," "severe," or "very severe." A rating of "slight" indicates that erosion is unlikely under ordinary conditions; "moderate" indicates that some erosion is likely and that erosion-control measures may be needed; "severe" indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and "very severe" indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical (NRCS 2007).

The erosion potential for soils within the Plan area is fairly balanced with approximately one third of the Plan area having slight, one third moderate, and one third severe or very severe erosion hazard ratings (see Table 14-4 below). Refer to Exhibit 14-5 for the geographic distribution of erosion hazard ratings throughout the Plan area. Within the proposed mixed-use areas, nearly 90 percent of the soil map units have an erosion hazard of slight or moderate, with only one percent rated as severe (see Table 14-5). For a table of erosion hazard rating within individual mixed-use areas, see Appendix K. The erosion hazard of the soils at the lodge site is mapped as slight.



Source: SSURGO 2007; adapted by Ascent Environmental in 2015

**Exhibit 14-4**

**Plan Area Soils**

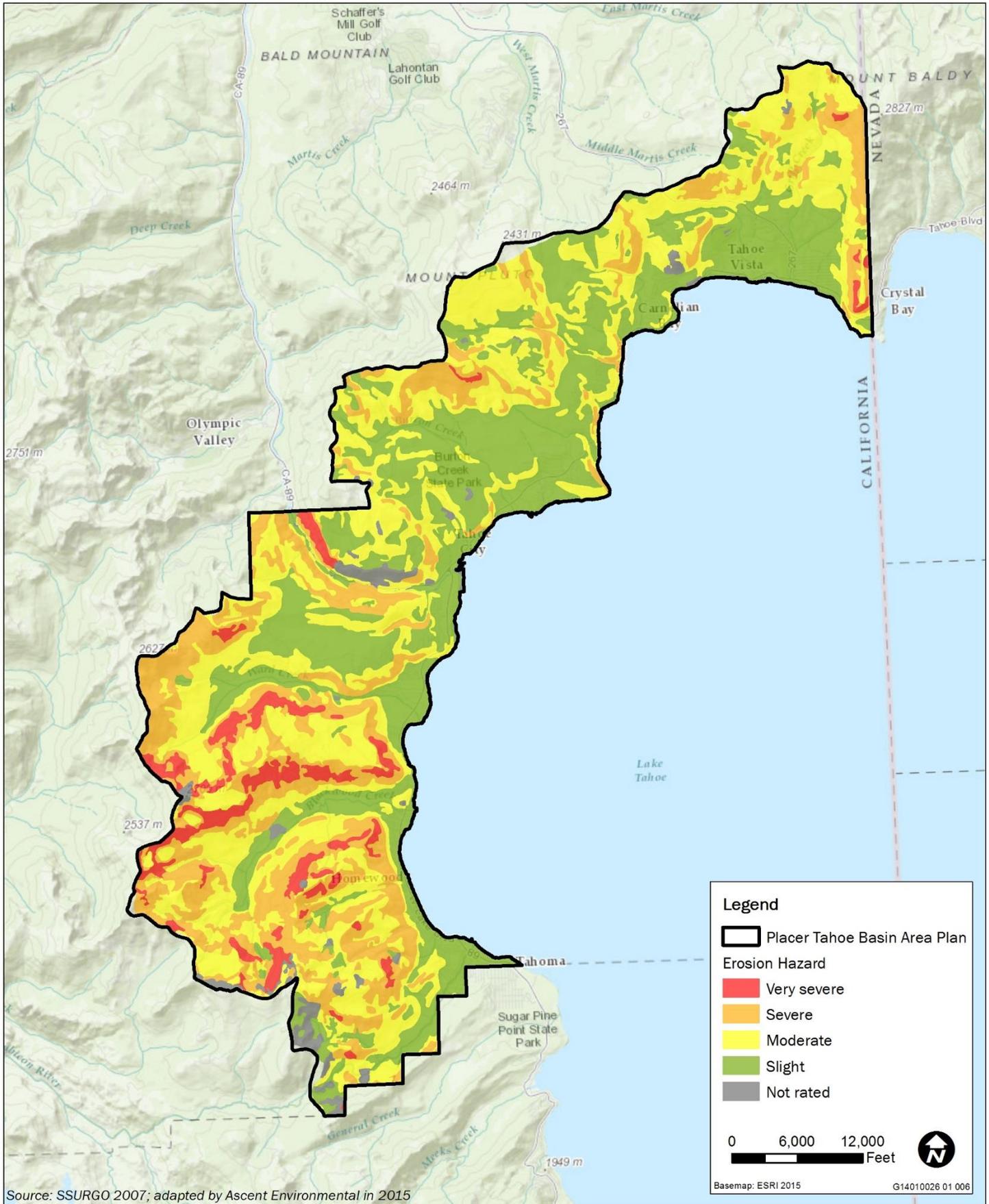


**Table 14-3 Characteristics of Project Area Soils**

Soil Types	Characteristics	% of Plan Area, (Acres)
<b>Alluvial Soils:</b> Tahoe, Watah, Oxyaquic Cryorthents, Bidart	These are soils formed in geologically recent alluvial deposits from streams and from Lake soils are generally found on floodplains. They are deep but generally poorly drained because of a high water table created by a nearby surface water or groundwater source. Their fine texture and high water content can make these soils susceptible to compaction.	2.7% (1,242)
<b>Ancient Lakebed Soils:</b> Kingsbeach	The Kingsbeach soil is an unusual case. It is formed in volcanic material atop ancient lake bed sediments. Although the upper portion of the soil profile is coarse textured and well drained, the lakebed sediments (beginning between 20 and 29 inches below the ground surface) restrict water movement through the soil creating a perched seasonally high water table.	2.7% (1,234)
<b>Glacial Soils:</b> Paige, Kneeridge, Tallac, Meeks	These soils formed in glacial moraines and outwash areas. The large amount of gravel and cobble contained in these soils differentiates them from adjacent alluvial soils. Glacial soils are very deep, and well drained. Surface textures are coarse sandy loams or loam coarse sands.	14.9% (6,917)
<b>Mid Slope Soils:</b> Jorge, Tahoma, Sky, Waca, Watsonlake, Cassenai, Dagget, Cagwin	These soils have typically weathered in place or from material moved down slope by gravity. Within the Plan area the parent material is generally volcanic, however some soils south of Homewood are granitic. As a rule, they are deep to very deep and well drained because of the high rock content. Surface textures are sandy loams or loamy coarse sand.	65.5% (30,321)
<b>Upper Slope Soils:</b> Ellispark, Melody, Temo	These are soils found on ridges and upper mountain slopes. They have a shallow depth to bedrock and are excessively well drained. Surface textures are sandy loams to coarse sands.	11.9% (5,458)
<b>Miscellaneous:</b> Rock Outcrop, Rubble Land, Pits and Dumps, Beaches	These map units are not true soils. They are either immovable (rock outcrops), disturbed (rubble lands and pits and dumps) or not stable enough to form a soil profile (beaches).	2.1% (1,071)
Source: NRCS 2007		

**Table 14-4 Summary of Erosion Hazard Ratings within the Plan Area**

Erosion Hazard Rating	Acres	% of Plan Area
Not Rated	1,543	3.3
Slight	15,428	33.2
Moderate	17,025	36.6
Severe	10,324	22.2
Very Severe	2,176	4.7
Source: NRCS 2007		



Source: SSURGO 2007; adapted by Ascent Environmental in 2015

**Exhibit 14-5**

**Plan Area Erosion Hazard Ratings**



**Table 14-5 Summary of Erosion Hazard Ratings within Proposed Mixed-Use Areas**

Erosion Hazard Rating	Acres	% of Mixed-Use Areas
Not Rated	61	9.8 %
Slight	544	86.8 %
Moderate	16	2.5 %
Severe	6	0.9%

Source: NRCS 2007

## Compaction Potential

Soil compaction refers to an increase in soil density or a loss of pore space. Soil pores provide storage space for the oxygen and water needed to facilitate biological activity within the soil. Compaction negatively impacts soil productivity and hydrologic function because compacted soils resist water absorption, restrict air movement around roots, and create a physical barrier to root development. All soils are more vulnerable to compaction when they are wet; however, fine textured, poorly drained soils with little organic matter are the most susceptible. The alluvial soils found within the Plan area are poorly drained with fine textured surface horizons, which could make them susceptible to compaction.

## Expansive Soils

Expansive soils contain shrink-swell clays that are capable of absorbing water. As water is absorbed the clays increase in volume. This change in volume is capable of exerting enough force on buildings and other structures to damage foundations and walls. Damage can also occur as these soils dry out and contract.

One measure of the shrink-swell potential of soils is linear extensibility. Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. The volume change is reported as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent, moderate if 3 to 6 percent, high if 6 to 9 percent, and very high if more than 9 percent. Within the Plan area, linear extensibility is low for all soil map units with the exception of the Kings Beach Stony Sandy Loam, which has moderate shrink-swell potential (Linear Extensibility of 5.4). This soil covers 1,207 acres (2.6 percent) of the Plan area as a whole, and 203 acres (32.3 percent) of the proposed mixed-use areas.

## LAND CAPABILITY AND COVERAGE

Since the late 1970s, TRPA has used a land capability classification system based on the ability of areas of soil to tolerate use without resulting in environmental damage (Bailey 1974). The Bailey map was based, primarily, on the best available soil, slope, and geomorphic hazard information available in 1974, when the classification system was created. The soil survey used to create the Bailey map was intended for use at a minimum scale of 1:24,000, which is suitable for comparing large areas for general land uses. This level of detail is not appropriate for planning the management of small sites or the locations of roads, buildings, or other structures (NRCS 2007). For this reason, TRPA uses the Bailey map as the starting point to determine the land capability and allowable coverage for a site on which a project is proposed. The actual land capability is determined through a land capability verification or challenge process, which uses an on-the-ground assessment and other available information to adjust the land capability districts as shown in the Bailey map. A land capability verification confirms and/or adjusts the soil type and LCD presented in the Bailey map, whereas a land capability challenge may allow for the identification of an entirely different soil type and LCD than presented in the Bailey map. Because the Area Plan is a large-scale planning document, the use of the Bailey land capability map is appropriate. It should be assumed however, that the LCD mapping developed by Bailey will be adjusted and refined based on site-specific soils data produced for individual projects.

The land capability of the Tahoe City Golf Course and lodge site has been verified by TRPA. The updated mapping is reflected in the following environmental analysis and in Exhibit 14-6, which encompasses the golf course and the location of the proposed lodge. Exhibits 14-6 and 14-7 show the TRPA LCD mapping for the Tahoe City and Kings Beach Town Centers and the boundaries of the TRPA delineated watersheds.

The watershed boundaries shown on Exhibits 14-6 and 14-7 (referred to as subwatersheds in Chapter 15, “Hydrology and Water Quality”) are included on these exhibits for reference purposes only. Because the town center areas have been highly modified by urban development, drainage patterns do not align with the topographic watershed boundaries and instead are directed by stormwater management infrastructure. Chapter 15 contains an analysis of the effects of changes in land coverage on water quality, based on small watersheds (known as catchments), which reflect the actual drainage patterns under current conditions.

The Bailey Land Capability system assigns LCDs based primarily on soil characteristics and slope. The LCDs reflect the amount of development the site can support without experiencing soil or water quality degradation. The LCDs range from 1 to 7, with 1 being the most environmentally sensitive and 7 being most suitable for supporting development. LCD 1b is applied to land that is influenced by surface water or high groundwater and is also referred to as “Stream Environment Zone” or SEZ. The amount of compacted or impervious surface, known as Coverage, allowed with a given parcel is limited by its LCD. The amount of existing and allowable land coverage within the Plan area is shown in Table 14-6 below. Existing land coverage as show in Table 14-6 was estimated using TRPA’s 2010 high resolution LiDAR data set and does not reflect TRPA verified land coverage.

**Table 14-6 Existing Land Capability and Coverage Within the Plan Area**

Land Capability District	Total Area (acres)	Base Allowable Coverage	Allowable Coverage (acres)	Existing Coverage (acres)	Available Coverage (acres)
1a	8,676	1%	87	53	34
1b	2,962	1%	30	223	-193
1c	11,509	1%	115	68	47
2	1,973	1%	20	12	8
3	4,756	5%	238	112	126
4	3,162	20%	632	58	574
5	7,660	25%	1,915	659	1,256
6	5,404	30%	1,621	256	1,365
7	0	30%	0	0	0
Water	416	n/a	0	4	-4
Total	46,518		4,658	1,445	3,213

Source: Placer County 2013

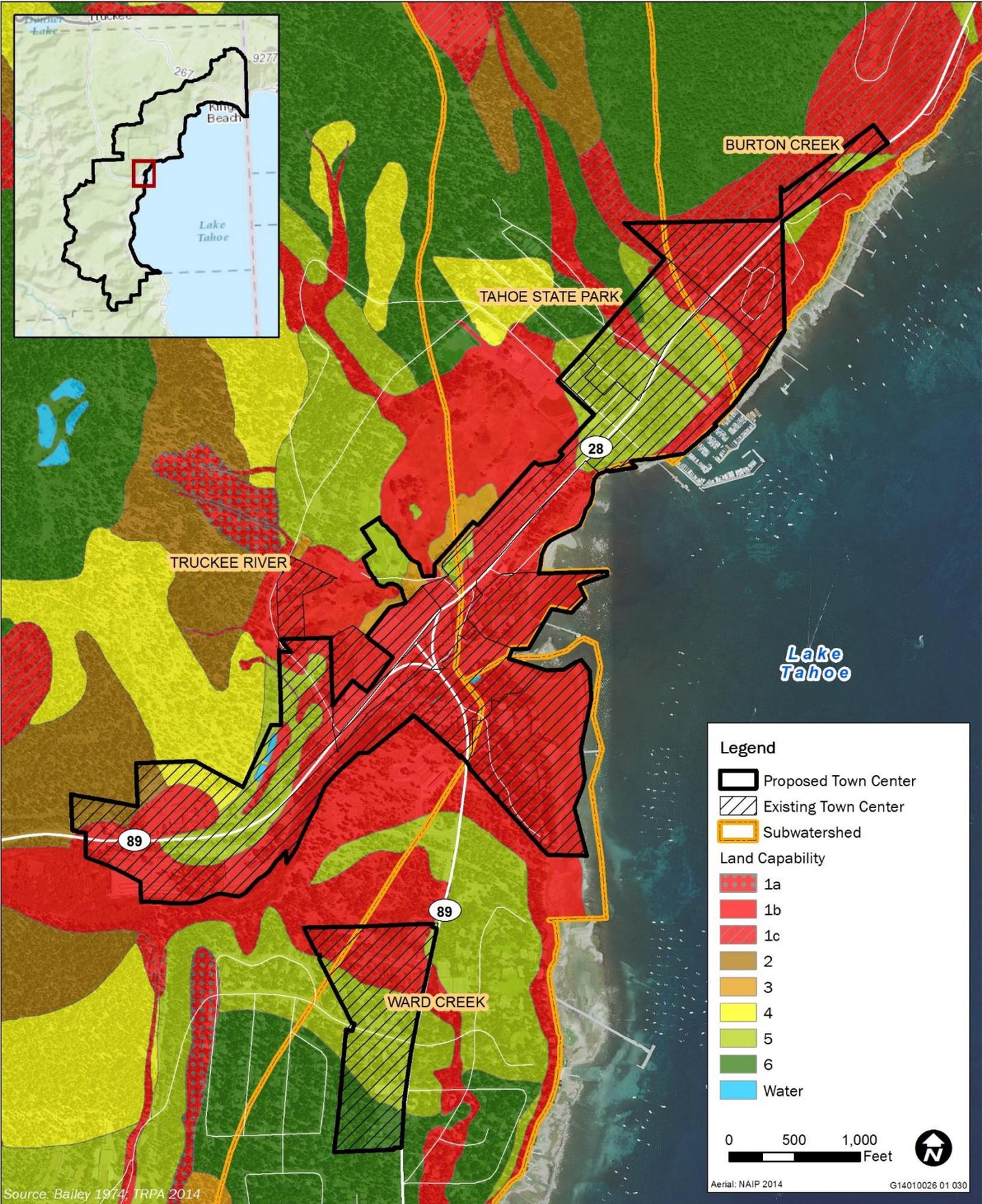
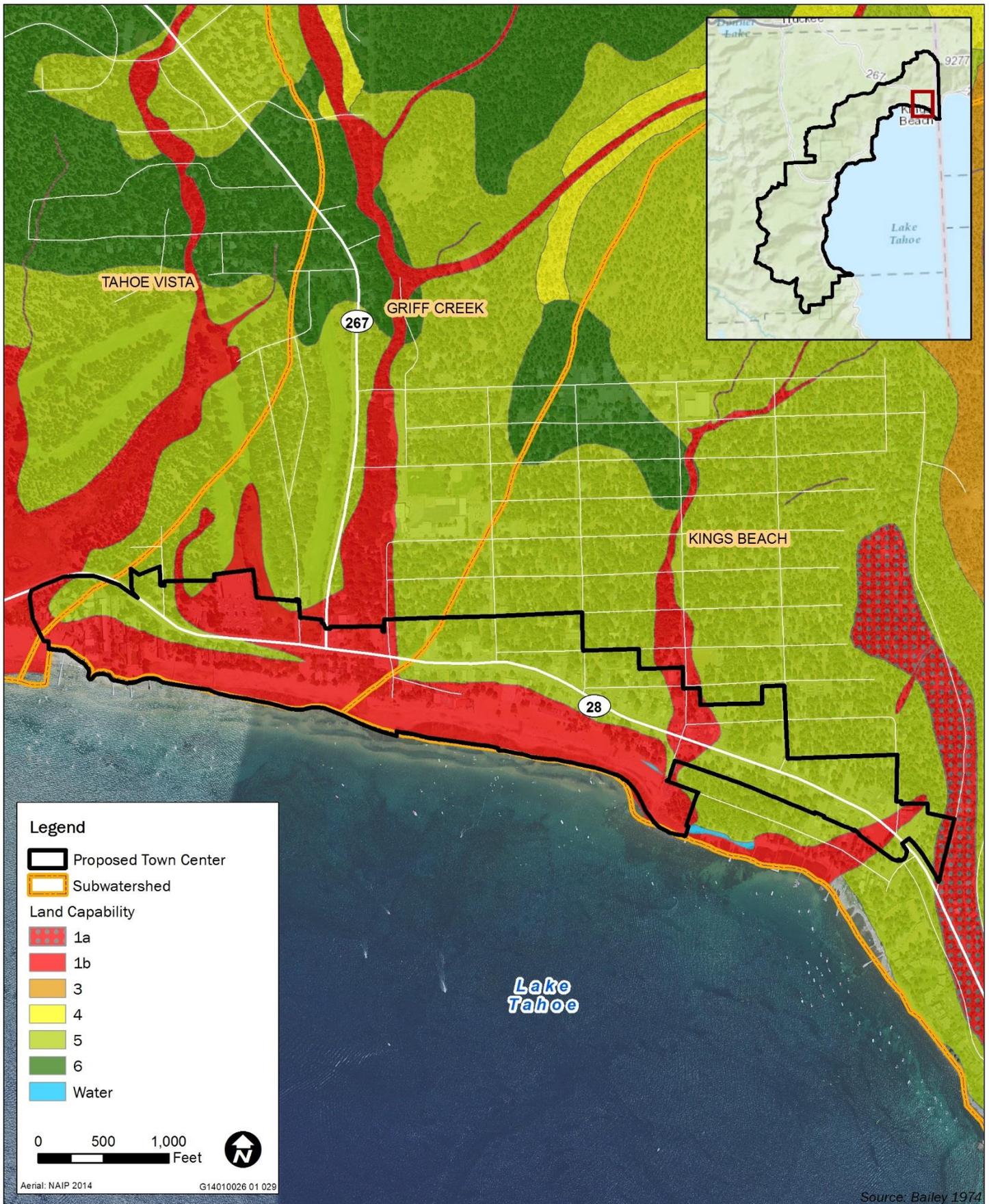


Exhibit 14-6

Tahoe City Land Capability Districts





**Exhibit 14-7**

**Kings Beach Land Capability Districts**



## 14.4 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

### 14.4.1 Methods and Assumptions

The evaluation of coverage changes and potential geologic and soil impacts is based on a review of documents pertaining to the project study area, including CGS and USGS technical guides; the NRCS 2007 Soil Survey; TRPA regulations and planning documents; environmental impact reports; background reports prepared for plans and projects in the vicinity; and published and unpublished geologic literature. The information obtained from these sources was reviewed and summarized to understand existing conditions and to identify potential environmental effects, based on the thresholds of significance. In determining the level of significance, the analysis assumes that the proposed project would comply with relevant, federal, state, and local laws, regulations, and ordinances. The analysis of the proposed Area Plan evaluates the effects of implementing policies and standards that would apply under each Area Plan alternative. The lodge project alternatives are evaluated separately to determine the site-specific effects of constructing and operating each alternative.

Potential soil and geologic effects associated with the project alternatives can be classified as temporary or permanent. Temporary impacts generally include effects associated with construction activities, such as ground disturbance and short term increases in turbidity. Permanent impacts would be associated with proposed facilities, such as new impervious land coverage and deep soil and geologic disturbance.

### 14.4.2 Significance Criteria

Significance criteria relevant to Geology, Soils, Land Capability and Coverage are summarized below.

#### TRPA CRITERIA

The “Land” criteria from the TRPA Initial Environmental Checklist were used to develop significance criteria to evaluate the Geology, Soils, Land Capability, and Coverage impacts of the alternatives. Impacts would be significant if the project would:

- ▲ compact or cover soil with impervious surfaces beyond that limits allowed by the land capability districts;
- ▲ change the topography or ground relief features in a manner inconsistent with the natural surrounding conditions;
- ▲ substantially change undisturbed soil or native geologic substructures;
- ▲ increase wind or water erosion of soils, or change siltation or deposition such that channel of a stream or river or the bed of Lake Tahoe could be modified; or
- ▲ substantially increase exposure of people or property to geologic hazards such as earthquakes, landslides, backshore erosion, avalanches, mud slides, ground failure, seiche, or similar hazards.

#### CEQA CRITERIA

Based on Appendix G of the State CEQA Guidelines and the Placer County CEQA Checklist, impacts to Geology, Soils, Land Capability, and Coverage would be significant if the project would:

- ▲ result in substantial soil erosion or the loss of topsoil;

- ▲ expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving: rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure, including liquefaction, or landslides;
- ▲ result in substantial risk of inundation by seiche, tsunami, or mudflow; or
- ▲ be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property.

### 14.4.3 Environmental Effects of the Project Alternatives

#### Impact 14-1: Create compaction or land coverage beyond TRPA limits

Area Plan Alternatives 1, 2, and 3 could result in land coverage changes that are consistent with and implement the TRPA Code of Ordinances. Although there would be a small increase in coverage within Town Centers, this change would be accompanied by transfers of land coverage and retirement of coverage on sensitive lands and lands outside of Town Centers, which would result in an overall reduction in land coverage. Because Alternatives 1 through 3 would implement land coverage standards that are consistent with TRPA coverage limits, the Area Plan alternatives would have a **less-than-significant** impact related to the creation of compaction or land coverage as it is managed by TRPA. The Tahoe City Lodge components of Alternatives 1 through 3 would result in different amounts of overall coverage reduction and SEZ restoration, with net increases in coverage in some LCDs. Under Alternative 2, the lodge project would result in decreases in coverage in all LCDs and coverage changes would be consistent with TRPA limits, resulting in a **less-than-significant** impact. Lodge Alternatives 1 and 3 would result in a net increase in coverage within LCD 3, which would exceed TRPA limits. This would be a **potentially significant** impact. This impact would be reduced through compliance with Mitigation Measure 14-1, which would require that the lodge site plan be refined to reduce coverage in LCD 3 and comply with TRPA limits. This mitigation would reduce Alternatives 1 and 3 to a **less-than-significant** level. Alternative 4 is the no action alternative for the Area Plan and the lodge and would have **no impact** related to coverage.

#### Placer County Tahoe Basin Area Plan Program-Level Analysis

##### Alternative 1: Proposed Area Plan

The proposed Area Plan would implement the redevelopment incentives included in the Regional Plan, including changes to maximum transferred coverage limits within the Tahoe City and Kings Beach Town Centers. Currently, developed parcels within the Tahoe City and Kings Beach Town Centers are allowed up to 50 percent coverage on high capability lands (LCDs 4 through 7) and undeveloped parcels are allowed up to 70 percent. Under Alternative 1, high capability lands within the Tahoe City and Kings Beach Town Centers would be allowed up to 70 percent coverage (base allowable plus transferred coverage) for both developed and undeveloped parcels, provided that they are either (1) located on the mountain side of SR 28, or (2) are further than 300 feet from Lake Tahoe (TRPA Code Section 3.4.2.B.1). Consistent with the Regional Plan, the amount of land coverage beyond the base allowable amount would be transferred from other parcels. This increase in transferred land coverage in town centers would directly affect the both the Kings Beach Center design concept and the Tahoe City Lodge. The potential effect of this policy was analyzed in the TRPA PRU EIS Impact 3.7-1 (TRPA 2012b: pp. 3.7-18 to 3.7-19) and was determined to be less-than-significant.

This coverage standard conforms to the land coverage restrictions of TRPA Code Section 30.4.2.B.1, pp 30-16. Projects wishing to take advantage of the increased maximum allowable coverage would be required to transfer the coverage that exceeds the base allowable from within the same Hydrologically Related Area (HRA) as defined by TRPA Code Section 30.4.3.E. The Plan area is approximately aligned with the McKinney Bay, Tahoe City, and Agate Bay HRAs). Coverage can be transferred across HRAs when the sending parcel is located in sensitive lands (LCDs 1 through 3) and the receiving parcel is located in non-sensitive land (LCDs 4 through 7) and the receiving parcel is located further than 300 feet from Lake Tahoe or on the

**Table 14-7 Land Coverage within Town Centers**

LCD	Existing					Alternative 1				Alternative 2				Alternative 3			
	Max Allowable Coverage <sup>1</sup> (%)	Max Allowable Coverage (Acres)	Existing Coverage (Acres)	Available Coverage (Acres)	Coverage Transferred into TC <sup>4</sup> (Acres)	Max Allowable Coverage <sup>2</sup> (%)	Max Allowable Coverage (Acres)	Increase in Coverage Within TC <sup>3</sup> (Acres)	Coverage Transferred into TC <sup>4</sup> (Acres)	Max Allowable Coverage <sup>2</sup> (%)	Max Allowable Coverage (Acres)	Increase in Coverage Within TC <sup>3</sup> (Acres)	Coverage Transferred into TC <sup>4</sup> (Acres)	Max Allowable Coverage (%)	Max Allowable Coverage (Acres)	Increase in Coverage Within TC <sup>3</sup> (Acres)	Coverage Transferred into TC <sup>4</sup> (Acres)

**Tahoe City Town Center**

1b	1%	1.08	36.09	-35.01	-	1%	1.02	0	-	1%	1.08	0	-	1%	1.02	0	-
1c	1%	0.09	1.78	-1.68	-	1%	0.09	0	-	1%	0.09	0	-	1%	0.09	0	-
2	1%	0.03	0.1	-0.07	-	1%	0.03	0	-	1%	0.03	0	-	1%	0.03	0	-
3	5%	0	0	0		5%	0.10	0	-	5%	0	0	-	5%	0.10	0	-
4	50% to 70%	1.35	0.55	0.8	0.79	70%	1.88	0.43	1.32 to 2.64	70%	1.88	0.43	1.32 to 2.64	50%	1.35	0	0.79
5	50% to 70%	18.26	18.8	-0.53	4.25	70%	26.14	3.69	7.63 to 15.26	70%	23.93	3.14	7.51 to 15.02	50%	20.31	0	4.32
6	50% to 70%	2.52	1.31	1.22	0.92	70%	3.54	0.75	1.84 to 3.68	70%	3.54	0.75	1.84 to 3.68	50%	2.52	0	0.92
<b>Totals</b>		<b>23.80</b>	<b>58.61</b>	<b>-34.79</b>	<b>5.96</b>		<b>32.80</b>	<b>4.87</b>	<b>10.79 to 21.58</b>		<b>30.55</b>	<b>4.32</b>	<b>10.67 to 21.33</b>		<b>25.42</b>	<b>0.00</b>	<b>6.03</b>

**Kings Beach Town Center**

1a	1%	0.008	0.07	-0.06	-	1%	0.008	0	-	1%	0.008	0	-	1%	0.008	0	-
1b	1%	0.59	16.17	-15.57	-	1%	0.59	0	-	1%	0.59	0	-	1%	0.59	0	-
5	50% to 70%	22.76	20.22	2.54	6.83 to 13.65	70%	28.72	3.52	10.51 to 21.03	70%	28.72	3.52	10.51 to 21.03	50%	22.43	0	6.5
<b>Totals</b>		<b>23.36</b>	<b>36.46</b>	<b>-13.09</b>	<b>6.83 to 13.65</b>		<b>29.32</b>	<b>3.52</b>	<b>10.51 to 21.03</b>		<b>29.32</b>	<b>3.52</b>	<b>10.51 to 21.03</b>		<b>23.03</b>	<b>0.00</b>	<b>6.5</b>

<sup>1</sup>Max Allowable Coverage under existing conditions. Undeveloped parcels in town centers are allowed up to 70% coverage on high capability lands (no available undeveloped parcels in the Tahoe City TC).  
<sup>2</sup>Max Allowable Coverage under Alternatives 1 - 3 = Base Allowable Coverage + Maximum Transferred Coverage. Parcels within 300 feet of Lake Tahoe (Up to SR 207) are limited to 50% Maximum Allowable Coverage.  
<sup>3</sup>Increase in Coverage within TC = Max Allowable Coverage - (greater of Existing Coverage or Existing Max Allowable Coverage)  
<sup>4</sup>Coverage Transfer = Max Allowable Coverage - Base Allowable Coverage (excludes over covered parcels). Coverage transfer for parcels exceeding 50% coverage uses a sliding scale transfer ratio from 1:1 at 50% coverage to 2:1 at 70% coverage. A range of transferred coverage is not shown for existing conditions or Alternative 4 in Tahoe City because all parcels are limited to 50% land coverage in these scenarios.  
 Source: TRPA 2010, Placer County 2015, Adapted by Ascent Environmental.

mountain side of SR 28. Coverage would also be transferred at ratios described in TRPA Code Section 30.4.3.A, would incentivize transfers from more sensitive lands to less sensitive lands, and result in a net reduction in coverage. A summary of the likely effects of the action alternatives on land coverage is included in Table 14-7. Raising the maximum allowable transferred coverage within the town centers would result in a potential increase of 4.8 acres of coverage within the Tahoe City Town Center. However, this increase would be coupled with the requirement to restore or retire and transfer 10.79 to 21.58 acres of coverage.

In the Kings Beach Town Center, Alternative 1 would result in an increase in coverage of up to 3.52 acres and a reduction of 10.51 to 21.03 acres of coverage elsewhere required for transfers. As described in the RPU EIS (TRPA 2012b p 3.7-41), the increase in coverage within town centers would be directly offset by coverage transferred from elsewhere within the same Hydrologically Related Area (including transfers from sensitive lands) resulting in an overall reduction in land coverage within the Area Plan.

Alternative 1 includes a change to the Tahoe City Town Center boundary to exclude three parcels located entirely in LCD 1B (APN numbers 094-540-012, 094-540-002, and 094-060-012) and to include portions of two parcels (APN numbers 094-020-006 and 094-540-003) located in LCDs 1B, 3, and 5. No change in allowable land coverage would occur on LCDs 1B or 3 regardless of their location inside or outside of the town center, because the increased maximum allowable coverage within Town Centers would only apply to LCDs 4 through 7. The change in the town center boundary proposed by Alternative 1 would bring an additional 0.90 acres of LCD 5 into the Tahoe City Town Center. Although LCD 5 would be allowed up to 70 percent land coverage, the maximum allowable land coverage would only increase by 0.14 acres (6,098 sf) because of existing coverage on the parcels added to the town center under this alternative. This increase in coverage would require the purchase and transfer of 0.12 acres (5,227 sf) to 0.24 acres (10,454 sf) of coverage as described in TRPA Code Sections 30.4.2.B.1, and 30.4.3.A.2. The actual amount of land coverage transferred onto the site would depend on the source of the coverage and the final amount of land coverage on the receiving parcel. For example, coverage transfers from sensitive lands may be transferred at a 1:1 ratio until the maximum allowable coverage is reached. The transfer ratio for coverage from non-sensitive lands begins at 1.05:1 for project resulting in 50 to 51 percent coverage, and the ratio increases to 2:1 for projects with a final coverage of 68 to 70 percent (see TRPA Code Table 30.4.4-1, Transfer Ratios).

In addition to the modification of the Tahoe City Town Center boundary, Alternative 1 would institute a policy allowing projects to use noncontiguous parcels within town centers. Although this policy could result in concentrated development in some portions of a given town center, the increase in land coverage in these area would be offset by the required reduction in coverage in the other portions of the project area in order to comply with TRPA Code Chapter 35. Noncontiguous parcels are currently permitted for use by industrial projects, in TRPA Redevelopment Areas, and for Environmental Improvement Projects (TRPA Code Section 30.4.1.C.2(v)). Additionally, TRPA Code Chapter 13 allows the development of alternative comprehensive coverage management systems which could designate areas of higher land coverage and lower land coverage, similar to the effect of noncontiguous project areas but on a larger scale. The existing provisions for noncontiguous parcels, alternative comprehensive coverage management systems, and the proposed use of noncontiguous parcels within town centers all comply (or would comply) with TRPA land coverage limits and would not result in a net increase in land coverage within any LCD. Also, use of the proposed policy would require TRPA approval (Implementing Regulations Section 1.04 (G)). Therefore, permitting the use of noncontiguous parcels within town centers would not result in an increase in land coverage beyond the TRPA established limits.

Implementation of Alternative 1 would result in coverage changes that are consistent with the TRPA Code of Ordinances. Although there would be a small increase in coverage within town centers, this change would be accompanied by transfers in land coverage, which would result in an overall reduction in land coverage. For these reasons, Alternative 1 would have a **less-than-significant** impact related to the creation of compaction or land coverage as it is managed by TRPA.

#### **Alternative 2: Area Plan with No Substitute Standards**

Alternative 2 would result in land coverage changes that are similar to Alternative 1. Because Alternative 2 would not include the modification of the Tahoe City Town Center boundary, the possible increase in

coverage in the Tahoe City Town Center would be lower by approximately 0.55 acres, with a corresponding reduction in transferred coverage of 0.12 to 0.25 acres. Refer to Table 14-7 for a summary of coverage changes within town centers. For the same reasons as Alternative 1, Alternative 2 would have a **less-than-significant** impact related to the creation of compaction or land coverage as managed by TRPA.

### **Alternative 3: Reduced Intensity Area Plan**

For Alternative 3, the maximum allowable transferred land coverage on developed parcels within town centers would remain at 50 percent of high capability lands. Undeveloped parcels within town centers would no longer be allowed up to 70 percent coverage of high capability lands. In the Tahoe City Town Center, all undeveloped parcels are located on low capability lands, so this change in policy would have no effect on land coverage in the Tahoe City Town Center. However, in the Kings Beach Town Center, there are several undeveloped parcels located on high capability lands that are permitted up to 70 percent coverage under current regulations. These parcels would be limited to 50 percent coverage of high capability lands under Alternative 3. As a consequence, Alternative 3 would result in a 0.33-acre decrease in maximum allowable coverage within the Kings Beach Town Center. This decrease in allowable land coverage would result in a 0.33 to 7.15-acre decrease in the amount of coverage that could be removed elsewhere to allow for transfers into the town center.

In the Tahoe City Town Center, Alternative 3 would include the same town center boundary modification described in Alternative 1. This would increase the amount of LCD 5 within the town center by 0.90 acres, however because of existing land coverage on the added parcels and the lower maximum allowable coverage limits in Alternative 3, the inclusion of these parcels in the Tahoe City Town Center would not result in an increase in allowable land coverage. Because Alternative 3 would result in a decrease in the amount of land coverage allowable in the Kings Beach town center and no changes elsewhere, it would have a **less-than-significant** impact related to the creation of compaction or land coverage.

### **Alternative 4: No Project**

Alternative 4 is the no project alternative. Under this alternative, no changes would be made to the existing land coverage regulations within the Plan area. Under the existing coverage regulations, redevelopment which adds coverage up to the maximum allowable could result in a 6.83 to 13.65-acre decrease in the amount of coverage that could be removed elsewhere to allow for transfers into the town center. Because Alternative 4 would be a continuation of existing land coverage policies, there would be **no impact** related to this significance criterion.

### **Tahoe City Lodge Project-Level Analysis**

The redevelopment of the Tahoe City Lodge and the associated modifications to the Tahoe City Golf Course Clubhouse and SEZ restoration would create changes in the existing land coverage pattern within the Plan area. Table 14-8 provides a summary of land capability changes for the four Tahoe City Lodge alternatives under consideration.

### **Alternative 1: Proposed Lodge**

Alternative 1 would decrease land coverage on the lodge site by a total of 10,080 square feet (sf). In addition, the SEZ restoration component of the project would restore the health and function of 74,052 sf (1.7 acres) of disturbed, but not covered, SEZ (LCD 1b) areas. Coverage in LCD 5 would decrease by 11,202 sf, and the resulting coverage in LCD 5 would be well below the maximum transferred coverage limits allowed by the TRPA Code of Ordinances and the proposed Area Plan.

Coverage in LCD 1b would be reduced by 3,205 sf. However, coverage would increase by 4,327 sf in LCD 3. LCD 3 already exceeds the allowable coverage limits within the Plan area. Coverage removed from LCD 1b could be relocated to LCD 3 consistent with TRPA Code Section 30.4.4. After relocation of coverage from LCD 1b to LCD 3, the project would still result in a net increase of 1,122 sf of coverage in LCD 3. This increase in LCD 3 coverage would be prohibited by TRPA Code Chapter 30, thus implementation of Alternative 1 would create a **potentially significant** impact to land coverage.

**Table 14-8 Tahoe City Lodge Land Coverage Changes by Alternative**

LCD	Existing Conditions					Alternative 1			Alternative 2			Alternative 3			Alternative 4
	Plan Area (sf)	Base Allowable Land Coverage (%)	Base Allowable Land Coverage (sf)	Verified Existing Coverage (sf)	Existing Coverage (%)	Proposed Coverage (sf)	Proposed Coverage (%)	Net Change in Coverage (sf)	Proposed Coverage (sf)	Proposed Coverage (%)	Net Change in Coverage (sf)	Proposed Coverage (sf)	Proposed Coverage (%)	Net Change in Coverage (sf)	Same as Existing Conditions (No Change in Coverage)
1b	23,864	1%	239	21,880	92%	18,675	78%	-3,205	18,783	79%	-3,097	18,955	79%	-2,925	
3	53,726	5%	2,686	33,465	62%	37,792	70%	4,327	31,553	59%	-1,912	37,569	70%	4,104	
5	90,885	25%	22,721	59,700	66%	48,498	53%	-11,202	43,300	43%	-16,400	55,566	61%	-4,134	
<b>Total</b>	<b>168,475</b>		<b>25,646</b>	<b>115,045</b>	<b>68%</b>	<b>104,965</b>	<b>62%</b>	<b>-10,080</b>	<b>93,636</b>	<b>53%</b>	<b>-21,409</b>	<b>112,090</b>	<b>67%</b>	<b>-2,955</b>	

Source: Auerbach 2015

**Alternative 2: Reduced Scale Lodge**

Alternative 2 would result in a greater net reduction of coverage than Alternative 1, with a total reduction of 21,409 sf of coverage across all LCDs on the lodge project site. However, Alternative 2 would not include the SEZ restoration component included in Alternative 1, and it would not result in the 74,052 sf (1.7 acres) of SEZ restoration realized under Alternative 1. Coverage in LCD 1b would decrease by 3,097 sf, which is similar to Alternative 1. In LCD 3, coverage would be reduced by 1,912 sf, and in LCD 5 coverage would be reduced by 16,400 sf. Because Alternative 2 would result in a net decrease in coverage in all LCDs, which would conform to TRPA Code Chapter 30, this alternative would have a **less-than-significant** impact to land coverage.

**Alternative 3: Reduced Height Lodge**

Implementation of Alternative 3 would result in a smaller decrease in land coverage than Alternatives 1 and 2, with a total decrease of 2,955 sf. Alternative 3 would include the same SEZ restoration as Alternative 1, resulting in the restoration of 74,052 sf (1.7 acres) of disturbed, but not covered, SEZ areas. Within LCD 1b, Alternative 3 would result in a 2,925 sf decrease in coverage. In LCD 3, land coverage would increase by 4,104 sf. As with Alternative 1, the 2,925 sf of coverage removed from LCD 1b could be relocated to LCD 3 pursuant to TRPA Code Section 30.4.4. After relocation of coverage from LCD 1b to LCD 3, the project would still result in a net increase of 1,179 sf of coverage in LCD 3, which would be prohibited by TRPA Code Chapter 30. Because Alternative 3 would create land coverage which does not comply with the established TRPA limits, implementation of this alternative would have a **potentially significant** impact.

**Alternative 4: No Project**

Alternative 4 is the no project alternative. Under this alternative, no changes would be made to land coverage within the Plan area. Therefore, Alternative 4 would have **no impact** related to this issue.

**Mitigation 14-1: Refine project site plan to reduce LCD 3 land coverage to comply with TRPA limits**

*This mitigation measure applies to the Tahoe City Lodge Alternatives 1 and 3.*

During the final design and before TRPA approval, the site plan shall be refined to reduce paved areas (such as roads, parking areas, or paved walkways) such that the total proposed land coverage within any LCD does not exceed the limits established by TRPA. This would require a net reduction of 1,122 sf and 1,179 sf of coverage in LCD 3 under Alternatives 1 and 3, respectively.

**Significance after Mitigation**

Implementation of Mitigation Measure 14-1 would reduce the significant impacts to land coverage associated with Lodge Alternatives 1 and 3 to a **less-than-significant** level by ensuring that land coverage created by the project complies with the established TRPA limits.

**Impact 14-2: Potential for substantial erosion or loss of topsoil**

Implementation of the Area Plan action alternatives would implement policies encouraging redevelopment within town centers. This redevelopment activity would involve ground disturbance, which could increase erosion. However, the Area Plan action alternatives would not change the existing protective TRPA and Lahontan RWQCB regulations regarding erosion control and natural resource protection. For this reason, implementation of Area Plan Alternatives 1, 2, and 3 would have a **less-than-significant** impact related to increased erosion. The Tahoe City Lodge action alternatives would result in ground disturbance which could lead to increased erosion, resulting in a **potentially significant** impact. This impact would be reduced through compliance with Mitigation Measure 14-2a through 14-2f, which would require that the alternatives prepare and comply with a series of construction standards that would reduce the impact of the Tahoe City Lodge Alternatives 1, 2, and 3 to a less-than-significant level. Alternative 4 is the no action alternative and would have **no impact** relative to seismic or geologic hazards.

## Placer County Tahoe Basin Area Plan Program-Level Analysis

### **Alternative 1: Proposed Area Plan**

The potential effect of Alternative 1 is the same as the RPU, and therefore the analysis is tiered from and consistent with the RPU EIS Impact 3.7-2, "Site Topography, Grading, and Soil Erosion," beginning at pg. 3.7-49.

The Area Plan incorporates TRPA RPU policies that encourage the redevelopment of town center properties in combination with the restoration and retirement of development elsewhere. Ground disturbance resulting from these policies would be concentrated in the town center areas, which are dominated by low erosion hazard soils (see Table 14-5), but could also occur in outside areas as properties are demolished, parcels restored, and development rights transferred into centers.

The Area Plan would not change or revise regulations that address grading, excavation, or erosion control. Grading and construction activities associated with projects that could occur under the proposed Area Plan would be required to meet the requirements of Article 15.48, "Grading, Erosion and Sediment Control" of Placer County Code and conditions of Chapter 33, "Grading and Construction," of the TRPA Code. Article 15.48 requires a grading permit or approved Improvement Plans prior to any grading within unincorporated areas of Placer County. Special restrictions apply to the Tahoe Basin area per Section 15.48.120 that require county grading review and approval for any excavation of 4 feet in vertical depth or more, 200 square feet or more in area, and/or three cubic yards or more per site. A grading permit is required if fill exceeds 3 feet or more in vertical depth, the fill material covers more than 200 square feet, and/or exceeds three cubic yards per site. In addition, a grading permit is required if vegetation clearing of 1,000 square feet or more in area is proposed. TRPA's Chapter 33 includes specific provisions for timing of grading, winterization of construction sites, specifications for cut and fills areas, protection of vegetation during construction, preparation of a Slope Stabilization Plan for projects at the request of TRPA, and limitations on excavation in excess of 5 feet where the potential to intercept groundwater exists. TRPA Code Section 33.3.6 allows excavation in excess of 5 feet in limited circumstances, provided that a soils/hydrologic report has been completed that demonstrates that the excavation will not interfere with or intercept groundwater, no damage occurs to mature trees, excavated material is disposed of properly (as defined in Code Section 33.3.4), and the project area's natural topography is maintained.

Existing erosion control regulations would remain in place and soil disturbance associated with projects that could occur under the proposed Area Plan would be required to comply with Placer County Code Article 15.48 and Chapters 33 and 60 through 68 of the TRPA Code. These requirements include the installation of best management practices (BMPs) for all projects, as specified in Section 60.4 of the TRPA Code. Temporary BMPs which comply with the TRPA *Handbook of Best Management Practices* must be implemented on construction sites and maintained throughout the construction period until winterization, and permanent BMPs must be installed once construction has been finalized. Alternative 1 would continue to require that improvement plans are submitted for review and approval to ensure conformance with Placer County and TRPA rules, regulations, and ordinances as part of standard conditions of approval.

In addition, all construction projects within the Plan area with greater than one acre of disturbance would continue to be required, by Lahontan RWQCB, to prepare a SWPPP that includes a site-specific Construction Site Monitoring and Reporting Plan (CSMRP) pursuant to the National Pollution Discharge Elimination System (NPDES) 2011 Tahoe Construction Stormwater permit. Project SWPPPs are required to describe the site, construction activities, proposed erosion and sediment controls, means of waste disposal, maintenance requirements for temporary BMPs, and management controls related to stormwater. Temporary BMPs to protect water quality would be required during all site development activities. Water quality controls outlined in a SWPPP would be required to be consistent with TRPA requirements. Controls would be required to ensure that runoff quality meets or surpasses TRPA water quality objectives and the federal and state antidegradation policies, remains within the TRPA and Lahontan RWQCB discharge limits to surface water and groundwater sources, and maintains beneficial uses of Lake Tahoe. Stormwater quality sampling and reporting requirements outlined as a Construction Site Monitoring and Reporting Plan are also part of the SWPPP.

Although Area Plan policies could encourage redevelopment activities that would result in ground disturbance, the potential for grading or topography changes that are inconsistent with the Placer County Code and TRPA Code, or increased erosion resulting from future projects would be minimized through compliance with the strong Placer County, TRPA and Lahontan RWQCB protective code requirements and permit conditions. For this reason, implementation of Alternative 1 would have a **less-than-significant** impact related to grading, topography, and increased soil erosion.

**Alternative 2: Area Plan with No Substitute Standards**

The effects of Alternative 2 would be the same as those described under Alternative 1 above. For the same reasons, implementation of Alternative 2 would have a **less-than-significant** impact related to increased soil erosion or loss of topsoil.

**Alternative 3: Reduced Intensity Area Plan**

The effects of Alternative 3 would be the same as those described under Alternative 1 above. For the same reasons, implementation of Alternative 3 would have a **less-than-significant** impact related to grading, topography, and soil erosion.

**Alternative 4: No Project**

Alternative 4 is the no-action alternative and, as such, would not result in any changes to existing development patterns or the potential for soil erosion. Therefore, Alternative 4 would have **no impact** related to grading, topography, and soil erosion.

**Tahoe City Lodge Project-Level Analysis**

**Alternative 1: Proposed Lodge**

The proposed Tahoe City Lodge redevelopment project would require the demolition of existing structures, grading and excavation to prepare the site for new construction, and temporary ground disturbance during SEZ restoration activities. Because the project involves the redevelopment of an extensively disturbed site, changes to natural topography would be minimal. Excavation would be required for utilities, drainage systems, and foundation. Although it is anticipated that all excavations would be less than five feet in depth, it is possible that deeper excavation could be required for utility lines, drainage systems or portions of building foundations. Soils exposed through excavation, grading, or in stockpiles are more susceptible to wind and water erosion.

Table 14-9 provides a summary of ground disturbance that would occur during implementation of Alternative 1. An estimated 3.05 acres of ground disturbance would occur during construction at the lodge and Club House sites. Of this total, 0.64 acres would be temporary disturbance, which would be stabilized and revegetated following construction. An additional 3.49 acres of temporary disturbance would be required for the SEZ restoration component of the project. A total of 1.79 acres of this would provide access and staging and would be restored to managed turf following the project. The remaining 1.7 acres would be converted from turf to restored SEZ.

**Table 14-9 Tahoe City Lodge Alternative 1, Temporary and Permanent Ground Disturbance**

Project Component	Temporary Disturbance	Permanent Disturbance	Total Disturbance
Lodge and Clubhouse	0.64	2.41	3.05
SEZ Restoration	3.49	0	3.49
Total	4.13	2.41	7.54

Source: Auerbach 2015, adapted by Ascent Environmental

The TRPA Code prohibits excavation deeper than 5 feet below ground surface or where there exists a reasonable possibility of interference or interception of a water table except in limited circumstances (see

Section 33.3.6.B of the TRPA Code). Where an exception is allowed, and where excavation beyond 5 feet is necessary, TRPA requires the following:

1. A Soils/Hydrologic report prepared by a qualified professional that demonstrates that no interference or interception of groundwater will occur.
2. The excavation must be designed such that no damage occurs to mature trees except where tree removal is allowed.
3. Excavation material is disposed of properly and the area's natural topography is maintained.

If the lodge project requires excavation deeper than five feet, a Soils/Hydrology report demonstrating that excavation would not intercept or interfere with groundwater (in the manner described in Section 33.3.6.A of the TRPA Code) would be prepared and submitted to TRPA for review and approval before TRPA permit acknowledgement. If the Soils/Hydrology report indicates that interception of the seasonal groundwater table cannot be avoided, TRPA may approve an exception provided that the circumstances authorizing such an exemption are present (see Section 33.3.6.A.2). In addition, the project would be required to meet the other conditions of TRPA Code Section 33.3.6.B, including protection of mature trees, proper disposal of excavated material, and maintenance of groundwater flows to avoid adverse impacts to SEZ vegetation and to prevent any groundwater or subsurface water flow from leaving the lodge project area as surface flow. Tahoe City Lodge Alternative 1 would result in the removal of structures and excavation activities which create ground disturbance. However, the project would have a minimal effect on natural topography and would comply with TRPA regulations regarding excavation deeper than five feet, if required. Also, as described in the programmatic Area Plan analysis above, the proposed Tahoe City Lodge is located on soils with an NRCS Erosion Hazard Rating of "slight," which indicates that substantial erosion would be unlikely under normal conditions. However, the potential for erosion would remain, resulting in a **potentially significant** impact.

#### Alternative 2: Reduced Scale Lodge

The potential impact of Alternative 2 would be similar to those described for Alternative 1, above. Alternative 2 would result in 0.79 acres of temporary disturbance and 2.15 acres of permanent disturbance (see Table 14-10 below). In comparison to Alternative 1, this represents an additional 0.15-acres of temporary disturbance and a decrease of 0.26-acres of permanent disturbance. Alternative 2 does not include the relocation of the golf course club house or the restoration of SEZ areas within the golf course.

**Table 14-10 Tahoe City Lodge Alternative 2, Temporary and Permanent Ground Disturbance**

Project Component	Temporary Disturbance	Permanent Disturbance	Total Disturbance
Lodge	0.79	2.15	2.94
SEZ Restoration	0	0	0
Total	0.79	2.15	2.94

Source: Auerbach 2015, adapted by Ascent Environmental

For the same reasons described above in regard to Tahoe City Lodge Alternative 1, implementation of Alternative 2 would have a **potentially significant** impact related to increased soil erosion.

#### Alternative 3: Reduced Height Lodge

The effects of Alternative 3 would be similar to those described under Alternative 1 above. Alternative 3 would result in 0.64 acres of temporary disturbance and 3.21 acres of permanent disturbance (see Table 14-11 below). In comparison to Alternative 1, this represents a 0.16-acre increase in permanent disturbance and the same amount of temporary disturbance. The temporary ground disturbance associated with SEZ restoration would also be the same as Alternative 1.

**Table 14-11 Tahoe City Lodge Alternative 3, Temporary and Permanent Ground Disturbance**

Project Component	Temporary Disturbance	Permanent Disturbance	Total Disturbance
Lodge and Club House	0.64	2.57	3.21
SEZ Restoration	3.49	0	3.49
Total	4.13	2.57	6.7

Source: Auerbach 2015, adapted by Ascent Environmental

For the same reasons described above in regard to Tahoe City Lodge Alternative 1, implementation of Alternative 3 would have a **potentially significant** impact related to increased soil erosion.

#### Alternative 4: No Project

Alternative 4 is the no-action alternative and, as such, would not result in any changes to existing development patterns or the potential for soil erosion. Therefore, Alternative 4 would have **no impact** related to soil erosion or loss of topsoil.

#### Mitigation Measure 14-2a: Prepare and implement a stormwater pollution prevention plan

*This mitigation measure applies to Tahoe City Lodge Alternatives 1, 2, and 3.*

Implement Mitigation Measure 15-1a. As a condition of the SWRCB Statewide Construction General Permit, the project applicant shall prepare and implement a stormwater pollution prevention plan (SWPPP). The SWPPP will be prepared by a qualified SWPPP practitioner and/or a qualified SWPPP developer, will specify water quality controls consistent with Lahontan RWQCB requirements, and will ensure that runoff quality maintains beneficial uses of Lake Tahoe and the Truckee River. The site-specific SWPPP developed for each construction phase will describe the site controls, erosion and sediment controls, means of waste disposal, implementation of project specific plans required by local regulations, control of post-construction sediment and erosion control measures, and other impact reduction strategies unrelated to stormwater. The SWPPP shall be consistent with Chapter 4.5 of the TRPA BMP Handbook (“Temporary BMPs for Construction”).

#### Mitigation Measure 14-2b: Prepare and submit required plan materials to Placer County

*This mitigation measure applies to Tahoe City Lodge Alternatives 1, 2, and 3.*

The project applicant shall prepare and submit Improvement Plans, specifications, and cost estimates (per the requirements of Section II of the Land Development Manual [LDM] that are in effect at the time of submittal) to the Engineering and Surveying Division (ESD) for review and approval. The plans shall show all physical improvements as required by the conditions for the project as well as pertinent topographical features both on and off site. All existing and proposed utilities and easements, on site and adjacent to the project, which may be affected by planned construction, shall be shown on the plans. All landscaping and irrigation facilities within the public right-of-way (or public easements), or landscaping within sight distance areas at intersections, shall be included in the Improvement Plans. It is the project applicant’s responsibility to obtain all required agency signatures on the plans and to secure department approvals. If the Design/Site Review process and/or Development Review Committee (DRC) review is required as a condition of approval for the project, said review process shall be completed before submittal of Improvement Plans. Record drawings shall be prepared and signed by a California Registered Civil Engineer at the applicant’s expense and shall be submitted to the ESD in both hard copy and electronic versions in a format to be approved by the ESD before acceptance by the county of site improvements.

Building Permits associated with this project shall not be issued until, at a minimum, the Improvement Plans are approved by ESD.

Before the county's final acceptance of the project's improvements, submit to the ESD two copies of the Record Drawings in digital format (on compact disc or other acceptable media) in accordance with the latest version of the Placer County Digital Plan and Map Standards along with two blackline hardcopies (black print on bond paper) and two PDF copies. The digital format is to allow integration with Placer County's Geographic Information System (GIS). The final approved blackline hardcopy Record Drawings will be the official document of record.

### **Mitigation Measure 14-2c: Identify ground disturbance areas and develop revegetation plan**

*This mitigation measure applies to Tahoe City Lodge Alternatives 1, 2, and 3.*

The Improvement Plans shall show all proposed grading, drainage improvements, vegetation and tree removal and all work shall conform to provisions of the Placer County Grading Ordinance (Ref. Article 15.48, Placer County Code) and Stormwater Quality Ordinance (Ref. Article 8.28, Placer County Code) that are in effect at the time of submittal. No grading, clearing, or tree disturbance shall occur until the Improvement Plans are approved and all temporary construction fencing has been installed and inspected by a member of the Development Review Committee (DRC). All cut/fill slopes shall be at a maximum of 2:1 (horizontal: vertical) unless a soils report supports a steeper slope and the ESD concurs with said recommendation.

The project applicant shall revegetate all disturbed areas. Revegetation, undertaken from April 1 to October 1, shall include regular watering to ensure adequate growth. A winterization plan shall be provided with project Improvement Plans. It is the applicant's responsibility to ensure proper installation and maintenance of erosion control/winterization before, during, and after project construction. Soil stockpiling or borrow areas shall have proper erosion control measures applied for the duration of the construction as specified in the Improvement Plans. Provide for erosion control where roadside drainage is off of the pavement, to the satisfaction of the ESD.

The project applicant shall submit to the ESD a letter of credit or cash deposit in the amount of 110 percent of an approved engineer's estimate for winterization and permanent erosion control work before Improvement Plan approval to guarantee protection against erosion and improper grading practices. One year after the acceptance of improvements as complete, if there are no erosion or runoff issues to be corrected, unused portions of said deposit shall be refunded to the project applicant or authorized agent.

If, at any time during construction, a field review by county personnel indicates a significant deviation from the proposed grading shown on the Improvement Plans, specifically with regard to slope heights, slope ratios, erosion control, winterization, tree disturbance, and/or pad elevations and configurations, the plans shall be reviewed by the DRC/ESD for a determination of substantial conformance to the project approvals before any further work proceeding. Failure of the DRC/ESD to make a determination of substantial conformance may serve as grounds for the revocation/modification of the project approval by the appropriate hearing body.

### **Mitigation Measure 14-2d: Use approved design standards for BMPs**

*This mitigation measure applies to Tahoe City Lodge Alternatives 1, 2, and 3.*

The Improvement Plans shall show that water quality treatment facilities/best management practices (BMPs) shall be designed according to the guidance of the California Stormwater Quality Association Stormwater Best Management Practice Handbooks for Construction, for New Development / Redevelopment, and for Industrial and Commercial (or other similar source as approved by the ESD, such as the Erosion and Sediment Control Guidelines for Developing Areas of the Sierra Foothills and Mountains prepared by the High Sierra RC&D Council, October 1991).

Construction (temporary) BMPs for the project include, but are not limited to: Hydroseeding (EC-4), Straw Mulch (EC-6), Velocity Dissipation Devices (EC-10), Silt Fencing (SE-1), Fiber Rolls (SE-5), Storm Drain Inlet Protection (SE-10), Wind Erosion Control (WE-1), and Stabilized Construction Entrances (TC-1). These BMPs shall comply with Chapter 4.5 of the TRPA BMP Handbook ("Temporary BMPs for Construction").

### Mitigation Measure 14-2e: Comply with grading season prohibitions

*This mitigation measure applies to Tahoe City Lodge Alternatives 1, 2, and 3.*

There shall be no grading or other disturbance of ground between October 15 of any year and May 1 of the following year, unless an extension has been granted by TRPA.

### Mitigation Measure 14-2f: Staging areas

*This mitigation measure applies to Tahoe City Lodge Alternatives 1, 2, and 3.*

The Improvement Plans shall identify the stock-piling and/or vehicle staging areas with locations as far as practical from existing dwellings and protected resources in the area.

#### Significance after Mitigation

Implementation of Mitigation Measures 14-2a through 14-2e would reduce the significant impacts of erosion through minimization of ground disturbance, installation of temporary and permanent erosion control BMPs, revegetation of disturbed areas, and compliance with Placer County construction standards. Therefore, implementation of these mitigation measures would reduce the potential for Tahoe City Lodge Alternatives 1, 2, and 3 to create substantial soil erosion to a **less-than-significant** level.

### Impact 14-3: Exposure to seismic or geologic hazards

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The Area Plan is located within a seismically active area and it encompasses varied terrain which may become unstable or hazardous. Area Plan Alternatives 1, 2, 3, and 4 would continue to permit development and redevelopment within the Plan area, however compliance with existing TRPA and Placer County permitting requirements, which limit development on steep slopes, require site specific environmental review, and, as appropriate, require geotechnical analysis to identify and mitigate potential geologic hazards would reduce these potential risks to a **less-than-significant** level. The Tahoe City Lodge Alternatives 1, 2, and 3 would include redevelopment within an area where soils may be susceptible to seismically induced liquefaction and subsidence, and the project site could be located within the inundation area of a seismically induced seiche wave. This **potentially significant** impact would be reduced through compliance with Mitigation Measures 14-3a and 14-3b, which require the submission of a site specific geotechnical investigation which identifies and addresses potential geologic hazards, and the preparation of an emergency response and evacuation plan for the Tahoe City Lodge. Compliance with these mitigation measures would reduce the impact of the Tahoe City Lodge Alternatives 1, 2, and 3 related to seismic and geologic hazards to a **less-than-significant** level. Tahoe City Lodge Alternative 4 is the no action alternative and would have **no impact** relative to seismic or geologic hazards.

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### Placer County Tahoe Basin Area Plan Program-Level Analysis

#### **Alternative 1: Proposed Area Plan**

The Plan area contains the West Tahoe-Dollar Point Fault which is capable of generating earthquakes with a magnitude greater than 7 (Brothers et al. 2009). Two other active faults (the Stateline-North Tahoe Fault and the Incline Village Fault) are located within 2.5 miles of the Plan area. Although the Plan area would experience strong seismic shaking in the event of a large earthquake, the risk to people and structures would be reduced through compliance with the current seismic design requirements of the California Building Standards Code. Because the majority of buildable land within the Tahoe Basin is located along the shore of Lake Tahoe, a seismically induced seiche wave could inundate many communities within the Plan area. The potential risks associated with seiche waves would continue to be addressed through the Placer County Local Hazard Mitigation Plan, which includes public outreach and education regarding seiche hazards, and seiche warning systems to address current and future development (Placer County 2016). The potential risks to individual projects would be addressed through the project level environmental review and permitting process.

The Plan area's varied terrain contains slopes steep enough to generate avalanches or areas that are susceptible to landslides or similar hazards. In addition, moderately expansive soils are found within the vicinity of Kings Beach and could affect the structures contemplated by the Kings Beach Center design concept. These potential hazards are mitigated by the existing protective provisions included in the Placer County and TRPA permitting process. Implementation of Alternative 1 would not alter the existing TRPA and Placer County permitting requirements, which limit development on steep slopes and require site specific environmental review and, as appropriate, geotechnical analysis to identify and mitigate potential geologic hazards (TRPA Code Section 33.4 and Placer County Code Section 15.04.135).

Because the potential for risk to people and structures would be minimized through the seismic design requirement of the California Building Standards Code and because site specific geotechnical investigations are required through the Placer County permit system, Implementation of Area Plan Alternative 1 would have a **less-than-significant** impact.

#### **Alternative 2: Area Plan with No Substitute Standards**

The potential impact of Alternative 2 would be similar to those described under Alternative 1 above. For the same reasons, implementation of Alternative 2 would have a **less-than-significant** impact related to the exposure of persons or property to seismic or geologic hazards.

#### **Alternative 3: Reduced Intensity Area Plan**

The potential impact of Alternative 3 would be similar to those described under Alternative 1 above. For the same reasons, implementation of Alternative 3 would have a **less-than-significant** impact related to the exposure of persons or property to seismic or geologic hazards.

#### **Alternative 4: No Project**

Alternative 4 is the no-action alternative and, as such, would not result in any changes to existing development patterns or the potential for soil erosion. Therefore, Alternative 4 would have **no impact** related to the exposure of persons or property to seismic or geologic hazards.

### **Tahoe City Lodge Project-Level Analysis**

#### **Alternative 1: Proposed Lodge**

As described above in relation to the Area Plan, the Tahoe City Lodge would be located in a seismically active area which could experience strong ground shaking in the event of a large earthquake. The potential risk to persons and property associated with seismic shaking would be mitigated through compliance with the seismic design requirements of the California Building Standards Code. As required by state law, the proposed structures would be designed to resist stresses produced by lateral forces caused by wind and earthquakes and would meet the minimum seismic safety and structural design requirements described in Chapter 16 of the California Building Standards Code.

The lodge site is located in Soil Map unit 7042, "Tahoe Complex, 0 to 5 percent slopes, gravelly." These are alluvial soils, some of which have a water table within the upper 12 inches of the soil profile. Seismically induced liquefaction, subsidence, and lateral spreading may be concerns in alluvial areas where high ground water exists. In addition, the lodge project would add residential and tourist uses in an area that could be inundated by a seismically induced seiche wave. While earthquakes and seismically induced seiches would be very rare occurrences with a remote chance of occurring in any given year, construction in unstable soils with intermittently high groundwater can also cause less catastrophic, but adverse effects over time, including differential settling that can result in structural damage. For these reasons, implementation of Alternative 1 would create a **potentially significant** impact.

#### **Alternative 2: Reduced Scale Lodge**

The potential impact of Alternative 2 would be similar to those described under Alternative 1 above. For the same reasons, implementation of Alternative 2 would have a **potentially significant** impact related to the exposure of persons or property to seismic or geologic hazards.

**Alternative 3: Reduced Height Lodge**

The potential impact of Alternative 3 would be similar to those described under Alternative 1 above. For the same reasons, implementation of Alternative 3 would have a **potentially significant** impact related to the exposure of persons or property to seismic or geologic hazards.

**Alternative 4: No Project**

Alternative 4 is the no-action alternative and, as such, would not result in the redevelopment of the lodge site. Therefore, Alternative 4 would have **no impact** related to the exposure of persons or property to seismic or geologic hazards.

**Mitigation Measure 14-3a: Submit a geotechnical investigation for the Tahoe City Lodge project site**

*This mitigation measure applies to Tahoe City Lodge Alternatives 1, 2, and 3.*

As required by the Placer County Development Code, Improvement Plans submitted to Placer County for the Tahoe City Lodge shall include a final geotechnical engineering report produced by a California Registered Civil Engineer or Geotechnical Engineer for ESD review and approval. The report shall address and make recommendations on the following:

- A) Road, pavement, and parking area design;
- B) Structural foundations, including retaining wall design (if applicable);
- C) Grading practices;
- D) Erosion/winterization;
- E) Special problems discovered on-site, (i.e., groundwater, expansive/unstable soils, etc.)
- F) Slope stability

The report must also include the recommended and mandated measures to assure that the project complies with the California Building Code seismic design requirements. Once approved by the ESD, two copies of the final report shall be provided to the ESD and one copy to the Building Services Division for its use. It is the responsibility of the developer to provide for engineering inspection and certification that earthwork has been performed in conformity with recommendations contained in the report.

If the soils report indicates the presence of critically expansive or other soils problems that, if not corrected, could lead to structural defects, a certification of completion of the requirements of the soils report will be required before issuance of Building Permits.

**Mitigation Measure 14-3b: Prepare an emergency response and evacuation plan for the Tahoe City Lodge**

*This mitigation measure applies to Tahoe City Lodge Alternatives 1, 2, and 3.*

Placer County and TRPA shall require that the project applicant prepare and submit an emergency response and evacuation plan for the Tahoe City Lodge. This plan shall be submitted to Placer County, TRPA, and the appropriate municipality or fire protection district for approval. The plan shall include detailed descriptions of how emergency response and evacuation will occur in case of a large earthquake and seiche event. Emergency response and evacuation measures shall identify actions that help avoid, reduce, alleviate, and mitigate disaster damage and potential loss of life.

**Significance after Mitigation**

Implementation of Mitigation Measures 14-3a and 14-3b would reduce the potential for the Tahoe City Lodge project to expose persons and property to unstable soil conditions by requiring the completion of a geotechnical investigation of the project site and compliance with the recommendations it contains, and by implementing an emergency response and evacuation plan which addresses the potential seiche related risks at the project site. Compliance with these mitigation measures would reduce the impact of the Tahoe City Lodge Alternatives 1, 2, and 3 related to seismic and geologic hazards to a **less-than-significant** level.