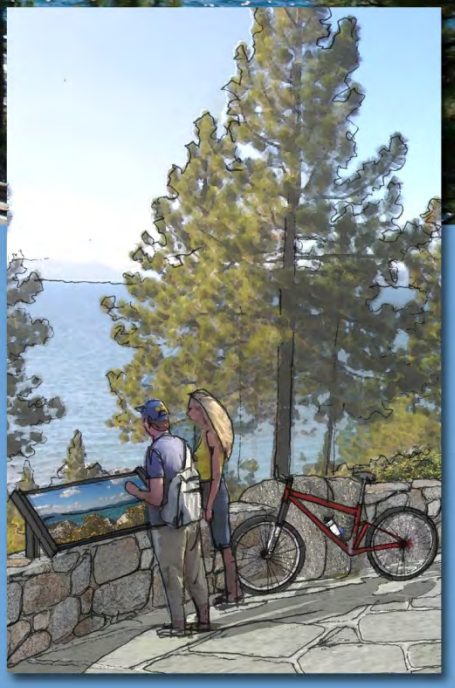
Nevada Stateline-to-Stateline Bikeway, North Demonstration Project

Joint Environmental Assessment



March 2014

Prepared for:

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Nevada Stateline-to-Stateline Bikeway
North Demonstration Project

ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to:
42 USC 4332(2)(c) and 49 USC 303

U.S. Department of Transportation
Federal Highway Administration
Central Federal Lands Highway Division

In Cooperation with
Tahoe Regional Planning Agency
Tahoe Transportation District

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08/03/14
Date

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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
ADA	American with Disabilities Act
ADT	average daily traffic
APE	area of potential effect
AQMD	Washoe County Health District Air Quality Management Division
ATV	all terrain vehicle
BAPC	Bureau of Air Pollution Control
BAQP	Bureau of Air Quality Planning
BMP	best management practice
CalEEMod	California Emissions Estimator Model
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGS	California Department of Conservation, California Geological Survey
CNEL	Community Noise Equivalent Level
CO	carbon monoxide
CO_2	carbon dioxide
Code	TRPA Code of Ordinances
CWA	Clean Water Act
CWPP	Community Wildfire Prevention Plans
dB	decibel
dBA	A-weighted decibels
dbh	diameter at breast height
EA	Environmental Assessment
EDCAQMD	El Dorado County Air Quality Management District
EIP	Environmental Improvement Program
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	federal Endangered Species Act
ETCCs	Environmental Threshold Carrying Capacities
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
Forest Plan	Land Resource Management Plan
FRWPS	Fuel Reduction and Wildfire Prevention Strategy
FTA	Federal Transit Administration

GHG	greenhouse gas
HAP	hazardous air pollutants
HAWK	High-intensity Activated crossWalK
HRA	Hydrologically Related Areas
IEC	Initial Environmental Checklist
in/sec	inches per second
ISD	Incline Sanitation Department
ITAs	Indian Trust Assets
IVGID	Incline Village General Improvement District
lb/day	pounds per day
LCD	land capability district
L_{dn}	Day-Night Noise Level
L_{eq}	Equivalent Noise Level
L_{max}	Maximum Noise Level
L_{min}	Minimum Noise Level
LOP	limited operating period
LOS	level of service
LPF	linear public facility
LTAB	Lake Tahoe Air Basin
LTBMU	Lake Tahoe Basin Management Unit
LTIMP	Lake Tahoe Interagency Monitoring Program
LTRPAC	Lake Tahoe Response Plan Area Committee
LWCFA	Land and Water Conservation Fund Act
MMT CO_2e	million metric tons carbon dioxide equivalent per year
mph	miles per hour
MSE	Mechanically Stabilized Earth
MT	metric tons
MUTCD	Manual on Uniform Traffic Control Devices
NAC	Nevada Administrative Code
NDEP	Nevada Division of Environmental Protection
NDF	Nevada Division of Forestry
NDOT	Nevada Department of Transportation
NDSL	Nevada Division of State Lands
NDSP	Nevada Division of State Parks
NEPA	National Environmental Policy Act
NEV-OSHA	State of Nevada Occupational Safety and Health Administration
NFS	National Forest System
NHPD	Nevada Highway Patrol Department
NLTFPD	North Lake Tahoe Fire Protection District
NNHP	Nevada Natural Heritage Program

NO_2	nitrogen dioxide
NPS	National Parks Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NSPC	National Standard Plumbing Code
NWP	nationwide permit
O&M Plan	Operation and Maintenance Plan
OEHHA	Office of Environmental Health Hazard Assessment
ONRW	Outstanding National Resource Water
PAOT	persons at one time
PAS	Plan Area Statements
PCAPCD	Placer County Air Pollution Control District
PM_{10}	respirable particulate matter
$PM_{2.5}$	fine particulate matter
ppm	parts per million
PPV	peak particle velocity
RMS	root mean square
ROG	reactive organic gases
ROW	right-of-way
RTAC	Regional Targets Advisory Committee
RTP	Regional Transportation Plan
SEL	Single Event Noise Levels
SEZ	Stream Environment Zone
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMAQMD	South Coast Air Quality Management District
SMAQMD	Sacramento Metropolitan Air Quality Management District
SO_2	sulfur dioxide
SQIP	Scenic Quality Improvement Program
SR	Historic State Route
SWPPP	Stormwater Pollution Prevention Plan
TAC	toxic air contaminant
TART	Tahoe Area Regional Transit
TCP	traffic control plan
TERC	Tahoe Environmental Research Center
TMDL	Total Maximum Daily Load
TMPO	Tahoe Metropolitan Planning Organization
tpd	tons per day
TRPA	Tahoe Regional Planning Agency

TTD	Tahoe Transportation District
UCMP	U.C. Berkeley Museum of Paleontology
US 50	U.S. Highway 50
USACE	U.S. Army Corps of Engineers
USDOI	U.S. Department of Interior
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VdB	vibration decibels
VMT	Vehicle Miles Traveled
WCSO	Washoe County Sheriff's Department
µ	micro

LIST OF PROJECT DESIGN FEATURES

Project Design Features are measures that were developed to reduce or avoid adverse environmental effects of the action alternatives analyzed in this Environmental Assessment (EA). These measures are part of the project alternatives and would be implemented with Alternatives A and B, except where noted. Many of the measures incorporate context-sensitive design elements, monitoring effectiveness, and adaptive management elements to address unanticipated adverse resource effects or effects to sensitive sites.

The following table lists the Project Design Features by resource category and provides the page number(s) where these measures are referenced in the EA, the agency and/or individuals responsible for monitoring and verifying implementation, and a description of the measure(s).

The Project Design Features are binding and are not subject to change or modification without prior written approval of the Federal Highway Administration (FHWA) and the Tahoe Regional Planning Agency (TRPA).

EA Page Reference	Responsibility for Monitoring and Verifying Implementation	Description
Soils, Hydrology, and Water Quality		
Excavation and grading activities necessary to construct the shared-use path would occur within highly erodible granitic soils, along steep topography, and in close proximity to Lake Tahoe. Once disturbed, soils within the project area could become unstable and susceptible to increased rates of land surface erosion. Furthermore, successful long-term stabilization of soils disturbed by project construction using soil restoration and revegetation techniques would present a number of challenges given the lack of nutrients within the soil, low amounts of precipitation during the summer growing season, and steep topography. Project design features have been organized into the following categories to minimize, control, and monitor potential effects on soils, hydrology, and water quality: 1. Geotechnical Report: developed to address potential for soils hazards 2. Temporary BMP Plan: developed to minimize disturbance and control construction-related effects 3. Permanent BMP Plan: targets design and implementation of site improvements and BMPs with the highest probability of success based on project site conditions 4. Adaptive Management Restoration Plan: developed to monitor, assess, and augment restoration efforts when deemed necessary		
Geotechnical Report		
4.5-14	TRPA	**SOIL-1: Complete a detailed Geotechnical Report for the selected alignment prior to final design.** A registered professional geologist or engineer will conduct a geotechnical analysis and prepare a Geotechnical Report for the selected alignment that will be used to develop the final design of all project components to ensure that the potential for landslides, slope instability, seismic events, and all applicable codes and seismic standards are adequately addressed in the design and construction of the project. The final design will be reviewed and approved by a Professional Engineer registered in the State of Nevada prior to construction.
Temporary BMP Plan A Temporary BMP Plan will be prepared for the North Demonstration Project. Temporary BMPs will be implemented during construction of the shared used path to minimize potential impacts and control sediment and pollutants in stormwater runoff to a level that meets waste discharge requirements. The key component of the Temporary BMP Plan will be the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) as described below.		
4.3-1, 4.3-8,	NDEP and TRPA	**BMP-1: Develop and implement a SWPPP.** A SWPPP will be prepared by a qualified SWPPP practitioner and/or a qualified SWPPP developer that identifies water quality controls consistent

EA Page Reference	Responsibility for Monitoring and Verifying Implementation	Description
4.4-24, 4.4-32, 4.5-11, 4.5-16		with TRPA and Nevada Division of Environmental Protection (NDEP) requirements, and will ensure that runoff quality meets TRPA water quality requirements under the TRPA Code, and maintains beneficial uses of Lake Tahoe, as defined by Section 445A.191 of the Nevada Administrative Code (NAC). The SWPPP will describe the site controls, erosion and sediment controls, means of waste disposal, implementation of approved local plans, control of post-construction sediment and erosion control measures, and management controls unrelated to stormwater. Best management practices (BMPs) identified in the SWPPP will be implemented during all site development activities. The following will be required elements of the SWPPP: ◢ Temporary BMPs to prevent the transport of earthen materials and other construction waste materials from disturbed land areas, stockpiles, and staging areas during periods of precipitation or runoff, including: filter fence, fiber roll, erosion control blankets, mulch (such as pine needles and wood chips); and temporary drainage swales and settling basins. ◢ TRPA pre-grade inspection a minimum of 48-hours prior to commencement of construction-related activities to ensure proper and adequate installation of the temporary erosion control measures. ◢ Designated contractor staging areas for materials and equipment storage (Exhibits 3-3 through 3-5) outside of stream environment zone (SEZ) areas. Designated staging and storage areas will be protected by construction fencing and/or silt barriers, as appropriate. Following project completion, all areas used for staging will be restored to meet the objectives of the Permanent BMP Plan and Adaptive Management Restoration Plan, described below. ◢ Temporary BMPs to prevent the tracking of earthen materials and other waste materials from the project site to offsite locations, including stabilized points of entry/exit for construction vehicles/equipment and designated vehicle/equipment rinse stations, and sweeping. ◢ Temporary BMPs to prevent wind erosion of earthen materials and other waste materials from the project site, including routine application of water to disturbed land areas and covering of stockpiles with plastic or fabric sheeting. ◢ Earthmoving activities will be limited to May 1 through October 15, unless a grading ordinance exemption is granted by TRPA. At the end of the grading season or before completion of the project, all surplus or waste earthen materials from the project site will be removed and disposed of at a TRPA-approved disposal site or stabilized on-site in accordance with TRPA regulations. ◢ A spill prevention and containment plan will be prepared and implemented. Project contractors will be responsible for storing on-site materials and temporary BMPs capable of capturing and containing pollutants from fueling operations, fuel storage areas, and other areas used for the storage of hydrocarbon-based materials. This will include maintaining materials on-site (such as oil absorbent booms and sheets) for the cleanup of accidental spills, drip pans beneath construction equipment, training of site workers in spill response measures, immediate cleanup of spilled materials in accordance with directives from the TRPA and the NDEP, and proper disposal of waste materials at an approved off-site location that is licensed to receive such wastes. ◢ Temporary BMPs to capture and contain pollutants generated by concrete construction including lined containment for rinsate to collect runoff from washing of concrete delivery trucks and equipment. ◢ Protective fencing to prevent damage to trees and other vegetation to remain after construction, including tree protection fencing and individual tree protection such as wood slats strapped along the circumference of trees.

EA Page Reference	Responsibility for Monitoring and Verifying Implementation	Description
		◢ Temporary BMPs for the containment of removal of drilling spoils generated from construction of bridge foundations and abutments. ◢ Daily inspection and maintenance of temporary BMPs. The prime contractor will be required to maintain a daily log of Temporary Construction BMP inspections and keep the log on site during project construction for review by TRPA and NDEP. ◢ Tree removal activities, including the dropping of trees, will be confined to the construction limit boundaries. ◢ Construction boundary fencing to limit disturbance and prevent access to areas not under active construction.
4.3-1, 4.3-8, 4.3-13, 4.4-24, 4.4-32, 4.5-11, 4.5-12, 4.5-16	NDEP and TRPA	**BMP-2: Develop and implement a Dewatering Plan.** A Dewatering Plan will be developed, and implemented if groundwater is encountered, to protect groundwater during excavations from potential sediment and contaminant releases, including methods to clean up releases if they do occur. The plan will include methods for controlling potentially sediment-laden water from dewatering activities from entering the lake or groundwater. Measures to prevent or minimize sediment and contaminant releases into groundwater during excavations, and methods to clean up releases if they occur may include: using temporary berms or dikes to isolate construction activities; using vacuum trucks to capture contaminant releases; and maintaining absorbent pads, and other containment and cleanup materials on-site to allow an immediate response to contaminant releases if they occur. Measures for controlling potentially sediment laden water from dewatering activities may include routing pumped groundwater to an infiltration basin or to a treatment system.
4.3-1, 4.3-8, 4.4-24, 4.4-32, 4.5-8, 4.5-11, 4.5-14, 4.5-16	TTD and TRPA	**BMP-3: Limit amount of allowable construction-related disturbance in Land Capability District 1a (LCD 1a).** As a condition of the construction contract, TTD will set maximum limits for allowable construction-related disturbance in LCD 1a to complete the shared-use path, as determined during final design for the selected alignment. TTD will also explore additional options to minimize disturbance in LCD 1a lands, and if deemed feasible, will include contractual incentives for the completion of the shared-used path with less total construction-related disturbance in LCD 1a relative to the maximum limit defined above. Furthermore, TTD will include contractual penalties if total disturbance in LCD 1a from construction-related activities exceeded the maximum limit defined in final design. Any fees collected as contractual penalties will be used to restore/mitigate disturbance in LCD 1a.
4.3-1, 4.3-8, 4.5-8, 4.4-24, 4.4-32, 4.5-11, 4.5-14, 4.5-16	TRPA	**BMP-4: Develop and implement a Temporary SEZ Access and Revegetation Plan.** TTD will prepare and implement a Temporary SEZ Access and Revegetation Plan, or will incorporate the same in construction notes to the construction plans, to minimize and restore any construction-related impacts to LCD 1b (SEZ) for TRPA approval. The plan will describe the measures taken to minimize the area of temporary disturbance in the Tunnel Creek and Bonpland Creek SEZs that will be necessary to construct the proposed bridge foundations; avoid placing fill within an SEZ; define the construction methods employed to minimize compaction of SEZ soils and disturbance to SEZ vegetation by construction equipment; identify soil restoration methods, if necessary; and revegetation methods. Related to this project design feature, TTD will also implement BMP-11 under the Adaptive Management Restoration Plan to monitor and measure potential SEZ impacts, the success of SEZ protection and restoration efforts, and the potential need to de-compact and restore soils within the SEZ because of construction-related disturbances.

EA Page Reference	Responsibility for Monitoring and Verifying Implementation	Description
4.3-1, 4.3-8, 4.3-9, 4.4-24, 4.4-32, 4.5-11, 4.5-16	NDEP and TRPA	**BMP-5: Develop and implement a Rain Event Action Plan.** TTD will prepare a Rain Event Action Plan as a component of the SWPPP that will include monitoring the weather on a daily basis and implementing pre-defined action within the SWPPP to avoid discharges during rain events in the construction period. During periods of inclement weather, and when weather forecasts exceed a pre-defined threshold for forecasted precipitation (typically 60 percent or greater), active areas of construction will be stabilized and all earth moving activities will cease.
Permanent BMP Plan Permanent BMPs will be used to control stormwater runoff and to minimize erosion and the transport of sediment and other pollutants of concern to Lake Tahoe. Project design features will include:		
4.3-1, 4.3-10, 4.3-12, 4.4-24, 4.4-32, 4.5-11, 4.5-14, 4.5-16	TTD and TRPA	**BMP-6: Tailor slope stabilization techniques to existing site conditions.** Slope stabilization measures will be designed and implemented to address the unique challenges presented by the steep topography and highly erosive soils within the project area. Selected techniques will be aligned with existing and proposed grades, where more intensive measures will be implemented for steeper slopes. Exhibits 3.3-3 and 3.3-4 display typical design details for slope stabilization measures based on existing cross slopes. Related to this project design feature, TTD will also implement BMP-11 under the Adaptive Management Restoration Plan to monitor, assess, and augment slope stabilization and revegetation efforts where necessary. ◢ Slopes greater than 33 percent will be stabilized with mechanical methods. In areas where the shared-use path is located on steep existing side slopes in excess of 33 percent (3:1), the slopes will be stabilized using mechanical methods. The mechanical slope stabilization techniques used for specific sections of the shared-use path will be determined during latter phases of design, but will include a mixture of rock slope protection, stacked rock walls, mechanically stabilized earth walls, or cast-in-place Portland cement concrete walls. ◢ Slopes between 20-33 percent will be stabilized with a combination of bio-technical and revegetation methods. In areas where the shared-use path is located on moderately steep existing side slopes between 20 percent (5:1) and 33 percent (3:1), the slopes will be stabilized using a combination of biotechnical and mechanical methods. The biotechnical methods employed may include joint-planted rock or rock toes, planted geotextiles, planted log or geotextile slope breaks, and other features to be developed during latter phases of design. The viability of vegetative and biotechnical erosion control features will be determined on a site-specific basis considering slope, soils, nutrients, aspect, and need for temporary irrigation. ◢ Slopes less than 20 percent will be stabilized with soil restoration and revegetation methods. In areas where the shared-use path is located on relatively flat existing side slopes less than 20 percent (5:1), the slopes will be stabilized with soil restoration, soil amendment, and revegetation methods with an appropriate combination of native seed mixes and plantings with temporary irrigation.
4.3-1, 4.3-10, 4.3-12, 4.4-24, 4.4-32, 4.5-11, 4.5-16	TRPA	**BMP-7: Design improvements to meet the 20-year, 1-hour design storm event, where feasible.** Improvements will be designed to meet requirements for infiltrating runoff generated by the 20-year, 1-hour design storm event, as required by Section 60.4.6 of the TRPA Code. On relatively flat existing side slopes (less than 20 percent), stormwater from the shared-use path will runoff the path as sheet flow onto the adjacent downstream pervious area and naturally infiltrate. Soils within the project area have been mapped by the Natural Resources Conservation Service (NRCS; 2007) to be well-drained to somewhat excessively well drained, exhibiting high rates of measured saturated hydraulic conductivity (estimate range). On moderately steep to steep side slopes (greater than 20 percent), stormwater from the shared-use path will sheet flow into infiltration trenches constructed on the downhill side of path to store and infiltrate the 20-year,

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		1-hour design storm event. For some locations associated with Alternative A, the shared-use path will be constructed as a bridge over existing rock outcroppings or shallow soils on the lake side of SR 28. For these specific cases the shared-use path will not meet the storage requirements for the 20-year, 1-hour design storm event. If Alternative A is selected, TTD will need to request an exemption from TRPA for special circumstances under Section 60.4.8 of the TRPA Code by demonstrating that the rock outcroppings and shallow soils are a natural constraint to infiltrating runoff generated by the 20-year, 1-hour design storm event. The project design will still need to meet all other TRPA BMP requirements, including discharge limits for surface runoff (Section 60.1.3 of the TRPA Code).
4.3-1, 4.3-10, 4.3-12, 4.4-24, 4.4-32, 4.5-11, 4.5-16	TRPA	**BMP-8: Maintain existing drainage patterns.** The shared-use path will be designed to maintain existing drainage patterns to the greatest extent practical and consistent with Washoe County design standards.
4.3-1, 4.3-10, 4.3-12, 4.4-24, 4.4-32, 4.5-11, 4.5-16	TRPA	**BMP-9: Design drainage pathways to avoid concentration of runoff.** The shared-use path will be designed to convey stormwater runoff as sheet flow for even distribution across pervious areas or within infiltration trenches for storage and infiltration. For locations where topography prohibits this approach, runoff will be routed in stabilized conveyances to flatter locations where infiltration trenches or infiltration basins will be used to store and infiltrate runoff to meet the 20-year, 1-hour design storm event.
4.3-1, 4.3-10, 4.3-12, 4.4-24, 4.4-32, 4.5-11, 4.5-16	TRPA	**BMP-10: Design bridges over stream crossings for the 100-year storm event.** Bridges over stream crossings (e.g., Tunnel Creek and Bonpland Creek, Alternative B) will be designed to pass at a minimum the 100-year storm event as required by Federal Emergency Management Agency (FEMA) regulations and Washoe County.
Adaptive Management Restoration Plan Adaptive management measures will be developed to monitor, assess, and augment restoration efforts when deemed necessary to ensure that the slope stabilization efforts are successful and that potential impacts to SEZs from temporary constructed access are minimized or mitigated. Adaptive management plans will be developed and approved by TRPA prior to permit acknowledgement.		
4.4-24, 4.4-32, 4.5-11, 4.5-14, 4.5-16	TRPA	**BMP-11: Develop and implement a plan for SEZ compaction and revegetation monitoring.** TTD will develop revegetation success criteria and a monitoring plan that includes pre-construction and post-construction photographs and evaluation to confirm that the revegetation has been successful in the SEZ for areas disturbed by construction access. This plan will include annual reporting to TRPA for 3 years. Soil compaction measurements using a cone penetrometer will be used to determine if additional de-compaction and restoration efforts will be required after project completion by comparing the depth of penetration at 300 psi measured in areas disturbed by construction access in the SEZ to undisturbed areas within the SEZ. The revegetation success criteria will include performance metrics for native species growth and cover in SEZs.
4.4-24,	TRPA	**BMP-12: Develop and implement a plan for slope stabilization, revegetation monitoring, and**

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4.4-32, 4.5-11, 4.5-14, 4.5-16		**augmented restoration activities when deemed necessary.** TTD will develop slope stabilization success criteria and a monitoring plan that includes post-construction photographs and evaluation to confirm that mechanical slope stabilization measures remain stable and revegetation efforts meet defined performance metrics. This plan will include annual reporting to TRPA for 3 years. The revegetation success criteria will include performance metrics for native species growth and cover for the east shore environment developed by a qualified revegetation specialist. TTD will retain a revegetation contractor for the 3 year post-construction period to perform revegetation monitoring and any necessary additional restoration activities to achieve the revegetation success criteria (which may include but not be limited to soil reconditioning, soil amending, additional seeding, and additional watering).
Biological Resources		
4.4-1, 4.4-22, 4.5-14	TRPA	**BIO-1: Minimize ground and vegetation disturbance, and limit construction and staging footprints.** Ground and vegetation disturbance will be minimized during construction to avoid or minimize loss of native vegetation and disturbance to terrestrial wildlife habitat. Shared-use path construction activities, vehicle use and parking, and placement of equipment and materials generally will be restricted to a 25 to 30-foot-wide construction zone along the path depending on slope and the presence of retaining walls. The outer boundary of this zone will be flagged or fenced.
4.4-1, 4.4-27, 4.5-14	TRPA	**BIO-2: Use path design elements to minimize off-path disturbance.** Use signage, fencing, planting, etc., to discourage users from leaving the path; any fencing will be designed to avoid interference with hydrology and wildlife movement. This measure will contribute to minimizing potential impacts to native plant species and communities that occur adjacent to the shared-use path.
4.4-1, 4.4-28	TRPA	**BIO-3: Retain down woody debris levels.** The shared-use path design will consider opportunities for meeting desired down woody material retention levels (guidance provided in Forest Plan practice standards and guidelines for snags and downed woody material and Section 62.3 of the TRPA Code) for the protection of wildlife habitat. For example, where trees are to be felled as part of construction (e.g., hazard trees or those within the footprint), they will be retained on-site as necessary to meet desired down woody debris levels.
4.4-1	TRPA	**BIO-4: Retain snags.** The shared-use path design will consider desired snag retention needs for wildlife (guidance provided in Forest Plan practice standards and guidelines for snags and downed woody material and Section 62.3 of the TRPA Code). Snags will be retained unless deemed a "hazard tree."
4.4-1, 4.4-22	TTD and TRPA	**BIO-5: Minimize removal of trees that are 24 inches diameter at breast height (dbh) or greater.** The shared-use path alignments will be routed to minimize the removal of live trees, especially those 24 inches dbh or greater. For any tree 24 inches dbh or greater that will be felled during the construction of the project, removal will occur, as allowable, under circumstances specified in the Section 61.1.4(A)(7) of the TRPA Code. Section 61.1.4(A)(7) states that, for EIP Projects, "Trees larger than 30 inches dbh in the westside forest types and larger than 24 inches dbh in eastside forest types may be removed when it is demonstrated that the removal is necessary for the activity." The North Demonstration Project is an EIP Project (EIP Project 03.01.02.17) and subject to this Code provision.
4.4-1	TTD and TRPA	**BIO-6: Avoid mature or overmature conifer stands where feasible.** The shared-use path will avoid, where feasible, mature or overmature conifer stands (where the dominant size class is $\geq$ 24 inches dbh) within 0.5-mile of large bodies of water (Lake Tahoe), and with relatively low levels of human disturbance that occur within the project area. No mature or overmature conifer stands occur within the area of ground disturbance associated with the proposed project

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		(i.e., project disturbance area) and very little habitat of this type with relatively low levels of human disturbance exists in the vicinity of the project.
4.4-1	TRPA	**BIO-7: Install signage that informs the public about noxious weed and invasive plant species, as well as protecting sensitive vegetation.** Trailhead signage will be developed, as applicable and relevant, at key access points to the shared-use path and will contain information about (1) nonnative invasive species and how they are spread, and (2) (if applicable) sensitive plant species and how they are harmed by disturbance from human activities.
4.4-1, 4.4-23	TRPA and U.S. Forest Service (USFS)	**BIO-8: Prevent the contamination of construction-related materials by noxious weeds and invasive plant species.** The following actions will ensure that construction-related materials entering or leaving the project area are not potential sources of noxious weed infestations. ◢ The construction contractor will ensure that any clothing, footwear, and equipment used during construction is free of soil, seeds, vegetative matter or other debris or seed-bearing material before entering the construction area. ◢ Where it is not possible to keep equipment out of sites infested with noxious weeds, the equipment will be cleaned so that it is free of soil, seeds, vegetative matter or other debris before being moved from infested sites to un-infested sites and before being transported out of the project area. ◢ TTD will ensure that any fill soil, mulch, seeds, and straw materials used during construction and implementation of BMPs are weed-free. Certified weed-free material will be used. ◢ All earth-moving equipment, gravel, fill, or other materials will be required to be weed free. Sand, gravel, rock, or organic matter from an approved onsite source will be used when possible. Otherwise, weed-free materials will be obtained from gravel pits and fill sources that have been surveyed and approved by a botanist or ecologist at the USFS, Lake Tahoe Basin Management Unit (LTBMU) for NFS lands or a qualified botanist on non-NFS lands. ◢ TTD will ensure that equipment and vehicles are washed when exiting the perimeters of infested areas before proceeding outside the infested perimeters to un-infested areas.
4.4-1, 4.4-23, 4.5-11, 4.5-14, 4.5-16	TRPA	**BIO-9: Revegetate/landscape using appropriate native planting mixes.** Appropriate plant species native to the area that do not require long-term irrigation, or species approved by a qualified botanist for local use, will be used when revegetating disturbed areas and for landscaping improvements. This measure will contribute to minimizing impacts to TRPA Habitats of Special Significance (habitats consisting of deciduous trees, wetlands, and meadows) that are temporarily disturbed during project construction, but will also help to minimize permanent loss of native habitats. Following shared-use path construction, vegetation dominated by native perennial herbaceous and shrub species will be established in temporary construction areas. Seed, seedlings, or propagules of montane chaparral grasses, forbs, and shrubs that are native to the Tahoe Basin will be applied to the temporary construction areas. All seed, seedlings, and propagules will be collected from or near the project site, if practicable, or if local collection is not practicable, will originate from east of the Sierra crest within 50 miles of the Tahoe Basin, and from an elevation within 1,000 feet of the project area (to the extent feasible). Persistent nonnatives such as cultivated timothy (*Phleum pratense*), orchard grass (*Dactylis glomerata*), or ryegrass (*Lolium* spp.) will not be used. The plant mix will be approved by the TRPA and LTBMU botanists and seeds will be certified weed free. For seed materials, the seed analysis report will be provided prior to seed application, and seed materials containing invasive plant seed will not be approved for use. A restoration ecologist or qualified botanist will be retained by TTD to assist with native plant selection and application, and native plant establishment methods, including appropriate, limited use of irrigation, if necessary. Nutrient inputs in the form of fertilizer and organic matter

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		will be minimized or avoided. During revegetation, care will be taken to avoid damaging existing natural vegetation. Following path construction and restoration efforts, monitoring will be conducted for a minimum of 3 years to determine the site's progress toward attaining the established success criteria. The monitoring will include both quantitative surveys of percent cover of native vegetation, and qualitative assessments of overall condition and success of restoration efforts.
4.4-1, 4.4-23	TRPA	**BIO-10: Develop and implement a Monitoring and Adaptive Management Plan for Invasive Plants and Noxious Weeds.** An invasive plant/noxious weed species monitoring and adaptive management plan will be developed by a qualified biologist, botanist, or restoration ecologist for control of noxious weeds in the path area. Monitoring will occur three times per year (spring, early-midsummer, and late summer) during and after project construction. Any noxious or invasive weed species found along the path or within the temporary construction areas will be hand pulled before seed set or treated by other approved means. Invasive plant/noxious weed monitoring and control measures will continue throughout path construction and for a minimum of 3 consecutive years following completion of the path. This measure will contribute to minimizing impacts of invasive plants and noxious weeds to TRPA Habitats of Special Significance (habitats consisting of deciduous trees, wetlands, and meadows) as well as other native habitats that occur within and adjacent to the project area. As part of the adaptive management plan, success criteria for noxious and invasive weed control will be established by a qualified biologist or restoration ecologist. If these success criteria have not been met by the third year of monitoring, monitoring and control efforts will continue and remedial actions will be identified and implemented until success criteria are met. For example, based on monitoring results, additional or revised measures may be needed to ensure the introduction and spread of noxious weeds is not promoted by the construction and use of the shared-use path. Invasive plant/noxious weed species management will include collaboration with local experts from agencies and nonprofits, such as LTBMU, the Nevada Land Trust, Great Basin Institute, and University of Nevada Cooperative Extension, Reno, to adapt the invasive plant/noxious weed management plan to the latest methods, seek funding opportunities, share knowledge, and acquire labor resources.
4.4-1, 4.4-25, 4.4-32	USACE and TRPA	**BIO-11: Delineate wetlands that could be affected by project implementation.** Any wetlands and other waters of the U.S. potentially affected by the project will be delineated according to U.S. Army Corps of Engineers (USACE) methodology before completion of final project design. The preliminary wetland delineation will be submitted to USACE for verification and the final path alignment will be designed to avoid waters of the U.S., including wetlands, to the maximum extent feasible.
4.4-1, 4.4-25, 4.4-32	NDEP, USACE, and TRPA	**BIO-12: Obtain appropriate permits for and mitigate potential impacts to wetlands.** Where fill of wetlands and other waters of the U.S. will be unavoidable (e.g., bridge footings), a Clean Water Act (CWA) Section 404 permit will be obtained from USACE and a Section 401 permit from NDEP and all permit conditions will be implemented. A wetland mitigation and monitoring plan will be developed by a qualified wetland ecologist to ensure no net loss of wetlands and other waters of the U.S. and associated aquatic functions. The mitigation plan will include performance standards and success criteria developed based on the best available science, and corrective measures to be implemented if performance standards are not met. Mitigation will include restoring wetland and other waters of the U.S. disturbed during project construction to pre-project conditions, including restoration of pre-project topography, vegetation, and soil characteristics in accordance with USACE regulations, except where restoration will not be possible because of permanent structures (e.g., bridge footings). Where it is not possible to

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		restore to pre-project conditions, compensatory mitigation will be provided as part of the wetland mitigation plan. Mitigation for impacts to wetlands will be designed to meet the requirements of Design Feature BIO-13, which requires that disturbances to SEZs and other low capability lands be fully mitigated either through enhancement or restoration to 150 percent of the amount disturbed in accordance with Sections 30.5.1.B (5) and 30.5.2.B. of the TRPA Code.
4.4-1, 4.4-24, 4.4-32, 4.4-37, 4.5-8, 4.5-14	TRPA	**BIO-13: Minimize new and relocated coverage that could result in disturbance to SEZ and other low capability lands, and compensate for disturbances to these lands.** The shared-use path alignments will be developed to minimize riparian effects and effects to low capability lands, including TRPA Habitats of Special Significance (habitats consisting of deciduous trees, wetlands, and meadows). Disturbance to SEZ areas and habitat for aquatic- or riparian-dependent species will be minimized by aligning the shared-use path crossings perpendicular to and in narrow SEZ areas to the extent feasible, and incorporating elevated crossing features such as boardwalks and bridge crossings in sensitive riparian areas. The amount of new and relocated coverage in SEZ areas and low capability lands will be minimized. Disturbance to low capability lands (LCDs 1a and 1b) will be fully mitigated either through enhancement or restoration to 150 percent or 1:1.5 ratio of the amount disturbed in accordance with Forest Plan practice standards and guidelines and Sections 30.5.1.B (5) and 30.5.2.B of the TRPA Code. The appropriate restoration or enhancement actions, methods, locations, and amount will be developed based on the magnitude of new and relocated coverage in these sensitive lands, as well as site-specific and watershed-level opportunities and constraints for SEZ enhancement. Restoration and enhancement activities could include the following: ◢ restoring roads and trails inside or adjacent to SEZ areas and low capability lands; ◢ re-routing project features to less sensitive area to provide a net benefit to SEZs; ◢ implementing or upgrading long-term BMPs and revegetating disturbed areas within riparian zones; ◢ controlling conifer encroachment into SEZ areas; and ◢ restoring stream bed and banks to promote additional riparian habitat establishment and increased hydrologic function.
4.4-1	USFS, TRPA, and NDOW	**BIO-14: Report and protect sensitive wildlife species in accordance with applicable regulations.** A construction awareness training session regarding federally threatened or endangered, USFS Region 5 sensitive, or TRPA special interest wildlife species will be provided by a qualified biologist to the construction contractor prior to ground-disturbing activities. Any detection of federally threatened or endangered, LTBMU sensitive, or TRPA special interest wildlife species or of nests, dens, roost sites, or other areas of concentrated use by these species, before or during construction and facilities maintenance activities will be reported to LTBMU, Nevada Department of Wildlife (NDOW), and TRPA wildlife biologists and protected as directed in the Forest Plan and TRPA regulations. Except for osprey nest sites, no construction limited operating periods (LOPs) to protect the breeding or other activities of special-status species from construction-related disturbances are anticipated at this time. However, if active breeding sites or other active core-use areas of these species are located in the future near project construction areas, incidentally or based on future survey data, the need for construction LOPs or other measures will be evaluated in consultation with LTBMU, NDOW, and TRPA.
4.4-1, 4.4-27, 4.4-29, 4.4-30, 4.4-32	TRPA	**BIO-15: Avoid construction disturbances to nesting osprey, install interpretive signage, and prepare and implement an Osprey Habitat Enhancement and Management Plan.** Surveys for nesting osprey in and adjacent to the study area will be conducted prior to construction, to identify active nests that could be disturbed during construction. No construction activities will occur within 0.25 mile of active osprey nests during the breeding season (approximately April to

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		August), unless surveys confirm that the birds are not nesting. A qualified biologist can amend the start and end dates of this LOP with concurrence from appropriate agencies if it can be determined that breeding has not started or that fledglings have left the nest. Additionally, with concurrence from appropriate agencies, the LOP could be waived in locations where construction disturbance is not expected to increase ambient levels or disturbance to an active nest. For example, project construction on the west side of SR 28 near Memorial Point may not increase levels of existing disturbances to osprey nests on the east side of SR 28, due to the existing vehicle traffic and recreation use along SR 28 in this area (including existing trails west of SR 28 below the Memorial Point rest area), and noise associated with boat traffic and pedestrian use along Lake Tahoe's shorezone. Where the path traverses TRPA osprey disturbance zones, signage that describes the sensitivity of the area and discourages users to leave the path or otherwise disturb nesting osprey will be designed and installed. As described in Section 4.4, "Biological Resources," implementation of Alternative B will result in the permanent loss or disturbance of vegetation, and long-term increases in recreation disturbances, within two partially overlapping TRPA osprey disturbance zones. TRPA maintains a nondegradation standard for habitat within osprey disturbance zones. For areas outside of TRPA urban plan areas, the Code, Section 62.4.1, "Disturbance Zones," states that the habitat in TRPA-designated disturbance zones around osprey nests "shall not be manipulated in any manner unless such manipulation is necessary to enhance the quality of the habitat." Section 62.4.3, "Environmental Documents," states that "applicants for projects within disturbance zones shall submit with their applications appropriate environmental documentation prepared by a biologist that includes specific recommendations for avoiding significant adverse impacts to the … species." Through consultation with TRPA on this issue, it was determined that habitat enhancement for osprey must be a project objective, to meet Code requirements, and will be required to compensate for significant effects of Alternative B. Although implementation of Alternative A is not expected to significantly affect osprey, TRPA would similarly require habitat enhancement as a project objective, because project construction and operation would occur within osprey disturbance zones. If Alternative B is selected, an Osprey Habitat Enhancement and Management Plan will be developed and implemented. The plan will include objectives, measures, and techniques to enhance osprey habitat within the affected TRPA osprey disturbance zones and/or other osprey disturbance zones in the Tahoe Basin where enhancement opportunities could be maximized. The primary approaches identified to enhance nesting habitat for osprey include active long-term snag recruitment in appropriate locations and reducing existing disturbance levels in appropriate locations near nests. Potential techniques for snag recruitment over time include vegetation management to promote large tree and snag development, and creating snags by topping tall trees. Reducing existing disturbance levels in appropriate locations near nests could include decommissioning, rerouting, or otherwise managing certain roads and trails within disturbance zones. These actions will first require an assessment and prioritization of all disturbance zones, and specific location within those zones, to determine those that could be enhanced effectively, and where benefits of enhancement will be maximized. Ascent Environmental has prepared some initial GIS analyses and habitat models to identify possible management zones to concentrate osprey conservation actions, based on distance to water bodies, proximity to Lake Tahoe shorezone fish habitat types, current and historic osprey nest distribution and concentrations, and other variables. Additionally, an analysis of road and trail density within current and historic osprey buffer zones identified approximately 45 miles of road and 32 miles of trail within osprey buffer zones; some of these could be candidates for restoration or management. Specific elements of the Osprey Habitat Enhancement and

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		Management Plan, such as the locations, techniques, and amount of required enhancement will be developed in close coordination with TRPA. Plan development and implementation will initially focus on the Nevada side of the Tahoe Basin, which is less developed/disturbed and where potential impacts to local osprey productivity as a result of Alternative B would occur. If Alternative A is selected, coordination with TRPA will occur to determine whether an Osprey Habitat Enhancement and Management Plan will be required, whether more focused measures to achieve habitat enhancement as part of the project could be implemented, or whether the current project design may benefit osprey habitat. For example, installing interpretive and protective signage within osprey disturbance zones along Alternative A (as part of this Design Feature) could result in benefits to osprey under Alternative A, by concentrating existing patterns of human use and disturbances along unimproved footpaths in these areas (near Memorial Point and west of SR 28) into a smaller and more predictable footprint.
4.4-1	USFS, TRPA, and NDOW	**BIO-16: Provide notification of seasonal closures, if required.** The project will be designed to avoid or minimize the potential need for seasonal closures to recreational use for protected and/or sensitive wildlife. However, if necessary, seasonal closures, will be announced with adequate advance posting and be as short as feasible. No seasonal closures are anticipated at this time; however, if protected and/or sensitive wildlife are detected in proximity to the shared-use path in the future, the need for seasonal closures to recreational use will be evaluated in consultation with appropriate resource management agencies (e.g., USFS, TRPA, NDOW, etc.).
4.4-1	TRPA	**BIO-17: Maintain passage for fish and other aquatic-dependent species.** All stream crossings will be designed to maintain upstream or downstream passage for fish or other aquatic-dependent species. All stream crossings will be designed to convey the 100-year, 24-hour storm event as required by FEMA and Washoe County.
4.4-1	TRPA	**BIO-18: Minimize tree removal that could affect water temperatures.** Minimize tree removal that could reduce shaded areas and increase stream temperatures.
4.4-1	TRPA, USFS, and NDOW	**BIO-19: Conduct preconstruction surveys for nesting migratory birds and avoid removal of active nest sites.** Removal of vegetation or other nesting substrates during the nesting season (approximately March 1 through September 1, depending on species and weather) will be avoided to the maximum extent feasible, particularly within riparian zones. If vegetation or other substrates that could support nesting birds would be removed during the nesting season, a qualified biologist approved by the appropriate resource management agencies (e.g., USFS, TRPA, NDOW, etc.) will be retained to conduct focused preconstruction surveys for active nest sites of migratory birds. The biologist will be able to identify Sierra Nevada bird species audibly and visually. The survey area will be limited to the areas where project activities could lead to direct destruction of active nests. Nest-searching techniques will be developed and implemented as appropriate for target species and habitat types. The results of nesting bird surveys conducted between March 1 and June 15 will be considered valid for no more than 14 days (i.e., the onset of each construction phase should begin no later than 14 days after these surveys are completed). Results of surveys conducted after June 15 can be considered valid for up to 30 days. Because most neotropical migrant birds that nest in the region typically arrive and begin establishing territories between March and June, and new individuals and species continually arrive in the area during this period, negative survey results (e.g., absence, no nesting activity) for a given location may be valid only for a short period. If an active nest is located, removal of the nest site will be avoided until it is no longer active. Exclusionary buffer zones (to be determined based on species-specific needs) will be created surrounding any active nests along the project alignment. Buffers will be established by a qualified biologist prior to the start of construction. If an area is given clearance to proceed with construction

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		and nesting subsequently occurs, it will be assumed that the individuals are acclimated to the ongoing disturbance of construction. If circumstances exist such that future activities may result in the abandonment or failure of the nest, as determined by a qualified biologist, an appropriate exclusionary buffer will be established.
Scenic Resources		
4.6-6	TRPA, NDOT, and Nevada Division of State Parks (NDSP)	**SCE-1: Design applicable structures to be consistent with Nevada Department of Transportation (NDOT) and TRPA design standards and design review guidelines and compatible with existing architectural features in Lake Tahoe Nevada State Park.** Project structures such as bridges (below SR 28, Alternative A)(Tunnel Creek and Bonpland Creek, Alterative B), undercrossings, at-grade crossings, trailhead parking areas, guardrails, retaining walls, and safety rails will be designed to meet TRPA design standards (Chapter 36 of the TRPA Code) and design review guidelines. Structures located within the NDOT right-of-way (ROW) will also meet NDOT design standards. The project will respond to the Regional Design Principles, particularly for Rural Visual Environments, described in the Design Review Guidelines. Architectural characteristics of project features will respond to their context and setting. A narrow range of colors and materials will be used. Materials will be primarily natural or natural-appearing. Ranges of subdued earth tone colors will be used that blend, rather than contrast, with the existing vegetation and soils color in and around the immediate area. The project will reflect the visual characteristics of line, form, color, and texture found in the characteristic landscape. The overall design of the project will exhibit "Tahoe" style and will be compatible with existing architectural features in Lake Tahoe Nevada State Park.
4.6-6	TRPA	**SCE-2: Design project features consistent with Chapter 66 of the TRPA Code.** The project will comply with Chapter 66 of the TRPA Code. The total visible area of lakeward facing surfaces of project features (e.g., bridges, walls, and safety rails) will not exceed the total surface area allowed. The total allowable surface area will be determined by conferring with TRPA and conducting a contrast rating analysis of the project's final design using the methods described in Appendix G of the TRPA Design Review Guidelines.
4.6-6	TTD and TRPA	**SCE-3: Implement Scenic EIP Projects within the project area.** Two EIP projects that include scenic improvements within the SR 28 corridor will be implemented in conjunction with the North Demonstration Project. They include EIP Project 04.02.01.12, which involves reducing the contrast of rock revetment placed on roadside slopes along SR 28 for erosion control purposes by staining the rock, and EIP Project 04.02.01.11, which involves screening views of the maintenance facility at Sand Harbor from SR 28.
4.6-6	TTD and TRPA	**SCE-4: Reduce visual contrast within the project area.** The exposed face of the large highway cut on the east side of SR 28 at the north end of the project will be treated with a darkening stain so as to eliminate the high contrast of the cut with the surrounding setting. The unfinished metal posts that support the wood retaining wall along the west side of SR 28 will be similarly treated.
Recreation		
4.7-15, 4.7-16	NDOT, NDSP, LTBMU and TRPA	**REC-1: Use signage to minimize use conflicts, notify users of limited or restricted access to recreation sites during peak periods, and enhance the recreation experience.** Use conflicts will be reduced or minimized on the shared-use path through use of informational signage installed at trailheads, connection points, and in other areas where necessary to alert users of possible obstacles or changes in the shared-use path. Signage will also be provided that designates the allowed uses and provides real-time information on any limitations or restrictions on access to recreation sites (such as Sand Harbor) during peak periods. Other informational and interpretive/way finding signs may also be installed along the shared-use path to provide

EA Page Reference	Responsibility for Monitoring and Verifying Implementation	Description
		background information regarding points of interest. Trailheads and access points will include interpretive and directional signing as appropriate. A detailed signage plan will be prepared as part of the final design consistent with the FHWA's Manual on Uniform Traffic Control Devices (MUTCD). All proposed signage will be developed in accordance with NDOT, NDSP, LTBMU, and TRPA design standards and subject to subsequent review and approval by these agencies.
4.7-15, 4.7-16	TRPA	**REC-2: Locate signage appropriately to minimize visual effects.** Signs will be placed and designed to prevent distraction of views.
4.7-15, 4.7-16	TRPA and NDSP	**REC-3: Remove trees that could create hazardous conditions along the shared-use path.** Trees with sufficient height and/or width to reach the shared-use path that are in a condition that could create a hazard to path users will be identified and removed as necessary.
4.7-15, 4.7-16	TRPA	**REC-4: Prepare and implement an Operations and Maintenance Plan.** An Operations and Maintenance Plan (O&M Plan) will be prepared to address regular maintenance and upkeep of the path, trash collection, and servicing of restrooms. The plan will include specifications for signage, maps, and kiosks to inform users of the locations of trash receptacles and restrooms, and to encourage users to pack out their trash. TRPA will ensure that the O&M Plan is complete prior to construction of the shared-use path.
Archaeological and Historical Resources		
4.8-7	TRPA	**ARCH-1: Cease work and implement notification procedures for previously undiscovered archaeological and historical resources.** In the event that previously undocumented cultural resources or human remains are discovered during any project-related ground-disturbing activities, the construction crew will immediately cease ground-disturbing activities in the vicinity of the find and the procedures of 36 CFR Part 800 will be implemented. A qualified archaeologist approved by FHWA, NDOT, NDSP, LTBMU, TRPA, and Washoe County will be consulted to evaluate the resource in accordance with Section 106 and TRPA guidelines. If the discovered resource is determined to be significant per NRHP and TRPA criteria, mitigation measures consistent with the TRPA Code will be devised and a mitigation plan submitted for approval by the FHWA, NDOT, NDSP, LTBMU, TRPA, and Washoe County. Any necessary archaeological excavation and monitoring activities will be conducted in accordance with prevailing professional standards and the Federal Secretary of the Interior's Standards and Guidelines for Identification of Cultural Resources and Professional Qualifications (National Park Service 1983). Mitigation, in accordance with a plan approved by FHWA, NDOT, LTBMU, NDSP, TRPA and Washoe County will be implemented before ground-disturbing work in the area of the resource find can continue. The State of Nevada Revised Statutes Section 383.170 requires a person to report to the Office of Historic Preservation immediately upon discovery of a previously unreported Native American interment inadvertently disturbed by ground-disturbing activities such as construction, logging, or farming. The Office of Historic Preservation must consult immediately with the Nevada Indian Commission and notify the appropriate Indian tribe. The authorized tribe or their representative, with the permission of the landowner, must inspect the burial site and recommend an appropriate means for the treatment and disposition of the site and all associated artifacts and human remains. If the burial site is located on private land, Section 383.170 allows, at the owner's expense, the reinterment of all human remains and associated artifacts in a location not subject to further disturbance if the Indian tribe fails to make a recommendation within 48 hours after it receives notification of the find.
Traffic, Parking, and Transit		
4.9-6,	NDOT	**TRA-1: Prepare a Traffic Control Plan (TCP) for locations that will involve construction in**

EA Page Reference	Responsibility for Monitoring and Verifying Implementation	Description
4.9-7		**existing roadway rights-of-way.** To minimize effects on emergency vehicle and existing public vehicular access, TTD will prepare a traffic control plan (TCP) that will address locations that will involve construction in existing roadway rights-of-way (e.g., SR 28). The TCP will be prepared in accordance with professional traffic engineering standards and in compliance with the requirements of the affected agency's encroachment permit requirements (i.e., Washoe County and NDOT) and will include measures that will provide notification to emergency service providers and adequate circulation around construction sites for emergency vehicle and existing public vehicular access. The TCP may include, but not be limited to, the following elements: ◢ Identify specific construction methods to maintain traffic flows on affected streets. ◢ Maintain the maximum amount of travel lane capacity during non-construction periods and provide flagger control at sensitive sites to manage traffic control and flows. ◢ Limit the construction work zones to widths that, at a minimum, maintain alternate one-way traffic flow past the construction zones. Access will not be prohibited, at any time, for local residents, school buses, or emergency vehicles. ◢ Coordinate construction activities (time of year and duration) to minimize traffic disturbances. ◢ Post advanced warning of construction activities to allow motorists to select alternative routes in advance. ◢ Prepare appropriate warning signage and lighting for construction zones. The TCP will be submitted to the Nevada Highway Patrol, NDOT, and the North Lake Tahoe Fire Protection District (NLTFPD) for review and comment.
4.9-10, 4.9-13	NDOT, TRPA	**TRA-2: Design all SR 28 at-grade crossings to ensure adequate stopping sight distance.** All SR 28 at-grade crossing treatments will be designed to meet standards in AASHTO's *A Policy on Geometric Design of Highways and Streets* and NDOT's *Roadway Design Guide* standards related to driver sight distances, posted speed limits, and curvature requirements.
Air Quality		
4.10-5	NDEP and TRPA	**AQ-1: Reduce construction-generated emissions.** The contractor will implement practices that minimize exhaust and fugitive dust emissions during construction. Measures to be implemented will comply with TRPA and NDEP Bureau of Air Quality Planning and Bureau of Air Quality Plan requirements. More specifically, the measures will conform with: ◢ NAC Sections 44B.7665 and 445B.22037 related to opacity (visible emissions) for heavy-duty equipment and fugitive dust, respectively; ◢ Section 33.1 of the TRPA Code related to seasonal limitations on construction and dust control measures; ◢ Section 65.1.8.of the TRPA Code related to vehicle idling time limitations; and, ◢ TRPA's Standard Conditions of Approval for Grading Projects (Attachment Q).
Noise		
4.12-10, 4.12-12, 4.12-16	TRPA	**NOI-1: Implement noise controls on construction equipment.** Construction equipment will be properly maintained and equipped with noise control, such as mufflers, in accordance with manufacturers' specifications.
4.12-10, 4.12-12,	TRPA and Washoe	**NOI-2: Implement construction hour limits.** Typical construction activities will be limited to the hours between 8:00 a.m. and 6:30 p.m., during which such activities are exempt from noise

EA Page Reference	Responsibility for Monitoring and Verifying Implementation	Description
4.12-16	County	levels identified in Chapter 68 of the TRPA Code of Ordinances (Code). Emergency work to protect life or property is exempt from these hourly limits and applicable noise standards. If construction activities must run past exempted hours (e.g., during wastewater line relocation or highway closures), any nearby sensitive receptors (less than 200 feet from those activities) will be given at least 1 week notice of such activities. Before initiating construction activities during exempted hours, TTD will prepare a plan demonstrating how appropriate noise-reducing measures (such as erecting temporary sound barriers) will be implemented to maintain the applicable PAS's maximum Community Noise Equivalent Level (CNEL) standards (TRPA has established CNELs ranging from 45 to 60 dBA for PASs 047, 049, and 055, and the Ponderosa Ranch Community Plan). The plan will be submitted to TRPA and Washoe County for review and approval, and will be implemented during all construction activities occurring outside of TRPA's exempted hours.
4.12-10, 4.12-12, 4.12-16	TRPA	**NOI-3: Consider equipment placement and operation during construction.** Construction equipment will be arranged to minimize travel adjacent to noise-sensitive receptors and turned off during prolonged periods of non-use. Construction equipment will be staged and construction employee parking will be located in designated areas only. All construction equipment and vehicles used for project construction will be fitted with the factory installed muffling devices and will be maintained in good working order. Should noise complaints be received, TRPA and/or Washoe County staff or the project contractor will attempt to respond within 1 working day and to resolve noise complaints as soon as possible.
4.12-10, 4.12-12, 4.12-16	TRPA	**NOI-4: Implement alternative methods to blasting for rock removal.** To minimize the potential for vibration effects that could result from blasting activities, alternative methods such as use of earthmoving equipment, rock saws, and silent chemical demolition (pour expansive chemicals into pre-drilled holes to fracture rocks) will be used to break apart and remove large rocks, boulders, and rock outcroppings.
Public Services and Utilities		
4.13-6	IVGID, NDOT, and NDSP	**PS&U-1: Coordinate with Incline Village General Improvement District (IVGID), NDOT, and NDSP regarding relocation of sewer and effluent mains.** The relocation will occur in coordination with IVGID, NDOT, and NDSP and be scheduled at a time when the Sand Harbor and Memorial Point facilities experience minimum use and sewer and effluent lines receive low flows. Standard "out of service" procedures will be followed to manage flows during service interruption, including placement of temporary restroom facilities at these facilities during outages.
4.13-6	IVGID and TRPA	**PS&U-2: Develop and implement sewer or effluent spill avoidance BMPs and management plan.** TTD will prepare project specific spill prevention and control measures, consistent with IVGID's existing spill control practices. The Spill Avoidance Plan will be reviewed and approved by IVGID and submitted to TRPA for agency review and approval. TTD will ensure the selected contractor is familiar and complies with these measures to protect the effluent line during construction and prevent any wastewater discharges to adjacent land and Lake Tahoe. At a minimum, the Spill Avoidance Plan will identify 24-hour emergency contacts, procedures for the rapid shut down of the export main, spill containment methods and materials, and procedures to drain and repair the effluent and sewer mains.

Source: Adapted by Ascent Environmental 2013

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1 INTRODUCTION

The proposed North Demonstration Project is a shared-use path that comprises Phase 2 of the Nevada Stateline-to-Stateline Bikeway Project. It consists of an approximately 3-mile section of the longer bikeway project, which is a proposal to build a premier, separated, shared-used path on the east side of Lake Tahoe between the Nevada state line in Crystal Bay on the north and the casino core in Stateline, Nevada on the south. The North Demonstration Project is proposed to connect Incline Village and Sand Harbor in Washoe County, Nevada.

1.1 LEAD AGENCIES

This joint Environmental Assessment (EA) has been prepared in accordance with both National Environmental Policy Act (NEPA) and Tahoe Regional Planning Agency (TRPA) environmental review requirements. For NEPA, the EA is written to comply with the statute, Council on Environmental Quality Regulations Implementing NEPA (Title 40, Section 1500 and subsequent sections of the Code of Federal Regulations [40 CFR 1500 et seq.]), and Federal Highway Administration's (FHWA) NEPA Regulations (23 CFR 771) and related procedures. For TRPA requirements, the EA complies with Chapter 3 of the TRPA Code of Ordinances (Code) and Article VI of the TRPA Rules of Procedure. The lead agency for the NEPA aspect of the joint EA is FHWA, Central Federal Lands Highway Division. The Nevada Department of Transportation (NDOT) provided assistance to the FHWA in preparation of this EA. TRPA is the lead agency and primary permitting agency under the Tahoe Regional Planning Compact (Public Law 96-551). The project is included in the 2010 Lake Tahoe Region Bicycle and Pedestrian Plan and 2012 Regional Plan.

An approximately 800-foot section of the North Demonstration Project crosses a parcel on National Forest System (NFS) land managed by the U.S. Forest Service, Lake Tahoe Basin Management Unit (LTBMU). This section of the shared-use path falls within the NEPA exclusion category described in 36 CFR 220.6 (e)(3) – *Approval, modification, or continuation of minor special uses of NFS lands that require less than five contiguous acres of land*. Therefore, LTBMU is preparing a NEPA Categorical Exclusion Decision Memorandum, which will focus on considering the potential for seven extraordinary circumstances found in Forest Service Handbook 1909.15, Chapter 30.4. LTBMU will be preparing the Decision Memorandum independently, in a separate process from this EA.

The Tahoe Transportation District (TTD) is the project proponent for the North Demonstration Project. The project is included within the 2012 Lake Tahoe Regional Transportation Plan. Other agencies that have been instrumental in guiding the preliminary design and preparation of this EA include the Nevada Division of State Parks (NDSP), the Nevada Division of State Lands (NDSL), Washoe County, and the Incline Village General Improvement District (IVGID). Other agencies or entities involved indirectly through sponsorship of the Nevada Stateline-to-Stateline Bikeway planning process include: Douglas County, Carson City, and the Washoe Tribe of Nevada and California.

1.2 DOCUMENT STRUCTURE

The information provided in this EA is intended to satisfy NEPA and TRPA environmental review requirements for the proposed North Demonstration Project. The EA discloses the direct, indirect, and cumulative environmental impacts that may result from implementation of any of the alternatives. The document is organized into the following seven chapters:

- **Chapter 1, Introduction.** This chapter includes information on: the lead agencies for environmental review; the document structure; background of the project proposal; the proposed action; project funding; the regulatory and decision-making framework; key issues; and a comparison of alternatives evaluated.

- **Chapter 2, Purpose and Need.** This chapter describes the purpose and need for the project, and project goals and objectives.
- **Chapter 3, Alternatives.** This chapter provides a detailed description of the action and no-action alternatives, including alternatives that have been considered but eliminated from detailed study. It contains maps that define the project and study areas and identify the alternative shared-use path alignments evaluated in this EA.
- **Chapter 4, Affected Environment and Environmental Consequences.** This chapter is organized by resource topic area and, within each section, the regulatory background is summarized; the affected environment is described; the significance criteria and analysis methodology are explained; and the direct, indirect, and cumulative environmental effects and the consequences for TRPA Environmental Threshold Carrying Capacities of the alternatives are discussed. Because the proposed project is included in the 2012 Regional Plan and 2012 Regional Transportation Plan, this EA relies, where appropriate, on the environmental documents prepared for those two plans for cumulative impact conclusions. The sections in this chapter also provide a discussion of compliance with applicable federal executive orders and regulations required under NEPA.
- **Chapter 5, Section 4(f) of the U.S. Department of Transportation Act of 1966.** This chapter discusses the relevance of Section 4(f) of the U.S. Department of Transportation (DOT) Act of 1966 to the proposed North Demonstration Project. Section 4(f) stipulates that the FWHA and other DOT agencies cannot approve the use of land from publicly-owned parks, recreational areas, wildlife and waterfowl refuges, or other public and private historical sites unless certain conditions apply.
- **Chapter 6, Agency Coordination and Public Involvement.** This chapter describes the public involvement process and provides a list of EA preparers and agencies consulted during the development of the EA.
- **Chapter 7, References.** Provides a bibliography of sources cited in the EA.

1.3 BACKGROUND

The Nevada Stateline-to-Stateline Bikeway Project is a joint proposal of local, state, and federal agencies with responsibilities on the Nevada side of the Tahoe Basin. A “Working Group” has been formed to oversee Bikeway project development activities. It consists of the staff from the sponsoring and partnering agencies that are helping to direct the project planning, environmental review, shared-use path design, construction, and operations and maintenance. Partnering agencies are:

- Tahoe Metropolitan Planning Organization;
- Tahoe Regional Planning Agency;
- Tahoe Transportation District;
- U.S. Forest Service, Lake Tahoe Basin Management Unit;
- U.S. Department of Transportation, Federal Highway Administration, Central Federal Lands Highway Division;
- Nevada Department of Transportation;
- Nevada Division of State Lands;
- Nevada Division of State Parks;
- Carson City Parks and Recreation Department;
- Douglas County Parks and Recreation Department;
- Washoe County Department of Regional Parks and Open Space; and
- Incline Village General Improvement District.

The Washoe Tribe of California and Nevada also participated as a partnering government.

Numerous planning documents within the Tahoe Basin have highlighted the importance of a region-wide pedestrian and bicycle network. The TRPA Regional Plan, the Tahoe Metropolitan Planning Organization (TMPO) Lake Tahoe Regional Transportation Plan (RTP), and the TRPA Lake Tahoe Region Bicycle and Pedestrian Plan addressed this need directly and each of these documents maps and contemplates a shared-use path similar to the proposed project between Incline Village and Sand Harbor. Additionally, the Lake Tahoe Environmental Improvement Program (EIP) identifies the project as a means to achieve and maintain environmental threshold carrying capacities for air quality and recreation while also furthering the Tahoe Regional Planning Compact mandate to "reduce dependency on the private automobile."

TRPA's 2012 Regional Plan restated the agency's commitment to encouraging pedestrian and bicycle use as a significant mode of transportation at Lake Tahoe. The Regional Plan presented a transportation strategy including 40 bicycle/pedestrian projects (including the larger Nevada Stateline-to-Stateline Bikeway and the proposed North Demonstration Project—RTP Project No. 18) throughout the Region representing a commitment of $140 million. The revised TRPA Code that accompanied the Regional Plan also provided regulatory relief for the development of non-motorized public trails.

A primary objective of the RTP is to establish a safe, secure, efficient, and integrated transportation system that reduces reliance on the private automobile. Specifically, Goal 2 of the RTP is to encourage bicycle and pedestrian usage as viable and significant modes of transportation in the Tahoe Region. The Lake Tahoe Region Bicycle and Pedestrian Plan (TRPA and TMPO 2010), which was incorporated into the RTP, identified the Nevada Stateline-to-Stateline Bikeway, North Demonstration Project as a high-priority transportation project that begins to address a critical gap in multi-modal transportation infrastructure. Currently, the east shore of Lake Tahoe has virtually no bicycle network and is accessed predominantly by automobile (TMPO and TRPA 2012). Visitors and residents that do access the public lands and developed recreation facilities on the east shore by foot or bicycle do so under extremely unsafe and hazardous roadway conditions.

In addition to the documents described above, the SR 28 Corridor Management Plan (completed in October 2013) presents a plan for integrated management of the State Route (SR) 28 corridor in a manner that accommodates the existing uses while protecting natural resources and improving user safety and experience. Elements considered in the plan include but are not limited to shuttle service and intercept parking areas, an off-highway shared-use path (including the proposed project, and extending through the remainder of the corridor), off-highway parking and emergency pullouts, vista points, improved access to recreational areas, and interpretative signage. The North Demonstration Project is being designed to complement connections to transit service within the corridor. Specifically, the paved improvements at the crossing at Tunnel Creek on the mountain side would accommodate the development of a transit stop at this location should that be considered for future implementation. The North Demonstration Project and the subsequent phases of the Nevada Stateline-to-Stateline Bikeway are critical components of this effort. The proposed shared-use path, coupled with increased transit service, would provide safe, reliable, and enjoyable access to the popular recreation sites within the corridor and would reduce the dependence on private automobiles within the corridor.

Sand Harbor is the southernmost beach area within the Lake Tahoe Nevada State Park, Sand Harbor Management Area. Sand Harbor is located at the southern terminus of the proposed shared-use path. In 2012 NDSP established a "no walk-in" policy at Sand Harbor to discourage illegal and unsafe shoulder parking near the main entrance when the park is at capacity. For the shared-use path to function as an alternative means of accessing the park, it is expected that this policy will be revised to allow walk-in and bicycle-in access from the shared-use path users, at least during non-peak use periods. During peak periods when Sand Harbor is at capacity, a decision could be made by NDSP to close access from the shared-use path, along with other walk-in access, with appropriate signage publicizing this information, if visitor safety and park management issues warrant it. The challenges associated with controlling shoulder parking and park access will be addressed though an Operations and Maintenance Plan as described in Chapter 3, "Alternatives," of this EA.

The proposed North Demonstration Project is the second of two demonstration projects identified by the Bikeway Project Working Group for initial development and implementation of the Nevada Stateline-to-Stateline Bikeway. The first demonstration project, South Demonstration Project, is an approximately 3-mile section of the Bikeway that has been constructed between the Stateline casino core and Round Hill Pines Beach. The EA for the South Demonstration Project was published in January 2011 and subsequently approved by LTBMU and TRPA. Construction was completed in 2013.

1.4 PROPOSED ACTION

The two action alternatives (Alternatives A and B) for the proposed shared-use path evaluated in this EA are described in detail in Chapter 3, "Alternatives." The proposed North Demonstration Project would be a shared-use path between Incline Village and the Sand Harbor Management Area of Lake Tahoe Nevada State Park. The path would be limited to pedestrians and non-motorized vehicle use, except for maintenance and emergency vehicles. The proposed shared-use path would typically include a 10-foot-wide paved path with 2-foot shoulders on both sides, consistent with American Association of State Highway and Transportation Officials (AASHTO) standards. Trailhead parking is proposed to be provided within the NDOT right-of-way (ROW) on the east side of SR 28 at the northern end of the shared-use path. The shared-use path would be accessible seasonally and would not be maintained for winter use.

Alternatives A and B would follow the same alignment north of Tunnel Creek. At Tunnel Creek the route would either drop in elevation to and cross SR 28 via a constructed undercrossing or an at-grade crossing (Alternative A), or would climb slightly and cross Tunnel Creek on a constructed bridge (Alternative B). To provide access to Hidden Beach, Alternative B would also include a SR 28 crossing at Tunnel Creek. Both alternatives would continue south ending at the main entrance to Sand Harbor. Alternative A would remain along the lake side of SR 28 after crossing the highway at Tunnel Creek. Alternative B would remain along the mountain side of SR 28 until crossing to Sand Harbor via an undercrossing or at-grade crossing.

TTD and the lead agencies are seeking stakeholder input before selecting a preferred alternative. Therefore, the EA herein refers to the proposed action as implementation of either action alternative.

1.5 PROJECT FUNDING

Funding for the North Demonstration Project would be provided by local, state, and federal grants, some of which require matching funds from the project proponent (TTD) and partnering agencies. Funding for the proposed project and the broader Nevada Stateline-to-Stateline Bikeway originated with the State of Nevada Conservation and Resource Protection Grant Program (also known as State Question 1 Program), a voter-approved bond measure passed in 2002, which provided up to $5 million for the construction of a "Lake Tahoe Pathway System." Funds from this program are administered by NDSL. Since that time, TTD and the partnering agencies have identified additional funding sources for the North Demonstration Project that include FHWA Federal Lands Highway Program funds administered by TMPO and TTD, and Scenic By-Ways funds administered by NDOT. Grant funds awarded to date have been used for preliminary design and environmental review related to the North Demonstration Project.

The North Demonstration Project has been designed in a series of segments (see Chapter 3, "Alternatives") that allows construction to occur in phases as funding becomes available and to coincide with the limited Lake Tahoe construction season. TTD has secured the funds necessary to complete final design and construction of the first segment of the North Demonstration Project shared-use path, which would connect Incline Village to Hidden Beach. Lastly, TTD has received preliminary award of Federal Lands Access Program funds administered by the Central Federal Lands Highway Division of the FHWA related to final design and construction of the remainder of the project.

Long-term operation and maintenance responsibilities for the shared-use path are still being discussed by the partnering agencies in accordance with the Interlocal Agreement signed by those agencies. Maintenance of this project would be eligible for funding under TRPA's Air Quality Mitigation Fund Program.

1.6 REGULATORY AND DECISION FRAMEWORK

1.6.1 USE OF THIS DOCUMENT BY LEAD AGENCIES

This EA is intended to meet the environmental review requirements of FHWA and TRPA, which maintain primary discretionary authority over the project approvals. The project approvals would include approval of project funding for final design and construction by FHWA and issuance of a TRPA Construction Permit.

After reviewing this EA and other information regarding the project proposal, TRPA will consider the adequacy of the EA and its compliance with the TRPA Regional Plan, Code, Rules of Procedure, and Goals and Policies. This will be followed by an action on the project by TRPA to approve or deny the project as presented.

The Responsible Official under NEPA is FHWA. Action by FHWA will follow TRPA's action. In considering the Purpose and Need (see Chapter 2, "Purpose and Need"), FHWA will review the action alternatives and decide: 1) whether or not to implement one of the action alternatives; and 2) whether the project necessitates preparation of an Environmental Impact Statement (EIS) or whether a Finding of No Significant Impact (FONSI) can be supported by the environmental analysis contained in this EA. If a FONSI can be supported, then it will be prepared to conclude the NEPA process and will document the rationale for the decision. The FONSI would consist of the EA modified to reflect all applicable comments and responses and the final environmental conclusions.

1.6.2 USE OF THIS DOCUMENT BY OTHER AGENCIES

This EA is also intended to be used by other agencies that may have authority over one or more elements of the North Demonstration Project. Other potential permits and/or approvals that may be required for development of the project could include, but are not limited to the following:

- U.S. Army Corps of Engineers – Section 404 Nationwide Permit
- U.S. Fish and Wildlife Service – Section 7 of the Endangered Species Act consultation
- USFS, LTBMU – LTBMU is preparing a separate NEPA Decision Memorandum for a categorical exclusion in support of issuance of a Special Use Permit for the short section of the shared-use path that would cross a single parcel on NFS land. The memorandum would use information from the EA, as appropriate.
- Nevada Department of Environmental Protection
  - Construction General Storm Water Permit
  - Section 401 Water Quality Certification
  - National Pollutant Discharge Elimination System Permit
- NDOT – Encroachment and Occupancy Permits for any work within NDOT ROW
- NDSP – Development, operations, and maintenance approvals and advice to NDSL on easements for projects within Lake Tahoe Nevada State Park
- NDSL – Easement allowing use of state-owned land
- Nevada State Historic Preservation Officer – Section 106 Consultation
- IVGID – Utility Relocation Permit/Agreement (lowering of the sewer mains at identified locations on SR 28)

- Washoe County
  - Site Improvement Permit
  - Encroachment Permit (if 4th Street is used, see Chapter 3, "Alternatives")

1.7 KEY ISSUES

This EA identifies and addresses the following key issues that are known to the lead agencies or were raised by agencies or interested parties during the public scoping period.

- pedestrian and bicyclist safety and conflicts with roadway traffic;
- privacy and security of residents in the Rocky Point Subdivision;
- project costs;
- impacts to wildlife;
- removal of rock outcroppings and effects to scenic resources;
- capacity issues/user experience at lake side recreation areas, including Hidden Beach, Memorial Point, and Sand Harbor;
- site drainage and water quality concerns, particularly given the project's proximity to Lake Tahoe;
- potential scenic impacts and impacts to shorezone character;
- potential impacts to cultural resources;
- tree removal, extent of new disturbance, and land coverage;
- construction-related road closures and techniques; and
- soil erosion.

In general, representatives of the State of Nevada, NDSL, and NDSP are very supportive of projects that improve and enhance recreational access within the Tahoe Basin. NDSL and NDSP—as landowner and manager—are concerned about the long term operations and maintenance of the proposed facility, as well as the impacts it may pose to the future operations and maintenance of existing NDSP facilities. NDSP is currently working with TTD and other project partners to develop an Operations and Maintenance Plan that will adequately address these concerns. Landowner and manager consent for this proposal will be pending successful resolution of the Operations and Maintenance Plan (see Section 3.4, "Long-Term Operations and Maintenance").

1.8 COMPARISON OF ALTERNATIVES

Three project alternatives are considered in this document. Table 1-1 below presents a comparison of the major physical characteristics of the two action alternatives (Alternatives A and B) and the No Project/No Action Alternative (Alternative C), as well as a comparison of environmental effects where the outcomes can be distinguished quantitatively or qualitatively between the alternatives. Chapter 3 provides a narrative description of the North Demonstration Project shared-use path and the project elements that are common to both action alternatives, followed by a more detailed description of each alternative.

Table 1-1 Summary Comparison of North Demonstration Project Alternatives			
Comparative Details	**Alternative A**	**Alternative B**	**Alternative C**
Approximate Total Length	~ 15,500 lf	~ 17,000 lf	NA
Projected Use (Daily One-Way Trips)	1,311	971	NA
Number of Highway Crossings	2	4 (3 crossings without Memorial Point connector)	NA
Rideability (Length of Path with a Finished Grade Exceeding 5%)[2]	1,170 lf	3,530 lf	NA
Approximate Increase in Land Coverage[1]			
Overall Coverage Increase	4.32 acres	4.63 acres (4.43 acres without Memorial Point connector)	NA
Coverage in LCD 1a	2.88 acres	3.00 acres (2.80 acres without Memorial Point connector)	NA
Coverage in LCD 1b (SEZ)	0.03 acres	NA	NA
Coverage in Backshore	0.05 acres	NA	NA
Biological Resource Constraints and Effects[3]			
Stream Crossings	2	2	NA
Permanent Effects to SEZs and Jurisdictional Waters[4]	0.05 to 0.06 acres	NA	NA
Temporary Effects to SEZs and Jurisdictional Waters	0.06 to 0.07 acres	0.04 acres	NA
Permanent Effects to Native Vegetation Communities/Habitat	4.7 to 4.9 acres	7.2 acres	NA
Permanent Effects to Ruderal/Developed Vegetation Communities/Habitat	1.9 to 2.0 acres	0.8 to 0.9 acres	NA
Temporary Effects to Native Vegetation Communities/Habitat	1.4 to 1.5 acres	1.7 acres	NA
Temporary Effects to Ruderal/Developed Vegetation Communities/Habitat	1.9 to 2.0 acres	1.7 acres	NA
Linear feet of path within TRPA osprey disturbance zones	4,742 to 5,939 lf	5,131 to 5,931 lf	NA
Acreage of permanent disturbance within TRPA osprey disturbance zones	2.4 to 2.7 acres	2.7 to 3.1 acres	NA
Acreage of temporary disturbance within TRPA osprey disturbance zones	0.6 to 0.7 acres	0.7 to 0.8 acres	NA
Likelihood of Osprey Nest Abandonment	Unlikely, SR 28 separates path from nests	Likely, two nests close to the alignment	NA
Tree Removal			
Total trees to be removed (>14” diameter at breast height [dbh])	49	121	NA
Trees 14 to <24” dbh	45	112	NA
Trees >24” dbh	4	9	NA
Scenic Resources			
Percent of Path Requiring Retaining Walls[2]	66%	70%	NA

Table 1-1 Summary Comparison of North Demonstration Project Alternatives

Comparative Details	Alternative A	Alternative B	Alternative C
Total Length of Bridge Structures[2]	1,315 lf	175 lf	NA
Total Vertical Surface Area Visible from Lake Tahoe	73,800 sf	77,200 sf	NA
Scenic Impact on TRPA Roadway Travel Units	Visible from SR 28 in some locations	Not as visible, located above SR 28	NA
Scenic Impact on TRPA Shoreline Travel Units	Likely to be more visible from lake, but within existing SR 28 disturbed area with visible guard rail and timber walls	Less visible, because of better screening potential by forest vegetation	NA
# of Locations where Power Line Crosses Trail	6	17	NA
Utility Relocation	16-inch effluent main (1 location in SR 28; only with undercrossing option) 4-inch force/pressure main (1 location in SR 28; only with undercrossing option)	guy wire (1 wire) 16-inch effluent main (up to 2 locations in SR 28; only with undercrossing option) 4-inch force/pressure main (up to 2 locations in SR 28; only with undercrossing option)	NA

Notes: NA = Not Applicable, lf = linear feet, sf = square feet, " = inches, and dbh = diameter at breast height
1 Land coverage, as well as land coverage increases in all LCDs, is defined in Section 4.5, "Earth Resources."
2 Calculated in GIS using the 30 percent preliminary engineering plan set included as Appendix B to this EA.
3 Details are discussed in Section 4.4, "Biological Resources."
4 Jurisdictional waters are defined in Section 4.4, "Biological Resources."
Source: Data adapted by Ascent Environmental in 2013

2 PURPOSE AND NEED

The purpose of the Nevada Stateline-to-Stateline Bikeway, North Demonstration Project, as adopted by the Bikeway Project Working Group, is to provide a premier separated, shared-use path that offers safe pedestrian and bicycle access and links recreation areas from Incline Village, Nevada to Lake Tahoe Nevada State Park's Sand Harbor Management Area. The proposed project is a TRPA Environmental Improvement Program (EIP) project. The EIP program was launched by the TRPA in 1997 to help implement the TRPA Regional Plan. EIP projects are focused on improving air, water, and scenic quality, forest health, fish and wildlife, and public access to the Lake and other recreation areas.

Existing bikeways in the Tahoe Basin are extremely popular and public surveys show that expansion of the bikeway system around the entire lake is desired (TRPA/TMPO 2010). Separated shared-use path facilities are not available along most of the Nevada side of Lake Tahoe, so improved facilities are needed to serve residents and visitors in this area; the projected use (demand) for the project is summarized in Section 4.9, "Traffic, Parking, and Transit." The proposal for a shared-use path originated with the State of Nevada Conservation and Resource Protection Grant Program (also known as State Question 1 Program), a voter-approved bond measure passed in 2002, which provided up to $5 million for the construction of a "Lake Tahoe Pathway System." Extensive planning efforts resulting from this bond measure (including the Bikeway Project Working Group's preparation of a Concept Document, Desired Design Parameters, GIS Trail Suitability Model, Opportunities and Constraints Report, and Feasibility Study) identified the desire for a shared-use path that now reflects the proposed North Demonstration Project.

The proposed North Demonstration Project would provide a spectacular, separated, shared-use path linking Incline Village to Sand Harbor and other recreational amenities, including Hidden Beach and Memorial Point, the Lakeshore Boulevard shared-use path, and the world-class, Flume Trail. These popular recreation areas are generally accessed by automobile at this time, because no other viable option exists. Providing pedestrian and bicycle links to recreation areas is an integral part of reducing vehicle-related impacts, improving the multi-modal options available to residents and visitors, promoting healthy lifestyles, and providing a high-value recreation experience in the shared-use path, itself. For these reasons, the North Demonstration Project provides high value as an independent facility, but is also a critical section of for the planned Nevada Stateline-to-Stateline Bikeway. Although high quality trails exist in the Tahoe Basin, necessary connections for an integrated network of bicycle trails have been identified as a future need (TRPA 2007). The North Demonstration Project is necessary to provide safe, pedestrian and bicycle access to Hidden Beach, Memorial Point, and Sand Harbor on a path separated from the highway. Today, visitor access to these lake side recreation sites is limited to automobile (year-round), and boat and shuttle (when operating in the summer) to Sand Harbor. A guard rail along the lake side of SR 28 separates the highway from the lake. The North Demonstration Project is critical for helping to ameliorate existing unsafe access conditions, as illustrated in Exhibits 2-1 and 2-2. The shoulders of SR 28 are narrow and in most places do not meet minimum bicycle lane width requirements. Parking at the recreation sites is constrained and historically visitors have attempted to access these sites by foot on and across the highway, creating segmented social trails and dangerous conditions along the shoulders of SR 28, or by parking illegally on the shoulders of SR 28, resulting in hazardous conditions for visitors and adverse environmental conditions, such as soil erosion.

The injury crash rate (injury accidents per million vehicle miles traveled) for SR 28 between the junction with US 50 and the Nevada state line in Crystal Bay is 180 percent higher than the statewide average, with the area between the northern boundary of Lake Tahoe Nevada State Park and Memorial Point being one of the top six areas within the SR 28 corridor where accidents occur (TTD 2013). Between 2006 and 2013, a total of 107 accidents occurred (35 percent involved at least one injury) within the limits of the project area (between Sweetwater Road and a point just south of the Sand Harbor). This represents nearly 25 percent of the accidents within the SR 28 corridor (LSC Transportation Consultants, Inc. [LSC] 2013).

Exhibit 2-1 Nevada Division of State Parks rangers crossing guard rail to conduct maintenance at Hidden Beach.

Exhibit 2-2 Family crossing guard rail on SR 28 to access the shoreline.

2.1 PROJECT GOALS AND OBJECTIVES

The following goal and objectives were developed for the North Demonstration Project to meet the Purpose and Need established for the Project:

Goal: The primary goal of the North Demonstration Project is to design and construct a demonstration shared-use, bicycle and pedestrian facility to showcase the potential for creating the Nevada portion of a premier separated bikeway encircling Lake Tahoe.

Objectives:

- Create a separated, shared-use path that connects Incline Village to Sand Harbor with connections to Hidden Beach and Memorial Point.
- Provide a separated, shared-use path that offers a high-quality user experience.
- Provide a new high-quality recreation access facility while protecting the quality, integrity, and character of existing outdoor recreation resources and user experiences.
- Serve a broad spectrum of users by meeting AASHTO and Americans with Disabilities Act (ADA) design standards, wherever feasible.
- Support the purpose of the SR 28 Corridor Management Plan and management of access to Lake Tahoe Nevada State Park.

In addition to the AASHTO and ADA standards, the North Demonstration Project would be designed to meet the 15 design principles established by the Working Group for the Nevada Stateline-to-Stateline Bikeway Project. These principles are:

1. Identify and provide convenient buildable connections to communities, public facilities, public lands, the lakeshore, and open space.
2. Establish separated shared-use path alignments, wherever feasible.
3. Serve both recreation and commuter needs, with recreation needs receiving first priority where choices must be made.
4. Support the protection, restoration, and sustainability of natural and cultural resources.
5. Anticipate future growth in the surrounding communities in Nevada and California.
6. Provide for a variety of bicycle and pedestrian uses on the separated, shared-use path, while recognizing and managing potential conflicts.
7. Provide adequate public and private support facilities.
8. Remain sensitive to the cultural resources and traditions of the Washoe Tribe.
9. Design the bikeway to create social and economic benefits.
10. Provide interpretive opportunities along the bikeway for natural, cultural, and historic resources.
11. Minimize the number of at-grade crossings on SR 28.
12. Provide connections to existing or new trails to recreation areas, transportation facilities, and community centers along the bikeway.
13. Where appropriate, enhance and use existing disturbed area, such as old logging and fire access roads, and take advantage of joint parking opportunities, such as at school sites.
14. Include opportunities for ADA accessibility.
15. Provide visitor amenities, such as rest areas and vista points, to make the bikeway an enjoyable experience.

In addition to the 15 design principles, the Working Group identified 10 objectives for the Bikeway. The following eight objectives apply to the North Demonstration Project:

1. Complete long-term maintenance, resource management, and operations plans for Bikeway segments prior to construction.
2. Establish partnerships for operations and maintenance for each segment prior to approval of construction.
3. Encourage the shift in travel demand for East Shore recreation areas from driving to bicycling, walking, and transit.
4. Respect the Washoe community by involving them in determining ways to protect and interpret Washoe cultural, historic, and natural resources values.
5. Maximize funding source opportunities for timely project implementation and for long-term operation.
6. Provide opportunities for existing local businesses to participate in the process so they can help enhance the visitor experience on, and access to, the Bikeway.
7. Coordinate Bikeway decisions with recommendations in the East Shore Access Plan and consider other alternative transportation choices.
8. Coordinate with appropriate agencies to incorporate the Bikeway in new development plans and avoid conflict with road and highway projects.

3 ALTERNATIVES

3.1 REGIONAL AND LOCAL SETTING

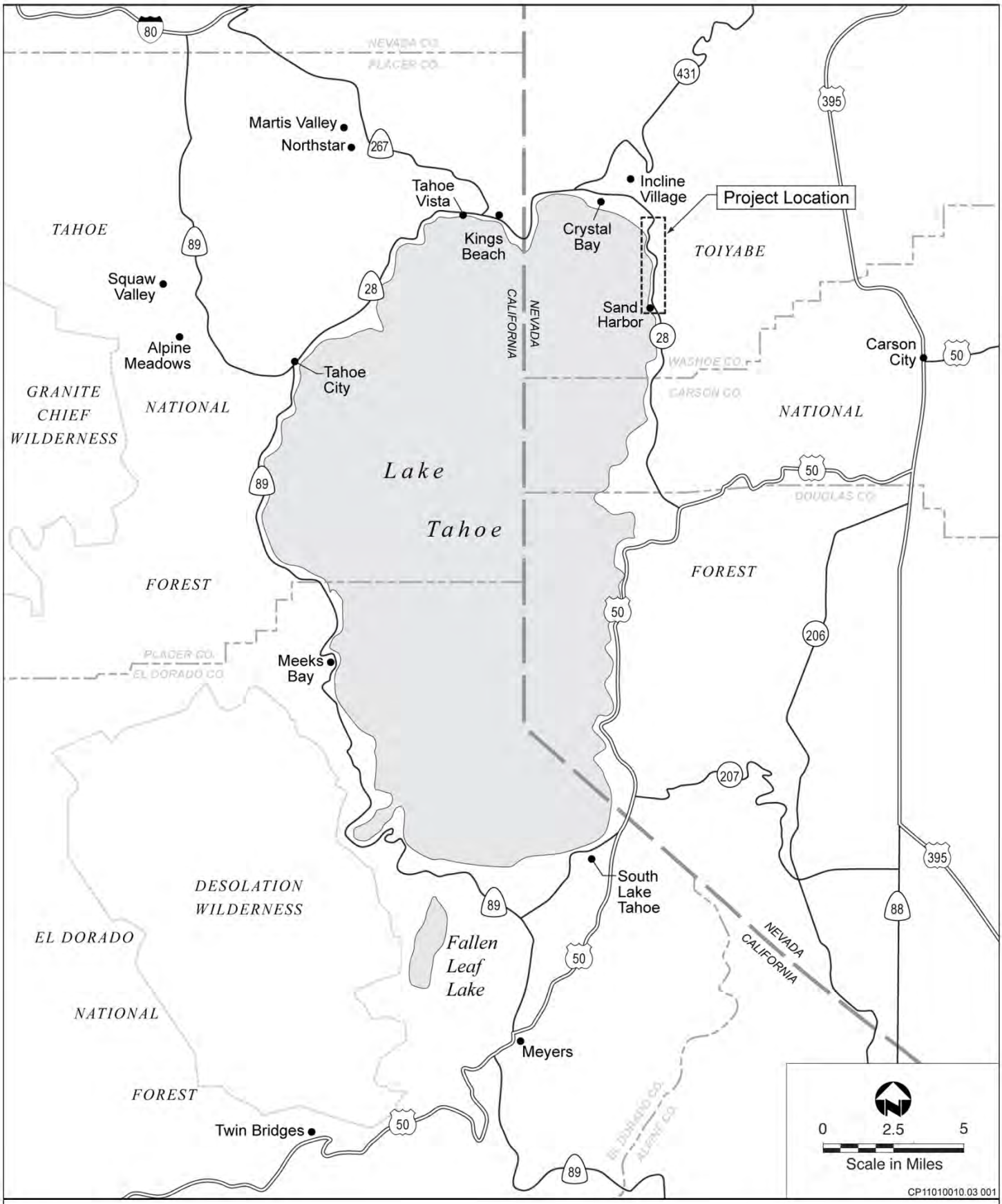
The North Demonstration Project is a component of the longer Nevada Stateline-to-Stateline Bikeway Project, which encompasses an approximately 30-mile-long corridor between Stateline, Nevada and Crystal Bay, Nevada. The North Demonstration Project is proposed to be a shared-use path connecting Incline Village and Sand Harbor in Washoe County, Nevada on the east shore of Lake Tahoe (Exhibits 3-1 and 3-2). Planned users would consist of pedestrians and non-motorized vehicles (primarily bicycles). The northern terminus of the North Demonstration Project would be in the NDOT ROW on the mountain side (i.e., east side) of SR 28, approximately 0.1 mile (700 feet) north of the intersection of Lakeshore Boulevard and SR 28. This terminus would be located adjacent to the Tunnel Creek Café property on the east side of SR 28. From there, the proposed shared-use path would extend south, parallel to SR 28, for approximately 3 miles to the main entrance at Sand Harbor within the Sand Harbor Management Area of Lake Tahoe Nevada State Park.

For the purpose of this EA, the project area is generally defined as extending from the southern edge of the Ponderosa Ranch property in the north to the southern edge of Sand Harbor in the south, and from the shoreline of Lake Tahoe on the west to 300 feet east of SR 28 (which would be well below the existing Flume Trail).

The terrain over the 3 miles of the project area rises rapidly to the east of SR 28 beginning immediately south of Incline Village, and drops sharply toward the lake on the west side of SR 28. Significant geographic features along this stretch include Tunnel Creek and Bonpland Creek, both of which flow though steep-walled canyons into Lake Tahoe. Existing recreation sites and facilities along this segment include: Hidden Beach – a popular east shore destination; Memorial Point – a vista point with short-term visitor parking, informational signage and restrooms; and Sand Harbor – which includes an extremely popular beach area, several parking lots, boat launch facilities, visitor center, restrooms, and a concessionaire facility. SR 28 is a nationally designated Scenic Byway. Several residences are located west of the proposed shared-use path along the lake side of SR 28 just south of Lakeshore Boulevard and on both the lake side and mountain side of SR 28 in the Rocky Point Subdivision area. The Rocky Point Subdivision is a small subdivision of primarily undeveloped public and private parcels located about 0.3 mile south of the Lakeshore Boulevard/SR 28 Intersection.

Hidden Beach and Sand Harbor are popular beach destinations on the east shore of Lake Tahoe, and Memorial Point is a popular stopping and viewing point, especially for tourists. Together the facilities compose the Sand Harbor Management Area, a defined unit of Lake Tahoe Nevada State Park. Sand Harbor receives the heaviest levels of visitation (nearly 496,300 visitors in 2010) of the entire Lake Tahoe Nevada State Park (NDSP 2011). There are long-recognized management concerns with Sand Harbor associated with the high level of use the area receives during the summer peak season. Chief among these concerns are parking limitations leading to unsafe and illegal parking along the SR 28 corridor; social impacts leading to lower quality recreation experiences; and potential ecosystem damage (USFS 1999). To address these issues, a corridor management planning effort for the entire SR 28 corridor was completed in October 2013 that involved the public agencies with jurisdiction in the corridor.

Approximately 95 percent of the proposed North Demonstration Project shared-use path would be located on lands owned by the State of Nevada (managed by NDSL, NDSP, or NDOT). The remaining 5 percent of the path would cross about 800 linear feet of a single NFS parcel managed by the LTBMU, and approximately 50 linear feet of two private parcels (described further herein). The private parcels are located in the Rocky Point Subdivision.



Source: Adapted by Ascent Environmental in 2013

Exhibit 3-1 Regional Location Map

Source: Data received from Lumos & Associates 2013; Adapted by Ascent Environmental 2013

Exhibit 3-2 **Alternative Alignments**

The shared-use path would be located within three TRPA Plan Area Statements (PAS): Mill Creek (049), Tunnel Creek (047), and East Shore (055). The trailhead parking would be within the NDOT ROW that falls within the Ponderosa Ranch Community Plan. (Note: Washoe County is in the early planning stages for development of the Washoe County Area Plan that will supersede these and other PASs and community plans within the Washoe County portion of the Tahoe Basin. This planning effort is not expected to be in effect before an action on the North Demonstration Project is taken and therefore references to local plans herein refer to the existing PASs and community plan that are in effect.) The shared-use path meets the definition of a linear public facility (LPF) in Chapter 90, "Definitions," of the TRPA Code, and as such would be subject to the applicable TRPA Code provisions that apply to LPFs.

3.2 ALTERNATIVES CONSIDERED IN DETAIL

Three alternatives are under consideration for the North Demonstration Project: Alternative A – a lake side path alignment; Alternative B – a mountain side path alignment, and Alternative C – No Project/No Action Alternative. Of these alternatives, one would be selected for approval and ultimately construction. The alternatives are divided into three segments, dividing the path into three logical segments for funding and construction phasing while providing independent utility. Segment 1 extends from the NDOT ROW at the northern terminus to Tunnel Creek and would include a crossing of SR 28 at Tunnel Creek to provide access to Hidden Beach. Segment 2 continues from Tunnel Creek to Memorial Point, and Segment 3 covers the section of the path between Memorial Point and Sand Harbor. Alternatives A and B are identical for Segment 1. In Segments 2 and 3, Alternative A extends along the lake side of SR 28 and Alternative B stays on the mountain side of SR 28 to Sand Harbor. The two action alternatives were selected after consideration of several alignments. (A summary of other alternatives considered and eliminated from detailed evaluation is presented in Section 3.5.) Action Alternatives A and B were chosen as those routes that would best meet the purpose and need, and project goals and objectives (see Chapter 2, "Purpose and Need").

3.2.1 NAMING CONVENTION FOR ALTERNATIVES AND OPTIONS

Both Alternatives A and B include optional design concepts for the shared-use path within each broader alternative. For example, both alternatives require crossing SR 28 at Tunnel Creek; Alternative B also includes a crossing at Sand Harbor and a potential crossing at Memorial Point. Options have been developed to consider both at-grade and undercrossing options at Tunnel Creek and Sand Harbor. Also, with Alternative A, four concepts were developed to bring the shared-use path past Memorial Point.

The naming convention provided in Table 3-1 has been developed to simplify the discussion of Alternatives A and B and their related options herein in this EA. Some examples using this format follow:

- Alternative A-1D refers to Alternative A with an at-grade cross of SR 28 at Tunnel Creek and a crossing below the restrooms at Memorial Point.
- Alternative A-2C refers to Alternative A with a crossing under SR 28 at Tunnel Creek and a crossing along the west side of the parking lot at Memorial Point.
- Alternative B-2B refers to Alternative B with crossings under SR 28 at Tunnel Creek and Sand Harbor.

The optional trailhead parking extending towards Sweetwater Road (described under the header "Parking" later in this chapter) does not affect the naming conventions for the alternatives.

A total of eight scenarios (alternative option combinations) are possible for Alternative A; four scenarios are possible for Alternative B.

Table 3-1 Naming Convention for Alternatives A and B Options

Alternative	Tunnel Creek SR 28 Crossing		Memorial Point Crossing		Sand Harbor SR 28 Crossing	
	Option	Description	Option	Description	Option	Description
Alternative A	A-1	At-grade	A-#A	Does not cross parking lot; uses existing sidewalk for crossing	NA	
			A-#B	Crosses center of parking lot		
	A-2	Undercrossing	A-#C	Crosses west side of parking lot		
			A-#D	Avoids parking lot; crosses below with connector to restrooms		
Alternative B	B-1	At-grade	NA		B-#A	At-grade
	B-2	Undercrossing			B-#B	Undercrossing

NA = Not Applicable
Source: Adapted by Ascent Environmental 2013

3.2.2 ELEMENTS COMMON TO ALTERNATIVES A AND B

Both Alternatives A and B would follow the same alignment for Segment 1, as described below. At Tunnel Creek the route would either drop to and cross SR 28 via a constructed undercrossing or an at-grade crossing (Alternative A), or would climb slightly and cross Tunnel Creek on a constructed bridge (Alternative B). To provide access to Hidden Beach, Alternative B would also include a SR 28 crossing at Tunnel Creek. Both alternatives would continue south ending at the main entrance to Sand Harbor. (Note: NDSP has expressed interest in revisiting the end point of the connection into Sand Harbor. Refinements to the endpoint can be made during subsequent phases of design if the project is approved with input from NDSP.) Alternative A would remain along the lake side of SR 28 after crossing the highway at Tunnel Creek. Alternative B would remain along the mountain side of SR 28 until crossing to Sand Harbor through an undercrossing or via an at-grade crossing. Exhibits 3-2 through 3-5 illustrate the alignments of Alternatives A and B. In addition, a complete set of preliminary engineering plans for both alignments are included in Appendix B.

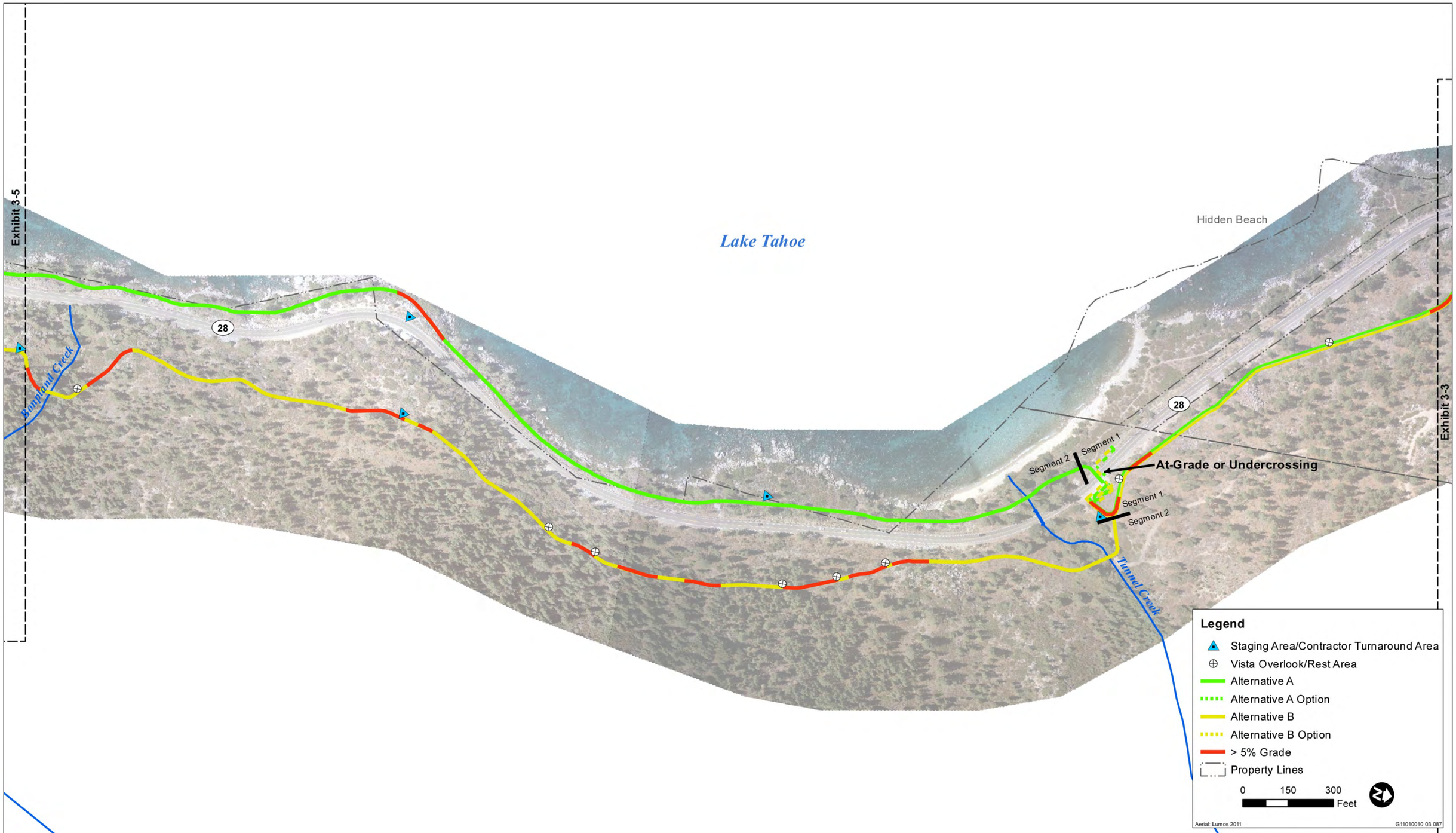
Project design features (see “List of Project Design Features” at the beginning of this document) are measures that were developed to reduce or avoid (i.e., mitigate) adverse environmental effects of the action alternatives analyzed in this EA. This comprehensive list of measures are part of the project alternatives and would be implemented with Alternatives A and B, except where noted.

LAKE TAHOE ENVIRONMENTAL IMPROVEMENT PROGRAM PROJECT IMPLEMENTATION

The EIP is a cooperative effort to preserve, restore, and enhance the unique natural and human environment of the Lake Tahoe Region. The program defines restoration needs for attaining environmental goals or thresholds and, through a substantial investment of resources, increases the pace at which the thresholds will be attained. Key to this strategy is reliance upon partnerships with all sectors of the community, including the private sector, local, state, and federal government. The EIP has several components, which make up a comprehensive strategy for restoration and improvements. The components include capital projects, research and science, program support and technical assistance, and operations and maintenance.

Source: Data received from Lumos & Associates (2013); Adapted by Ascent Environmental 2013

Exhibit 3-3 **Segment 1 – Overview Map**



Source: Data received from Lumos & Associates (2013); Adapted by Ascent Environmental 2013

Exhibit 3-4 **Segments 1 and 2 – Overview Map**

Source: Data received from Lumos & Associates (2013); Adapted by Ascent Environmental 2013

Exhibit 3-5 **Segments 2 and 3 – Overview Map**

As described in Chapter 2, "Purpose and Need," the Nevada Stateline-to-Stateline Bikeway is an EIP project (EIP Project 03.01.02.17). In addition, the EIP includes implementation of two projects within the vicinity of the North Demonstration Project that have been identified for further attainment of TRPA's scenic threshold. Both action alternatives would implement, at least partially, the following EIP projects:

- **EIP Project 03.01.02.17: Nevada Stateline-to-Stateline Bikeway.** The goal of this project is to create a 30 mile continuous shared-use path along the east shore of Lake Tahoe connecting the northern and southern Nevada state lines. The project would be developed in phases with the first phase constructed in 2012.
- **EIP Project 04.02.01.11: Scenic Roadway Unit #26 Sand Harbor Nevada State Parks Maintenance Yard.** Implementation of this EIP project would improve the visual appearance of the maintenance yard and office complex buildings at Sand Harbor by screening these areas from view of SR 28.
- **EIP Project 04.02.01.12: Scenic Roadway Unit #26 Sand Harbor/SR 28 Rock Revetments and Guard Rails.** This EIP project would vegetate and stain exposed rock revetments so as not to create the contrast that exists now. Replacement and redesign of the guardrails along NDOT's right of way would also remove glare and contrast.

AFFECTED PARCELS

Alternatives A and B would affect the same parcels. Table 3-2, below identifies the parcels affected by the action alternatives as depicted in the preliminary engineering plans, the landowner or land manager, and the project component(s) that would occur within each parcel. The alignment of the shared-use path through the Rocky Point Subdivision was designed to minimize cut and fill, avoid rock outcroppings to the north of the affected parcels, and to follow existing contours to complement the natural landscape. The five parcels that are crossed through this area are located between 3rd and 4th Streets ("paper" or un-built streets). The three state-owned parcels managed by NDSL were purchased with Tahoe Bond Act funds. The development rights and allowable land coverage associated with these parcels have been retired, but those rights were associated with the development of the lots for residential purposes. Development of a public shared-use path would not be precluded on these parcels, but may require that special conditions be placed on the project. The property owners for the two private parcels that would be crossed in this area were notified about the project when notices were distributed to initiate public scoping in the fall 2011. Because of the uncertainty as to whether these private undeveloped parcels would be available for purchase and the possibility that NDSL would not allow use of their lots, the survey effort and analyses herein evaluates the possibility that the path could be realigned eastward to 4th Street (Washoe County ROW) during latter phases of the design process without triggering the need for additional environmental review.

Table 3-2 Affected Parcels and Landowners/Land Managers as Depicted in 30% Preliminary Plans

APN	Landowner/Land Manager	Project Component	Comment
130-311-01	NDOT	Trailhead parking and portions of Segment 1 path in ROW	
130-302-10	NDOT	Trailhead parking and portions of Segment 1 path in ROW	
ROW	NDOT	Segments 1, 2, and 3	Due to the proximity of Alternative A to SR 28, the majority of the path south of Tunnel Creek is within NDOT's ROW. Portions of the path for Alternative B would also be within NDOT ROW. See 30% preliminary plans in Appendix B for ROW locations.
130-320-03	LTBMU	Segment 1	800 linear feet on NFS land

Table 3-2 Affected Parcels and Landowners/Land Managers as Depicted in 30% Preliminary Plans

APN	Landowner/Land Manager	Project Component	Comment
130-333-01	Thomas J. Mansfield	Segment 1	Rocky Point Subdivision (private parcel)
130-333-02	NDSL	Segment 1	Rocky Point Subdivision, purchased with Tahoe Bond Act funds[1]
130-333-03	NDSL	Segment 1	Rocky Point Subdivision, purchased with Tahoe Bond Act funds[1]
130-333-04	C.K. and Martha H. Jones	Segment 1	Rocky Point Subdivision (private parcel)
130-333-10	NDSL	Segment 1	Rocky Point Subdivision, purchased with Tahoe Bond Act funds[1]
130-340-01	NDSL/NDSP	Segment 1	To Tunnel Creek crossing, purchased with Land and Water Conservation Funds
130-350-01	NDSL/NDSP	Segments 1, 2, and 3	Tunnel Creek crossing to Sand Harbor, purchased with Land and Water Conservation Funds

[1] Development and land coverage rights have been extinguished for parcels purchased with Tahoe Bond Act Funds.
Source: TRPA 2013, NDSL 2012, adapted by Ascent Environmental 2013

The two largest parcels affected by the project are state-owned and managed by NDSP. These parcels extend from Tunnel Creek to Sand Harbor and were purchased with Land and Water Conservation Funds that require the preservation of these lands for public recreational use. The proposed North Demonstration Project would be consistent with this designated use. (See Chapter 5, "Section 4(f) of the U.S. Department of Transportation Act of 1966.")

DESIGN STANDARDS

It is an objective of the North Demonstration Project to construct a separated, shared-use path designed to meet AASHTO and ADA standards, wherever feasible, to serve a broad spectrum of pedestrian and non-motorized vehicle users. To meet ADA criterion for longitudinal slope, the shared-use path has been designed to avoid path sections in excess of 5 percent, however this may not be feasible for the path in its entirety given environmental and regulatory constrains within the Tahoe Basin. In instances where changes in grade over 5 percent are necessary, resting intervals (landings) would be provided. Locations where the finished grade would be greater than 5 percent are shown on Exhibits 3-3 through 3-5. The shared-use path would also have a firm and stable surface. The majority of both Alternatives A and B would also meet AASHTO standards by having a minimum 10-foot-wide asphalt path with graded/cleared 2-foot-wide shoulders. In areas where a shoulder is not feasible due to topographic or other constraints, or where the edge of the path closely parallels SR 28, a guard rail between 42- and 48-inches high would be constructed adjacent to the path's edge to protect path users from traffic and/or from areas where the ground drops steeply from the path's edge. These variations in path design would conform to AASHTO and ADA standards. Lighting would not be provided along the shared-use path, except as needed for safety purposes within the two SR 28 undercrossing locations and for trailhead parking.

Vista overlooks, which would also qualify as a resting interval, would be provided along the shared-use path in areas where the path provides an exceptional scenic opportunity. Benches and interpretative signage may be installed at some of these locations, a design detail that would be determined during latter phases of design.

In areas where topographic constraints necessitate a boardwalk or other cantilevered or separated structure, the boardwalk materials and guard rails would be composed of AASHTO-approved, non-slip surface materials, have aesthetic treatments, and be painted with TRPA-approved colors. The North Demonstration Project shared-use path would be limited to non-motorized vehicle use, except maintenance vehicles and, in the event of emergency, emergency vehicles.

RETAINING WALLS

The proposed path traverses steep terrain and would require retaining walls in many locations in both action alternatives and each of the segments. The retaining walls may be constructed to include wall components on the uphill side of the path, the downhill side, or split on both the uphill and downhill sides. The preliminary engineering plans indicate maximum wall heights of up to 15 feet, but the typical wall height would be between 5 and 8 feet. Surface features and colors of all walls would be designed to blend into the surrounding landscape. Wall heights and locations are shown on the preliminary design plans in Appendix B. Walls up to 8 feet in height would be constructed using stacked rock walls (rockery walls) or featured block walls. Walls taller than 8 feet would likely be constructed from mechanically stabilized earth (MSE) or cast-in-place Portland cement concrete with a featured exterior and coloring to blend with the landscape. MSE walls would have preformed panels with an architectural finish to mimic the natural stone. Exhibits 3-6 and 3-7 show wall details for several cross-slopes; other retaining wall details are included in Appendix B.

ACCESS AND CONNECTIVITY

SR 28 is a major auto route for intra-basin travel, linking U.S. Highway 50 (US 50) on the south to Incline Village and other north shore communities to the north. SR 28 serves as the only land-based access to Hidden Beach, Memorial Point, and Sand Harbor. Pedestrian activity along this section of SR 28 is heavy and dangerous during the summer (NDSP 2010). There are no bicycle lanes, sidewalks, crosswalks or signs to protect pedestrians or warn motorists of pedestrians on SR 28. On the west side of SR 28 several user created and formal hiking trails at Hidden Beach extend from west of the highway to the beach. Similar trails run between the shore and the highway along the length of SR 28 from Hidden Beach to Sand Harbor, providing an option for dispersed shore access, once people reach the west side of the highway (TRPA 2010).

Formal access to the North Demonstration Project at its northern terminus would be provided from Incline Village with primary access from Lakeshore Boulevard, which includes an existing shared-use path that is a component of the larger Nevada Stateline-to-Stateline Bikeway. Limited trailhead parking in the NDOT ROW would also provide access to the path. This access point is approximately 700 feet north of Lakeshore Boulevard along SR 28. The southern terminus of the shared-use path would be accessible from the beach, picnic, and other recreation areas within Sand Harbor.

Formal connections from the path to Hidden Beach (see discussion under “SR 28 Crossing Options at Tunnel Creek,” below) and Memorial Point (see Alternative B, Segment 2) are components of both Alternatives A and B.

Within Incline Village, there are a variety of bicycle lanes and shared-use pathways, including a shared-use path along the length of Lakeshore Boulevard and 3.5 miles of continuous bicycle lane along SR 28, for the entire length of highway through Incline Village (TRPA 2010). In general, ample bicycle and pedestrian access through and around Incline Village make the northern portion of the proposed shared-use path easily accessible by pedestrians and cyclists.

Ponderosa Ranch Road provides access to the Tunnel Creek Road trail, which in turn provides access to the Tahoe Rim Trail and Flume Trail. The Tahoe Rim Trail and Flume Trail are popular and noteworthy hiking and mountain biking trails. All of these trails are on the east side of SR 28, several hundred feet above the lake and do not provide access to east shore beaches.

TRAILHEAD PARKING

In an effort to promote non-automobile access to the shared-use path, TTD is proposing limited trailhead parking as part of the North Demonstration Project. New trailhead parking would be constructed within the SR 28 ROW just south of Ponderosa Ranch Road, adjacent to the parcel housing Tunnel Creek Café (Exhibit 3-8), in an unpaved area currently used for informal shoulder parking. This new facility would provide organized, paved parking to

replace shoulder parking displaced by the shared-use path, and would include 31 angled parking spaces, two of which would be designated for handicapped users. The parking area would have one-way traffic circulation with an entrance at Ponderosa Ranch Road and an exit returning to SR 28 on the southern end. A 5-foot wide sidewalk along the eastern edge of the parking area would provide safe pedestrian access to the path. Bicyclists would share the drive lane with automobile traffic. The shared-use path would begin at the southernmost corner of the parking area. A landscaped median and raised curb would separate the parking area from SR 28. Landscaping would consist of hardy native vegetation that would be able to tolerate loading from snow removal activities on the highway. The parking area would be designed so as not to prohibit its potential use as a transit stop in the future. Bus traffic would only be able to exit to the left (south bound) due to space constraints.

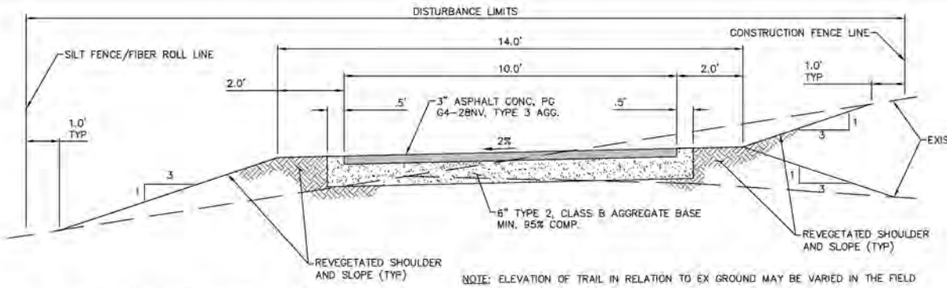
To provide non-auto trailhead access, TTD proposes to extend transit service to the path. TTD proposes to provide transit service to the path trailheads by either extending Tahoe Area Regional Transit service to the site (the service area now extends to Country Club Drive in Incline Village, about 0.7 mile west of the path) or providing service via the East Shore Express, a pilot bus program offered by TTD that provides access to Sand Harbor. TTD also proposes to implement other parking management strategies to promote safe parking and minimize risks of traffic conflict; these include coordination with NDOT, Washoe County, and Nevada Highway Patrol to post additional “no parking” signs on the west side of SR 28, Lakeshore Boulevard, and Ponderosa Ranch Road.

Optional Parking – Trailhead Parking Extending to Near Sweetwater Road

As an alternative to the limited parking strategy, TTD is considering an option that would include additional formalized parking on the east side of SR 28 in the ROW, between Ponderosa Ranch Road and a point near Sweetwater Road (Exhibit 3-9), in an area currently used for informal shoulder parking. This optional parking would include 70 angled parking spaces, three of which would be designated for handicapped users. A total of 101 angled parking spaces, five of which would be handicapped user spaces, would be provided with this option. The parking area would have one-way traffic circulation with entrances at Sweetwater Road and the existing main entrance to the Ponderosa Ranch parking area. A 5-foot wide sidewalk along the eastern edge of the parking area would provide safe pedestrian access to the path. Bicyclists would share the drive lane with automobile traffic. This option would also include new cross-walk striping on Ponderosa Ranch Road (Exhibit 3-8). A landscaped median and raised curb would separate the parking area from SR 28. Landscaping would consist of hardy native vegetation that would be able to tolerate loading from snow removal activities on the highway. The parking area would be designed to be compatible with its potential use as a transit stop in the future. Construction of the parking area would require the relocation of the State of Nevada commemorative marker currently located in the NDOT ROW. This marker would be relocated in coordination with NDOT to a specified location within the parking area.

SIGNAGE

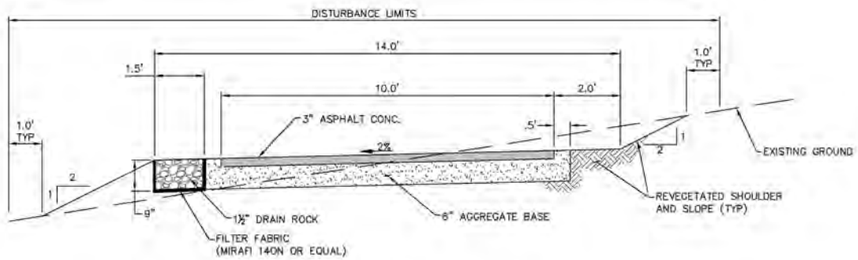
Signage would be developed and installed at the northern trailhead, connection points, and in other areas where necessary to alert users of possible obstacles or changes in the shared-use path. Other informational and interpretive/educational/way finding signs may also be installed along the shared-use path to provide background information regarding points of interest, such as those related to biological or cultural significance, and to notify path users of access restrictions/closures at Sand Harbor during peak periods. A detailed signage plan would be prepared as part of the final design consistent with the FHWA’s Manual on Uniform Traffic Control Devices (MUTCD) and TRPA Code. For the purpose of this EA, the analysis of signage would be limited to that which is necessary for path safety based on engineering judgment and associated standards. All proposed signage would be subject to approval by TRPA and the appropriate land manager, and NDOT if it falls within the NDOT ROW.



NOTE: ELEVATION OF TRAIL IN RELATION TO EX GROUND MAY BE VARIED IN THE FIELD

1/D1 TYPICAL TRAIL SECTION A (14 FT TRAIL, 0% TO 10% CROSS SLOPE)

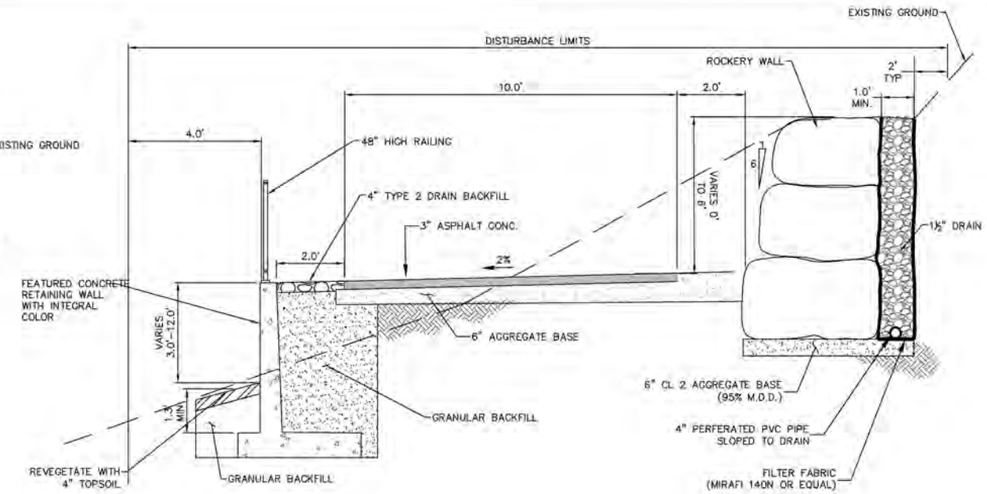
SCALE: N.T.S.



NOTE: ELEVATION OF TRAIL IN RELATION TO EX GROUND MAY BE VARIED IN THE FIELD

2/D1 TYPICAL TRAIL SECTION B (14 FT TRAIL, 11% TO 20% CROSS SLOPE)

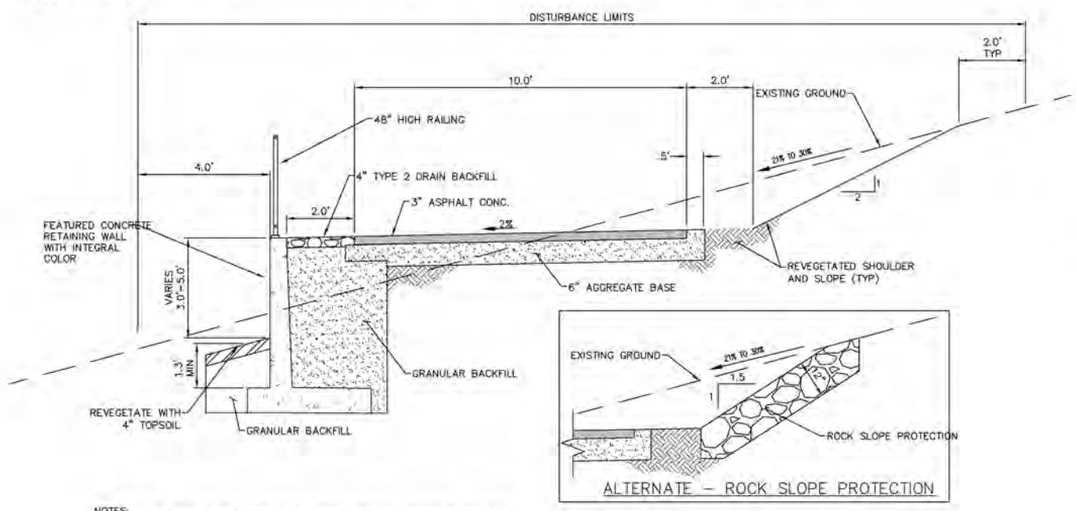
SCALE: N.T.S.



NOTES:
1. ELEVATION OF TRAIL IN RELATION TO EX GROUND MAY BE VARIED IN THE FIELD. SOME LOCATIONS MAY HAVE A WALL ON THE UPHILL OR DOWNHILL SIDE ONLY.
2. A MECHANICALLY STABILIZED EARTH (MSE) WALL WITH A WEATHERED APPEARANCE MAY BE USED IN LIEU OF A FEATURED CONCRETE WALL. FINAL WALL TYPE TO BE DETERMINED DURING FINAL DESIGN.

4/D1 TYPICAL TRAIL SECTION D (14FT TRAIL, 31% TO 50% CROSS SLOPE)

SCALE: N.T.S.

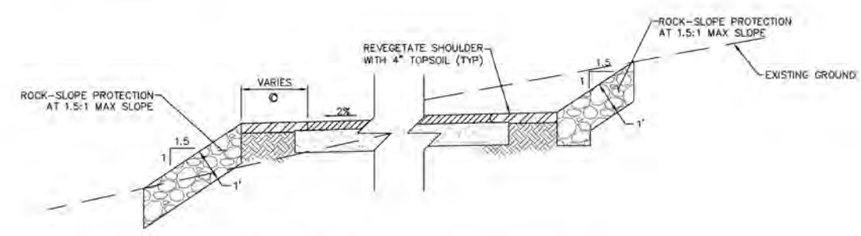


NOTES:
ELEVATION OF TRAIL IN RELATION TO EX GROUND MAY BE VARIED IN THE FIELD.
WALL MAY BE ON UPHILL SIDE OR BOTH SIDES OF TRAIL IN SOME LOCATIONS.

3/D1 TYPICAL TRAIL SECTION C (14 FT. TRAIL, 21% TO 30% CROSS SLOPE)

SCALE: N.T.S.

30% SUBMITTAL
Not For Construction



NOTE:
SLOPES MAY BE STEEPER THAT 1.5:1 FOR SHORT DISTANCES TO AVOID TREES AND/OR BOULDERS

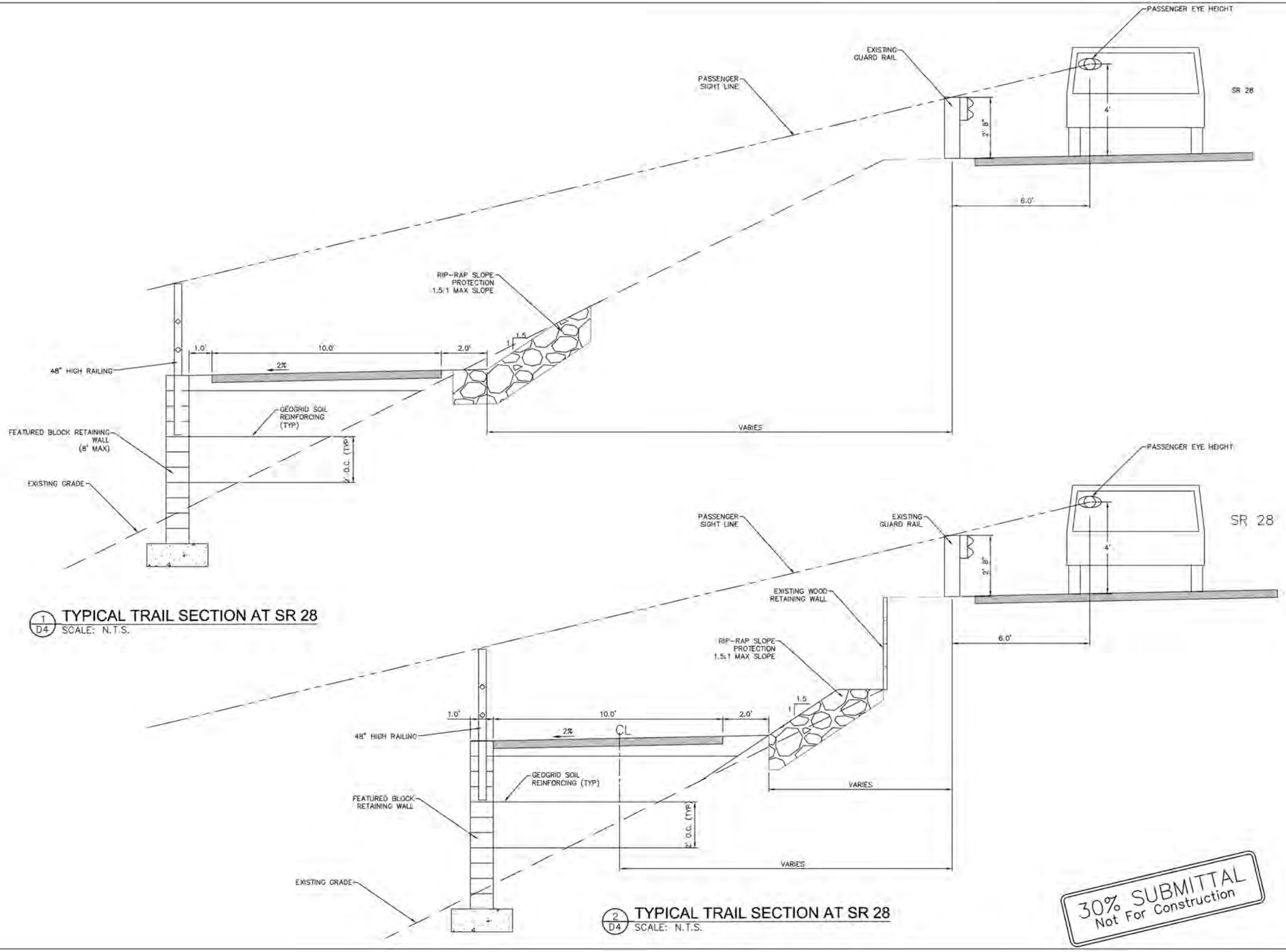
5/D1 ROCK SLOPE PROTECTION ON SLOPES STEEPER THAN 2:1

N.T.S.

X11010010.03.004

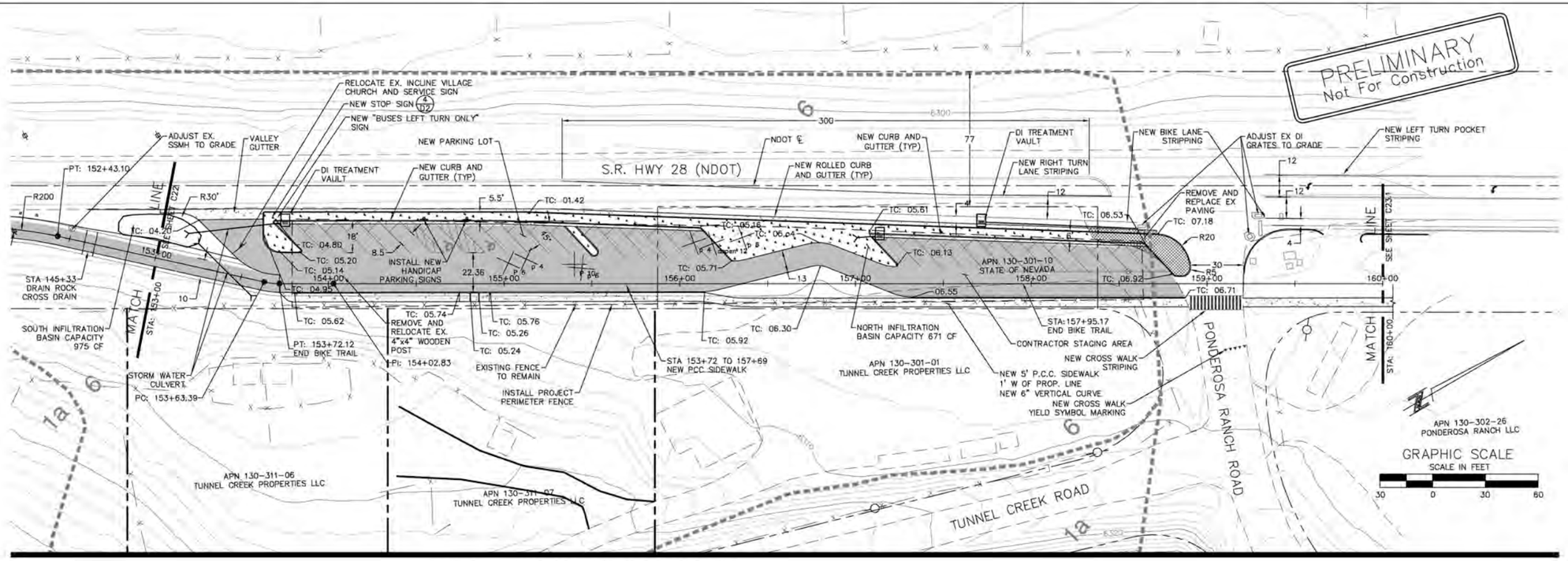
Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-6 **Typical – Wall Details**

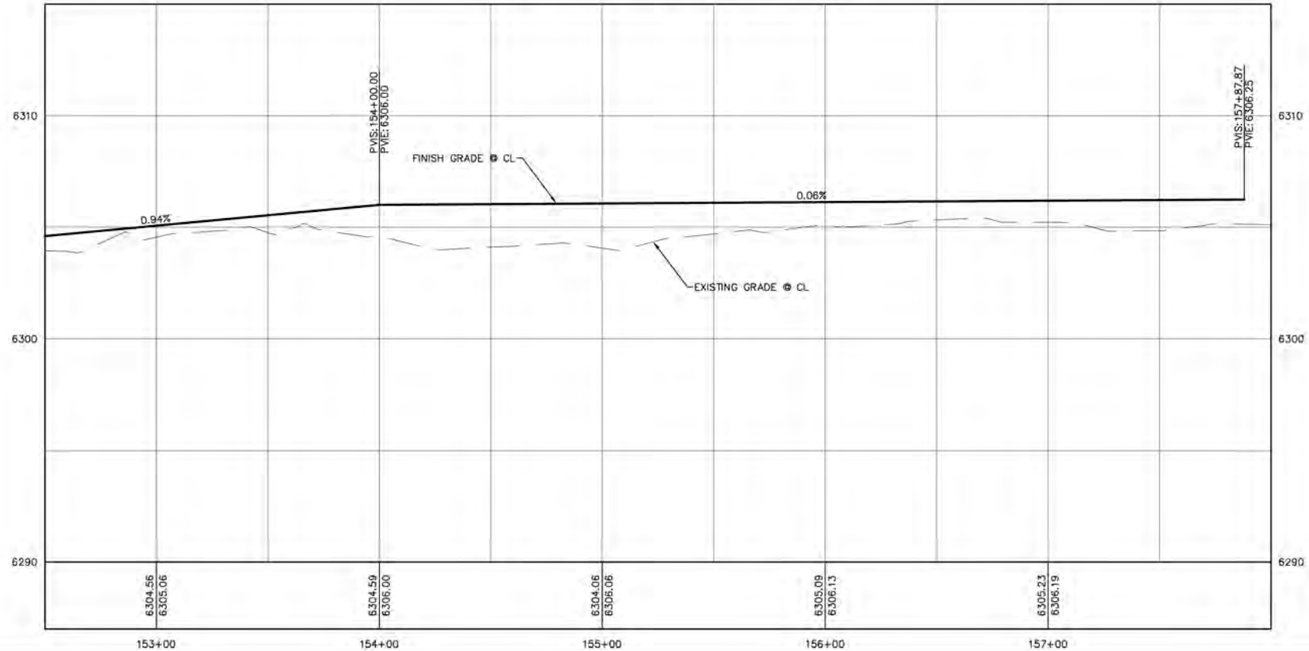


Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-7 **Typical – Wall Details at Close Proximity to SR 28**



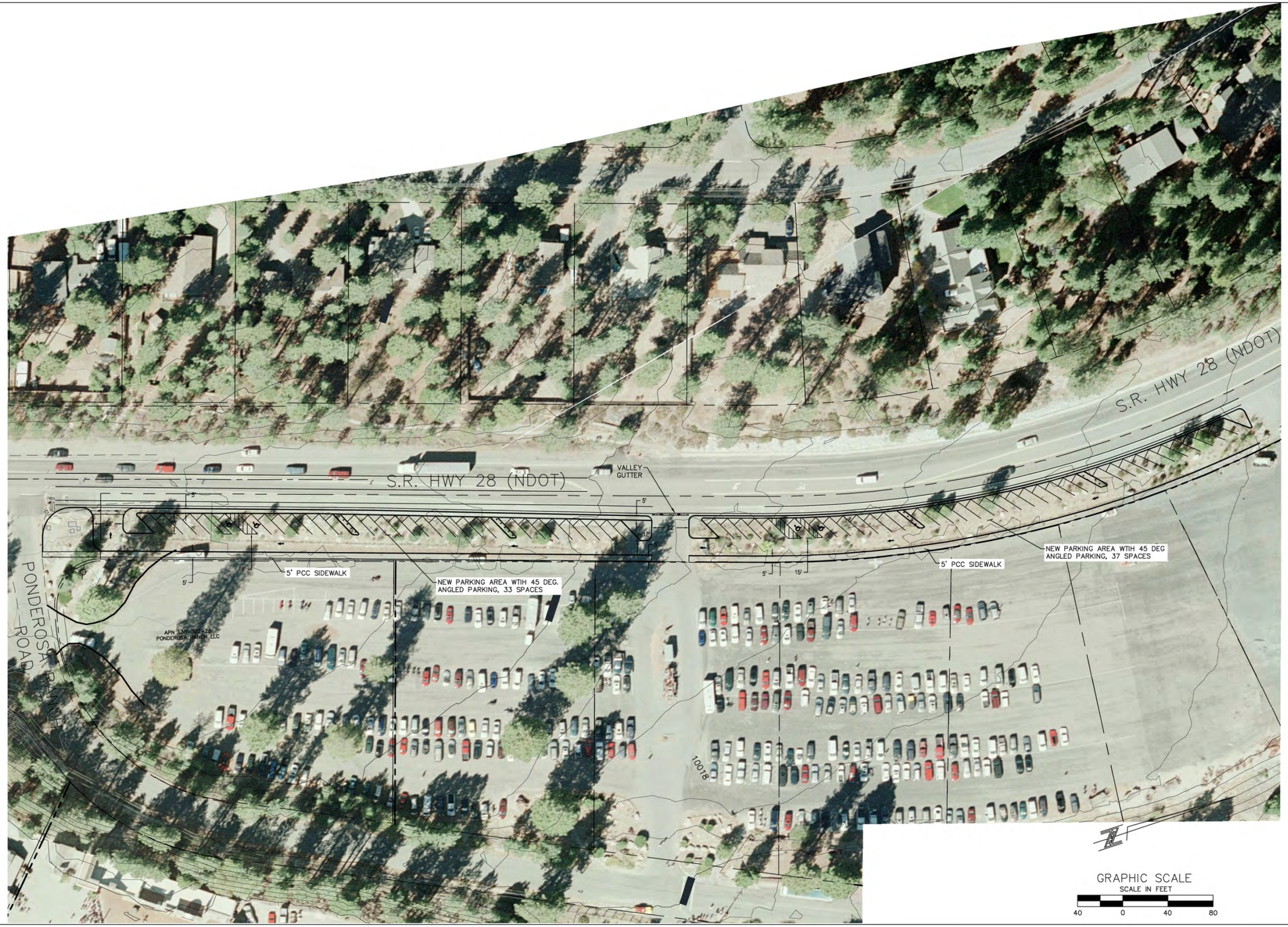
TC-PR – STA:152+50 TO STA:158+00



X11010010.03.017

Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-8 **Trailhead Parking Area**



X11010010 03 018

Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-9 **Optional Trailhead Parking Area**

3.2.3 ALTERNATIVE A – LAKE SIDE ALIGNMENT

SEGMENT 1

Segment 1 is the northern-most section of the proposed shared-use path from Incline Village to Tunnel Creek. Exhibits 3-3 and 3-4 show the extent of Segment 1. The path along the entirety of this segment would include a 10-foot wide paved (asphalt concrete) path with 2-foot wide shoulders on each side constructed of native material and retaining walls where required by slope conditions.

GENERAL ALIGNMENT OF SEGMENT 1

The northern terminus of the shared-use path would be approximately 0.1 mile (700 feet) north of the intersection of Lakeshore Boulevard and SR 28. Alternative A would include an at-grade crossing of SR 28 to connect to the existing shared-use path that runs along Lakeshore Boulevard, as shown in Exhibit 3-10. This crossing would incorporate a raised median and pedestrian refuge island, which could be removed during winter months as to not interfere with snow removal. The crossing treatment would include advance warning signs consistent with FHWA's MUTCD standards.

From the northern terminus, the path would run adjacent to SR 28 on the mountain side of the highway for several hundred feet to a point south of Lakeshore Boulevard where the path would climb the slope following a utility line corridor. The path would pass through the Rocky Point Subdivision either through two private and three State-owned parcels or within the 4th Street ROW, depending on, detailed engineering of the alignment and determination of the needs for grading, minimization of tree removal, and avoidance of rock outcroppings (Exhibits 3-11 and 3-12).

After the Rocky Point Subdivision, the shared-use path would continue south approximately 100 feet above SR 28 until reaching the highway crossing at Hidden Beach, just north of Tunnel Creek. The options for crossing SR 28 are summarized below.

SR 28 CROSSING OPTIONS AT TUNNEL CREEK

Two options are being considered for the highway crossing. Option 1 includes an at-grade crossing, and Option 2 includes an undercrossing. Both options would be ADA compliant.

The at-grade crossing (Option 1) would include a pedestrian activated crossing signal such as a High-intensity Activated crossWalK (HAWK) beacon or a similar device, as shown in Exhibit 3-13. Also known as a "pedestrian hybrid beacon," this pedestrian-activated signal light provides protected crossing of active roadways, stopping traffic only as needed. The at-grade crossing option is illustrated in Exhibit 3-14.

Exhibit 3-13: Example of a HAWK Beacon Pedestrian-Activated Signal

Option 2 would involve the construction of an ADA-compliant ramp that descends from the path to an undercrossing below SR 28. The width of the ramp would be 7 feet with a maximum landing width of 30 feet. The maximum slope of the ramp would be 8.3 percent. Stairs with bicycle channels (a parallel ramp next to the stairs where users can walk their bicycles as they ascend or descend the stairs) may also be constructed. Stair access is not required given that access would be provided by the ramp, but would provide a more convenient and shorter means of access that may be more desirable for some users. Beyond the undercrossing, the path would resume as a paved asphalt

surface, where it would continue south along the lake side of the highway. The construction of this undercrossing would require cutting back the existing slope, facing the cut slope with riprap, and reconfiguring the existing drainage inlets at the north end of the existing turnout. Approximately 8 to 10 feet of the upper retaining wall could be visible from SR 28. Option 2 is illustrated in Exhibit 3-15. Cross-sections for the undercrossing are shown in Exhibit 3-16.

Construction of the undercrossing with Option 2 would require relocation (i.e., lowering) of the existing 4-inch sewer force main and a 16-inch effluent force main operated by IVGID to accommodate the depth of the undercrossing beneath the highway. The mains are located under SR 28. Excavation to a depth of 12 to 16 feet would be required for construction of the undercrossings. These utilities would need to be lowered to cross beneath the proposed shared-use undercrossing, but would remain in their existing alignment perpendicular to the path. Up to 80 linear feet of these lines would need to be deepened, depending on the angle points of the lowered lines. The replacement lines would be constructed and would tie into the existing lines in the initial phase of the replacement, such that at no time would these lines need to be shutoff for any extended period of time.

SEGMENT 2

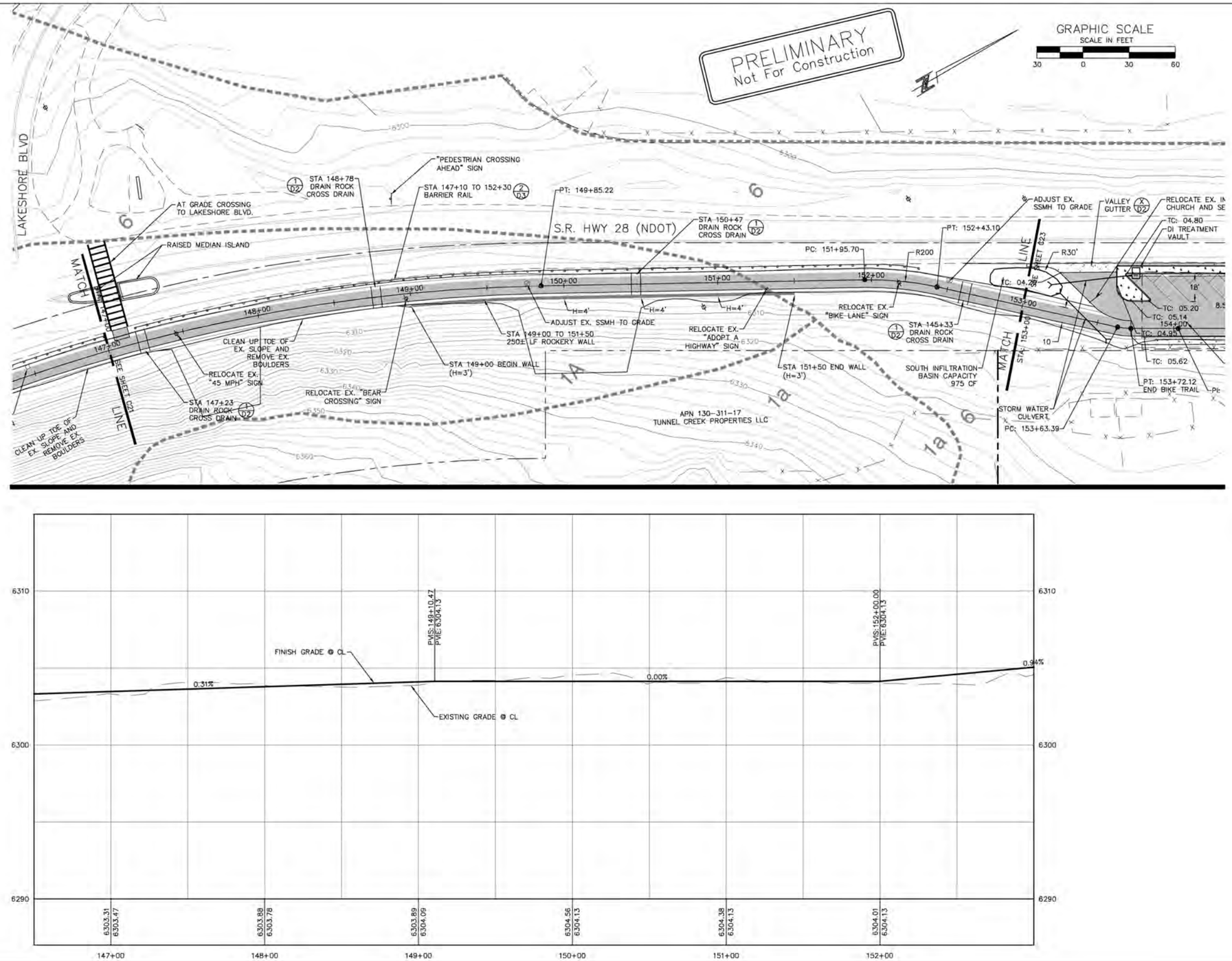
Segment 2 extends from Tunnel Creek to Memorial Point. Exhibits 3-4 and 3-5 show the extent of Segment 2.

GENERAL ALIGNMENT OF SEGMENT 2

After crossing SR 28, the path would continue south along the lake side of the highway to Memorial Point. Because of the narrow width of the existing shoulder of SR 28 and steep embankments extending from the edge of the highway shoulder down to the lake, Alternative A would require the construction of approximately 1,315 feet (0.25mile) of elevated cantilevered or separated bridge structure on the lake side of the highway. In locations where the bank drops off steeply to the lake, the structure would need to be supported on columns. In many locations, a 48-inch high safety rail would be used on the lake side of the elevated structure. In locations where the path is within 5 feet of SR 28, a 42-inch guard rail would also be constructed on the SR 28 side of the path. To comply with AASHTO design recommendations, those portions of the path that are on an elevated structure or that otherwise require a safety barrier would be 12 feet in width. To avoid degradation of views of the lake from SR 28, the path would be depressed below the highway (below and out of automobile passengers' view) in most locations. Bridge structures would also be used where the existing slope from SR 28 to the lake is too steep for a wall to be practical because the height of the wall would be excessive. The initial concept for the structure envisions the use of piers that would be drilled at intervals of between 50 and 60 feet, cross beams cast on top of them, and prefabricated beams and/or deck sections brought to the site and lifted into place by a crane. Subsequent to the environmental review process, detailed design development and value engineering would be needed to determine the final bridge structure design and configuration.

Access to the steep slopes and narrow shoulders would be challenging for construction equipment in many locations along Alternative A. In locations where the path alignment is close enough to SR 28, the pier foundations could be accessed by drilling equipment located on SR 28. This would require temporary partial or complete closure of the highway and thus, would likely require construction during the nighttime hours. Cross beams would be cast onto the piers utilizing concrete and pumper trucks parked on the highway. The pre-cast deck sections would be brought to the site by truck and placed on the cross beams by a crane positioned on SR 28. Again, SR 28 would have to be partially or completely closed for these activities. In areas where bridge segments cannot be constructed using SR 28, construction would require the use of specialized mechanical equipment, such as all terrain vehicle (ATV) mounted boring equipment (such as Menzi Muck or Kaiser S2 walking excavators, as illustrated in Exhibit 3-17).

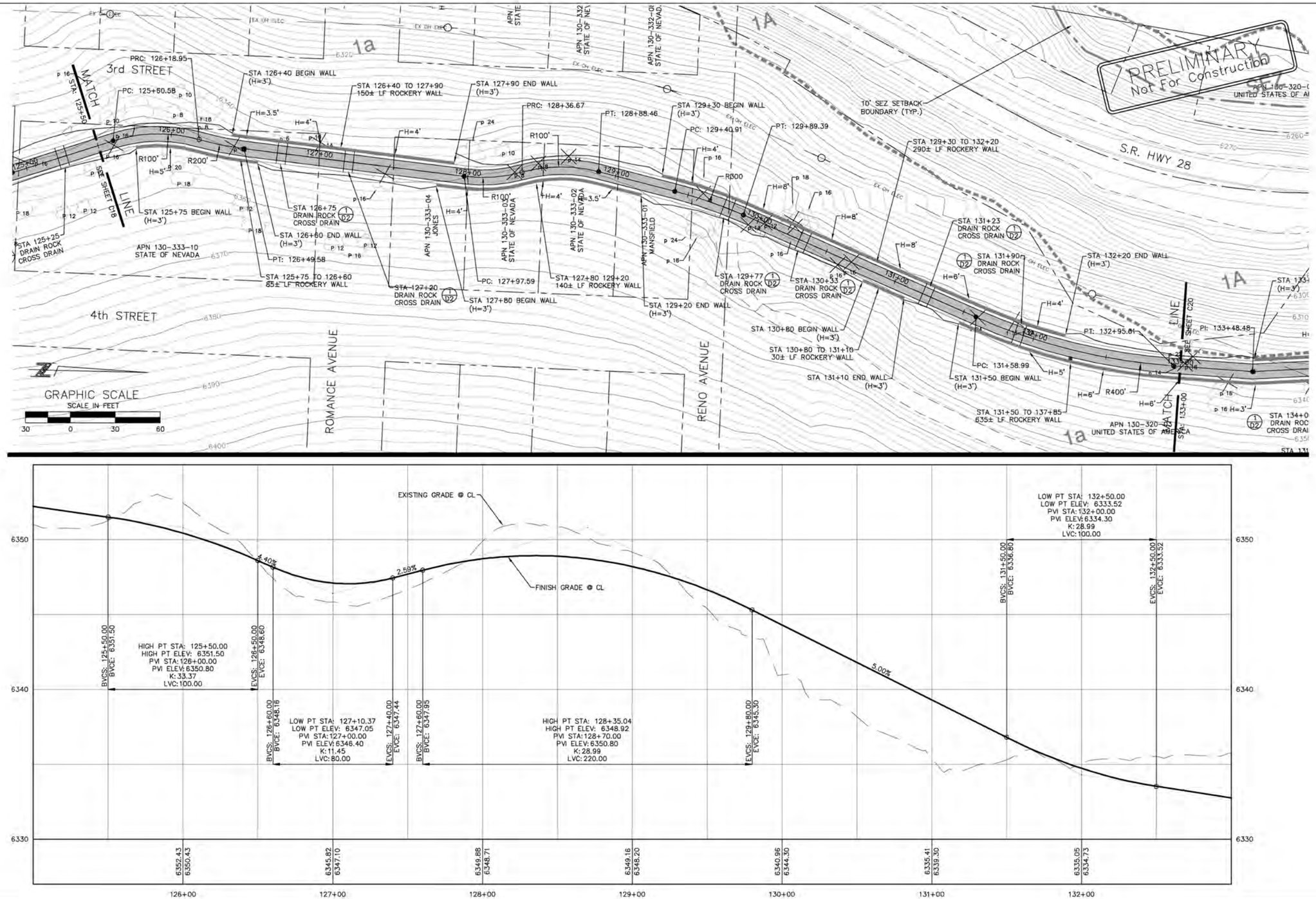
Exhibit 3-17: Kaiser S2 Walking Excavator



X11010010 03 016

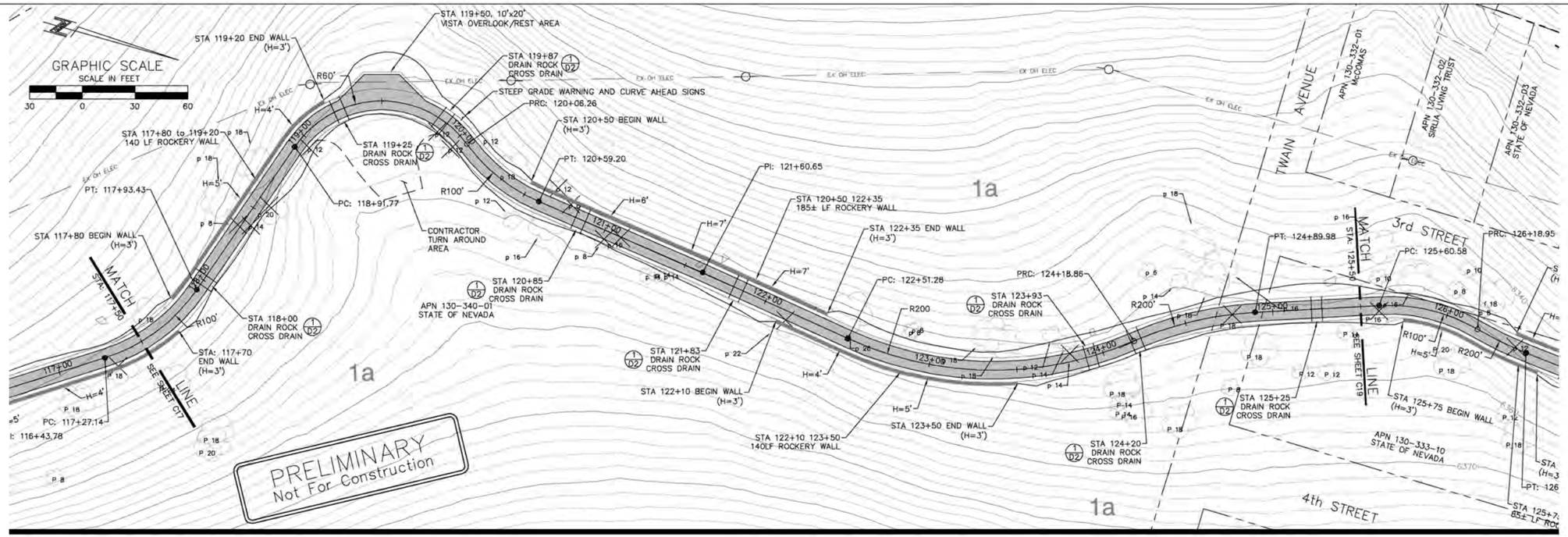
Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

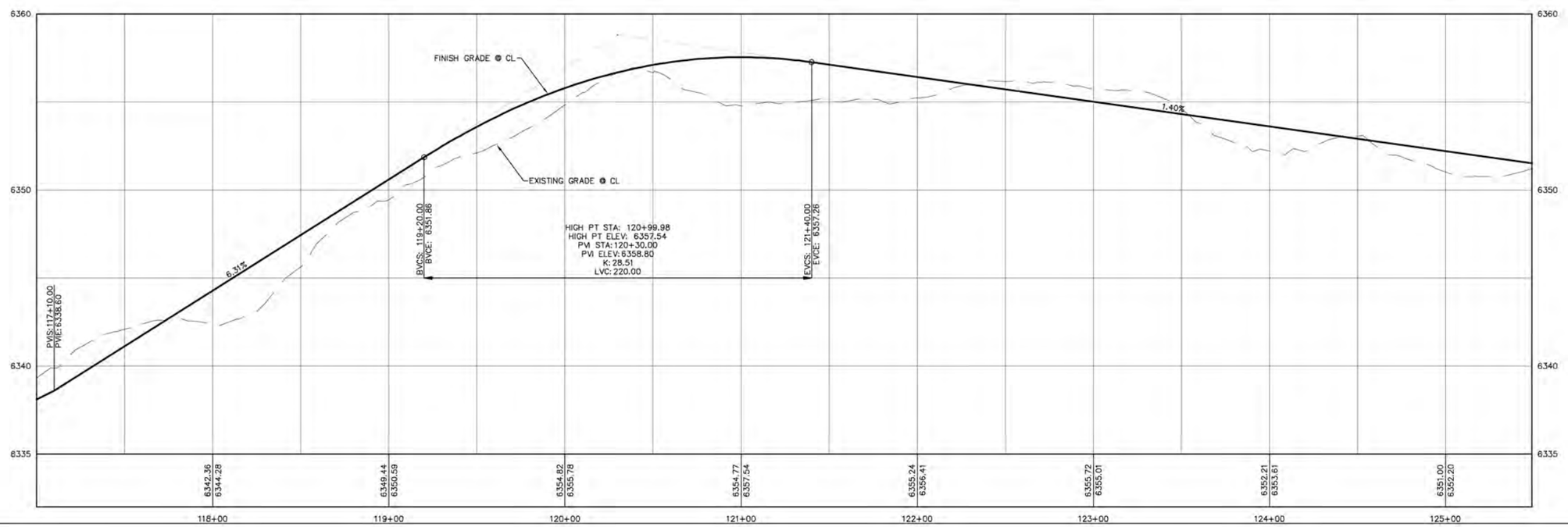
Exhibit 3-10 **Alternatives A and B – SR 28 Crossing at Lakeshore Boulevard**



Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-11 **Alternatives A and B – Rocky Point Subdivision Crossing (1 of 2)**

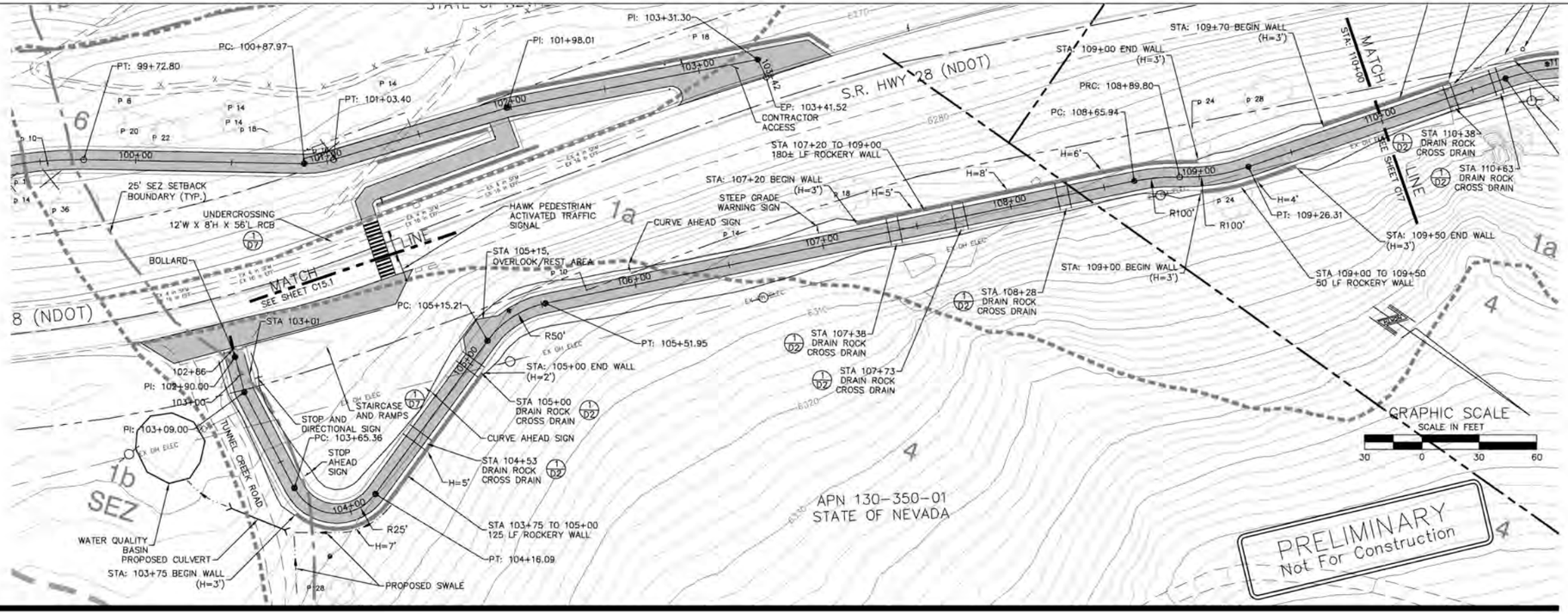


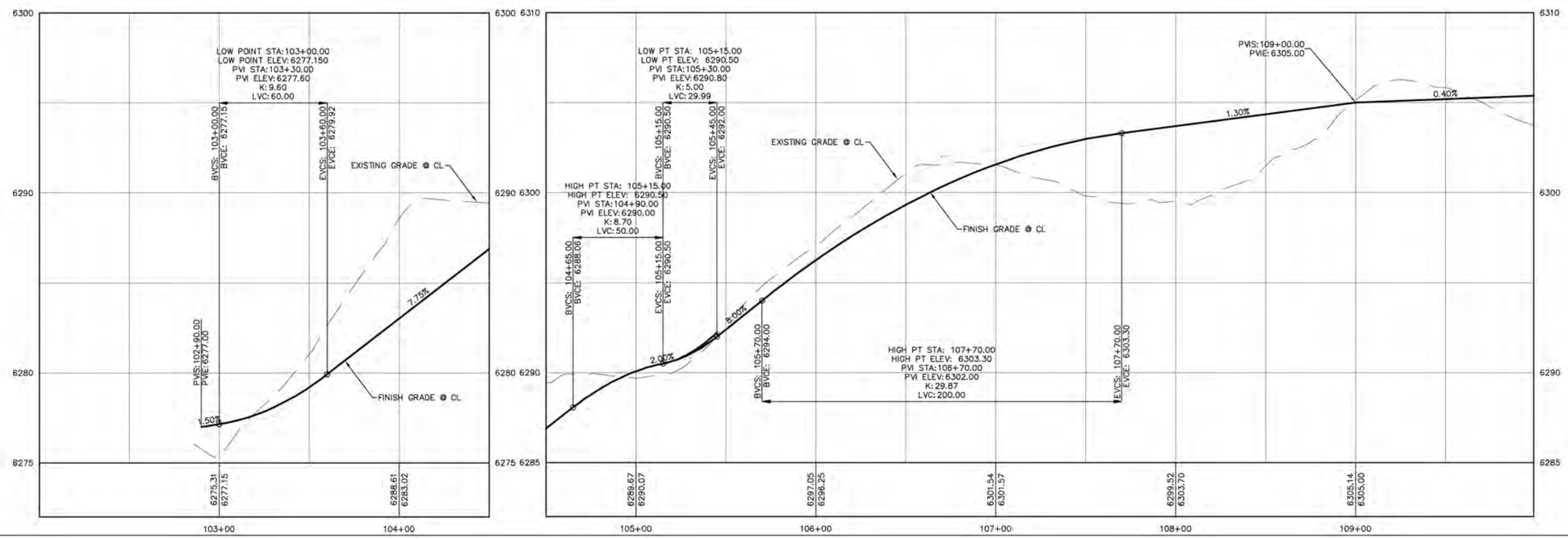


X11010010.03.015

Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

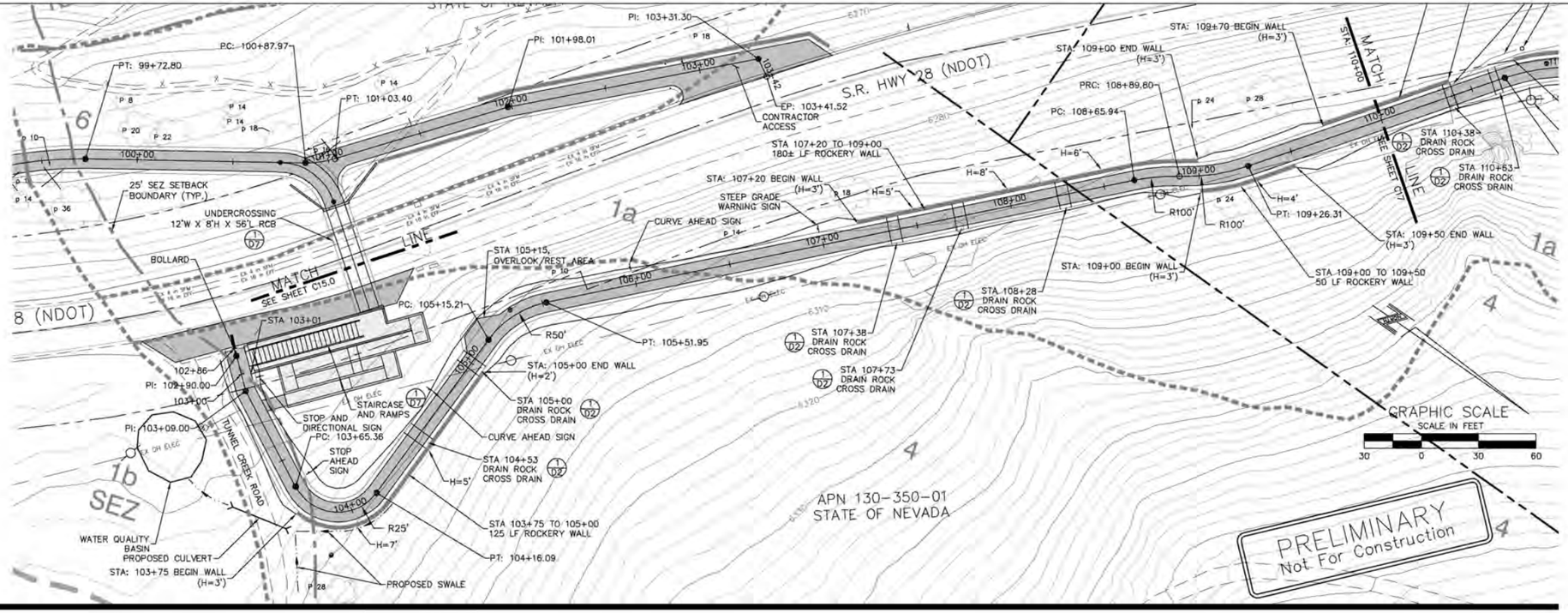
Exhibit 3-12 **Alternatives A and B – Rocky Point Subdivision Crossing (2 of 2)**

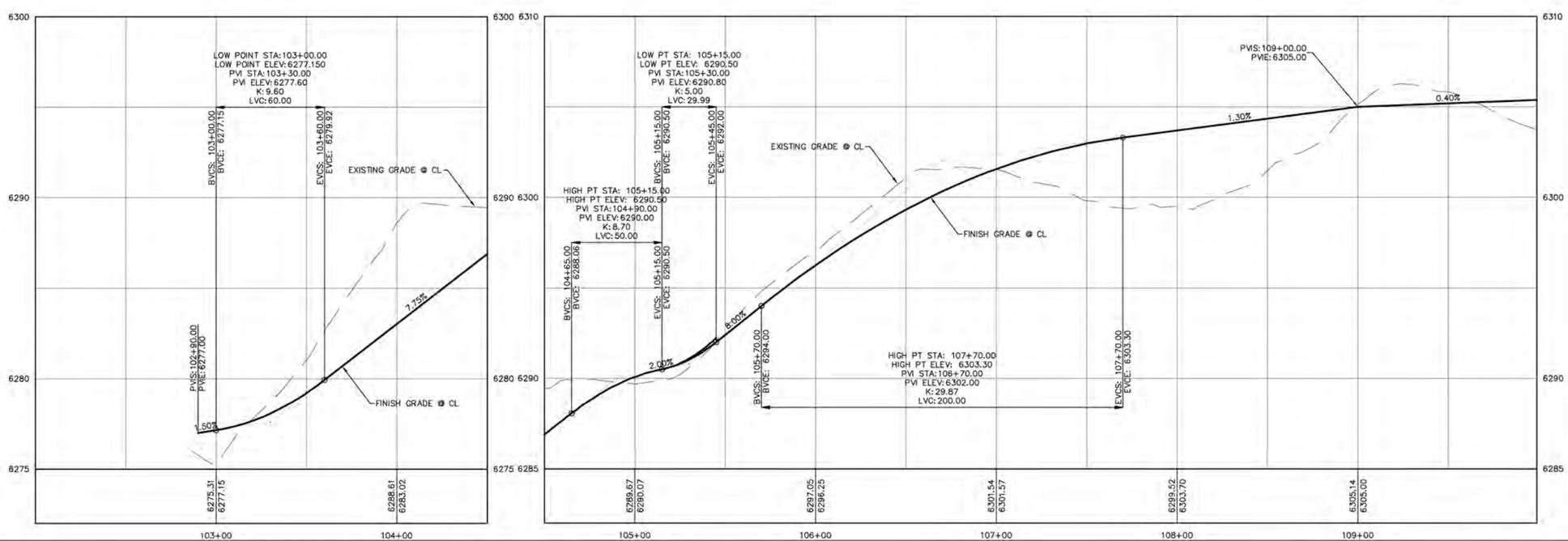




Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-14 **Alternatives A and B – SR 28 Crossing at Tunnel Creek, Option 1 (At-Grade)**

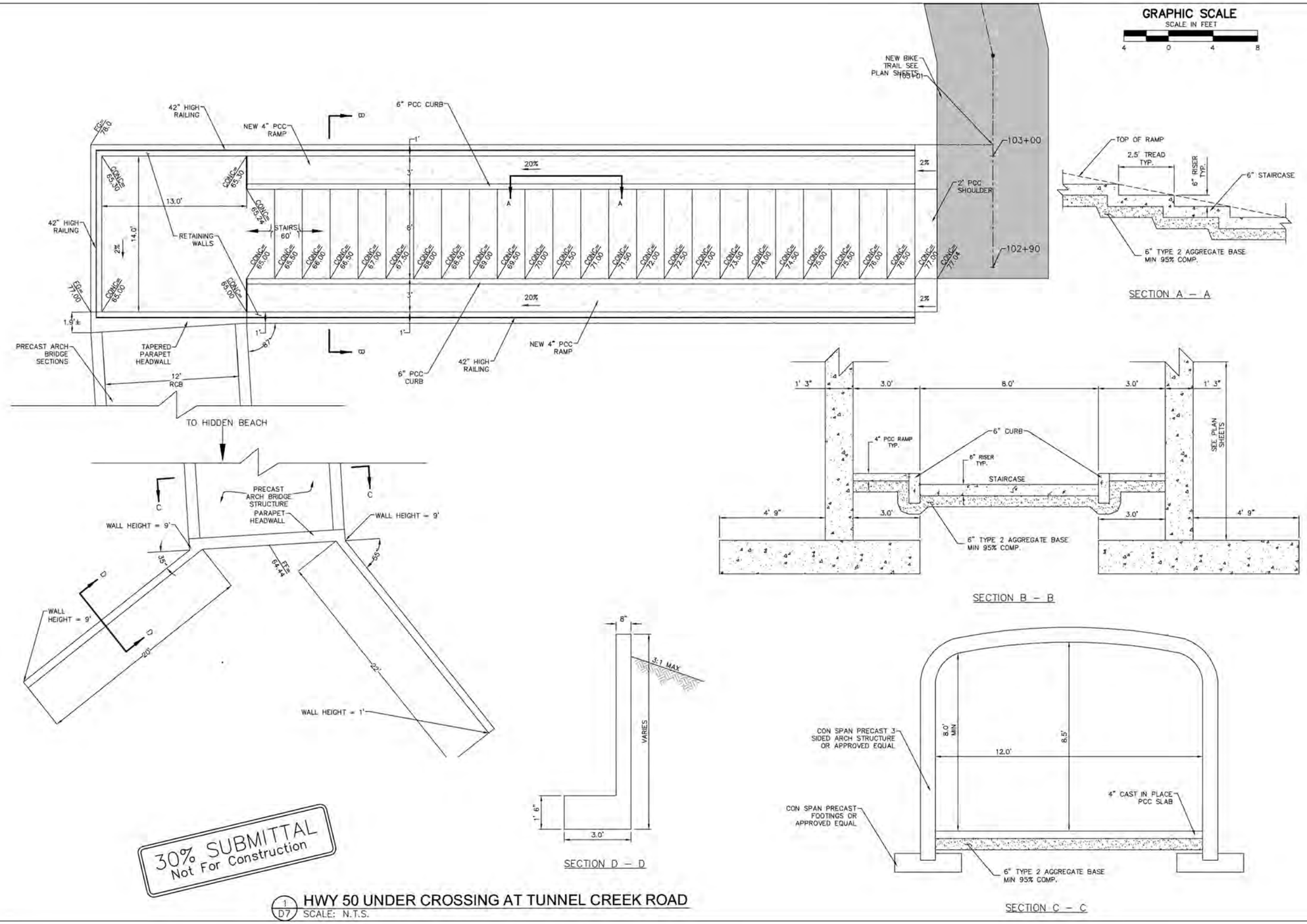




Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-15

Alternatives A and B – SR 28 Crossing at Tunnel Creek, Option 2 (Undercrossing)



1 D7 HWY 50 UNDER CROSSING AT TUNNEL CREEK ROAD
SCALE: N.T.S.

Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-16 **Typical – SR 28 Undercrossing Details at Tunnel Creek**

OPTIONS AT MEMORIAL POINT

Memorial Point is a popular scenic overlook and interpretive area on the west side of SR 28 approximately 2 miles south of Lakeshore Boulevard. Memorial Point offers parking, interpretive trails, and public restrooms. Four options are being considered to bring the path through Memorial Point. They were developed with input from NDSP. The options are summarized below.

Option A would connect the path to the parking lot via depressed curbs, but does not designate a bicycle lane through the parking lot. Exhibit 3-18 illustrates the conceptual layout for the Option A crossing. A stop sign and directional signage would be installed at both shared-use path entrances to the parking lot that would direct pedestrians to use the existing sidewalk and bicyclists to use caution through the parking lot. The improvements would include constructing approximately a 200-foot long by 10-foot wide shared use concrete sidewalk along the southern parking lot exit lane. In addition, removal of rocks and construction of bollards would be required to protect the existing electrical transformer at the southwest corner of the parking lot.

With Option B, the path would cross through the parking lot via a designated striped shared-use lane, which would replace the 12 parallel parking spaces immediately west of the raised median between SR 28 and the parking lot. Exhibit 3-19 illustrates the conceptual layout for the Option B crossing. The existing 16 angled parking spaces would be retained along with a 20-foot wide drive aisle. As with Option A, the path would connect to the parking lot via depressed curbs. A stop sign and directional signage would direct pedestrians to the existing sidewalk and bicyclists to the bicycle lane. Advance warning signs would be provided near the two parking lot entrances and bicycle lane crossings to alert incoming vehicles to the presence of bicyclists. As with Option A, the sidewalk improvements at the southern end of the lot would also be constructed as part of Option B.

Option C would include creating a lane (designated by white striping and reflective candles) between the angled parking and the existing pedestrian sidewalk near the restrooms. Exhibit 3-19 illustrates the conceptual layout for the Option C crossing. This option would require this elimination of the 12 parallel parking spaces west of the raised median. The existing 16 angled parking spaces would be narrowed and one handicap accessible parking space would be designated in order to provide an additional parking space (17 total). The existing pedestrian sidewalk and curb would remain. A yield sign and directional signage would direct pedestrians to the sidewalk and bicyclist to the bicycle lane. As with Option A, the sidewalk improvements at the southern end of the lot would also be constructed as part of Option C.

Option D would minimize modifications to the Memorial Point parking lot by aligning the path on the slope approximately 50 to 60 feet to the west of the parking lot, below the restroom building and closer to Lake Tahoe. Exhibits 3-20 and 3-21 illustrate the conceptual layout for the Option D crossing. Option D would include constructing path connections to existing trails to and from the parking lot and restroom facilities. (Note: the connection to the parking lot would be constructed with the Segment 2 improvements, and the path below Memorial Point would be constructed with other Segment 3 improvements.)

SEGMENT 3

Segment 3 would extend from Memorial Point to Sand Harbor. Exhibit 3-5 shows the extent of Segment 3.

After passing Memorial Point, the shared-use path would continue south until its terminus at the main entrance to Sand Harbor. As with Segment 2, this portion of the shared-use path would be constructed in steep terrain on the narrow margin between SR 28 and the shore of Lake Tahoe. This would require construction of a boardwalk or similar bridge structure. These elevated portions of the path would be supported by columns and may include a 48-inch high safety rail on the lake side of the structure. Boardwalk sections and areas with safety barriers would maintain a 12-foot width to comply with AASHTO standards. As with Segment 2, a 42-inch guard rail

would be constructed between the shared-use path and SR 28 in areas where the path is within 5 feet of the highway. The path would be depressed below the level of the highway to prevent the guardrail from obscuring scenic views from SR 28 by automobile passengers.

3.2.4 ALTERNATIVE B – MOUNTAIN SIDE ALIGNMENT

SEGMENT 1

Within Segment 1, Alternative B would be identical to Alternative A between the northern terminus and Tunnel Creek. In addition, Alternative B would include a spur path that drops down to the highway at Tunnel Creek to provide access to Hidden Beach. Crossing options for Alternative B at Tunnel Creek would also be the same as Alternative A (see SR 28 Crossing Options at Tunnel Creek, above).

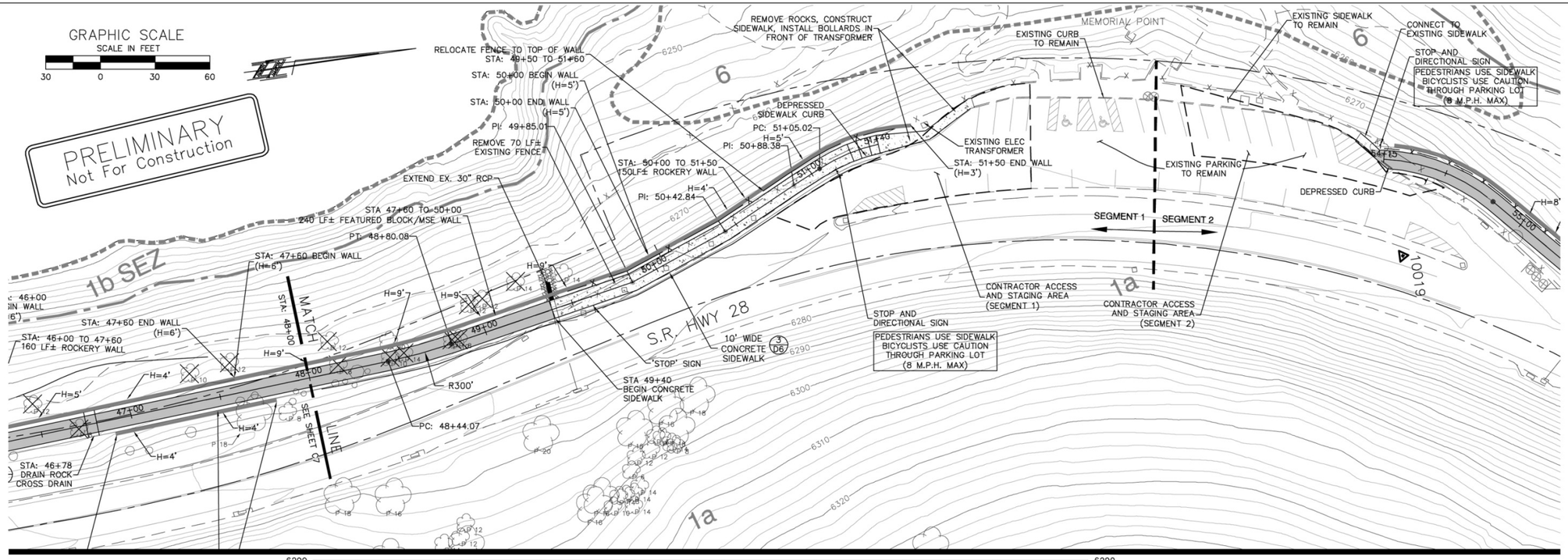
SEGMENT 2

Branching from the spur path to the SR 28 crossing at Tunnel Creek, the Alternative B alignment for Segment 2 would extend south and move uphill to cross Tunnel Creek and then continues through the forest along the mountain side of the highway to a point southeast of Memorial Point. The crossing of Tunnel Creek would require a bridge for the mountain side alignment. The bridge location over Tunnel Creek would be close to the existing pullout on SR 28 and unpaved road just north of and parallel to Tunnel Creek, which would be used for access to haul in a prefabricated bridge and a crane to lift it into place.

The bridge structure would be approximately 95 feet long and 12 feet wide. It would be delivered in two sections that would be bolted together on site. The abutments and wing walls for the bridge would be reinforced concrete and would be poured in place. A temporary compacted pad that is long enough to assemble the bridge sections and wide enough to support the crane's outriggers would be required. This is estimated to be a 120 foot by 40 foot pad. The only feasible location for the temporary pad would be in the SEZ adjacent to Tunnel Creek. The willows and other vegetation would be cut off at ground level, leaving their roots intact for regeneration after the fill has been removed. A geofabric would be placed over the existing ground and temporary fill placed on the fabric. The fabric would serve to delineate the existing ground elevation so that when the fill is removed, it would be removed only to original ground level. The fabric would be removed after the fill is removed. The type of prefabricated bridge has not been determined at this time, but one possibility is a prefabricated truss bridge.

A bridge at Bonpland Creek would be required for the mountain side alignment of Alternative B. It would be located about 4,000 feet from the nearest road access. The area around the creek has steep, rocky slopes with several trees greater than 24 inches dbh. Site conditions would effectively preclude use of a prefabricated bridge at this location, because there is not sufficient space to construct a temporary pad for the crane and a turn-around area for the trucks without significant grading, slope disturbance, and tree removal. Therefore, it is expected that this bridge would be constructed in place. The abutments and wing walls, and likely the bridge deck, would be reinforced concrete. This would require locating a temporary framework within the SEZ to support construction of the bridge deck. A turn-around area for construction equipment and a storage area for construction materials would be required as close to the bridge as practical, probably at a small knoll about 300 feet to the north of the creek.

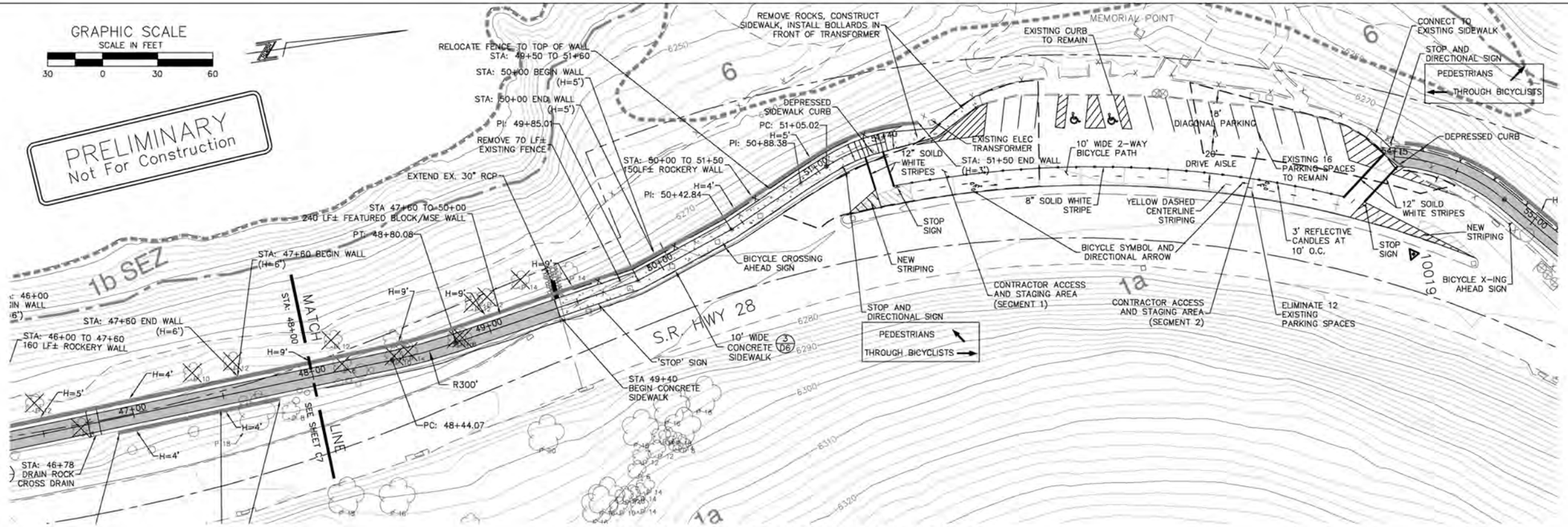
From Bonpland Creek, the shared-use path would continue south to Memorial Point. At a point southeast of Memorial Point, approximately 50 feet above the highway, a connecting path may be constructed from the main path to SR 28, allowing path users to leave the shared-use path to enjoy the view and access facilities at Memorial Point on the west side of SR 28 as shown in Exhibit 3-22. (Note: NDSP has expressed an interest in eliminating this connector path and retaining only crossings at Tunnel Creek and Sand Harbor. This refinement could be made during subsequent design development, if Alternative B is selected for approval.) Due to



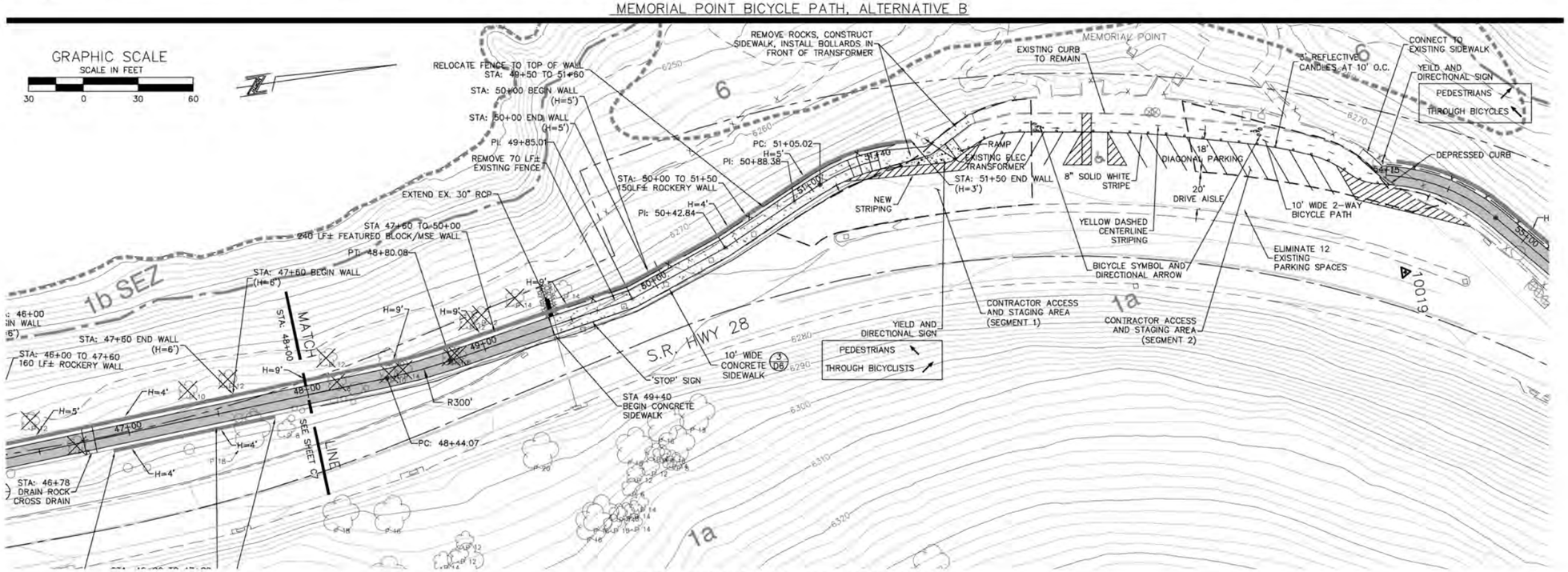
X11010010 03 008

Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-18 **Alternative A – Memorial Point Crossing, Option A**



MEMORIAL POINT BICYCLE PATH, ALTERNATIVE B

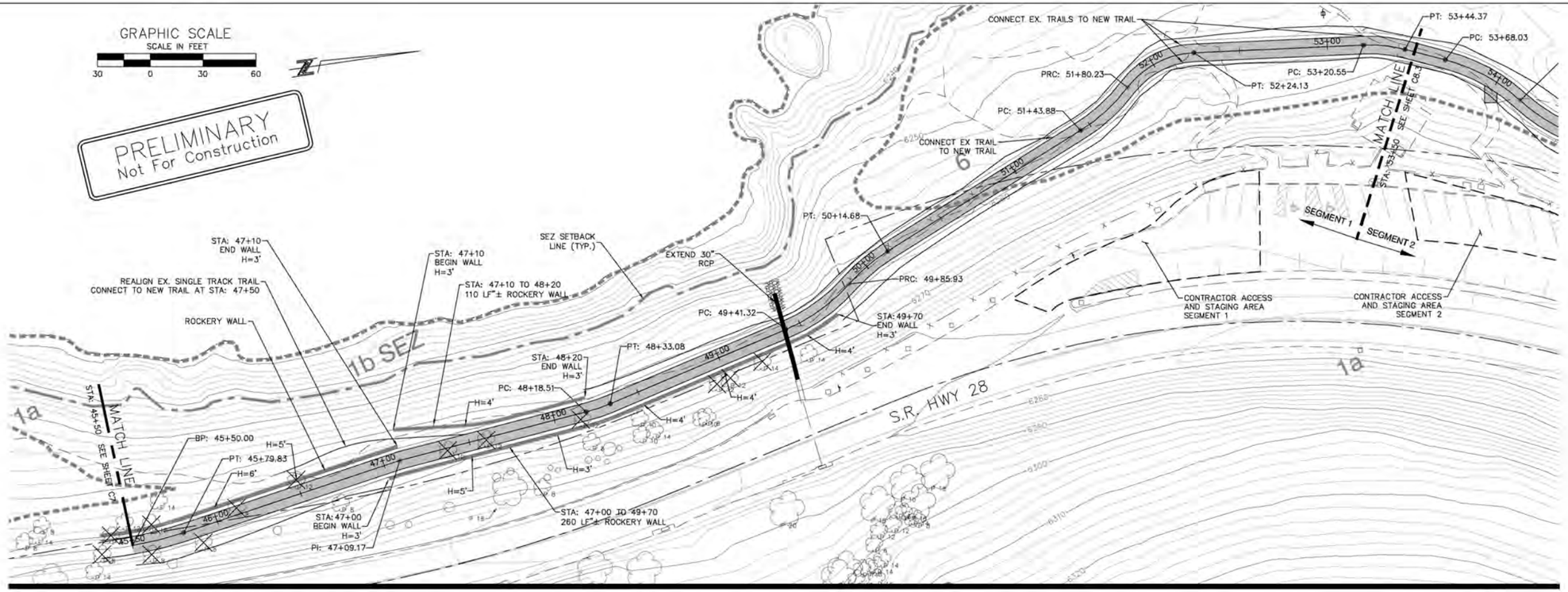


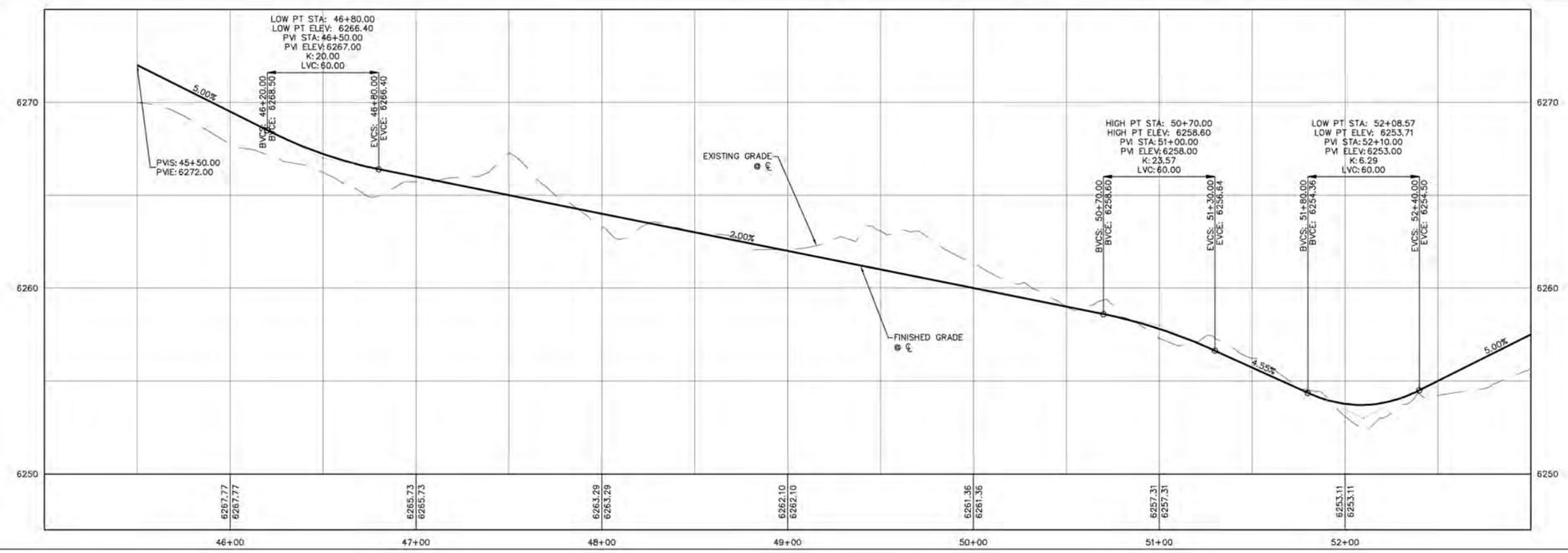
X11010010 03 009

MEMORIAL POINT BICYCLE PATH, ALTERNATIVE C

Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

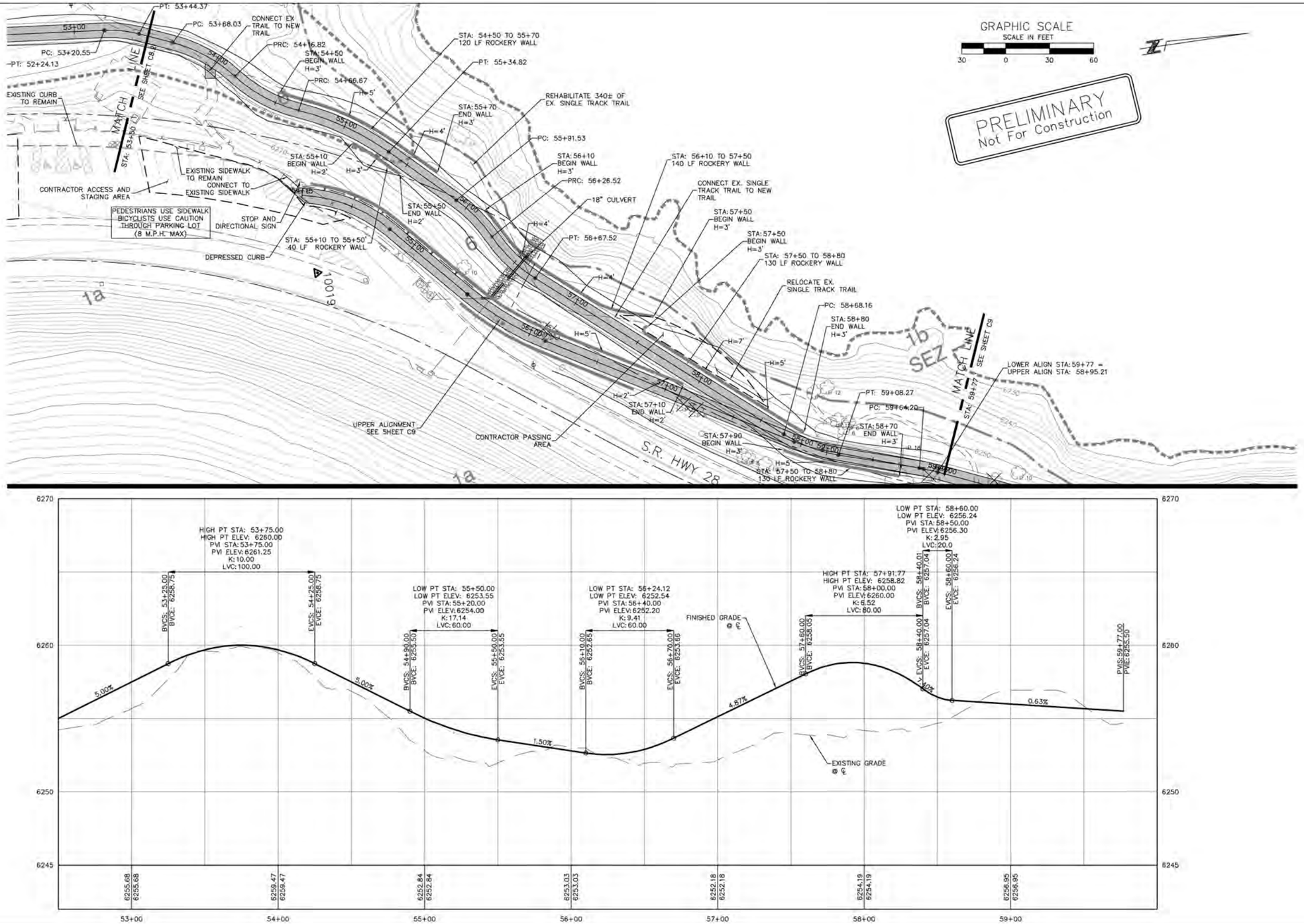
Exhibit 3-19 **Alternative A – Memorial Point Crossing, Options B and C**





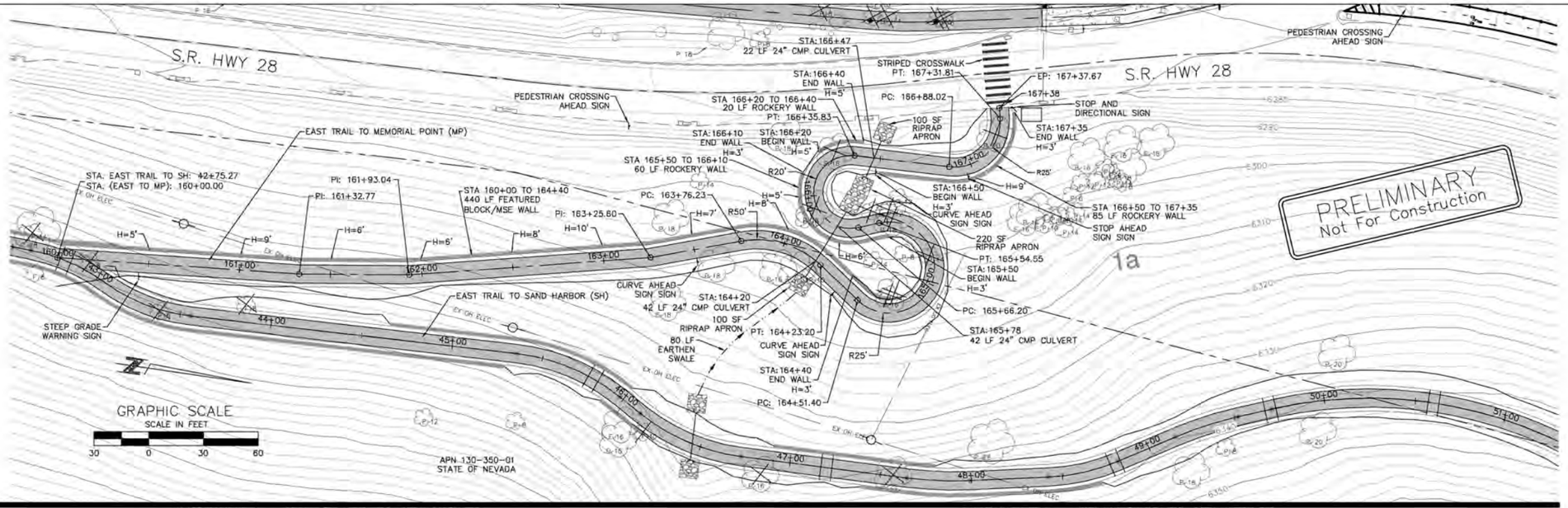
Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-20 **Alternative A – Memorial Point Crossing, Option D (1 of 2)**

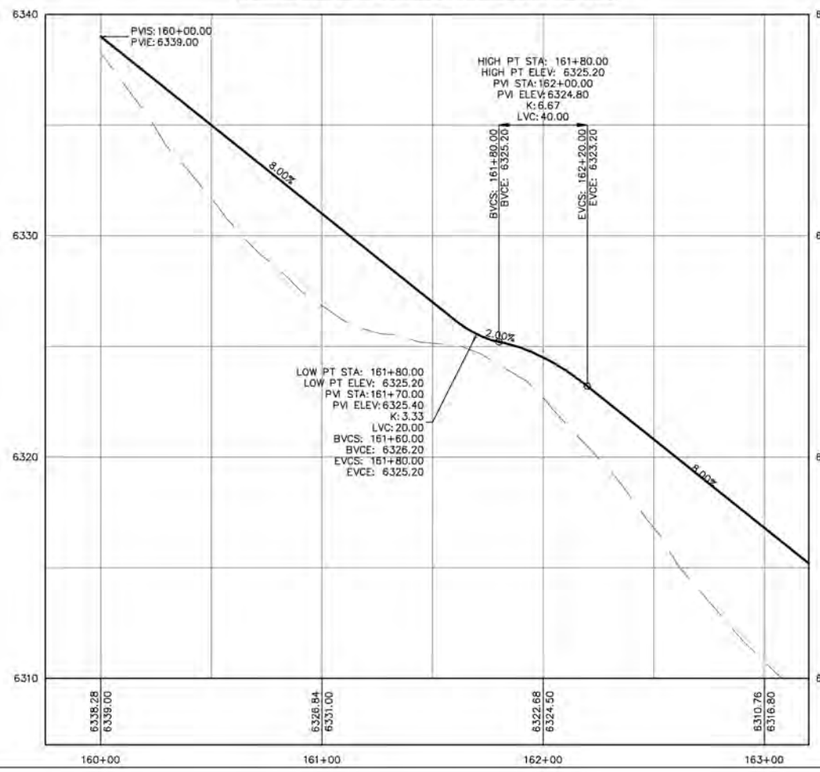


Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

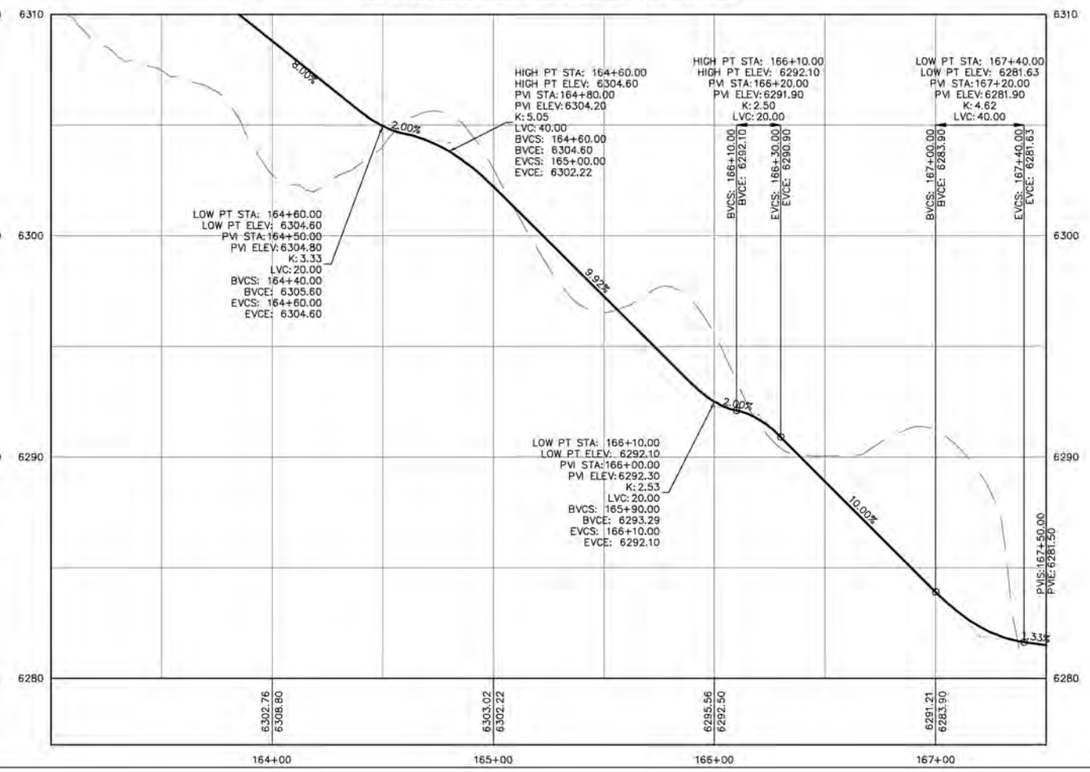
Exhibit 3-21 **Alternative A – Memorial Point Crossing, Option D (2 of 2)**



ALIGNMENT 1 – STA:159+75 TO STA:163+20



ALIGNMENT 1 – STA:163+00 TO STA:167+50



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Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-22 **Alternative B – Memorial Point Connector**

topographic and environmental constraints, the grade of the proposed connector path does not currently conform to AASHTO or ADA 5 percent grade standards; to meet these standards would require substantial hillside cuts with very lengthy switchbacks in the steep side slopes. These design refinements could be made in subsequent design phases, if approved. An at-grade crossing of SR 28 would also be provided that would include advance warning signs and stop bars for highway traffic.

The steepness of the side slope in this segment would require the construction of walls in many locations (as described under Section 3.2.1, “Elements Common to Alternatives A and B”).

SEGMENT 3

Between Memorial Point and Sand Harbor, the mountain side alignment of Alternative B would continue through the forest and reach about 80 feet in elevation above SR 28, offering views of the lake and west shore, before descending to highway level across from Sand Harbor.

Across SR 28 from Sand Harbor, Alternative B would traverse the driveway of the State Park ranger residence and continue south to a point about 300 feet north of the main entrance to Sand Harbor on the mountain side of the highway. The options for crossing SR 28 are summarized below.

Two options are being considered for the highway crossing at Sand Harbor. Option 1 would include an at-grade crossing and Option 2 would include an undercrossing. Both options would be ADA compliant. After the SR 28 crossing, the Alternative B alignment would continue south to the main entrance of Sand Harbor on the west side of the highway.

The Option 1 at-grade crossing would be located near the northern side of main entrance to Sand Harbor. The crossing would include road striping and a raised median (Exhibit 3-23). The crossing treatment would include advance warning signs consistent with the FHWA MUTCD standards.

Option 2 would include an undercrossing that would be located approximately 300 feet north of the main entrance to Sand Harbor (Exhibit 3-24). Construction of the undercrossing would require excavation to a depth of 12 to 16 feet and lowering of the existing in-road wastewater lines described earlier in this chapter. The undercrossing would be constructed from a pre-cast three sided arch structure or an approved equivalent on precast footings. The undercrossing would be 12 feet wide and would have a minimum height of 8 feet. It would consist of cast in place cement concrete over an aggregate base.

3.2.5 ALTERNATIVE C

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed. No bridges or walls, undercrossings, at-grade crossings, or parking facilities would be constructed or expanded within the project area. Alternative C would result in a continuation of existing conditions into the future. There would continue to be minimal to non-existent bicycle and pedestrian facilities between Incline Village and Sand Harbor, unsafe conditions, and a lack of access to recreation sites for non-automobile users.

3.3 CONSTRUCTION SCHEDULE AND ACTIVITIES

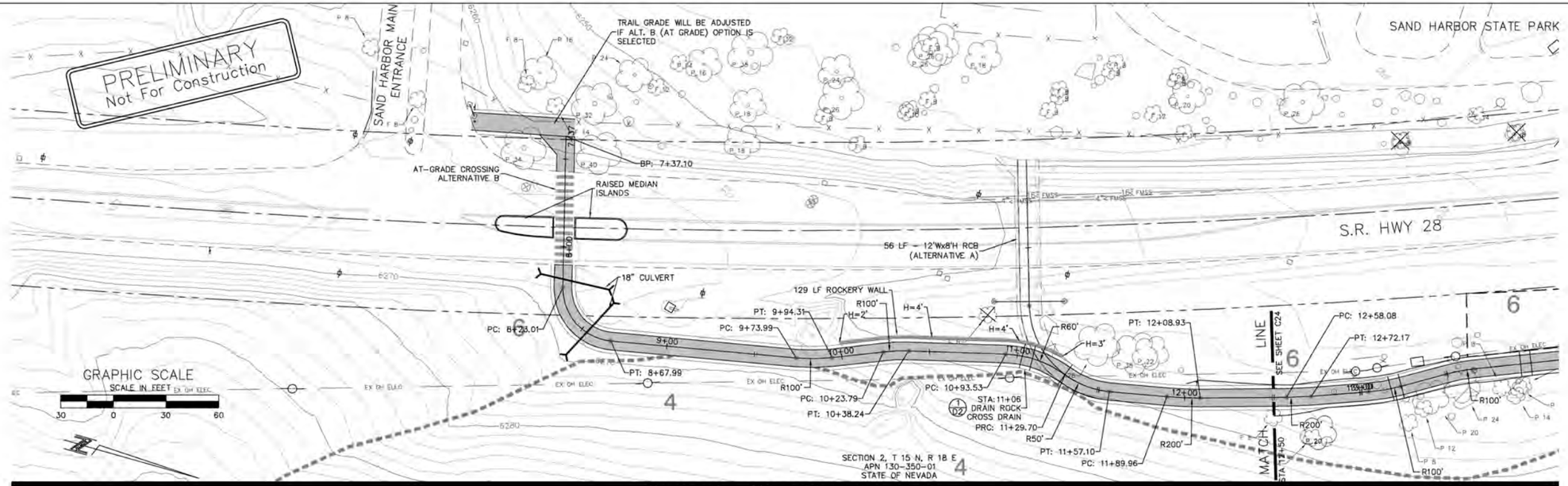
Construction of the North Demonstration Project is expected to occur in three phases (or segments), beginning as early as summer 2014 for the first phase. The planned first phase would construct the segment between Incline Village and Tunnel Creek. Construction of the three phases could, however, occur simultaneously if adequate funding were available. Because of the potential timing of funding, it is likely that construction of some portions of the project would extend into the 2016 and possibly the 2017 construction seasons.

The specific construction methods would depend on the selected contractor's approach to constructing the path. Nonetheless, a number of requirements would be incorporated into the contract documents that address issues such as:

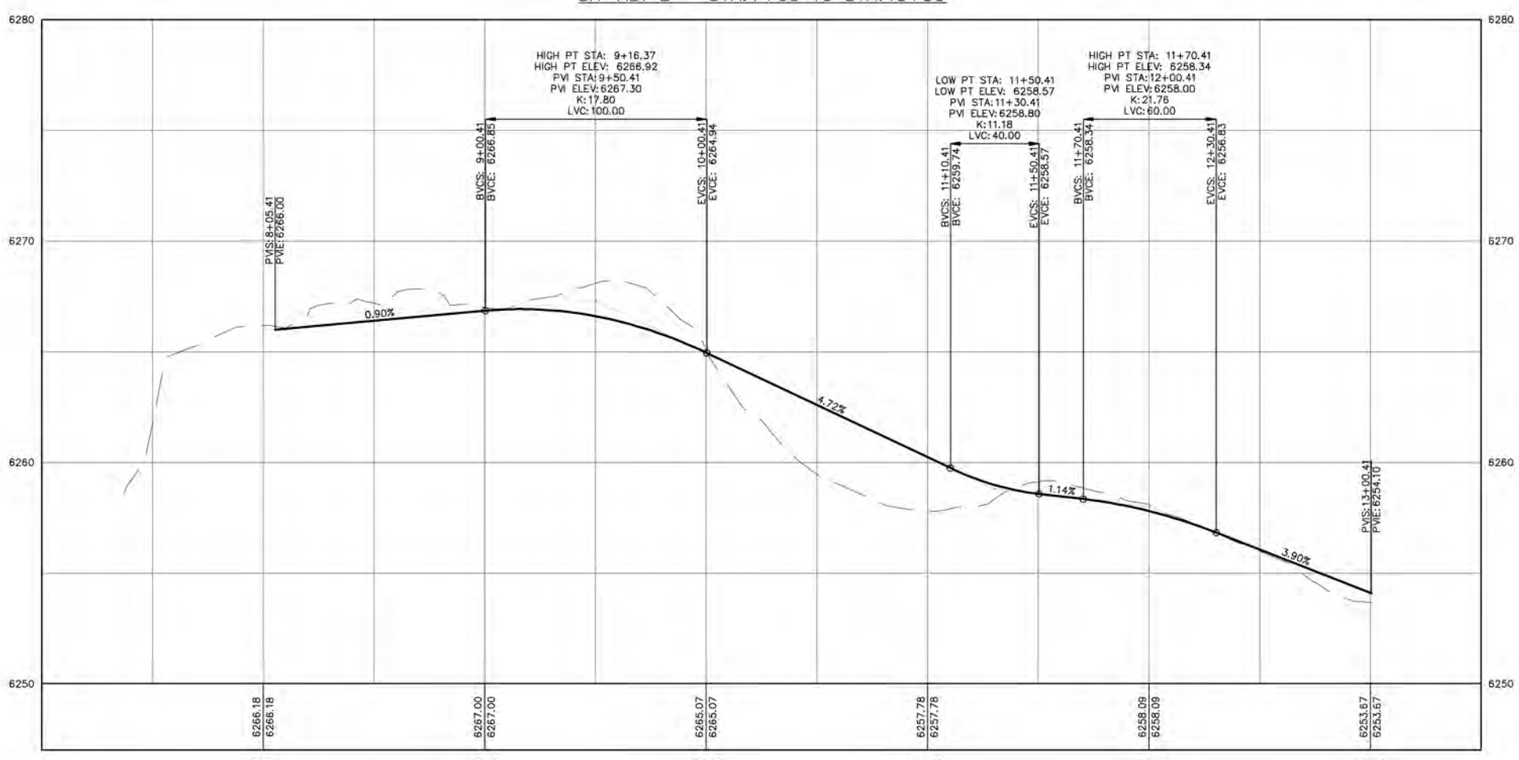
- temporary and permanent best management practices (BMPs);
- allowable temporary road and lane closures, along with other traffic control procedures and traveler notifications;
- sequencing of work for critical path segments;
- designated contractor access routes, staging, and turn-around areas;
- noise restrictions and other mitigations for wildlife; or
- agency permit requirements.

The details of these items would not be known until final design and permitting; however, the construction operation is anticipated to occur in the following general sequence:

1. The limits of construction would be staked in the field and construction fencing would be installed on the uphill side of the path and silt fence installed on the downhill side. The fencing would be installed 2 feet outside the cut or fill catch points and would delineate the outer limits of disturbance. The limits of disturbance would also include contractor staging and turn-around areas as shown on the preliminary plans (Appendix B).
2. The contractor would install any additional required BMPs. These could include fiber rolls, gravel bags, construction entrances, concrete washout areas, and protection at existing drainage structures. Some sensitive areas, such as SEZs, creek crossings, and sections of path in close proximity to Lake Tahoe, would require additional BMPs. Steam cleaning of all equipment would occur to mitigate the transport and introduction of noxious and invasive weeds.
3. After the pre-grade inspection by TRPA, the contractor would take down the trees scheduled for removal and strip the topsoil in the shared-use path corridor. Existing vegetation within the limits of disturbance would be shredded and may be used for mulch on cut and fill slopes. Topsoil would be removed and stored in available areas for reuse on cut and fill slopes, although it is recognized that the topsoil layer is thin and the quantity of available topsoil may be minimal. Because there are limited available on-site storage areas, topsoil may have to be stored off-site.
4. In locations along the path that do not require walls or structures, the contractor would grade the path to subgrade elevation. This would involve cuts and fills as shown on the plans.
5. Once subgrade has been constructed, aggregate base would be brought onto the site, spread and compacted.
6. The path would be paved with an asphalt surface. (Note: bridge structures would have a concrete surface.)
7. The shoulders would be finished and topsoil spread over the areas to be revegetated (path shoulders, slopes flatter than 2:1, and other disturbed areas).
8. In areas where the path is located on moderately steep to steep existing side slopes, the path side slopes would be constructed at a 1.5:1 slope to minimize the area of disturbance. The 1.5:1 slopes would be covered with rock riprap or at least equally protective material. The contractor would be required to submit a sample of the proposed riprap to verify that it meets the requirement for a dark color similar to the natural weathered rock in the area. Table 3-3 shows the proposed path side slopes and approximate disturbance widths.



SH-ALT B – STA: 7+00 TO STA: 13+50



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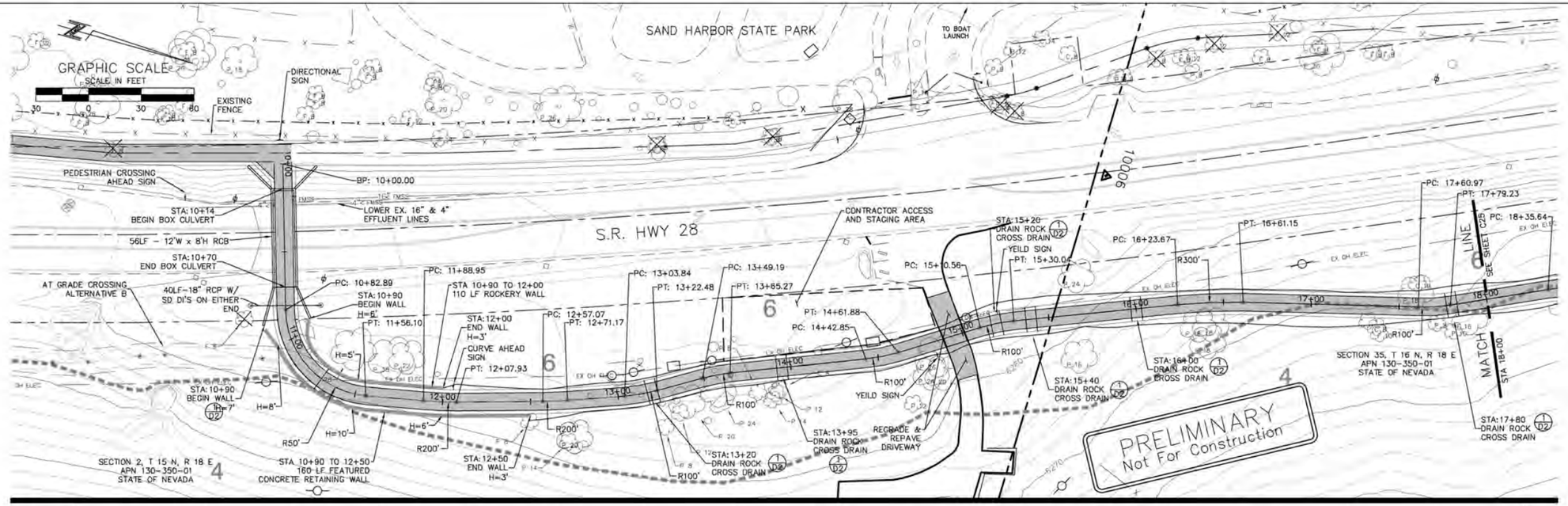
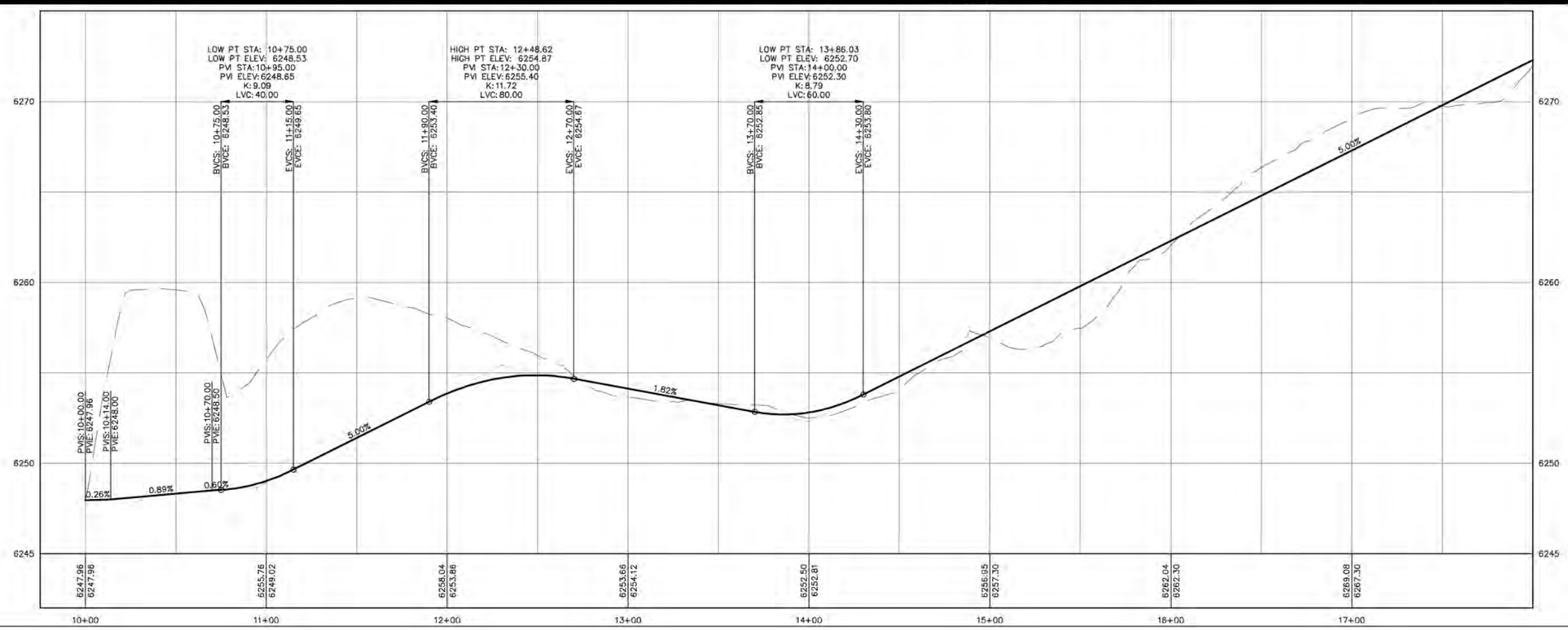
Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-23 **Alternative B – Sand Harbor Crossing, Option 1**





X11010010 03 019

Source: Data received from Lumos & Associates (2013); Prepared by Ascent Environmental 2013

Exhibit 3-24 **Alternative B – Sand Harbor Crossing, Option 2**

Table 3-3 Disturbance Width by Steepness of Cross Slope		
Existing Ground Cross Slope (Horizontal [H]:Vertical [V])	Slope to Catch Point (H:V)	Disturbance Width (feet)
Flatter than 6:1	3:1	25
6:1	2:1	25
5:1	2:1	27
4:1	1.5:1	30
3:1	1.5:1	35
2:1 and steeper	Walls	23 – 31[a]

[a] Disturbance width based on wall height. The typical disturbance width would be about 28 feet.
Source: Lumos & Associates 2012

Construction activities would require temporary closures of SR 28, which would range from closing one lane of the highway to complete closure for specified limited periods. Temporary closures would be required for undercrossing construction, and with Alternative A for construction of the bridge pier columns and path construction. Construction would be scheduled to minimize impacts to travel on SR 28, particularly during peak summer periods. Complete closures would likely occur during nighttime hours and off-peak periods. The timing and duration of highway closures is a detail that would be resolved during latter phases of design in consultation with NDOT and other stakeholder agencies. Any temporary closures would be dictated by conditions by NDOT's Occupancy Permit once issued.

Construction activities would include tree removal; clearing and grubbing; grading; retaining wall construction; placement of aggregate base; asphalt concrete; and construction of bridges, undercrossings, benches, and signage. Typical construction activities would occur mostly during daylight within the range of hours permitted by the TRPA, with approximately 20 workers on-site for each phase or segment. Construction outside of daytime hours (e.g., if there were nighttime construction required for closing SR 28 to construct proposed improvements) would require advance TRPA approval.

Construction equipment that would be used during one or more of the construction phases would likely include the following:

- chainsaws and other hand-held equipment
- haul trucks
- backhoes or small excavators
- front end loaders
- bulldozer
- grader
- track hoe
- roller
- water truck
- dump truck
- crane
- walking excavator or ATV mounted boring device

A maximum of 10 one-way haul truck trips per day is expected in addition to commute trips for construction workers. The maximum acreage that would be disturbed would be less than 12 acres in total (see Section 4.5, "Earth Resources") with a maximum of 0.5 acre disturbed on any given day.

3.4 LONG-TERM OPERATIONS AND MAINTENANCE

It is a requirement of the Interlocal Agreement between the Nevada Stateline-to-Stateline Bikeway Working Group partners (see Chapter 1, "Introduction") that an Operations and Maintenance Plan (O&M Plan) be developed prior to construction of the shared-use path. Ground-breaking for construction of the path could not commence without an approved O&M Plan. Discussions regarding operations and maintenance for the North Demonstration Project are currently in progress with a Draft Interim O&M Plan noting the general operating responsibility and maintenance and operating duties possibly completed prior to project approval. A final O&M

Plan would be completed based on alignment selection and design specifics. It is anticipated that one or more of the following entities would be responsible for operations and maintenance of the shared-use path: NDSP, Washoe County, and/or NDOT.

The shared-use path would be operated and maintained to provide access to users of all age groups and abilities, to protect natural and cultural resources, to adequately meet the safety needs of all user groups, and to protect the investment in construction costs. The agency or agencies responsible for implementing the O&M Plan would use the least restrictive means available to effectively manage path use, increasing the degree of restrictions only in response to actual conditions.

The following describes standard O&M tasks, adaptive management elements, and funding mechanisms that would be integrated into the O&M Plan for the North Demonstration Project.

3.4.1 POTENTIAL ELEMENTS OF THE OPERATION AND MAINTENANCE PLAN

STANDARD PRACTICES

Generally, the O&M Plan tasks would include, but not be limited to, the following:

- **Designate Project Spokesperson.** Identify and disseminate contact information for a spokesperson to interact with the public, at least during initial years of operation.
- **Security/Safety/Accident Monitoring.** Conduct routine inspections of the path for vandalism or unsafe conditions (frequency to be determined in O&M Plan). With the widespread use of cellular phones by the public, including path users, aspects of security/safety/accidents have changed in recent years. Users are very well prepared to report situations and their locations on or within the path corridor should it occur. Law enforcement agencies depending on the type of emergency who would respond include NDSP, Nevada State Highway Patrol, the Washoe County Sherriff's Department, and North Lake Tahoe Fire Protection District.
- **Volunteer Group and User Assistance.** Volunteer groups and informal user assistance would be explored for the path. Volunteer groups often formed to support a positive presence on paths. Users and volunteers are very well prepared to report situations and their locations on or within path corridors. High visitor demand tends to deter potential criminal activity such as vandalism.
- **Maintenance/Improvements.** Conduct, and manage contracts for out-sourced work, necessary maintenance and improvement work along path. Anticipated tasks include, but are not limited to, the following:
  - BMP Maintenance. Permanent BMPs would be inspected and maintained on a routine basis (frequency to be determined in O&M Plan).
  - Sign Replacement/Repair. All signs included in the Signage Plan (e.g., closure of the path or limiting access to recreation sites [such as Sand Harbor when it reaches capacity during peak periods during summer months], educational and interpretive, directional, mileage, safety, trailhead signage, and signage indicating path would not be maintained for winter use) would be replaced and repaired, as needed.
  - Pavement Marking Replacement/Re-Striping. Repaint all path markings, including designating roadway crossings, as needed. Repainting of highway crossing markings would typically be necessary every 3 years. Path striping and other path markings typically require less frequent maintenance, which would occur approximately every 5 to 7 years.
  - Inspection and Maintenance of the SR 28 Crossing Treatments. Depending on final crossing design for the Lakeshore Boulevard/SR 28 crossing, maintenance activities could involve installation and removal of a seasonal center lane pedestrian refuge. Maintenance activities would also include routine inspection and maintenance of the pavement striping, the pedestrian crossing signal, and signage associated with the potential at-grade SR 28 crossings at Hidden Beach, Memorial Point, and Sand Harbor. Coordination with NDOT would be required for traffic control protocols to complete these activities.

- Vegetation Management. Routine vegetation management, including trimming trailside vegetation and removal of tree hazards, would be required to maintain clearance, visibility, and safety.
- Shared-use Path Sweeping. Sweeping, particularly following snow melt, would be scheduled on a routine basis in the spring.
- Bridge Inspection and Maintenance. Inspection by a qualified individual of the major structural elements of the bridges would be required every 2 years. Maintenance would involve implementing any improvements resulting from scheduled bridge inspections.
- Path Surface Sealing. Maintenance would involve as-needed crack sealing and routine pavement sealing approximately every 2 to 3 years.
- Waste Management. Stewardship by path users will be encouraged with "carry-in, carry-out" messaging. An adaptive management approach would be used to address waste management needs along the path and at the trailhead parking area. Bear-resistant trash receptacles are currently available at Memorial Point and Sand Harbor and could be provided at the trailhead parking area. It is not anticipated that trash receptacles would be provided at other points along the path due to the level of staffing required to access internal path locations at an appropriate frequency. Additionally, providing trash receptacles can sometimes encourage illegal dumping. Trailhead signage would inform users of the location of waste receptacles and of their responsibilities to properly dispose of any trash that they generate. If necessary, additional bear-resistant trash receptacles would be provided.
- Graffiti Removal. As needed, maintenance would involve graffiti removal on path components.

Vehicles used for maintenance would typically be light-duty trucks with occasional use of heavy dump trucks and tractors, as well as emergency vehicles in the event of an emergency on the path. The shared-use path would be designed to accommodate the loads expected with these vehicle types.

The proposed shared-use path would not be maintained for winter use. No snow removal activities would occur as the path would be signed "not maintained for winter use."

ADAPTIVE MANAGEMENT ELEMENTS

The O&M Plan would include an adaptive management approach that provides a mechanism to respond to the evolving operation and maintenance needs of the shared-use path. Implementation of the project would increase access to popular recreation sites and could place additional maintenance pressure on the existing facilities. The O&M Plan would establish a set of specific performance indicators and/or monitoring metrics that would identify conditions whereby management changes may be necessary, such as:

- accumulation of litter;
- development of social trails;
- trampling or destruction of vegetation;
- unauthorized access to recreation sites;
- increased erosion; and
- overuse of restroom facilities and existing recreation facilities.

Adaptive management techniques could include, but not be limited to, the following:

- changes to hours of operation;
- limited or restricted access for shared-use path users to recreation sites when at capacity—likely to occur during peak periods in summer months at Sand Harbor (such closures would be publicized with electronic signage at the trailhead and other locations as appropriate and determined at the time of the Signage Plan preparation);

- placement of path barriers or user management fences if needed for resource protection;
- directional and interpretative signage encouraging protection/stewardship of resources and access to recreation sites;
- user surveys to gage level of satisfaction and identify maintenance needs;
- placement of waste receptacles and "mutt mitts" (i.e., dog waste bags) as needed; and,
- new or altered fee measures (e.g., paid or metered parking, increased recreation site entrance fees, fee collection at existing non-fee areas, etc.).

FUNDING CONSIDERATIONS

The O&M Plan would describe the funding mechanisms required to implement the plan. The SR 28 Corridor Management Plan estimated total annual cost for operation and maintenance of the North Demonstration Project at approximately $30,000 (TTD 2013). This estimate included infrastructure maintenance costs (pavement sealing, re-striping, pavement overlays, and visitor amenity replacement) and routine operating expenses (sweeping of pavement twice per year, seasonal labor for litter, and trash collection).

Many recreation providers including counties, conservation agencies, land managers, and public utility districts regularly contract with other entities to manage and maintain specific recreation properties and facilities. If O&M contracts are established with eligible local jurisdictions, funding may be available through a local tax and/or TRPA mitigation fees. Public and private grant funding may also be available to fund O&M activities. Additionally, many trail operators have been able to supplement their maintenance programs by creating partnership agreements with local businesses, clubs, and organizations. Formal cooperative agreements can be made with these partners that clearly define the roles and responsibilities of each party (examples may include litter patrols or "adoption" of vista points). Other potential funding sources could include special event fees, advertising, donations and endowments, and social funding opportunities. Developing an effective funding mechanism would be an on-going process.

3.5 ALTERNATIVES CONSIDERED BUT NOT STUDIED IN DETAIL

The section describes alternatives that were considered but eliminated from detailed study either because they did not meet the project objectives or purpose and need (Chapter 2, "Purpose and Need"), were not feasible, or did not reduce adverse environmental effects.

During the early planning stages, including the preliminary alignment and feasibility analysis phase of the project, five alignments were considered for the segment of the path that generally would extend between Incline Village at Ponderosa Ranch Road and Tunnel Creek. The proposed path alignment in this segment (which is identical for Alternatives A and B) emerged from this preliminary analysis. Of the alternatives considered, the proposed path is the most user-friendly, i.e., it would accommodate the broadest range of user abilities. It has the least amount of grade over 5 percent, and the least amount of elevation gain and loss. It would provide an excellent user experience with interesting terrain and views of Lake Tahoe. It is the only alternative that would meet ADA requirements (the fourth project objective listed in Chapter 2, "Purpose and Need").

A general description of each of the four alternatives that were considered but eliminated from detailed evaluation, and the reasons for their rejection, is provided below. Table 3-4 compares the overall length, grades, switchbacks, and ADA compliance for these four alternatives with the alignment carried forward for detailed consideration in this EA. These alternatives are shown in Exhibit 3-25.

Table 3-4 Comparison of Alternatives Considered But Not Studied In Detail with the Proposed Action (Between Ponderosa Ranch Road and Tunnel Creek)

Alternative	Number of Linear Feet (lf) of Shared-Use Path at Various Grades (expressed as percent slope)					No. of Switchbacks	Meet ADA?
	0-5%	5-8.3%	8.3-11%	Over 11%	Total		
Lake Side Alternative, From Northern Terminus	NA					NA	NA; not enough room to construct
Lake Side Alternative, From Southernmost Private Property in Rocky Point Subdivision	NA					NA	NA; requires SR 28 overcrossing
Tunnel Creek Road Alternative	2,750	870	460	1,370	5,450	1	No
Tunnel Creek Road Alternative, ADA-Compliant Access to Tunnel Creek	3,230	2,390	0	200	5,820	3	No
Proposed Action (Alternatives A and B)	4,800	810	0	0	5,610	1	Yes, with landings

NA = Not Applicable (in this table, it refers to alternatives eliminated from detailed consideration for reasons other than those listed in this table.)
Source: Lumos & Associates 2013; adapted by Ascent Environmental 2013

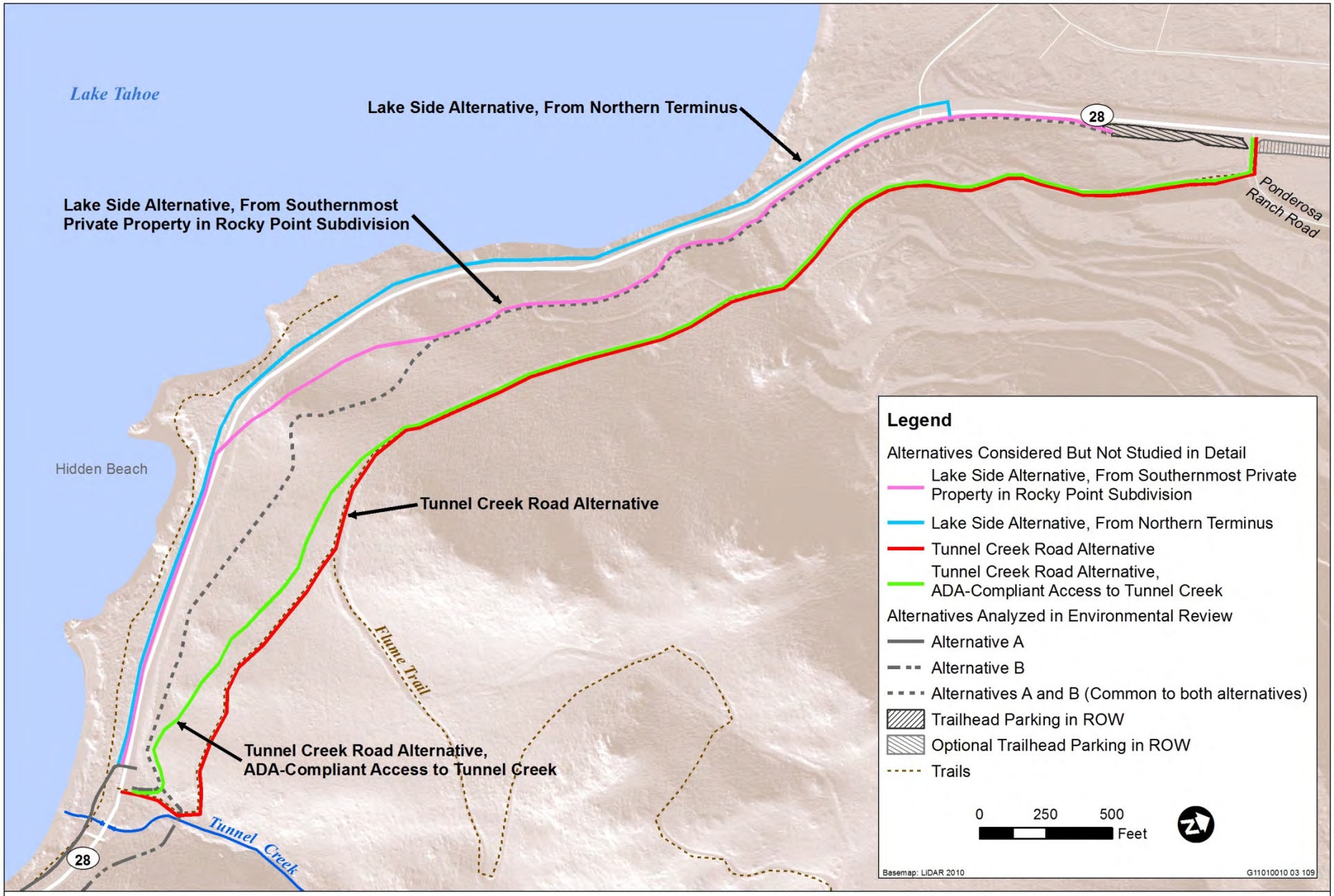
In addition to the alternatives described herein, there were potential project elements described in the NOP (Appendix A) and at the public workshop on October 5, 2011 that have since been eliminated from further consideration. These elements include a sidewalk from the southern edge of Lakeshore Boulevard to the SR 28 guard rail near Hidden Beach, and shoulder parking on the lake side of SR 28, approximately 100 feet south of the southernmost Rocky Point home. These elements were eliminated from further consideration based on public feedback received in response to public scoping and they were not required for the project to achieve the project objectives and purpose and need.

3.5.1 LAKE SIDE ALIGNMENTS

Two possible alternatives that would have included portions of the shared-use path along the lake side of SR 28, north of Tunnel Creek were considered and eliminated from further evaluation. Those alternatives and their reasons for elimination are summarized below.

LAKE SIDE ALTERNATIVE, FROM NORTHERN TERMINUS

A possible alignment of the North Demonstration Project with its northernmost terminus on the west side of the highway at the intersection of SR 28 and Lakeshore Boulevard was considered in early planning efforts. Under this alternative, the shared-use path would have run along the west side of SR 28 to its terminus at Sand Harbor, thereby avoiding any crossing of SR 28 and seamlessly connecting to the shared-use path on Lakeshore Boulevard. This alternative was dismissed from further evaluation due to the narrow shoulder width and private property constraints along the west side of SR 28 between Lakeshore Boulevard and Hidden Beach. At Rocky Point there are several homes with very short setbacks from SR 28. This alignment was deemed infeasible and rejected because there is not enough room to construct a separated shared-use path (or even bicycle lanes and a sidewalk) between the existing houses in the Rocky Point Subdivision that are immediately adjacent to SR 28 with driveways that front onto SR 28.



Source: Data received from Lumos & Associates 2013; Adapted by Ascent Environmental 2013

Exhibit 3-25 Alternatives Considered But Not Studied in Detail

LAKE SIDE ALTERNATIVE, FROM SOUTHERNMOST PRIVATE PROPERTY IN ROCKY POINT SUBDIVISION

A second lake side alignment north of Tunnel Creek was considered that would have followed the current proposed shared-use path alignment (Segment 1 of Alternatives A and B) on the mountain side of SR 28 to the southern end of the Rocky Point Subdivision. At this point, the path would turn to the west to cross the highway at a point just south of the southernmost private property on the lake side of SR 28. The slope leading to such a crossing is steep and would require an overcrossing to reach the lake side of the highway. A path along the lake side at this location would be within the public ROW and would provide excellent views of the lake. This side of the roadway is narrow and steep and would require an elevated structure. This option would eliminate the need to cross SR 28 at Tunnel Creek. Because the overcrossing could have significant and unavoidable consequences to the scenic character of a nationally designated Scenic Byway and TRPA Roadway Travel Unit, this alternative was deemed infeasible.

3.5.2 MOUNTAIN SIDE ALIGNMENT

Two alternatives that would have used paved and unpaved sections of existing Tunnel Creek Road as part of the shared-use path were considered and eliminated from further evaluation. Those alternatives and their reasons for elimination are summarized below.

TUNNEL CREEK ROAD ALTERNATIVE

From Ponderosa Ranch Road, this alignment would follow paved and unpaved portions of Tunnel Creek Road/trail, which does not meet ADA requirements, until just north of Tunnel Creek. South of Tunnel Creek, the alignment of the shared-use path would follow either Alternative A or B studied in detail in this EA.

The unpaved portion of Tunnel Creek Road is currently managed by NDSP and used by hikers and mountain bikers to access the Tahoe Rim Trail and Flume Trail. The portion of the unpaved road that is relatively flat is between 8 and 10 feet wide. To meet the AASHTO minimum width of 10 feet of paved path with 2-foot shoulders, there would have to be additional grading on one or both sides of the existing road to widen it. This would require rock walls or steep rock-protected slopes. The advantage of aligning the proposed path along Tunnel Creek Road is that it would utilize existing road, minimizing the need for substantial grading, additional coverage, and vegetation removal. However, the grades on approximately 1,800 feet of the existing road are too steep to meet ADA requirements (200 feet on the existing paved portion of Tunnel Creek Road just south of Ponderosa Ranch Road, and 1,600 feet of the unpaved section of the road between the Rocky Point Subdivision and Tunnel Creek). Also, this alternative would require an additional 100 feet of elevation gain and loss relative to the proposed action, which would reduce its usability by some cyclists.

About 180 feet of the existing paved section of Tunnel Creek Road (above Tunnel Creek Café) has grades of between 12 and 13 percent, which exceed the maximum allowed under ADA. Another 550 feet is at 8.3 percent. This is allowed if landings at (2 percent or less) are provided at intervals not exceeding 200 feet. Because the paved road is existing and lies within a narrow ROW, with a steep cut bank on the uphill side and a steep fill slope on the downhill side, there is not room to provide landings. Thus, this alternative would not meet ADA for approximately 750 feet. In fact, the paved section of Tunnel Creek Road is so steep at its steepest point that many users would be forced to dismount and push their bicycles up the hill.

Besides the very steep paved portion describe above, there is approximately 1,170 feet of the unpaved portion that is above 11 percent. Of this, about 850 feet is between 14 and 20 percent. This does not meet ADA or

AASHTO requirements. Also, as mentioned above additional grading with rock walls or rock-protected slopes would be required because the existing road is between 8 and 10 feet wide.

In summary, this alternative was dismissed from further evaluation, because of the substantial elevation and steepness challenge to access the path from SR 28; the necessary redirection of shared-use path users continuing from the shared-use path on Lakeshore Boulevard that would need to travel north approximately 0.2 mile on SR 28 to access the path via Ponderosa Ranch Road; the historic nature of the unpaved Tunnel Creek Road (likely finding of effect for a resource that is eligible for listing on the National Register of Historic Places that could be avoided with the action alternatives evaluated in detail in this EA); potential conflicts with NDSP maintenance activities along this trail; and the path steepness and new disturbance that would be required to bring the shared-use path back to SR 28 for a safe crossing to Hidden Beach.

TUNNEL CREEK ROAD ALTERNATIVE, ADA-COMPLIANT ACCESS TO TUNNEL CREEK

This alternative would be the same as the Tunnel Creek Road Alternative, but would include an ADA-compliant design for the section of path between the Rocky Point Subdivision and SR 28 at Tunnel Creek. Next to the proposed path alignment, this alternative reflects the next most user-friendly alignment, but it does not meet ADA requirements because of the very steep section of the paved portion of Tunnel Creek Road, as described above. The alignment would need to deviate from Tunnel Creek Road to achieve ADA-compliance south of the Rocky Point Subdivision, which would increase landscape disturbance. This alignment was rejected because it does not meet ADA requirements on 200 feet of the paved portion of Tunnel Creek Road, requires over 100 feet more elevation gain and loss than the proposed action, and would require as much landscape disturbance as the proposed action.

4 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4.1 APPROACH TO ENVIRONMENTAL ANALYSIS

This chapter summarizes the existing physical, biological, and social environments of the project area and the potential changes to those environments related to implementation of the North Demonstration Project alternatives. The resources evaluated in Sections 4.2 through 4.14 of this chapter include all environmental topics originally identified for review in the NOP of a joint NEPA (FHWA) and TRPA EA released in September 2011 (Appendix A).

The resource sections herein are prepared in accordance with the *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR Sections 1500 et seq.) issued by the CEQ. In addition, this EA follows the FHWA procedures for implementing NEPA, including *Environmental Impact and Related Procedures* (23 CFR Section 771), *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* (T.6640.8a), and the *Environmental Guidebook*. As a joint EA, this document has also been prepared in accordance with the TRPA Tahoe Regional Planning Compact, Goals and Policies, Code or Ordinances, and Rules of Procedure. The TRPA Initial Environmental Checklist was used as a tool to guide the discussion of environmental effects.

All project construction and operation activities described and proposed in this document would be implemented to the extent that they are consistent with applicable federal laws and executive orders. The relevant federal laws and executive orders and applicability to the action alternatives are described at the beginning of the relevant resource section.

4.1.1 ORGANIZATION OF RESOURCE SECTIONS

Sections 4.2 through 4.14 of this EA are organized into the following subsections:

- **Affected Environment:** This subsection describes the existing regional and local environmental conditions relevant to the resource under evaluation. The affected environment differs by resource area, and is determined by the potential for environmental effect. For example, air quality effects resulting from the action alternatives are assessed in the context of the entire Lake Tahoe Basin, whereas cultural resource effects are assessed for the specific project area only.
- **Environmental Consequences and Recommended Mitigation Measures:** This subsection describes the criteria used to determine whether a significant adverse environmental effect could occur as a result of implementing the North Demonstration Project alternatives, the methods and assumptions used in the analysis, potentially adverse effects, and feasible mitigation measures that could reduce potentially adverse effects. This section also cross-references relevant project design features described in the "List of Design Features" at the beginning of this document that were developed to reduce or avoid adverse environmental effects of the action alternatives.

  Alternatives A through C are analyzed at an equal level of detail. Impacts, and associated mitigation measures if necessary, are identified for each alternative in each of the resource sections. Because the action alternatives share an alignment in the northern portion of the project area, Alternatives A and B have some of the same or similar impacts. In these instances the reader is referred to the impact discussion of Alternative A to reduce redundancy.

Direct effects are evaluated with respect to areas subject to construction disturbance, including the footprint of the shared-use path, construction access and staging areas, and the outside limits of construction disturbance (about 25 to 30 feet on either side of the centerline of the shared-use path—this area conservatively accounts for final adjustments in the path footprint as the design process progresses, and disturbance caused during construction) for the action alternatives and are defined as effects that are caused by the action and occur at the same time and place.

Indirect effects are generally evaluated for the entire project area and are defined as secondary consequences that are caused by the action and are often later in time or farther removed in distance, but are still reasonably foreseeable.

Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time. The cumulative effects discussion considers the combined effects of the alternatives and the projects identified in Section 4.1.2, "Cumulative Projects," below.

- **Consequences for TRPA Environmental Threshold Carrying Capacities:** For applicable resource sections, consequences for the relevant TRPA environmental threshold carrying capacities for water quality, soil conservation, air quality, vegetation, wildlife, fisheries, noise, recreation, and scenic resources are also discussed at the end of the section.

Appendix C includes detailed regulatory information for those resource sections where a more extensive description of the regulatory background may be useful to the reader.

4.1.2 CUMULATIVE PROJECTS

NEPA requires that federal agencies consider the cumulative impacts of proposals under their review. The cumulative effects discussion provides an analysis of cumulative effects of the North Demonstration Project by resource topic. The cumulative impacts are the environmental effects of the project considered together with other past, present, and reasonably foreseeable future projects producing related effects. For the purposes of this analysis, the definition from the CEQ's NEPA Regulations is used (40 CFR Section 1508.7): "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant, actions over a period of time."

For this analysis, some types of cumulative effects are localized in character, and should be analyzed at a local scale. For example, project construction noise could combine with noise generated by related projects in the vicinity to result in a localized cumulative increase in construction noise such that the noise levels at a nearby sensitive receptor (such as a residence) could temporarily exceed established noise standards. Other types of cumulative impacts are regional in nature, and should be analyzed at a regional scale. For example, projected increases in regional traffic could cumulatively affect key regional intersections. In these cases, projections of region-wide traffic, rather than just the traffic effects of certain individual projects, should be used to analyze potential cumulative effects.

The list of related projects used for the cumulative effects analysis are those projects that have occurred or are planned to occur on both public and private lands within Incline Village, Nevada and the Washoe County, Nevada portions of the Tahoe Basin (Table 4.1-1). The table below provides the name of each related project, a brief description of the project, and the project's status (e.g., completed, under review, under construction). Implementation of each of these projects either has already, or could in the future, contribute to intensification of development in the northeast portion of the Lake Tahoe region and in Washoe County, generally. The result of such development may be increased coverage, runoff volume, and runoff pollutant loads; increased vehicle trips and vehicle miles traveled, related air pollutant emissions, and noise generation; massing and deterioration

of scenic quality; habitat removal; and further demand for public services and utilities such as water supply, wastewater conveyance, treatment, and disposal, police and fire protection, schools, and recreation.

Table 4.1-1 List of Related Projects in the Washoe County Portion of the Tahoe Basin

Name	Project Description	Status
TRPA Regional Plan Update	The Regional Plan is the blueprint for the Tahoe Region's sustainable future. It guides how communities evolve, how ecosystems function, whether the transportation network is effective, and whether the Basin is restored and economically sustainable. It proposes to do so by pairing ecosystem restoration with redevelopment activities to create mixed-use town centers where people can live, work, and thrive.	Updated plan adopted on December 12, 2012; effective February 9, 2013
Mobility 2035: Regional Transportation Plan/ Sustainable Communities Strategy	The transportation element of the Lake Tahoe Regional Plan is the Regional Transportation Plan Update (RTP) - Mobility 2035. The RTP was updated in conjunction with the Regional Plan. The proposed North Demonstration Project is included as a planned project in the RTP. Mobility 2035 is Lake Tahoe's blueprint for a regional transportation system that enhances the quality of life in the Tahoe Region, promotes sustainability, and offers improved mobility options for people and goods. Important directions of the plan are to reduce the overall environmental impact of transportation in the Region, create walkable, vibrant communities, and provide real alternatives to driving.	Updated plan adopted on December 12, 2012; effective February 9, 2013
Washoe County Area Plan	With the adoption of the TRPA Regional Plan Update, local jurisdictions around Lake Tahoe have initiated efforts to prepare Area Plans to replace the existing Community Plans and Plan Area Statements that are in effect today with plans that are consistent with the newly adopted Regional Plan. Washoe County's planning efforts are focusing on a Washoe County Area Plan that will serve Incline Village and Crystal Bay area, will supersede the existing TRPA plan area statements and community plans, and will determine what these areas will look like in the future.	Planning effort underway; public workshops held in February/March 2013
Nevada Stateline-to-Stateline Bikeway – Future Phases	This project includes completion of a 30+ mile-long separated shared-use path that would parallel the east shore of Lake Tahoe and connect the California/Nevada border in the south shore casino core to the California/Nevada border in Crystal Bay, Nevada. The North Demonstration Project is one component of the larger Bikeway. The only segment of the shared-use path approved for construction is the South Demonstration Project, which extends between the casino corridor in south shore and Round Hill Pines Beach. It is likely that the next segments of the path to be carried forward through design and environmental review would include: a path connection between Incline Village and Crystal Bay; a connection south to U.S. 50 (a fatal flaw study is underway to determine whether this segment could be co-located with IVGID's Sewer Line Export Upgrade Project, described below); and a connection between Round Hill Pines Beach and Zephyr Cove.	Feasibility study complete; construction of South Demonstration Project underway; environmental review/design for other segments pending the completion and construction of demonstration projects

Table 4.1-1 List of Related Projects in the Washoe County Portion of the Tahoe Basin		
Name	**Project Description**	**Status**
Lake Tahoe Nevada State Park General Management Plan Update	NDSP is updating the Lake Tahoe Nevada State Park General Management Plan (1990), which serves as the guidance document for the overall management of the park. The document describes park facilities and resources and includes policies and programs to guide park development, park management, and general operations.	Draft Plan update expected in 2014 or 2015
SR 28 Corridor Management Plan	TTD is leading a community-based action strategy outlining the goals, tactics and responsibilities for preserving and promoting the unique characteristics of the SR 28 National Scenic Byway. The plan includes traffic-related initiatives designed to make the area safer for residents and visitors while enhancing their experience. Elements considered in the study include but are not limited to shuttle service and intercept parking areas, an off-highway shared-use path (similar to the proposed project, but for the remainder of the SR 28 corridor), off-highway parking and emergency pullouts, vista points, improved access to recreational areas, and interpretive signage.	Plan completed in October 2013
Sand Harbor Recreational Capacity Study	NDSP recently completed a study to determine the carrying capacity of the Lake Tahoe Nevada State Park, Sand Harbor Management Area – including the areas of Memorial Point and Hidden Beach. The Study finds that peak summer season recreation use in the Sand Harbor Management Area is exceeding the recreational capacity and includes a series of management recommendations.	Study completed December 2011
Incline Fuels Reduction and Healthy Forest Restoration Project	LTBMU is proposing to complete thinning and fuels reduction treatments on approximately 3,917 acres of NFS lands on the northeast shore of Lake Tahoe near Incline Village and Crystal Base. The purpose of the treatments is to reduce the risk of catastrophic fire and its impacts to commercial, private, and public infrastructure, as well as ecological values along the northeast shore of Lake Tahoe. The NFS parcel crossed by the North Demonstration Project (APN 130-320-03) and several uphill NFS parcels would be hand treated (i.e., cut, pile, and burn) as part of this fuels project.	Decision on project issued on February 15, 2013; project implementation expected to begin in 2014; thinning would occur within first 3-5 years with prescribed burning to follow
Incline SR 28/431 Roundabout and Erosion Control	This project would improve the intersection of State Routes 28 and 431 at the west end of Incline Village with a round-about and landscaping. The project includes erosion control and water quality improvements from the same intersection northwest to Crystal Bay and from the summit of Mount Rose to the intersection at SR 28.	Roundabout construction completed in 2012; erosion control measures completed in 2013
SR 28 Erosion Control and Drainage Improvement Project (Carson City/Washoe County Line to Sand Harbor)	This NDOT project includes planning, design, and construction for installation of source control, conveyance, and treatment facilities for stormwater runoff. This project has been initiated to identify and implement erosion control and water quality features to reduce the discharge of sediments and pollutants into Lake Tahoe.	Project is in design/planning phase; construction planned for 2015

Table 4.1-1 List of Related Projects in the Washoe County Portion of the Tahoe Basin

Name	Project Description	Status
Boulder Bay Project	Redevelopment of Tahoe Biltmore Resort and former Tahoe Mariner site to a full-service resort community including 101 hotel and 282 fractional condominiums, seven residential units and 12, 350 sq. ft. of workforce housing units. The project would result in 10 to 15 percent reduction in existing coverage and a reduction of gaming commercial floor area. Intersection improvements, pedestrian walkways along SR 28 in Crystal Bay, a 4-acre public park, and water quality improvement projects including: BMPs on public rights-of-way, and the Placer County Brockway Water Quality Improvement Project – are part of the Boulder Bay project plan.	The Final EIS for the proposed Boulder Bay Project was certified by TRPA in 2011; status of project financing and construction timeframe are unknown at the time of writing of this document
The East Shore Express (Pilot Transit Shuttle Program)	An initial phase in a long-term revitalization plan by TTD to streamline traffic flow and enhance environmental and recreational assets along SR 28 between Incline Village and Spooner. Daily shuttle service is provided in the summer from 771 Southwood Boulevard (the old elementary school) to the Sand Harbor Management Area to improve safety, access for emergency vehicles, alleviate congested roadways and reduce vehicle emissions. TTD is currently pursuing grant funding for the East Shore Express 2014 season.	Shuttle service began June 15, 2012; shuttles run every 20 minutes between 9:00 a.m. and 6:00 p.m., 7 days per week through Labor Day
Sewer Export Pump Station Upgrade Project	The sewer export pump station is located just south of the Sand Harbor entrance on east side of SR 28. IVGID is upgrading pumps, installing a new emergency generator in a new building, expanding the driveway, and installing BMPs.	Construction completed in 2012
Sewer Export Line Upgrade, South of the Sand Harbor Management Area to U.S. 50	IVGID is in the early planning phase for potential replacement of 7 miles of existing pipeline with 16-inch pipes, from south of the Sand Harbor Management Area to the Douglas County line.	Project in early planning phase; construction tentatively planned for 2015
Incline Village/Crystal Bay Trails Update	A comprehensive trails plan that will map existing trails, possible trail reroutes, and potential new trail alignments as well as establish standards for trails, parking, and trail heads for the area between the California state line in Crystal Bay, to the Rim Trail on the north, the Rim Trail on the east, Tunnel Creek at the southern extent on the east side of the lake, and Lake Tahoe.	Project in early planning phase

Note: Ponderosa Ranch was purchased by a private property owner in 2007. The future of the Ponderosa Ranch property is unknown, but the Ponderosa Ranch Community Plan includes descriptions of visitor attractions and a hotel at this site.
Source: List compiled by Ascent Environmental 2013

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4.2 LAND USE, SOCIOECONOMICS, AND ENVIRONMENTAL JUSTICE

The section describes the existing land uses and land use plans applicable in the project area. The land uses proposed (shared-use path and associated trailhead parking) with Alternatives A and B are evaluated for consistency with applicable land use plans, as well as for conflicts with existing land uses in the project area. Alternative C is the No Action Alternative; no shared-use path would be constructed, and land uses would continue as they are today. Please note that Chapter 5, "Section 4(f) of the U.S. Department of Transportation Act of 1966," addresses the specific federal government responsibilities related to transportation projects or programs that require the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site of national, State, or local significance located on public or private land.

As described in Section 4.1, "Approach to Environmental Analysis," relevant federal laws and executive orders are discussed at the beginning of each resource section. Compliance with the National Forest Management Act (Public Law 94-588) and Executive Order 12898 (Environmental Justice) are discussed below.

National Forest Management Act (Public Law 94-588). This law requires the development of long-range land and resource management plans for each forest in the U.S. In the Tahoe Region, the management of NFS lands is guided by the Land Resource Management Plan (Forest Plan). An updated Forest Plan was released in November 2013. The Forest Plan provides guidance for all natural resource management activities on NFS lands. The National Forest Management Act requires all projects and activities on NFS lands to be consistent with the Forest Plan and amendments thereto.

Approximately 800 linear feet of the proposed North Demonstration Project would cross a single parcel on NFS land managed by the LTBMU, just north of the Rocky Point Subdivision. This section of the proposed shared-use path falls within the NEPA exclusion category under 36 CFR Section 220.6 (e)(3): *Approval, modification, or continuation of minor special uses of NFS lands that require less than five contiguous acres of land*. Therefore, LTBMU is preparing a NEPA Categorical Exclusion Decision Memorandum for the proposed North Demonstration Project, which will focus on whether any of the seven extraordinary circumstances found in Forest Service Handbook 1909.15, Chapter 30.4, arise. LTBMU is preparing a Decision Memorandum independently, in a separate process from this EA. The proposed North Demonstration Project is consistent with the Forest Plan.

Executive Order 12898 (Environmental Justice). This executive order requires that all federal actions consider potentially disproportionate effects on minority and low-income communities, especially if adverse effects to environmental or human health conditions are identified. The activities proposed in the action alternatives evaluated in this EA were based on sensitivity of the environment and providing a high-quality recreation experience in response to the Purpose and Need. In no case were the alignments based on demographic makeup, occupancy, property value, income level or any other criteria reflecting the status of adjacent non-federal land. Federal and state owned lands are located throughout the project area. No dislocation of existing residence or businesses is needed for any alignment option. Reviewing the location of the proposed alternatives in relationship to non-federal and state lands, there is no evidence to suggest that any minority or low income neighborhood would be affected disproportionately as described herein. Conversely, there is no evidence that any individual, group, or portion of the community would benefit unequally from either of the action alternatives.

4.2.1 AFFECTED ENVIRONMENT

As described in Chapter 3, "Alternatives," the project area is generally defined as extending from Incline Village to Sand Harbor; and from the shoreline of Lake Tahoe in the west to approximately 300 feet east of SR 28. Approximately 95 percent of the North Demonstration Project shared-use path would be located on lands owned by the State of Nevada (managed by NDSL, NDSP, or NDOT). The remaining 5 percent of the path would cross about 800 linear feet of a single NFS parcel managed by the LTBMU, and within the Rocky Point Subdivision (Exhibit 3-3) the path would either cross approximately 50 linear feet of two private parcels or within the limits of 4th Street (Washoe County ROW).

The terrain over the 3 miles of the project area rises rapidly to the east of SR 28 beginning immediately south of Incline Village, and drops sharply toward the Lake on the west side of the highway. Significant geographic features along this segment include Tunnel Creek and Bonpland Creek, both of which run through steep-walled canyons into Lake Tahoe. Existing facilities in the project vicinity include: the former Ponderosa Ranch; Hidden Beach, which is a popular 0.5-acre beach that is only accessible from water or hiking trails; Memorial Point, which is a vista point with short-term visitor parking and restrooms; and Sand Harbor, which has several parking lots, boat launch facilities, group facilities, beach areas, restrooms and a concessionaire facility. SR 28 is a nationally designated Scenic Byway.

Approximately 10 private residences are located near the northern end of the proposed shared-use path along the west side of SR 28 between the highway and the lake. Three residences are located on the east side of SR 28 in the Rocky Point Subdivision, downslope from the proposed shared-use path. The Tunnel Creek Station Café' is located adjacent to the proposed trailhead parking area south of Ponderosa Ranch Road.

Section 3.2.1 in Chapter 3, "Alternatives," describes those parcels and landowners/land managers that would be directly affected by the project. These parcels are located along SR 28 on the southeastern side of Incline Village.

DEMOGRAPHICS

Incline Village is a census-designated place (CDP) in Washoe County, Nevada. The CDP has a total area of 21.7 square miles, of which about 21.5 square miles is land and 0.19 square miles is water. It is part of the Reno—Sparks Metropolitan Statistical Area. At the time of the 2010 census, the CDP included 8,777 people, 3,765 households, and 2,335 families (Wikipedia 2013).

The population of Incline Village is predominantly white. The racial makeup of the CDP is characterized as follows:

- 77.9 percent white,
- 17.8 percent Hispanic or Latino,
- 0.3 percent African American,
- 0.3 percent Native American,
- 2.1 percent Asian,
- 0.1 percent Pacific Islander,
- 0.2 percent some other race, and
- 1.4 percent from two or more races.

For the period 2007-2011, the estimated median annual income for a household in the CDP was $78,375, and the median income for a family was $93,831. The per capita income for the CDP was $54,787. About 2.8 percent

of families and 5.7 percent of the population were below the poverty line, including 3.1 percent of those under the age of 18 and 7.0 percent of those that are age 65 or over.

RELEVANT PLANNING AREAS/ZONING

The North Demonstration Project would be located within the boundaries of four planning areas established by TRPA and Washoe County. The shared-use path would cross through three Plan Area Statements (PAS): Tunnel Creek (047), Mill Creek (049), and East Shore (055). The proposed trailhead parking would be within the NDOT ROW adjacent to Special Area #1 of the Ponderosa Ranch Community Plan. (Note: the boundaries of these planning areas are depicted in Exhibit 4.12-1 in Section 4.12, "Noise.")

Each PAS and community plan is assigned one of five land use classifications: conservation, recreation, residential, commercial and public service, and tourist accommodation. The land use classifications for the relevant planning areas are listed below:

- PAS 047 (Tunnel Creek) – Conservation,
- PAS 049 (Mill Creek) – Residential,
- PAS 055 (East Shore) – Recreation, and
- Ponderosa Ranch Community Plan – Commercial/Public Service.

Each PAS and community plan specifies categories of permissible uses consistent with the land use classification and identifies them as either an "Allowable" (A) or "Special" (S) use. Special uses require that certain findings of compatibility be made before a project may move forward. Any use not listed is considered either prohibited or non-conforming. Environmental Consequences and Recommended Mitigation Measures

SIGNIFICANCE CRITERIA

An evaluation of land use consistency is not required under NEPA because consistency or inconsistency with land use goals and policies does not necessarily result in changes to the physical or natural environment, whether adverse or beneficial. While other resource areas in this EA discuss the significance of direct, indirect, and cumulative impacts of the action alternatives in terms of context and intensity (pursuant to 36 CFR Section 220.4), this section does not evaluate potential inconsistencies with land use policies in those terms.

The "Land Use" criteria from the TRPA Initial Environmental Checklist (IEC) were used to define the land use topics for evaluation. The purpose of the TRPA IEC is primarily to determine if an EIS is required and to help define the topics to be evaluated in greater detail. While many of the IEC checklist questions are conducive for use as significance criteria (that is, they include a defined standard, qualitative or quantitative), many are not, such as those for land use. The checklist asks whether the project will:

- Include uses which are not listed as permissible uses in the applicable Plan Area Statements and adopted Community Plans?
- Expand or intensify an existing non-conforming use?
- Propose uses inconsistent with applicable goals and policies of the TRPA Regional Plan, and applicable Plan Area Statements and Community Plans?

The analysis of these issues herein identifies whether these conditions of plan compliance or non-compliance would occur under the action alternatives, but also assesses whether and to what degree the alternatives would result in incompatible land uses or land use conflicts.

Because the project would not result in the displacement of any residents or businesses and no new right-of-way would be required, there would be no impacts to the socioeconomic characteristics of the population of the

proposed project area. Furthermore, the proposed shared-use path would not divide an established community or otherwise effect community cohesion. Therefore, socioeconomic effects are not discussed further herein.

METHODS AND ASSUMPTIONS

The land use analysis involved a review of relevant land use plans, policies, and regulations. Appendix D includes a policy-by-policy discussion of each alternative's consistency with relevant policies contained in the TRPA Goals and Policies document; PASs 047 (Tunnel Creek), 049 (Mill Creek), and 055 (East Shore); and the Ponderosa Ranch Community Plan. The tables in Appendix D include a consistency determination for each policy and supporting narrative. The consistency determinations rely on analyses contained in other resource sections in this EA (i.e., Sections 4.3 through 4.14), and therefore in many places the Appendix D discussion includes a cross-reference to the applicable discussion elsewhere in this document.

LAND USE COMPATIBILITY

ALTERNATIVES A AND B

Direct and Indirect Effects

A project could be determined to be incompatible with surrounding uses if it includes uses that are not listed as permissible uses in the applicable PAS or community plan, or would expand or intensify an existing non-conforming use. The proposed project includes construction, operation, and maintenance of a *new* shared-use path, and therefore it would not expand or intensify an existing non-conforming use. The proposed shared-use path meets the definition of a linear public facility (LPF) in Chapter 90, "Definitions," of the TRPA Code, and would be subject to the applicable TRPA Code provisions that apply to LPFs.

The proposed shared-use path meets the primary use definition for a "transportation route," as defined in Table 21.4-A, "List of Primary Uses and Definitions," in Chapter 21 of the TRPA Code. The proposed trailhead parking area is defined as an accessory use; accessory uses include those uses that are customarily a part of a primary use that are clearly incidental and secondary to the primary use, and that do not operate independent of the primary use. Transportation routes are listed as permissible uses in each of the four relevant planning areas (PASs 047 [Tunnel Creek], 049 [Mill Creek], and 055 [East Shore], as well as the Ponderosa Ranch Community Plan). Transportation routes are classified as special uses in each of these areas (TRPA and Washoe County 2002a, 2002b, 2002c, and 1996). Special uses require that the following findings under Subsection 21.2.2 of the TRPA Code be made by TRPA:

A. The project to which the use pertains is of such a nature, scale, density, intensity, and type to be an appropriate use for the parcel on which and within the surrounding area in which it will be located;

B. The project to which the use pertains will not be injurious or disturbing to the health, safety, enjoyment of property, or general welfare of persons or property in the neighborhood, or general welfare of the region, and the applicant has taken reasonable steps to protect against any such injury and to protect the land, water, and air resources of both the applicant's property and that of surrounding property owners; and

C. The project to which the use pertains will not change the character of the neighborhood, or detrimentally affect or alter the purpose of the applicable planning area statement, community plan, and specific or master plan, as the case may be.

The findings supporting the proposed shared-use path will be incorporated into a separate Findings document for consideration by the TRPA Governing Board. Generally, the project implements the shared-use path envisioned in numerous planning documents (i.e., the TRPA Regional Plan, the Regional Transportation Plan, the Lake Tahoe Bicycle and Pedestrian Plan, and EIP Project 03.01.02.17).

Surrounding land uses in the vicinity include residential, existing recreation facilities, and undeveloped parklands. The project includes numerous design features intended to protect existing resources and to minimize conflicts with adjacent residences in the Rocky Point Subdivision (see "List of Design Features" at the beginning of this document). The path would provide an additional recreation amenity for use by local residents, visitors to the Tahoe Basin, as well as an opportunity to provide non-auto access to high value recreational areas and sites that would displace some existing automobile trips. Further, the proposed shared-use path would be restricted to non-motorized users, and is compatible with the types of uses that already exist within the project area (hiking and bicycling trails).

For these reasons, the proposed shared-use path would be compatible with existing surrounding land uses and would not result in land use conflicts.

Cumulative Effects

The existing land uses in the project area are consistent with the applicable PASs and community plan. Therefore, cumulatively land uses are considered to be compatible. The proposed shared-use path in Alternatives A and B would be compatible with existing land uses in the project area, as described above. Therefore, the proposed shared-use path would not contribute to cumulative development of incompatible land uses.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path would not be constructed and there would be no change to existing uses. Therefore, Alternative C would not result in direct and indirect effects related to land use compatibility.

Cumulative Effects

Under Alternative C, the shared-use path would not be constructed and there would be no change to the existing land uses. Therefore, Alternative C would not result in cumulative effects related to land use compatibility.

CONSISTENCY WITH RELEVANT PLANNING DOCUMENTS

ALTERNATIVES A AND B

Direct and Indirect Effects

Construction, operation, and maintenance of the project have the potential to result in conflicts with some of the policies or regulations adopted by relevant agencies with jurisdiction over the project. To reduce or avoid adverse environmental effects of the project, design features have been incorporated into the project as proposed project features. Appendix D of this document contains an analysis of the consistency of the project with applicable land use policies adopted for the purpose of avoiding or mitigating environmental effects and references specific design features and elements of the project that would preclude any policy conflicts. The Appendix D discussion focuses on the consistency of the project with land use plans prepared jointly by TRPA and Washoe County.

As discussed previously, the project implements the shared-use path envisioned in numerous planning documents (i.e., the TRPA Regional Plan, the Regional Transportation Plan, the Lake Tahoe Bicycle and Pedestrian Master Plan, and EIP Project 03.01.02.17).

The proposed action alternatives are also consistent with the Lake Tahoe Nevada Development Plan (1990), which contemplates a bicycle trail from Incline Village to Spooner Summit as a future development objective for

the park area (pp. 98, 99), and the proposed path would be consistent with the Plan's goals and objectives (pp. 4, 5).

The Washoe County Master Plan Public Services and Facilities Element and the Land Use and Transportation Elements contain multiple policies related to development of a regional trail system with access to/from major population areas and access to regional parks, special use facilities, and public lands. The proposed shared-use path (either Alternative A or B) from Incline Village to Sand Harbor would support the County's goals and policies related to a trail system, would be consistent with the County's trail design standards, and trail planning and development would follow the County's recommended process.

With integration of all design features into the project design, the action alternatives (Alternatives A and B) would not conflict with applicable land use plans and policies.

CUMULATIVE EFFECTS

As described above, the North Demonstration Project would be consistent with all land use planning documents. Therefore, the North Demonstration Project, in conjunction with related projects, would not contribute to or cause any potential cumulative land use impacts.

ALTERNATIVE C

DIRECT AND INDIRECT, AND CUMULATIVE EFFECTS

Under Alternative C, no shared-use path would be constructed and no change in existing uses would occur. Existing compatibilities and incompatibilities would continue in their current state. Alternative C would not contribute to any potential cumulative adverse land use effects.

4.3 HYDROLOGY AND WATER QUALITY

This section describes the existing hydrologic and water quality conditions within the North Demonstration Project area and provides an analysis of the potential effects due to implementation of Alternatives A, B, and C. The analysis herein is based on incorporation of all TTD-proposed design features (Design Features BMP-1 through BMP-10) into both action alternatives (Alternatives A and B). A discussion of effects to coverage and potential land surface erosion is provided in Section 4.5, "Earth Resources." A discussion of effects to stream environment zone (SEZ) habitat is found in Section 4.4, "Biological Resources," and is also discussed below in relation to water quality.

There are many federal, state, and local regulations that are applicable to the proposed project. TRPA provides oversight for planning and natural resource protection within the Tahoe Region. TRPA's Regional Plan and Code of Ordinances specify policies and regulations directed at protecting and improving water quality in Lake Tahoe and the Tahoe Region, which includes but is not limited to grading standards, water quality control and mitigation, source water protection, and best management practice (BMP) requirements. Additionally, TRPA has established Environmental Threshold Carrying Capacities specific to water quality. At the state level, the NDEP, Bureau of Water Quality Planning is responsible for water quality protection functions, including the development and implementation of the Lake Tahoe Total Maximum Daily Load (TMDL). At the Local level, applicable regulations include those included in the Washoe County Master Plan and Washoe County Development Code. For more information regarding the specifics of applicable regulations, please refer to the Hydrology and Water Quality Regulatory Table in Appendix C.

As described in Section 4.1, "Approach to Environmental Analysis," relevant federal laws and executive orders are discussed at the beginning of each resource section. Compliance with the Clean Water Act (Public Law 92-500), Section 10 of the Rivers and Harbors Act, Executive Orders 11988 and 11990 (Floodplain Management and Protection of Wetlands), and the Federal Antidegradation Policy are discussed below.

Clean Water Act (Public Law 92-500). The Clean Water Act (CWA, Public Law 92-500) consists of the Federal Water Pollution Control Act of 1972 and subsequent amendments. All federal agencies must comply with the provisions of the CWA. The CWA establishes the basic structure for regulation of discharges of pollutants to surface waters within the United States (U.S.). It authorizes the U.S. Environmental Protection Agency (EPA) to set effluent limits for discharges and requires the EPA to set water quality standards for contaminants in surface waters. The EPA has delegated responsibility to the State of Nevada to implement the National Pollutant Discharge Elimination System (NPDES) program authorized by the CWA. This is carried out by the NDEP, Bureau of Water Pollution Control.

The CWA regulates activities near waters of the U.S. and riparian areas. A permit from the U.S. Army Corps of Engineers (USACE) is required prior to any work in, over, or under; excavation of material from; or deposition of material into waters of the U.S., including jurisdictional wetlands, in accordance with Section 404 of the CWA. Fills of less than 0.5 acre of nontidal waters of the U.S. for residential, commercial, or institutional development projects can generally be authorized under USACE's nationwide permit (NWP) program, provided that the project satisfies the terms and conditions of the particular NWP. Fills that do not qualify for a NWP require a letter of permission or an individualized permit.

As discussed below and in Section 4.4, "Biological Resources," the proposed North Demonstration Project would cross Tunnel Creek and Bonpland Creek. The design features associated with the North Demonstration Project (see "List of Design Features" at the beginning of this document) would ensure that the terms of the CWA are met, primarily related to minimizing fill in Section 404 jurisdictional areas, and preventing pollution caused by erosion and sedimentation.

If less than 1/10th of one acre of jurisdictional land is impacted, and if fill in jurisdictional waterways is minimized to less than 25 cubic yards, a USACE Section 404 NWP No. 18 (Minor Discharges) would be required. If the project exceeds the limits of the above permit, a USACE Section 404 NWP No. 42 (Recreational Facilities) permit would be required. The appropriate permit for the North Demonstration Project would be determined during subsequent final design and permitting. In addition to the USACE Section 404 permit, a Section 401 water quality certification from NDEP would be required prior to initiating construction of the North Demonstration Project.

Section 10 of the Rivers and Harbors Act. Under Section 10 of the Rivers and Harbors Act of 1899, work in, over, or under; excavation of material from; or deposition of material into navigable waters is regulated by USACE. Navigable waters of the U.S. are defined as those waters, and the tributaries of those waters, subject to the ebb and flow of the tide shoreward to the mean high-water mark and those that are currently used, have been used in the past, or may be susceptible to use to transport interstate or foreign commerce. The jurisdiction of USACE under the CWA overlaps and extends beyond the geographic scope of its jurisdiction under the Rivers and Harbors Act. USACE permitting authority under the Rivers and Harbors Act is not subject to EPA oversight or any other restrictions specific to the CWA, and, in some cases the Rivers and Harbors Act alone will apply to waters.

For the North Demonstration Project, authorization under the USACE Section 404 NWP program would address the requirements of both the Rivers and Harbors Act (Section 10) and the CWA (Section 404).

Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands). These executive orders provide for protection and management of floodplains and wetlands. Executive Order 11988 for Floodplain Management directs all federal agencies to evaluate potential effects of any actions they may take in a floodplain and to avoid all adverse effects associated with modifications to floodplains. It also directs federal agencies to avoid floodplain development whenever there is a practicable alternative and to restore and preserve the natural and beneficial values served by the floodplains (EPA 2008).

Compliance with these orders would be assured by adhering to the project design features, including implementation of BMPs. The project would not adversely affect floodplains, as explained in this section. The only use of wetlands would be at and near the stream crossings at Tunnel Creek and Bonpland Creek that cannot be avoided; all practicable measures to minimize harm to wetlands are included in the project design features and best management practices. Therefore, this project would comply with these executive orders as proposed.

Federal Antidegradation Policy. The EPA has designated Lake Tahoe an Outstanding National Resource Water (ONRW). ONRWs are provided the highest level of protection under EPA's Antidegradation Policy. This policy provides for protection of water quality in high-quality waters that constitute an ONRW by prohibiting the lowering of water quality. ONRWs are often regarded as the highest quality waters of the U.S.

The EPA's antidegradation guidance for ONRW waters provides that states may allow some limited activities that result in temporary and short-term changes to water quality, but such changes should not affect existing uses or alter the essential character or special use that makes the water an ONRW. The EPA interprets this provision to mean no new or increased discharges to ONRWs and no new or increased discharge that would result in water quality degradation. Temporary activities "must not permanently degrade quality or result in water quality lower than that necessary to protect the existing uses in the ONRW." (EPA 1994)

The EPA's Antidegradation Policy is designed to protect existing beneficial uses and the level of water quality necessary to protect existing uses. It also provides protection for high-quality water resources and water resources of national importance. This policy further directs all states to adopt a statewide policy that includes the following provisions:

- Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected (40 CFR 131.12).

Compliance with these policies would be met by adhering to the project design features described in the "List of Design Features" at the beginning of this document and herein. Measures to protect existing instream water uses, water level and water quality include implementation of temporary and permanent BMPs.

4.3.1 AFFECTED ENVIRONMENT

REGIONAL HYDROLOGY

The North Demonstration Project is within the northern portion of the Lake Tahoe Hydrologic Unit, located east of the Nevada-California border in western Washoe County, Nevada within the Carson Range. The project area parallels SR 28 along the east shore of Lake Tahoe from Incline Village to Sand Harbor and crosses four TRPA delineated watersheds, which include the southern portion of the Mill Creek watershed, the Tunnel Creek watershed, the mouth of the Bonpland Creek watershed, and the northern portion of the Sand Harbor watershed.

LOCAL WATERSHED DESCRIPTION

The project area crosses two perennial streams that drain to Lake Tahoe (Tunnel Creek and Bonpland Creek) and one unnamed ephemeral drainage channel that drains to Lake Tahoe via a culvert, which is located under SR 28 between Bonpland Creek and Memorial Point. Tunnel Creek and Bonpland Creek are situated within steep-walled canyons.

The four TRPA watersheds traversed by the project area are characterized by steep topography. Approximately half the project area is situated on slopes greater than 30 percent (Table 4.5-3 in Section 4.5, "Earth Resources"). Land uses within the vicinity of the project area are primarily undeveloped and forested. Developed uses include SR 28, residential units adjacent to SR 28 in the Rocky Point subdivision, and various facilities associated with recreation opportunities at Hidden Beach, Memorial Point, and Sand Harbor.

Soil map units delineated by the NRCS (2007) are comprised of Inville gravelly coarse sandy loam, Cagwin-Rock outcrop complex, Cassenai gravelly loamy coarse sand, and Gefo gravelly loamy coarse sand. These soils have drainage classifications ranging from well drained to somewhat excessively well drained. Erosion hazard ratings, which are discussed in more detail in Section 4.5, "Earth Resources," are classified to range from moderate to very severe. Vegetation is comprised primarily of Jeffrey pine, red fir, white fir, and western white pine with underbrush comprised of manzanita and various shrubs.

The east shore of Lake Tahoe averages between 20 to 30 inches of precipitation per year, depending on elevation. Most precipitation falls between October and May as snow at higher elevations and as a mixture of snow and rain at lake level. The peak in stream runoff caused by snowmelt in the higher elevations typically occurs in April or May.

100-YEAR FLOODPLAIN

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) that bounds the project area is located in Washoe County, Nevada and dated March 16, 2009. The FIRM indicates that the project area is not within a special flood hazard area as mapped by FEMA (Exhibit 4.3-1).

Source: FEMA 2009

Exhibit 4.3-1 Flood Insurance Rate Map

JURISDICTIONAL WATERS OF THE UNITED STATES

A delineation of potential jurisdictional waters of the U.S. in the vicinity of the project area was completed in 2011 (Nichols Consulting Engineers [NCE], Appendix I). Waters of the U.S. include essentially all surface waters such as all navigable waters and their tributaries, all interstate waters and their tributaries, all wetlands adjacent to these waters, and all impoundments of these waters. The USACE has established two primary distinctions for jurisdictional waters—wetland and non-wetland waters of the U.S. Wetlands are defined as “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR Section 328.3[b]). Non-wetland waters are commonly referred to as other waters.

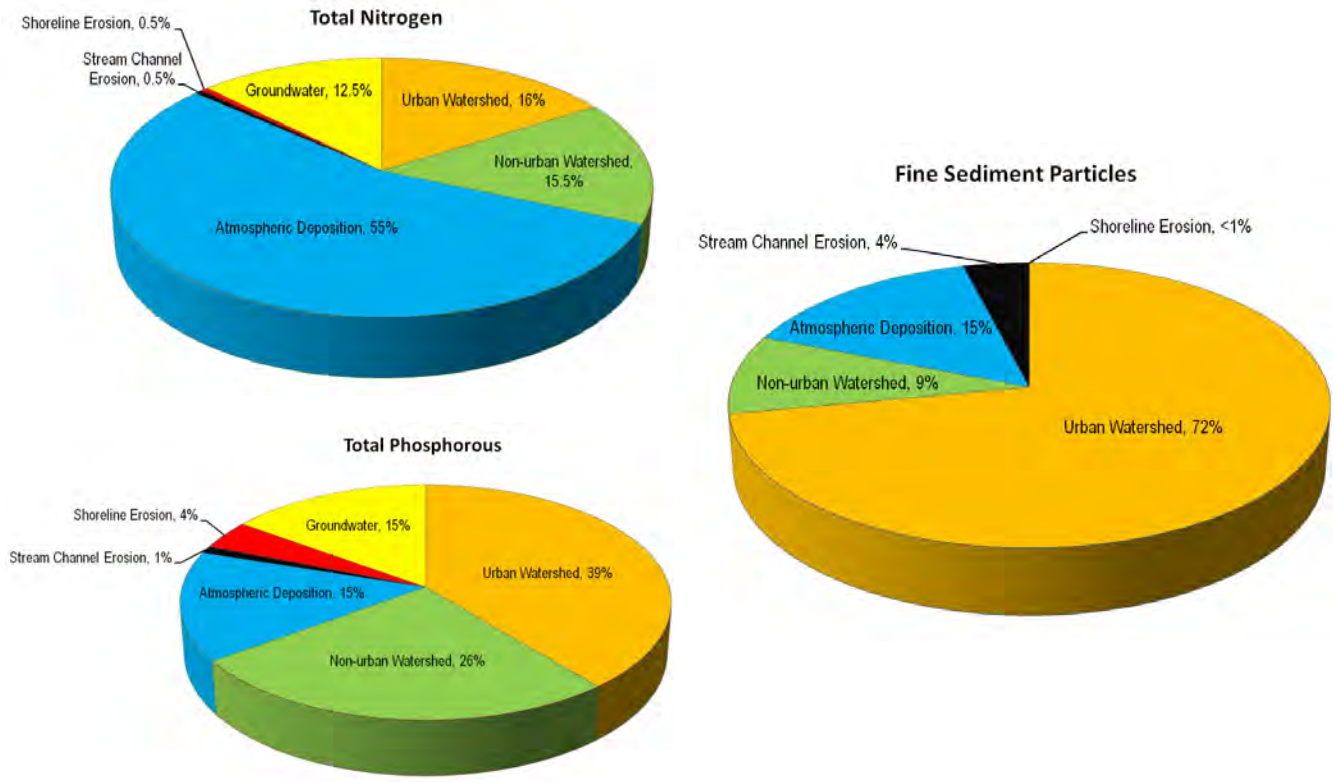
The 2011 survey did not identify wetlands within the project area, but did identify the following “other waters” that may be considered jurisdictional by the USACE (NCE 2011: p. 8-9):

- a total of 0.30 acres of Perennial Stream associated with Tunnel Creek and Bonpland Creek; and
- a total of 0.02 acres of Intermittent Drainage associated with the unnamed ephemeral drainage channel that drains to Lake Tahoe via a culvert, which is located under SR 28 between Bonpland Creek and Memorial Point.

SURFACE WATER QUALITY

Lake Tahoe is classified by limnologists as an oligotrophic lake, which means the lake has very low concentrations of nutrients that can support algal growth, leading to clear water and high levels of dissolved oxygen (Tahoe Environmental Research Center [TERC] 2011: p. 6.15). The exceptional transparency of Lake Tahoe results from naturally low inputs of nutrients and sediment from the surrounding watersheds. The most recent scientific research points to inorganic fine sediment particles (particles defined as less than 16 micrometers in diameter) as the primary pollutant of concern impairing Lake Tahoe's transparency. This finding is based on the ability of inorganic fine sediment particles to efficiently scatter light and decrease observed transparency (Swift et al. 2006). Additional pollutants of concern include phosphorus and nitrogen, which stimulate algal growth in the lake contributing to declines in transparency and the quality of the near-shore environment.

Lake Tahoe TMDL research included an analysis of pollutant sources to identify the magnitude of pollutant loads to Lake Tahoe from source categories defined as surface runoff from developed lands (urban watershed), atmospheric deposition, forested runoff (non-urban watershed), stream channel erosion, groundwater, and shoreline erosion. Exhibit 4.3-2 displays the relative distribution of average annual pollutant loading to Lake Tahoe for each pollutant of concern among the source categories (Lahontan Regional Water Quality Control Board [Lahontan RWQCB] and NDEP 2010: pp. 7-2 and 7-3). As shown in Exhibit 4.3-2, the Lake Tahoe TMDL identifies surface runoff from developed lands as the most significant source of pollutant loading for fine sediment particles and phosphorus. For nitrogen, atmospheric deposition is identified as the most significant source of loading to the lake, contributing 55 percent of the average annual load.



Source: Adapted from Lahontan RWQCB and NDEP 2010

Exhibit 4.3-2 Lake Tahoe TMDL Pollutant Sources

Historical surface water quality data for streams within the project area (Tunnel Creek and Bonpland Creek) was not located as part of this environmental assessment, and presumably an extensive water quality data set has never been collected for these two streams. The Lake Tahoe Interagency Monitoring Program (LTIMP) collects flow, nutrient concentration, and sediment concentration data from a selection of streams that discharge to Lake Tahoe. A total of 10 streams in the Tahoe Region have substantial flow and water quality data collected through the LTIMP program, which include Trout Creek, Upper Truckee River, General Creek, Blackwood Creek, Ward Creek, Third Creek, Incline Creek, Glenbrook Creek, Logan House Creek, and Edgewood Creek.

The Logan House Creek watershed, while located approximately 10 miles to the south of the project area is an east shore stream with a watershed having similar physiographic characteristics to the Tunnel Creek and Bonpland Creek watersheds. Specifically, the Logan House Creek watershed is primarily forested with minimal development associated with a handful of single-family homes and the crossing of U.S. 50. Based on these similar land use characteristics and geographic setting, water quality data collected for the Logan House Creek provides a reasonable basis to infer the general water quality characteristics of Tunnel Creek and Bonpland Creek relative to other streams in the Tahoe Region. The LTIMP stream gauge data set was analyzed and used in the Lake Tahoe TMDL work to calibrate the Lake Tahoe Watershed Model. An assessment comparing and analyzing the observed water quality data from the 10 monitored streams showed that pollutant loading discharged from the Logan House Creek watershed was quite low relative to other monitored watersheds. For example, the Lake Tahoe TMDL analysis estimated that Logan House Creek contributed approximately one-tenth of one percent of the annual Total Suspended Sediment load to Lake Tahoe among the total estimated load contributed by the 10 monitored streams (Lahontan RWQCB and NDEP 2009: Table 4-18). Relative to the information presented in Exhibit 4.3-2, the Tunnel Creek and Bonpland Creek watersheds would be classified as “non-urban watersheds” by the Lake Tahoe TMDL based on the low amount of existing development within the watershed. A GIS analysis estimates existing impervious coverage to be 1.1 percent of the total Tunnel Creek watershed area and less than 0.1 percent of the total Bonpland Creek watershed area. Given the relatively low amount of development in these watersheds, the concentration of pollutants in surface runoff generated within these watersheds and the associated pollutant loading to Lake Tahoe is likely quite low. Modeling analyses conducted for the Lake Tahoe TMDL supports this conclusion. Specifically, the Lake Tahoe TMDL Technical Report (Lahontan RWQCB and NDEP 2009: Table 4-32) estimates that Tunnel Creek and Bonpland Creek input less than one-tenth of one percent of the total average annual load of fine sediment (defined as particles less than 63 microns in size) to Lake Tahoe from the watershed.

GROUNDWATER

The project area is located within the Lake Tahoe groundwater basin within the Truckee River Region. Soils within the project area are primarily comprised of alluvium and glacial outwash, excessively drained soils over granitic material, or formed in colluvium over residuum weathered from granodiorite (NCE 2011: p. 10).

A Soils/Hydrologic Report was completed to assess the groundwater elevation for the optional SR 28 undercrossing just north of Tunnel Creek (Lumos & Associates 2012). A single boring was excavated to a depth of 21.5 feet at the location of the potential undercrossing adjacent to SR 28. Subsurface materials encountered during the excavation consisted of layers of pale to dark brown silty sand to 10 feet and layers of light gray to pale brown poorly graded sand with silt and gravel from 10 feet to the bottom of the boring hole. No groundwater was encountered during the excavation. Evidence of seasonally high groundwater in the soil column was identified at a depth of 20 feet below ground surface. A Soils/Hydrologic investigation has not been conducted for the optional undercrossing at Sand Harbor because the excavation would only encounter approximately 5 feet of native material as SR 28 was constructed on fill in the vicinity of this optional undercrossing.

Two groundwater wells are in the vicinity of the project area. Source water is supplied to Memorial Point and Sand Harbor via independent, permitted, transient, non-community public water systems. The Memorial Point water system is composed of a groundwater well with a single service connection that supplies the restroom facility, limited drip irrigation in front of the restroom, and a drinking fountain. The water system at Sand Harbor includes a

groundwater well and 16 service connections that supply multiple public service and support facilities at the park such as restrooms, water fountains, the visitor center, shop facilities, employee residences, and concessions.

4.3.2 ENVIRONMENTAL CONSEQUENCES AND RECOMMENDED MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The North Demonstration Project would result in a significant adverse effect on hydrology or water quality and attainment of water quality thresholds if it would:

- result in any permanent or long-term degradation of Lake Tahoe water clarity;
- substantially alter existing surface water drainage patterns or cause existing or planned stormwater drainage systems to exceed capacity;
- interfere with groundwater movement or reduce groundwater infiltration, except as permitted under Section 33.3.6(A)(2) of the TRPA Code;
- degrade a source water supply;
- cause substantial interference with or adverse effects on littoral processes in the project area;
- place housing within a 100-year flood hazard area as mapped on a federal flood hazard boundary, FIRM, or other flood hazard delineation map; or
- place structures or fill within a 100-year flood hazard area that would impede or redirect flood flows.

Littoral drift refers to the transportation of sediments, such as sand, along the shoreline, at an angle to the shoreline. Wave and current actions near the lake shoreline can affect sediment transport and, in turn, accumulation of beach sand along the shore and sediment deposition in the nearshore area. Disruption of these actions, then, can alter natural deposition processes. This can, in turn, alter nearshore and shoreline erosion. The project would not result in the placement of structures at an elevation that would be subject to wave and current actions of Lake Tahoe. Thus, the potential for the project to affect littoral processes is not discussed further herein.

Similarly, the project would not result in the placement of housing and structures within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or FIRM (Exhibit 4.3-1). Thus, the potential for the project to place structures or housing within a 100-year flood hazard area is not discussed further herein.

METHODS AND ASSUMPTIONS

The evaluation of potential hydrology and water quality effects associated with implementation of the proposed North Demonstration Project was based on a review of background reports; applicable federal, state, and TRPA regulations, codes, and guidelines; the preliminary engineering plans (Appendix B), and consultation with project engineers.

SOIL EROSION AND SEDIMENTATION AND/OR RELEASE OF POLLUTANTS TO NEARBY WATER BODIES

ALTERNATIVES A AND B

Direct and Indirect Effects

Construction activities would involve vegetation removal, grading, excavation, and temporary stockpiling of soils, all of which could expose soils to erosion. In addition, there would be onsite staging of construction

equipment and vehicles, as well as construction-related vehicle trips. The potential exists for fuels and other construction-related chemicals to be accidentally spilled or leaked, or otherwise be discarded into nearby drainages during construction of either action alternative (Alternatives A and B).

Excavation and grading activities necessary to construct the shared-use path would occur within highly erodible granitic soils, along steep topography, and in close proximity to Lake Tahoe. Once disturbed, soils on sensitive lands within the project area (primarily TRPA land capability district [LCD] 1a) could become unstable and susceptible to increased rates of land surface erosion. Furthermore, successful long-term stabilization of soils disturbed on sensitive lands by project construction using soil restoration and revegetation techniques would present a number of challenges given the lack of nutrients within the soil, low amounts of precipitation during the summer growing season, and steep topography.

To address the physical challenges associated with protecting water quality during construction of the shared-use path, and to minimize construction-related disturbance, a comprehensive Temporary BMP Plan would be prepared for either action alternative. The Temporary BMP Plan would be implemented during all phases of construction to minimize potential impacts and control sediment and pollutants in stormwater runoff to a level that meets waste discharge requirements. The required components of the Temporary BMP Plan are summarized below and described in more detail as design features in the "List of Design Features" at the beginning of this document (Design Features BMP-1 through BMP-5).

- A Stormwater Pollution Prevention Plan (SWPPP) will be prepared that identifies water quality controls consistent with TRPA and NDEP requirements, and will ensure that runoff quality meets TRPA water quality requirements under the TRPA Code, and maintains beneficial uses of Lake Tahoe, as defined by Section 445A.191 of the Nevada Administrative Code (NAC). The SWPPP will describe the site controls, erosion and sediment controls, means of waste disposal, implementation of approved local plans, and management controls unrelated to stormwater. (Design Feature BMP-1)
- A Dewatering Plan will be developed, and implemented if groundwater is encountered, to protect groundwater during excavations from potential sediment and contaminant releases, including methods to clean up releases if they do occur. The plan will include methods for controlling potentially sediment-laden water from dewatering activities. (Design Feature BMP-2)
- TTD will set contractual limits on the maximum amount of allowable construction-related disturbance in sensitive lands (LCDs 1a, 1b, and 2), as calculated from the selected action alternative that has been designed to minimize disturbance in sensitive lands. Additionally, TTD will explore the feasibility of including contractual incentives to complete the shared-used path with less total construction-related disturbance in sensitive lands relative to the maximum allowable limit. Similarly, TTD will explore the feasibility of including contractual penalties if total disturbance in sensitive lands from construction-related activities exceeds the maximum allowable limit. (Design Feature BMP-3)
- A Temporary SEZ Access and Revegetation Plan will be developed to minimize the area of temporary disturbance in the Tunnel Creek and Bonpland Creek SEZs necessary to construct the proposed bridge foundations; avoid placing fill within an SEZ; define the construction methods employed to minimize compaction of SEZ soils and disturbance to SEZ vegetation by construction equipment; identify soil restoration methods, if necessary; and revegetation methods. (Design Feature BMP-4)
- A Rain Event Action Plan will be included in the SWPPP to monitor the weather on a daily basis and will implement pre-defined actions within the SWPPP to avoid discharges during rain events. (Design Feature BMP-5)

In addition to the Temporary BMP Plan, an Adaptive Management Restoration Plan will be developed and implemented to monitor, assess, and augment restoration efforts when deemed necessary to ensure the success of slope stabilization efforts and to minimize or mitigate potential impacts to SEZs.

With either action alternative, TTD would develop and implement comprehensive Temporary BMP and Adaptive Management Restoration Plans, in addition to required permanent BMPs. The Plans would be subject to existing laws and regulations requiring erosion and sediment controls, implementation and maintenance of temporary construction BMPs, waste control measures, and management controls for stormwater runoff. Because TRPA, NDEP, and Washoe County regulations are in place to minimize erosion and transport of sediment and other pollutants during construction (Hydrology and Water Quality Regulatory Table in Appendix C), and appropriate project-specific measures would be defined to secure necessary permits and approvals, construction-related impacts would be minimized and would not result in a substantial adverse effect on water quality.

Cumulative Effects

The related on-the-ground development projects in the Washoe County portion of the Tahoe Basin (as listed in Table 4.1-1), as well as either action alternative of the North Demonstration Project, have the potential to generate construction-related discharges of sediment and pollutants to receiving waters. Implementation of either action alternative would involve numerous project design features to protect water quality during construction, compliance with TRPA, NDEP, and Washoe County regulations, and temporary BMPs that are expected to minimize the project's short-term effects related to soil erosion, sedimentation, or release of pollutants. Related projects would be required to implement similar water quality BMPs during construction as required by TRPA, NDEP, and Washoe County regulations. Therefore, the action alternatives would not result in an adverse cumulative effect to receiving waters associated with constructed-related discharges of sediment or pollutants.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C the shared-use path as described under Alternatives A and B would not be constructed; therefore, Alternative C would not result in any direct or indirect effects related to erosion or release of pollutants to receiving waters from construction activities.

Cumulative Effects

Under Alternative C the shared-use path as described under Alternatives A and B would not be constructed; therefore, Alternative C would not contribute to potential cumulative effects related to erosion or release of pollutants to receiving waters from construction activities.

IMPERVIOUS SURFACE AREA AND RUNOFF

Rates and volumes of runoff are affected by development through multiple mechanisms, but the most important of these are: (1) the conversion of vegetated or pervious surfaces to impervious surfaces; and (2) the development of drainage systems that connect these impervious surfaces to streams and other water bodies, thus increasing the rate of runoff and eliminating storage and infiltration that would otherwise occur along natural drainage paths. As water runs off the land surface, it collects and carries material that accumulates on the land surface. If the entrained material has potentially harmful effects on receiving waters downstream (e.g., fine sediment particles in Lake Tahoe), the material is defined as a stormwater pollutant. Additionally, runoff from impervious surfaces can become concentrated, causing land surface erosion and subsequent sediment transport into streams and Lake Tahoe.

ALTERNATIVE A

Direct and Indirect Effects

Alternative A would result in 194,261 square feet (4.46 acres) of additional impervious surfaces (land coverage) (Table 4.5-3 in Section 4.5, "Earth Resources") that could alter runoff patterns.

The following describes the general alignment of the shared-use path under Alternative A by segment.

- Segment 1 would be aligned on the eastern side of SR 28 from the northern terminus of the shared-use path heading south towards Tunnel Creek. Just north of Tunnel Creek the shared-use path would drop towards and cross SR 28.
- Segment 2 would continue south located to the west of SR 28 (lake side) to the parking lot at Memorial Point. Due to the existing narrow shoulder of SR 28 and steep embankments to the lake, Alternative A would require the construction of boardwalk or other cantilevered or separated bridge structures.
- Segment 3 would continue south, located to the west of SR 28, from the Memorial Point parking lot to the terminus of the shared-use path at the main entrance to Sand Harbor. As with Segment 2, this portion of the shared-use path would be constructed in steep terrain on the narrow margin between SR 28 and the shore of Lake Tahoe. Construction of boardwalks or other cantilevered or separated bridge structures would be required for much of this alignment.

Collectively, Segments 2 and 3 of Alternative A would require the construction of approximately 1,315 linear feet (0.25 mile) of boardwalk or other cantilevered or separated bridge structures.

Alternative A would include a Permanent BMP Plan (Design Features BMP-6 through BMP-10) used to control stormwater runoff and to minimize erosion and the transport of sediment and other pollutants of concern to Lake Tahoe. Alternative A would be designed to convey stormwater runoff flows under the shared-use path, where required, to meet Washoe County drainage design standards. Furthermore, bridges over stream crossings (Tunnel Creek and Bonpland Creek) would be designed to pass at a minimum the 100-year event as required by FEMA regulations and Washoe County (Design Feature BMP-10).

For Segment 1 of the shared-use path, improvements would be designed to meet requirements for infiltrating runoff generated by the 20-year, 1-hour design storm event, as required by Section 60.4.6 of the TRPA Code. On relatively flat existing side slopes (less than 20 percent), stormwater from the shared-use path would runoff the path as sheet flow onto the adjacent downstream pervious area and naturally infiltrate. Soils within the project area have been mapped by the NRCS (2007) to be well-drained to somewhat excessively well drained, exhibiting high rates of measured saturated hydraulic conductivity. On moderately steep to steep side slopes (greater than 20 percent), stormwater from the shared-use path would sheet flow into either rock riprap slope protection or infiltration trenches constructed on the downhill side of the path to store and infiltrate the 20-year, 1-hour design storm event. (Sheets D1 and D6 of Appendix B show typical cross sections for infiltration trenches that would be used to control runoff from the proposed shared-use path.) Where topography prohibits infiltration adjacent to the shared-use path, runoff would be routed in stabilized conveyances to flatter locations where infiltration trenches or infiltration basins would be used to store and infiltrate runoff to meet the 20-year, 1-hour design storm event.

For Segments 2 and 3, the bridge structures would be constructed over existing rock outcroppings or shallow soils on the lake side of SR 28. In these specific locations, project design features would not achieve storage requirements for the 20-year, 1-hour design storm event due to the rock outcroppings and shallow soils, which present a natural constraint to infiltrating runoff. Under Alternative A, TTD would be required to request an exemption from TRPA for special circumstances under Section 60.4.8 of the TRPA Code where the shared-use path crosses rock outcroppings or shallow soils adjacent to the lake. The project design under Alternative A would still need to meet all other TRPA BMP requirements, including discharge limits for surface runoff (Section 60.1.3 of the TRPA Code) in locations with natural infiltration constraints.

The quality of stormwater runoff can be reasonably predicted based upon the source of the impervious coverage from which the stormwater runoff originates; where higher quality or cleaner runoff would be expected from roofs, decks, and shared-use paths, and lower quality runoff associated with motorized vehicles would be expected from driveways, parking lots, and roads. This premise is supported by the most recent scientific studies in the Tahoe

Region, including the Lake Tahoe TMDL, which identify increasing concentrations of pollutants of concern across land uses within the Tahoe Region as the intensity of vehicular use increases. Specifically, the Lake Tahoe TMDL identifies increasing concentrations of pollutants of concern in the following order (lowest to highest) for land uses in the Tahoe Region: single-family residential; multi-family residential; commercial; secondary roads serving neighborhoods with relatively low levels of traffic, and primary roads, which are the major arterial roads in the Tahoe Region with high levels of traffic (Lahontan RWQCB and NDEP 2009: p. 4-60). Because the proposed shared-use path would limit access to non-motorized users (bicyclists and pedestrians), with the exception of infrequent use by emergency and maintenance vehicles; would not be actively managed in the winter for snow removal and would not receive traction abrasives; and would have slopes and drainages stabilized with permanent BMPs; the runoff quality of stormwater generated from the shared-use path would be relatively clean (free of direct automotive contaminants and crushed road abrasives) and is expected to meet TRPA discharge limits for surface runoff.

The Permanent BMP Plan for Alternative A would: (1) demonstrate that erosion will be minimized; (2) include BMPs adequate to meet applicable water quality standards; (3) incorporate adequate maintenance activities; and (4) be subject to review and approval by TRPA, NDEP, and Washoe County. Because Alternative A would meet all regulatory requirements for controlling runoff and storing the 20-year, 1-hour design storm event (which includes an exemption to the infiltration standard for naturally-constrained areas when TRPA discharge limits for surface runoff are met), the effects related to impervious surfaces and associated runoff would not result in significant short-term or long-term adverse effects on hydrology or water quality.

Stream Environment Zone

Implementation of Alternative A would result in 1,378 square feet or 0.03 acres of additional SEZ land coverage. This coverage increase would be in accordance with TRPA regulations related to coverage. The permanent effects would primarily involve partial or total conversion of SEZ vegetation cover. Because the proposed design would minimize effects to meadow vegetation and SEZ function, permanent effects to SEZ hydrologic function would be minimal and consistent with TRPA requirements. In addition, permanent disturbance to SEZ areas would be fully mitigated or restored at 150 percent of the amount disturbed (Design Feature BIO-12).

Cumulative Effects

The construction of the related projects in the project vicinity (Table 4.1-1) have the potential to increase impervious surfaces and associated surface runoff. However, these projects would be required to comply with TRPA stormwater BMP standards and to infiltrate the stormwater associated with each project (TRPA 2012b). Additionally, Alternative A would be designed and implemented to meet or exceed all TRPA, NDEP, and Washoe County standards that apply to the project. Therefore, Alternative A would not contribute substantially to potential cumulative effects related to increases in impervious surfaces and surface area runoff.

ALTERNATIVE B

Direct and Indirect Effects

Alternative B would result in up to 201,504 square feet (4.63 acres) of additional land coverage (Table 4.5-3 in Section 4.5, “Earth Resources”) that could alter runoff patterns.

The following describes the general alignment of the shared-use path under Alternative A by segment.

- Segment 1 would be the same as Alternative A above, and would include the same SR 28 crossing options to provide access to Hidden Beach.
- Segment 2 would cross Tunnel Creek using a prefabricated bridge while remaining on the eastern side of SR 28. Segment 2 would continue south from Tunnel Creek to Bonpland Creek. The crossing at Bonpland Creek is located about 4,000 feet from the nearest road access and the area around the creek has steep, rocky slopes with several trees greater than 24 inches in diameter at breast height (dbh). Because of these

constraints, it is expected that the bridge at Bonpland Creek would be constructed in place. From Bonpland Creek, Segment 2 of the shared-use path would continue south to a point uphill from Memorial Point.

- Segment 3 would continue on the eastern side of SR 28 between Memorial Point and Sand Harbor. The shared-use path would reach about 80 feet in elevation above SR 28 before descending to the highway elevation across from Sand Harbor. Here the shared-use path would cross SR 28 through an undercrossing or via an at-grade crossing and then continue south to the main entrance of Sand Harbor on the west side of the SR 28.

Alternative B would include a Permanent BMP Plan (Design Features BMP-6 through BMP-10) used to control stormwater runoff and to minimize erosion and the transport of sediment and other pollutants of concern to Lake Tahoe. Alternative B would be designed to convey stormwater runoff flows under the shared-use path, where required, to meet Washoe County drainage design standards. Furthermore, bridges over stream crossings (Tunnel Creek and Bonpland Creek) would be designed to pass at a minimum the 100-year event as required by FEMA regulations and Washoe County (Design Feature BMP-10).

For all segments of the shared-use path, improvements would be designed to meet requirements for infiltrating runoff generated by the 20-year, 1-hour design storm event, as required by Section 60.4.6 of the TRPA Code. The methods for storing and infiltrating runoff to meet this standard would be the same as described above for Alternative A. Unlike Alternative A, Alternative B does not cross rock outcroppings or shallow soils adjacent to Lake Tahoe that present a natural constraint to infiltrating runoff. Therefore, TTD would not be required to request an exemption for special circumstances under Section 60.4.8 of the TRPA Code from TRPA.

The Permanent BMP Plan for Alternative B would: (1) demonstrate that erosion will be minimized; (2) include BMPs adequate to meet applicable water quality standards; (3) incorporate adequate maintenance activities; and (4) be subject to review and approval by TRPA, NDEP, and Washoe County. Because Alternative B would meet all regulatory requirements for controlling runoff and storing the 20-year, 1-hour design storm event, the effects related to impervious surfaces and associated runoff would not result in significant short-term or long-term adverse effects on hydrology or water quality.

Stream Environment Zone

Implementation of Alternative B would not result in the creation of additional SEZ land coverage.

Cumulative Effects

The construction of related projects in the project vicinity (Table 4.1-1) has the potential to increase impervious surfaces and associated surface runoff. However, these projects would be required to comply with TRPA stormwater BMP standards and to infiltrate the stormwater associated with each project (TRPA 2012b). Additionally, Alternative B would be designed and implemented to meet or exceed all TRPA, NDEP, and Washoe County standards that apply to the project. Therefore, Alternative B would not contribute substantially to potential cumulative effects related to increases in impervious surfaces and surface area runoff.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C the shared-use path as described under Alternatives A and B would not be constructed; therefore, Alternative C would not result in potential effects related to increases in impervious surfaces or surface runoff.

Cumulative Effects

Under Alternative C the shared-use path as described under Alternatives A and B would not be constructed; therefore, Alternative C would not result in potential cumulative effects related to increases in impervious surfaces or surface runoff.

INTERCEPTION OF GROUNDWATER DURING CONSTRUCTION

ALTERNATIVES A AND B

Direct and Indirect Effects

Section 33.3 of the TRPA Code prohibits excavations, except under certain defined and permitted conditions, that interfere with or intercept the seasonal high water table by altering the direction of groundwater flow, altering the rate of flow of groundwater, intercepting groundwater, adding or withdrawing groundwater, or raising or lowering the water table. Exceptions to this prohibition can be made provided that the excavation is necessary (Section 33.3.6[A][2] of the TRPA Code), and measures are included in the project to maintain groundwater flows to avoid adverse impacts to SEZ vegetation and to prevent and groundwater or subsurface water flow from leaving the project area as surface flow.

Construction of the shared-use path for both action alternatives would require excavation below 5 feet in many locations. Approximately 40 percent of the length of either alternative would require excavations deeper than 5 feet for construction of retaining walls greater than 4 feet in height. Additionally, excavation greater than 5 feet would be required for the bridge abutments for Tunnel Creek and Bonpland Creek in Alternative B, and for the footings to support the elevated bridge structures in Alternative A. Excavations to a depth of 16 to 18 feet would be required for construction of the optional SR 28 undercrossings at Hidden Beach and Sand Harbor.

A Soils/Hydrologic Report was completed to assess the groundwater elevation for the optional undercrossing to just north of Tunnel Creek (Lumos & Associates 2012). A single boring was excavated to a depth of 21.5 feet at the location of the potential undercrossing adjacent to SR 28. The study estimated that seasonally high groundwater was 20 feet below the ground surface at the excavation site, indicating that the elevation of seasonal groundwater is likely to occur well beneath the necessary depth of excavation for most components of the shared-use path. Groundwater is likely to be encountered at a shallower depth near SEZ areas; however the SEZ areas within the project area are perpendicular to the project and cannot be avoided. Design Feature BMP-2 includes a dewatering plan for locations where groundwater may be encountered. The dewatering plan would include measures to protect groundwater during excavations from potential sediment and contaminant releases, including methods to clean up releases if they do occur. Additional Soils/Hydrologic reporting may occur in other locations to support project planning and permitting at the request of TRPA and prior to TRPA permit acknowledgement. Because measures have been incorporated into the project to protect groundwater in the event that it is encountered during project construction consistent with Section 33.3.6(A)(2) of the TRPA Code, the action alternatives would not result in a significant adverse effect to groundwater.

Cumulative Effects

The related on the ground development projects in the Washoe County portion of the Tahoe Basin (as listed in Table 4.1-1) as well as the North Demonstration Project, either action alternative, have the potential to result in excavation depths below 5 feet, which could result in the interception of groundwater during construction. Construction of the proposed shared-use path under either action alternative would require excavation to depths below 5 feet over approximately 40 percent of the path length. However, Alternatives A and B are not expected to contribute substantially to cumulative effects related to interception or contamination of groundwater given that: (1) the results of the Soils/Hydrologic investigation indicate that seasonally high groundwater is well below the ground surface and anticipated depths of excavation; (2) the soils in the project area are classified as well drained to somewhat excessively drained; and (3) a dewatering plan would be developed and implemented to protect groundwater in the event it is encountered. All related projects would be required to adhere to Section 33.3 of the TRPA Code to protect against adverse effects from excavation, filling, and clearing, due to such conditions as exposed soils, unstable earthworks, or groundwater interference. In addition, all projects requiring excavation below 5 feet (or where there exists a reasonable possibility of interference with or interception of a water table) would be required, pursuant to Section 33.3 of the TRPA Code, to prepare a soils/hydrologic study that

demonstrates that there would no interference or interception of groundwater, and if groundwater interception or interference would occur, that there would be no adverse SEZ vegetation and no groundwater or subsurface flow would leave the project areas as surface flow. Therefore the related projects listed in Table 4.1-1 as well as the North Demonstration Project would not result in adverse cumulative effects related to groundwater interception as the effects would be limited to only the localized area of excavation.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed; therefore, Alternative C would result in no direct or indirect effects related to interception or contamination of groundwater.

Cumulative Effects

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed; therefore, Alternative C would not create excavation activities and would not contribute to potential cumulative effects related to interception or contamination of groundwater.

SOURCE WATER QUALITY

ALTERNATIVES A AND B

Direct and Indirect Effects

Projects within 600 feet of a drinking water source identified by TRPA require special consideration in accordance with TRPA's Initial Environmental Checklist. Two groundwater wells, which are located at Memorial Point and Sand Harbor, are within 600 feet of the proposed shared-use path alignment under Alternatives A and B. However, as described in the effects discussion above under the heading "Impervious Surface Area and Runoff," and in detail in the "List of Design Features" at the beginning of this document, project design features and permanent BMPs would treat runoff from the shared-used path in the vicinity of the groundwater wells to meet regulatory requirements (see Hydrology and Water Quality Regulatory Table in Appendix C). Also, as discussed above under the heading "Impervious Surface Area and Runoff" for Alternative A, the runoff quality of stormwater generated from the shared-use path is anticipated to be relatively clean and is expected to meet TRPA discharge limits for discharge to surface water and groundwater (Section 60.1.3 of the TPRA Code). As such, the action alternatives would not result in a degradation to an existing source water supply.

Cumulative Effects

Alternatives A and B would create new connections to existing trails providing increased recreational access to Hidden Beach, Memorial Point, and Sand Harbor. However, the project area already supports a large number of roads and trails and is already subject to high levels of recreation and other use. Furthermore, the shared-use path would incorporate permanent BMPs and could decrease existing erosion problems by decreasing reliance on user-created trails to access the recreational facilities. Project design features and BMPs incorporated into the project (see "Impervious Surface Area and Runoff" in this section) are expected to ensure that the project would not contribute to cumulative effects related to degradation of a source water supply.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed; therefore, Alternative C would not cause a direct or indirect effect on a source water supply.

Cumulative Effects

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed; therefore, Alternative C would not contribute to potential cumulative effects related to a source water supply.

4.3.3 CONSEQUENCES FOR TRPA ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

This section describes the effects of implementing the action alternatives on the thresholds established by TRPA for water quality. The following Indicator Reporting Categories for water quality have been established by TRPA:

- Pelagic Lake Tahoe (deep waters),
- Littoral Lake Tahoe,
- Tributaries,
- Surface Runoff,
- Groundwater, and
- Other Lakes.

Implementation of Alternatives A or B (action alternatives) would include a similar level of construction-related disturbance, shared-use path facilities, and permanent BMP design approaches to retain and infiltrate stormwater runoff and to control slope erosion. Because the water quality and hydrology components of the action alternatives would have a similar effect on TRPA environmental thresholds, the analysis below is applicable to both action alternatives. Alternative C is the No Project/No Action Alternative and would not affect TRPA thresholds for water quality.

PELAGIC LAKE TAHOE AND LITTORAL LAKE TAHOE

The Pelagic Lake Tahoe and Littoral Lake Tahoe Threshold Indicator Reporting Categories include numerical standards that pertain to the quality and clarity of Lake Tahoe's waters, where measurements of the numerical standards are influenced by the amount of pollutant loading discharged to Lake Tahoe. According to the 2011 Threshold Evaluation (TRPA 2012a), the status of the three water quality thresholds is the following:

- Turbidity (Littoral Lake Tahoe): Status = Unknown; Trend = Unknown;
- Winter Clarity (Pelagic Lake Tahoe): Status = At or somewhat better than interim target, somewhat worse than standard; Trend = Unknown; and
- Phytoplankton Productivity (Pelagic Lake Tahoe): Status = Considerably below target; Trend = Rapid decline.

Both action alternatives would implement a Temporary BMP Plan, Adaptive Management Restoration Plan, and Permanent BMP Plan. The collective set of water quality protection measures and BMPs implemented through the Plans would: (1) demonstrate that erosion would be minimized; (2) include BMPs adequate to meet applicable water quality standards; (3) incorporate adequate maintenance activities; and (4) be subject to review and approval by TRPA, NDEP, and Washoe County. Therefore, the action alternatives would not contribute to the nonattainment of the Pelagic Lake Tahoe and Littoral Lake Tahoe Threshold Indicator Reporting Categories.

TRIBUTARIES

The Tributaries Threshold Indicator Reporting Category includes indicators that have been interpreted to include Nevada nutrient standards for nitrogen and phosphorus in streams (e.g., Tunnel Creek and Bonpland Creek). The 2011 Threshold Evaluation (TRPA 2012a) identifies the status for this threshold indicator reporting category as "somewhat worse than target" with a trend that is showing "moderate improvement."

Historical surface water quality data for Tunnel Creek and Bonpland Creek was not located as part of this environmental assessment, and presumably an extensive water quality data set has never been collected for these two streams. Relative to the information presented in Exhibit 4.3-2, the Tunnel Creek and Bonpland Creek watersheds would be classified as "non-urban watersheds" based on the limited amount of existing development. A GIS analysis estimates existing impervious coverage to be 1.1 percent of the total Tunnel Creek watershed area and less than 0.1 percent of the total Bonpland Creek watershed area. Given the relatively low amount of development in these watersheds, the concentration of pollutants and nutrients generated within these watersheds, and present within the stream systems, is likely to be quite low.

The concentrations of pollutants in stormwater runoff that may be discharged to these streams as a result of either action alternative would be minimized by the Temporary and Permanent BMP Plans described in the "List of Design Features" at the beginning of this document. Therefore, implementation of the action alternatives would not contribute to the nonattainment of this threshold.

SURFACE RUNOFF AND GROUNDWATER

The Surface Runoff and Groundwater Threshold Indicator Reporting Categories include numerical standards for specific water quality constituents that set maximum allowable concentrations for discharges to surface water or infiltration into soils. According to the 2011 Threshold Evaluation (TRPA 2012a), the status for these water quality thresholds is the following:

- Surface Runoff: Status = Unknown; Trend = Unknown; and
- Groundwater: Status = Unknown; Trend = Unknown.

The concentrations of pollutants in stormwater runoff discharged to surface waters or infiltrated in soils would be minimized by the Temporary and Permanent BMP Plans. Furthermore, the anticipated quality of runoff from the shared-use path, as explained above under the heading "Impervious Surface Area and Runoff" for the action alternatives, would be relatively clean and would meet TRPA, NDEP, and Washoe County standards for surface runoff and groundwater and, therefore, implementation of the action alternatives would not result in a significant contribution to the nonattainment of these thresholds.

OTHER LAKES

The Other Lakes Threshold Indicator Reporting Category includes numerical standards for specific water quality constituents that set maximum allowable concentrations for lakes in the Region other than Lake Tahoe. The 2011 Threshold Evaluation (TRPA 2012a) indentifies the status for this threshold as "unknown" with a trend that is also "unknown." The project area parallels SR 28 along the east shore of Lake Tahoe from Incline Village to Sand Harbor and would not affect other lakes within the Tahoe Region and therefore would not affect this water quality threshold.

4.4 BIOLOGICAL RESOURCES

This section describes the existing biological resources within the project area and evaluates the potential effects of the project alternatives on them. The analysis herein is based on incorporation of all TTD-proposed design features (Design Features BIO-1 through BIO-19) into both action alternatives (Alternatives A and B). Biological resources include common vegetation and habitat types, sensitive plant communities, and special-status plant and animal species. A summary of applicable regulations under which the action alternatives would be implemented is provided in Appendix C.

As described in Section 4.1, "Approach to Environmental Analysis," relevant federal laws and executive orders are discussed at the beginning of each resource section. Compliance with the Federal Endangered Species Act, the Migratory Bird Treaty Act, Executive Order 13112 (Invasive Species) and Executive Order 12962 (Recreational Fisheries) is discussed below. Executive Order 11990 (Protection of Wetlands) is addressed in Section 4.3, "Hydrology and Water Quality."

Federal Endangered Species Act. The U.S. Fish and Wildlife Service (USFWS) has authority over projects that may result in take of a species listed as threatened or endangered under the Federal Endangered Species Act of 1973 (ESA; Title 50, Part 17 of the CFR), as amended under the USFWS Mitigation Policy of 1956 (Title 16, Chapter 35, Section 1531 of the United States Code [16 USC 1531 et seq.]), as well as those species that are designated by Region 1 of USFWS as species of concern. The ESA defines *take* as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (Public Law 93-205, as amended by Section 3 of Public Law 107-136 [16 USC 1532]). USFWS has also interpreted the definition of "harm" to include habitat modification that could result in take. If a project is likely to result in take of a federally-listed species, either an incidental take permit under ESA Section 10(a) or a federal interagency consultation under ESA Section 7 is required before the take may occur. Such a permit typically requires various types of mitigation to compensate for or to minimize a take.

Because no USFWS-listed endangered or threatened species are known or expected to occur in the project area, there would be no effects to threatened or endangered species and take authorization would not be needed under ESA.

Migratory Bird Treaty Act of 1918, as Amended. The original 1918 statute, known as the Migratory Bird Treaty Act (MBTA, 16 USC 703-712), implemented the 1916 Convention between the U.S. and Great Basin (for Canada) for the protection of migratory birds. Later amendments implemented treaties between the U.S. and Mexico, Japan, and the Soviet Union (now Russia). Specific provisions in the statute include the establishment of a federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention … for the protection of migratory birds … or any part, nest, egg of any such bird" (16 USC 703). The current list of species protected by the MBTA comprises several hundred species, essentially all native birds. (The current list of species protected by the MBTA can be found in 50 CFR 10.13.)

As required by Design Feature BIO-19 (as described in the "List of Design Features" at the beginning of this EA), a preconstruction survey would be conducted to identify whether any nests are present and avoid removal of active nests.

Executive Order 13112 (Invasive Species). Executive Order 13112 requires federal agencies to identify actions that may affect the status of invasive species, prevent the introduction of invasive species to the extent practicable and permitted by law, and only authorize actions that could promote the introduction or spread of invasive species if the agency determines that (1) the benefits of the action outweigh the potential harm caused by invasive species, and (2) all feasible and prudent measures to minimize the risk of harm would be taken.

The section below covers botanical resources and noxious weeds. The proposed design features include several actions that would minimize risk of new weed introductions, as described in the "List of Design Features" at the beginning of this document. Therefore, the North Demonstration Project would comply with Executive Order 13112.

Executive Order 12962 (Recreational Fisheries). Federal agencies shall, to the extent permitted by law and where practicable, improve the quantity, function, sustainable productivity, and distribution of aquatic resources for increased recreational fishing opportunities by, among other things, evaluating the effects of federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries.

The effects on fish habitat associated with the North Demonstration Project are evaluated herein and have been found to be extremely limited. Direct effects on fish productivity and the quality of the recreational fisheries would be negligible. The project would, therefore, comply with Executive Order 12962.

Section 4.4.1, "Affected Environment," discusses special-status plant and animal species evaluated in this analysis. Those plant and animal species not expected to occur, or with a low probability to occur (because of a lack of suitable habitat, recent focused surveys that did not detect the species, or lack of other occurrence records) are not addressed further in this analysis. Implementation of this project is not expected to affect those species.

4.4.1 AFFECTED ENVIRONMENT

To evaluate and describe the presence or absence and quality of common and sensitive biological resources in the project area, map land cover types, and identify potential effects of project implementation on those resources, project biologists reviewed several existing data sources providing information for the project area (see sources under "Sensitive Biological Resources," below) and conducted field surveys of the site.

On July 19, 20, 21, and 27, 2011, a wildlife biologist and botanist conducted field studies to verify information collected during the data review and augment that information with current project-specific survey results. Field studies consisted of reconnaissance-level surveys and habitat assessments for terrestrial wildlife and aquatic resources, focused botanical surveys for special-status plants and noxious weeds, and land cover/vegetation mapping. During the reconnaissance field survey and habitat assessment for wildlife and aquatic resources, information about land cover type, hydrology, vegetation stand composition and structure, and habitat suitability for special-status species within the project area was recorded. Botanical surveys focused on special-status species with potential habitat in the project area, although none were expected to occur. Vegetation communities were also mapped and classified during the botanical surveys. The special-status plant and noxious weed surveys were conducted during the appropriate summer blooming period for all sensitive plants with potential habitat in the area. Botanical surveys were floristic in nature and attempts were made to identify all plants encountered in the field. During the surveys, the biologists walked the project area (including each alignment alternative and option), following the flagged centerline and moving throughout the area of potential effect (APE), as needed. Special emphasis was placed in the riparian corridors of the two stream courses of Tunnel Creek and Bonpland Creek and an intermittent drainage feature southeast of Memorial Point.

On September 26, 2013, an additional field evaluation of Tunnel Creek and Bonpland Creek, the two aquatic habitat features within the project area, was conducted to evaluate potential for fish passage from Lake Tahoe to the project area and habitat suitability for Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*).

The following sections summarize the biological resources in the study area that are most relevant to the significance criteria and impact analysis for the project, which are provided in Section 4.4.2, "Environmental Consequences and Recommended Mitigation Measures."

VEGETATION COMMUNITIES AND HABITATS IN THE PROJECT AREA

Huckleberry oak chaparral and Jeffrey pine forest are the predominant native habitat types in the study area. Montane riparian communities are present along Tunnel Creek and Bonpland Creek. Exhibits 4.4-1 through 4.4-3 show the location and extent of vegetation communities and habitat types in the study area. Table 4.4-1 provides a brief description and the acreage of each habitat type mapped in the study area for each alternative and option. Classification and community descriptions generally follow *A Manual of California Vegetation* (Sawyer et al. 2009) and California Wildlife Habitat Relationships (CDFW 2012), with modifications to account for local variability and communities.

SENSITIVE BIOLOGICAL RESOURCES

In this analysis, sensitive biological resources include those species and biological communities that receive special protection through the TRPA Code, the ESA, Section 404 of the CWA, the USFS *Forest Service Manual,* or local plans, policies, and regulations; or that are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Sensitive biological resources evaluated as part of this analysis include special-status species and sensitive natural communities. These resources are addressed in the following sections.

SPECIAL-STATUS SPECIES

Special-status species include plants and animals that are legally protected or otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. In this document, special-status species are defined as species that are:

- listed or proposed for listing as threatened or endangered under ESA,
- designated as candidates for listing as threatened or endangered under ESA,
- designated as a sensitive, special interest, or threshold species by TRPA,
- designated as sensitive by the USFS Regional Forester in Region 5,
- designated as protected in Nevada and further classified as endangered or sensitive under Section 501 of the Nevada Revised Statutes and Section 503 of the Nevada Administrative Code,
- plant species on Nevada's state list of fully protected species of native flora (Nevada Administrative Code, Section 527.010), also known as the Critically Endangered Species List,
- designated as an At-Risk Species by the Nevada Natural Heritage Program (NNHP),
- considered by the NNHP as a "watch list" or threatened plant species, or
- identified as a species of conservation priority in the Nevada Wildlife Action Plan (NDOW 2013).

Preliminary lists of special-status plant and animal species known or with potential to occur in the study area were initially developed based on a review of the following:

- a list of taxa designated by TRPA as sensitive or special interest/threshold species (TRPA 2002);

- TRPA and USFS, LTBMU GIS data;
- a list and GIS data of special-status species known to occur within a 5-mile radius of the project site obtained from the NNHP (NNHP 2011);
- a list of special-status species tracked by the NNHP (NNHP 2010);
- a list of federally endangered, threatened, or candidate species that may be affected by projects in the Tahoe Basin (USFWS 2012).

SPECIAL-STATUS PLANTS

The initial data review preliminarily identified 29 special-status plant species that could occur in the project vicinity. None of the special-status plant species considered in this analysis is expected to occur in the project area, due to existing disturbance, habitat modification, marginal habitat conditions for those species, or lack of recent occurrence records in the region. Additionally, no special-status plant species were observed during surveys of the project area for botanical resources. Table J-1 in Appendix J summarizes the regulatory status, habitat associations, and potential for occurrence of each of the special-status plant species evaluated during this analysis.

SPECIAL-STATUS WILDLIFE

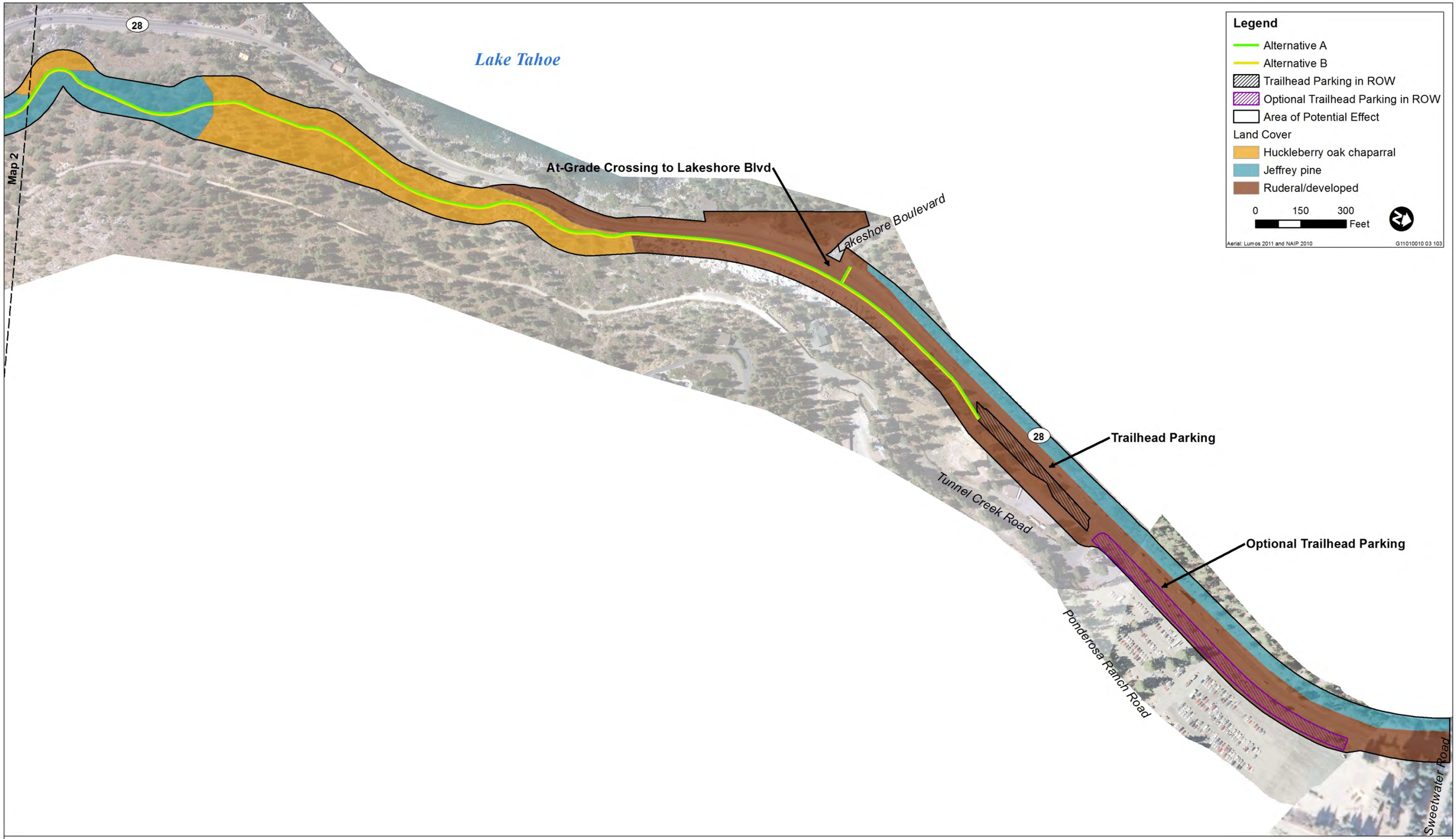
The initial data review preliminarily identified 30 special-status wildlife species that could occur in the project vicinity. Two special-status species–osprey and mule deer–occur in the project area. Two other species–bald eagle and Sierra Nevada snowshoe hare–have a moderate likelihood to occasionally occur in the project area and vicinity. No other special-status wildlife species are expected to occur in the project area. This determination was based primarily on (1) the types, extent, and quality of habitats on the project site documented during the field survey; (2) the proximity of the project area to known extant occurrences of the species; and (3) the regional distribution and abundance of the species in the Tahoe Basin. Table J-2 in Appendix J summarizes the regulatory status, habitat associations, and potential for occurrence of each of the 35 special-status fish and wildlife species that was evaluated during this analysis.

Species known or with a moderate or high potential to occur in the project area are described below.

Osprey

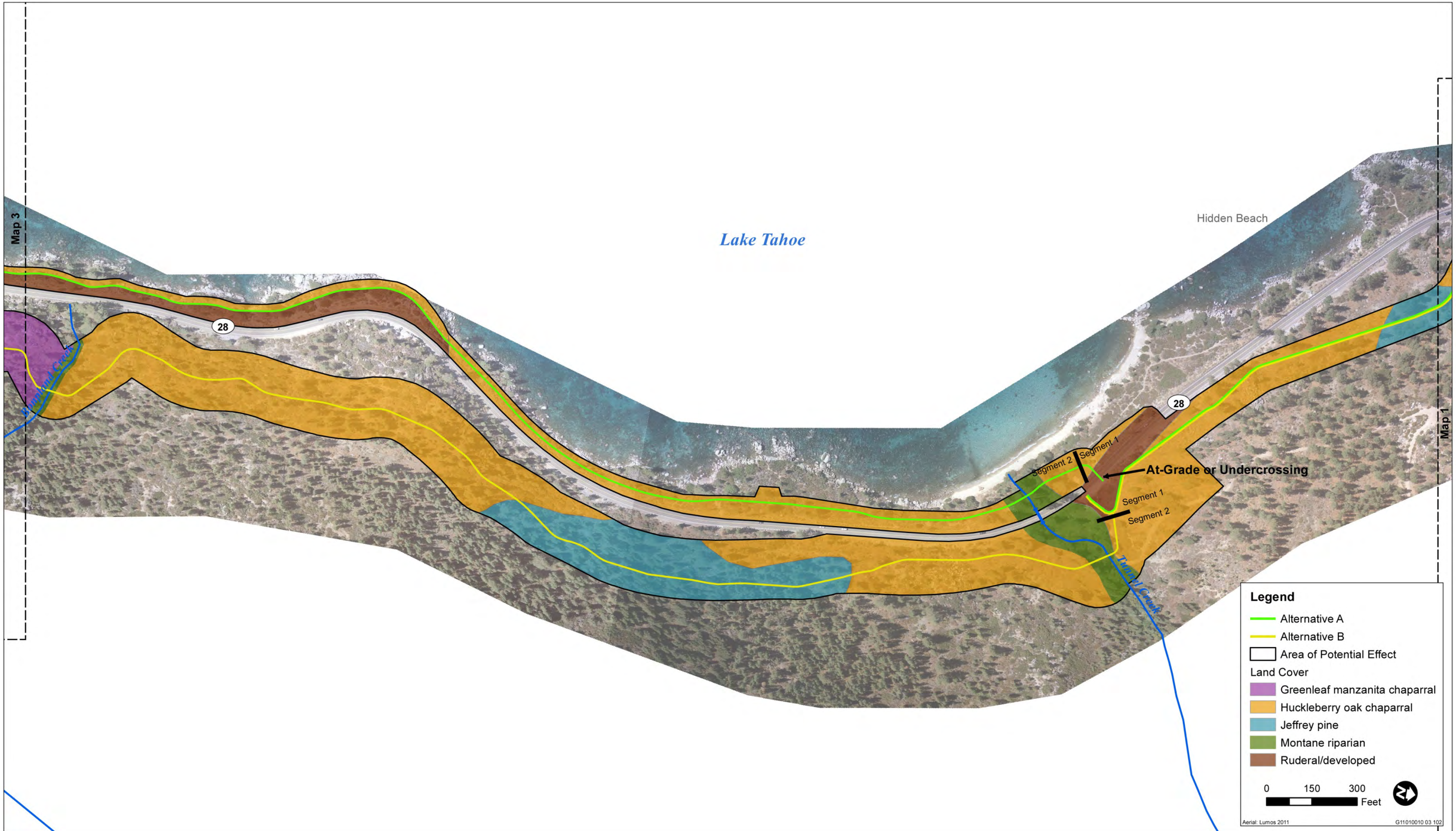
Osprey is designated by TRPA as a special-interest species. Osprey is associated with large fish-bearing waters. In the Tahoe Basin, osprey nests are distributed primarily along the northern portion of the east shore and the southern portion of the west shore of Lake Tahoe. Other osprey nests in the Tahoe Basin are located along the shorelines of smaller lakes (such as Fallen Leaf Lake) and in forest uplands up to 1.5 miles from water. Ospreys forage in Lake Tahoe as well as several other fish-bearing lakes, streams, and rivers within the Tahoe Basin.

The osprey population in the Tahoe Basin has increased over the last several years. Between 1997 and 2011, the number of active nests ranged from approximately 13 (in 1997) to 28 (in 2005 and 2011). The status of the Tahoe Basin's osprey population has been in attainment with respect to TRPA's environmental threshold carrying capacity for this species during the last five threshold evaluation periods (1991, 1996, 2001, and 2006, and 2011). The TRPA threshold standard for osprey includes maintaining a minimum of four population sites (i.e., four nests).



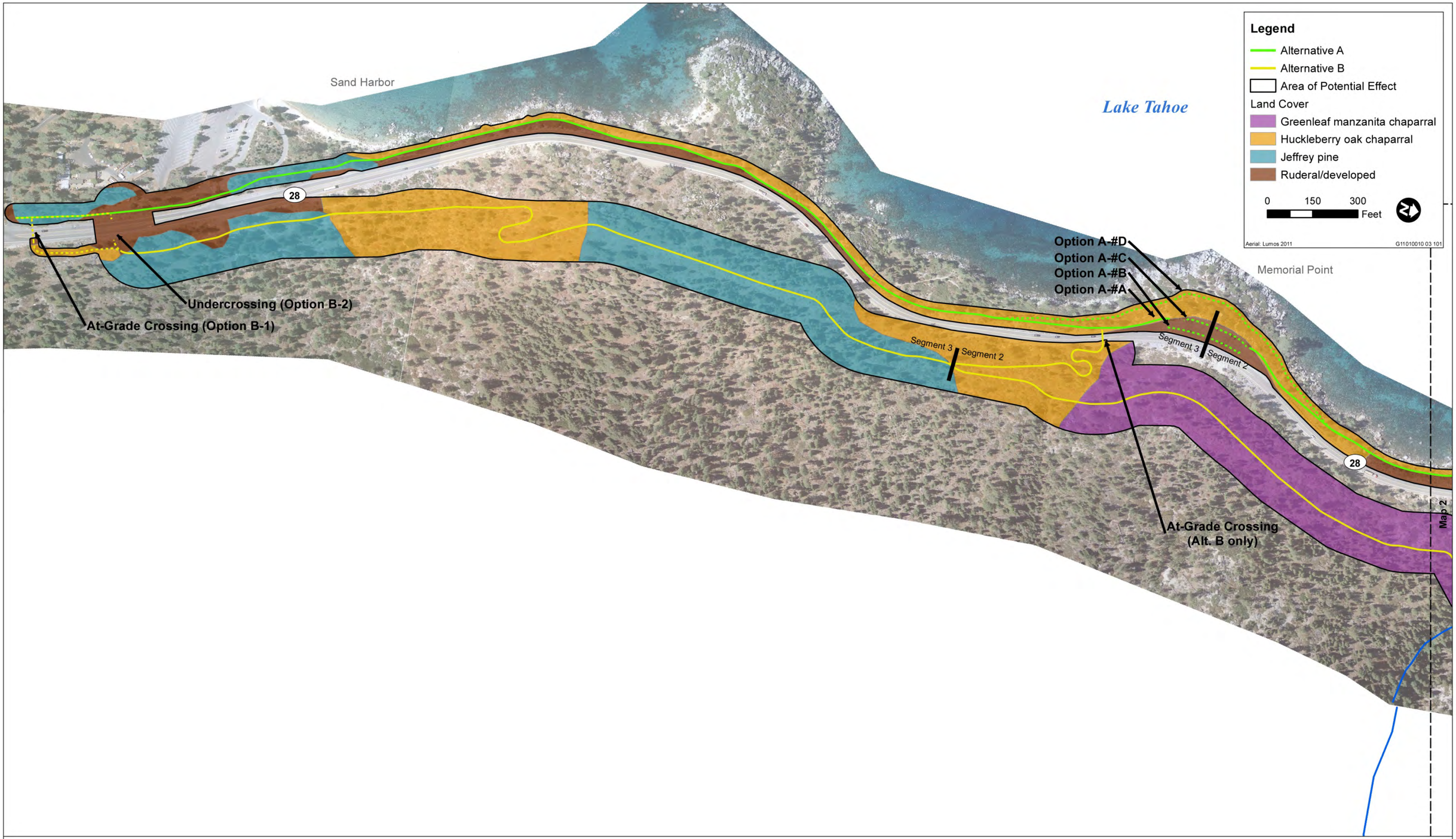
Source: Data adapted by Ascent Environmental in 2013

Exhibit 4.4-1 **Segment 1 – Vegetation Communities and Habitat Types in the Study Area**



Source: Data adapted by Ascent Environmental in 2013

Exhibit 4.4-2 **Segments 1 and 2 – Vegetation Communities and Habitat Types in the Study Area**



Source: Data adapted by Ascent Environmental in 2013

Exhibit 4.4-3 **Segments 2 and 3 – Vegetation Communities and Habitat Types in the Study Area**

Table 4.4-1 Vegetation Community/Habitat Types Mapped in the Study Area for Each Action Alternative and Segment Option

Vegetation Community/ Habitat Type	Summary Description	Acres Mapped in the Study Area							
		Alternative A				Alternative B			
		Options A-1A, 1B, 1C	Option A-1D	Options A-2A, 2B, 2C	Option A2-D	Option B-1A	Option B-1B	Option B-2A	Option B-2B
Jeffrey Pine	The only mapped forested vegetation type in the study area is Jeffrey Pine Forest. According to the California Manual of Vegetation (Sawyer et al 2009), Jeffrey pine must have >5% absolute cover in the tree canopy and white fir and lodgepole pine must have ≤ 5% absolute cover. The relative cover of Jeffrey pine in the tree canopy may be >50% or similar to other conifer species including white fir. The canopy may be open to continuous and shrubs are generally sparse to intermittent. Within the study area, tree canopy cover in the vegetation mapped as Jeffrey pine Forest ranged between 15-30%, comprised of Jeffrey pine and white fir with a few intermittent incense cedar. Many trees are <24 inches diameter at breast height (dbh) and the smaller size classes are generally either white fir or incense cedar. The shrub layer is variable in cover and dominance of different species but includes the same suite of species as the huckleberry oak chaparral (see below). The forb layer is very sparse with <5% except in lopcalized infestations of cheatgrass (*Bromus tectorum*) where cover may be >50%.	6.0	6.0	6.0	6.0	17.4	17.9	17.4	17.9
Huckleberry Oak Chaparral	In huckleberry oak chaparral, huckleberry oak (*Quercus vaccinifolia*) has >30% relative cover in the shrub canopy and may be dominant or co-dominant with other shrub species including greenleaf manzanita (*Arctostaphylos patula*). Emergent conifer trees may be present at low cover. Soils are skeletal over many substrates and usually rocky. This is the most common of the montane chaparral types occurring throughout the central and northern Sierra Nevada. In the study area, huckleberry oak and green leaf manzanita are often co-dominant. Bitterbrush (*Purshia tridentata*) is a prevalent species that sometimes appears dominant. Other common shrubs include mahalla mat (*Ceanothus prostratus*), bittercherry (*Prunus emarginata*) and rabbitbrush (*Ericameria nauseosus* formerly *Chrysothamnus*). Shrub cover may range from 25-75%. The forb layer is very sparse (<5%) and often confined to sandy or gravelly openings. Some common forbs include *Boechera holboellii* (formerly *Arabis*), *Phacelia heterophylla* ssp. *virgata, P. mutabilis*, and *Gayophytum diffusa*.	17.4	18.1	17.4	18.1	29.6	29.5	29.6	29.5
Greenleaf manzanita chaparral	Greenleaf manzanita (*Arctostaphylos patula*) must have >60% relative cover in the shrub canopy for vegetation to be classified as greenleaf manzanita chaparral. However, it may be dominant or co-dominant with other shrub species. Emergent conifer trees may be present at low cover and soils are shallow and typically derived from grantitic or volcanic substrates. In the study area mapped as greenleaf manzanita chaparral, the shrub height is about 1 meter (m) tall and absolute cover is >50%. Greenleaf manzanita is dominant with a lower shrub layer of mahalla mat, but little huckleberry oak is present. The tree canopy is very open, and some trees are large (>24”) and several live oak (*Q. chrysolepis*) are present. The forb layer is very sparse with <5% cover. Common forbs include *Boechera holboellii* (formerly Arabis) and *Mentzelia dispersa.*	-	-	-	-	7.3	7.3	7.3	7.3

Table 4.4-1 Vegetation Community/Habitat Types Mapped in the Study Area for Each Action Alternative and Segment Option

Vegetation Community/ Habitat Type	Summary Description	Acres Mapped in the Study Area							
		Alternative A				Alternative B			
		Options A-1A, 1B, 1C	Option A-1D	Options A-2A, 2B, 2C	Option A2-D	Option B-1A	Option B-1B	Option B-2A	Option B-2B
Montane Riparian	There are two applicable montane riparian shrub alliances that could be applied to the streamzone vegetation surrounding Bonpland and Tunnel Creek in the study area. In Lemmon's Willow Thickets, *Salix lemmonii* has >5% absolute cover and >50% relative cover in the shrub canopy. In Mountain Alder Thickets, *Alnus incana spp. tenuifolia* has >25% absolute cover in the small tree layer where it usually dominates or >5% absolute cover in the shrub layer where it is dominant or co-dominant with other species, including lemmon's willow. Emergent conifers and willow may be present in both types. In the study area around Bonpland Creek, the riparian vegetation zone is only about 15 m wide around the centerline of Alternative B. Mountain alder is dominant in that area but willows (*S. lemmonii* and *S. geyeriana*) become more dominant downslope near the mouth so overall the vegetation is most simply classified as montane riparian. Some very large conifers are present at Bonpland Creek near the centerline of Alternative B including a large Jefrrey pine and a nearby sugarpine (*P. lambertiana*). Canopy cover is >60% along the stream. Common understory species include thimbleberry (*Rubus parviflora)*, brackenfern (*Pteridium aquilinum var. Pubescens)*, and dogbane (*Apocynum androsaemifolium)*. Moss was also present on the rocks in the stream channel. The stream zone around Tunnel Creek is also around 15 m wide on the east side of the centerline of Alternative B, but it flares much more widely to over 50 m wide at SR 28 and the creek mouth. The riparian vegetation is much more diverse than at Bonpland Creek due in part to a much greater amount of disturbance. Canopy cover is variable. The streambank has limited exposed soil and a high amount of thatch from pine needles and the forb layer. Non-native species are present including prickly lettuce (*Lactuca serriola)*, tall wheatgrass (*Elymus ponticus*) and cheatgrass.	0.5	0.4	0.5	0.4	1.3	1.3	1.3	1.3
Ruderal/ Developed	Ruderal vegetation is present along the SR 28 corridor. The west side of SR 28 is characterized by the presence of tall wheatgrass and rabbitbrush along the guardrails and then a steep slope with bare eroding soil or sparse shrub cover. Bare areas and user trails may have dense concentrations of cheatgrass. At the entrances to Sand Harbor there is a sparse Jeffrey pine overstory, but the understory vegetation is primarily composed of ruderal species including a dense planting of tall wheatgrass and scattered white sweet clover (*Melilotus albus*). The parking area at Memorial Point is mostly paved. The entrance to the road at Tunnel Creek is very disturbed with many non-natives and cheatgrass. The SR 28 corridor north of the Map 3 matchline has mainly ruderal species like pineapple weed (*Matricaria discoidea*).	16.2	16.2	16.2	16.2	13.4	13.7	13.4	13.7
Total		**40.1**	**40.7**	**40.1**	**40.7**	**69.0**	**69.7**	**69.0**	**69.7**

Ospreys nest in and adjacent to the study area are near Sand Harbor and Memorial Point, on the east (uphill) side of SR 28. Nevada Department of Wildlife (NDOW) biologists have been monitoring osprey nests on the east side of the Tahoe Basin for several years, including those in the study area. The osprey pairs nesting near Memorial Point are among the most productive in the Tahoe Basin (Catalano, pers. comm., 2008). The number of nesting pairs and active nests in this area vary annually, and the locations of nest sites have changed over the last several years. For example, some trees in the study area along Lake Tahoe on the west side of SR 28 that were historically used by osprey for nesting have fallen down in recent years.

Presently, the study area includes two osprey nest sites on the east side of SR 28 along the Alternative B shared-use path alignment–one nest ("MMP08") is located within approximately 200 feet of and directly above the proposed shared-use path and at-grade crossing at Memorial Point; the second nest ("MMP05") is located within approximately 10 feet of and directly above the proposed path alignment just north of Bonpland Creek (Exhibits 4.4-4 and 4.4-5). TRPA maintains a nondegradation standard within a 0.25-mile buffer zone ("disturbance zone") around each osprey nest site. The project study area and proposed shared-use path alignments cross portions of the TRPA-designated disturbance zones around these two nests. Recognizing the 0.25-mile radius of the buffer and the location of the nests, the buffer zone of these two nests cover the full width of the forest slope from the lake shore to a point approximately 1,800 feet east of the lake and up to approximately 6,800 feet elevation above the lake (as illustrated in Exhibit 4.4-5). A third nest ("SAH09") is located southwest of the study area near Sand Harbor; although the nest site is not within the study area, its 0.25-mile disturbance zone includes a small portion of the southern terminus of the project area along SR 28. Exhibits 4.4-4 and 4.4-5 show the location of these nests and TRPA disturbance zones in relation to the proposed Alternative A and B shared-use path alignments. Nests "MMP08" and "SAH09" have been active consistently during the last several breeding seasons, including 2013.

Mule Deer and Sierra Nevada Snowshoe Hare

Mule deer is designated as a special interest species by TRPA. Both the Carson River and Loyalton-Truckee deer herds occur in the Tahoe Basin during snow-free months. The Tahoe Basin includes fawning and summer range for these herds. Mule deer in the Tahoe Basin are elevational migrants, leaving the Tahoe Basin during winter months for the Carson Valley or other low-elevation areas free of deep snow. Mule deer numbers in the Tahoe Basin are relatively low; and over the last 10 years, migratory habitat loss and fragmentation has increased throughout the herds' range as a result of residential development, and population sizes have been declining. The loss of wintering habitat and reduced access to wintering areas may be the primary causes of these population declines (TRPA 2002). Mule deer primarily use early to mid-successional stages of several vegetation types, including riparian, meadow, and forest with moderate understory shrub cover. Important habitat requirements for mule deer fawning include undisturbed meadow and riparian areas that provide hiding cover and forage, and availability of open water. Early to mid-successional forests are used primarily as summer range.

The project area is at the edge of the range for the Loyalton-Truckee and Carson River mule deer herds. Mule deer may occasionally migrate through or forage in the project area. Deer sign (scat) was observed in the study area during project reconnaissance surveys. Deer are not expected to use the project area for fawning due to the existing high levels of human disturbance from recreational development and major roads, and limited availability of undisturbed riparian or other shrub habitats near open water in the project area.

Sierra Nevada snowshoe hare is identified as a species of conservation priority in the Nevada Wildlife Action Plan (NDOW 2013). In the Sierra Nevada, snowshoe hare occurs in boreal zones, typically inhabiting riparian and meadow communities with dense thickets of deciduous trees and shrubs such as willows and alders; this species also uses dense stands of young conifers and chaparral patches. Snowshoe hares typically do not dig or occupy burrows; rather, they use scrapes or shallow depressions on the ground. Snowshoe hare has been documented east of the project area, in the Spooner Backcountry Management Area of Lake Tahoe Nevada State Park, including one record within 0.2 mile of the project area (NNHP 2011). The project area includes chaparral and riparian habitat that could support snowshoe hare, although the suitability of these areas where the project would be constructed is limited by vegetation structure and existing levels of human disturbance.

Bald Eagle

Bald Eagle is designated by TRPA as a special-interest species. Bald eagle is also federally protected by USFWS under the Bald and Golden Eagle Protection Act. Bald eagles require large bodies of water or free-flowing streams with abundant fish and adjacent snags or other perches for hunting. They generally nest in undisturbed coniferous forests, usually within 1 mile of a lake or reservoir. Bald eagle habitat typically consists of several components, most significantly, proximity to large bodies of water and wetlands associated with lakes, mature coniferous stands with presence of dominant trees, and adequate protection from human disturbance. Bald eagles are known to nest in two areas of the Tahoe Basin–Marlette Lake and Emerald Bay. Bald eagle does not nest within the study area. Bald eagles could occasionally perch in the study area and forage in Lake Tahoe adjacent to the study area throughout the year, particularly during winter when the abundance of bald eagles in the Tahoe Basin is greatest.

Sensitive Habitats

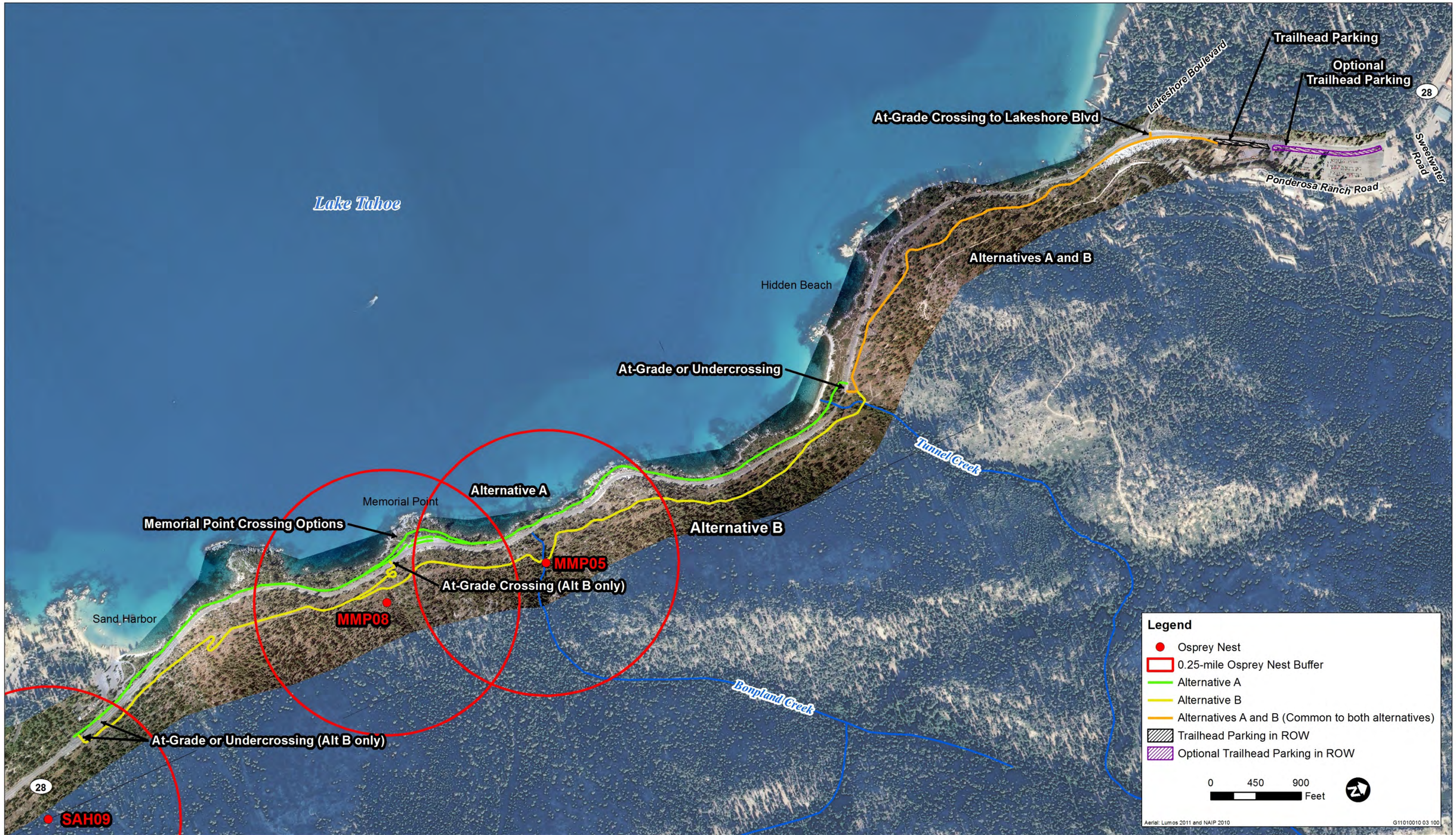
Sensitive habitats include those that are of special concern to resource agencies or are afforded specific consideration through the TRPA Goals and Policies and TRPA Code, Section 404 of the CWA, and other applicable regulations. Sensitive natural habitats may be of special concern to these agencies and conservation organizations for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat to common and special-status species.

Sensitive habitats in the study area include montane riparian communities described in Table 4.4-1. These habitats are also designated as SEZ, which is one of two TRPA-adopted threshold standards for soil conservation (see Section 4.5, “Earth Resources”). SEZ is a term used specifically in the Tahoe Basin to describe perennial, intermittent and ephemeral streams; wet meadows, marshes, and other wetlands; riparian areas; and other areas expressing the presence of surface and groundwater through its biological and physical characteristics. Additionally, habitats consisting of deciduous trees, wetlands, and meadows (i.e., riparian, wetland, and meadow habitats) are designated by TRPA as habitats of special significance. The TRPA threshold standard for habitats of special significance is nondegradation while providing for opportunities to increase the acreage of these habitats.

A draft delineation of waters of the U.S., including wetlands, was completed for the project in 2012 (NCE 2012, Appendix I). Delineated features likely to be considered jurisdictional by the USACE include 0.30 acre of perennial stream at Tunnel Creek and Bonpland Creek, and 0.02 acre of intermittent drainage located just south of Memorial Point. The potential jurisdictional acreage of Tunnel Creek and Bonpland Creek are included within the montane riparian community acreage. However, the intermittent drainage is not included as part of the montane riparian community type.

NOXIOUS WEEDS

Cheatgrass is an invasive species and noxious weed that was documented in the study area during project surveys. Cheatgrass was found in disturbed areas and openings along most of the study area. Cheatgrass is also continuously distributed along SR 28. Other noxious weed species not documented in the study area but known to occur in the region include sulphur cinquefoil, bull thistle, Canada thistle, Russian thistle, Klamath weed, lens-podded hoary cress, and woolly mullein.



Source: Data adapted by Ascent Environmental in 2013

Exhibit 4.4-4 **Overview of Osprey Nest Sites and TRPA Disturbance Zones in the Study Area**

Source: Data adapted by Ascent Environmental in 2013

Exhibit 4.4-5

Close-up of Osprey Nest Sites and TRPA Disturbance Zones in the Study Area Near Memorial Point

4.4.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

TRPA CRITERIA

Based on TRPA's Initial Environmental Checklist, effects related to vegetation, wildlife, and aquatic resources were evaluated based on whether an alternative would:

- result in substantial removal of riparian vegetation or other vegetation associated with critical wildlife habitat, either through direct removal or indirect lowering of the groundwater table;
- introduce new vegetation that would require excessive fertilizer or water, or would provide a barrier to the normal replenishment of existing species;
- introduce new species of animals into the Region, or result in a barrier to the migration or movement of wildlife;
- result in a substantial change in the diversity or distribution of species, or number of any species of plants or wildlife;
- substantially reduce the numbers of any unique, rare, or endangered species of plants or wildlife;
- result in a change in the natural functioning of a late seral or old-growth ecosystem; or
- result in deterioration of existing fish or wildlife habitat quantity or quality.

TRPA has established environmental thresholds, goals, and policies for vegetation, wildlife, and fisheries resources in several categories: common vegetation; uncommon plant communities; sensitive plants; late seral/old-growth ecosystems; special-interest, threatened, and endangered wildlife; protected wildlife habitat; and fish habitat. The goals and policies are designed to achieve and maintain adopted environmental threshold carrying capacities, and are implemented through the TRPA Code. A combination of relevant TRPA thresholds, goals, policies, and ordinances for these resources were also used to analyze potential effects of an alternative on biological resources.

NEPA CRITERIA

Under NEPA, the context and intensity of an alternative's potential effect on biological resources were evaluated based on whether the alternative would:

- substantially reduce the size, continuity, or integrity of a plant community through temporary or permanent removal, interruption of natural processes that support it, and/or disturbance that favors the establishment of invasive nonnative species; or
- substantially reduce the size, continuity, or integrity of wildlife or fish habitat, or result in unnatural changes in the abundance, diversity, or distribution of wildlife or fish species; substantially affect, either directly or through habitat modifications, any species listed as threatened or endangered under the ESA or other special-status species.

METHODS AND ASSUMPTIONS

Potential effects associated with the project can be classified as either temporary or permanent. Temporary impacts generally include effects associated with construction activities, including the use of construction vehicles, storage of construction materials and equipment, or vegetation removal in areas that would be restored once construction is complete. Permanent impacts generally include effects associated with permanent tree or other vegetation removal for establishment of the shared-use path and stabilization of disturbed areas using rock or engineered slope protection.

As described previously in the "Affected Environment" discussion, a wildlife biologist and botanist with expertise in Tahoe Basin natural resources reviewed existing data and conducted field surveys of the study area. Prior to the field surveys, biologists reviewed existing data to preliminarily identify special-status species and other sensitive resources known or with potential to occur in or near the study area. A wildlife biologist and botanist conducted the field studies to verify information collected during the data review and augment that information with current project-specific survey results.

The routes of Alternatives A and B have been aligned at the design precision level of preliminary engineering, i.e., laid out in a scaled manner with areas of landscape disturbance and grading defined considering topography, slope conditions, large rock outcrop areas, and existing vegetation. Habitat effects and tree loss are estimated based on the areas of landscape disturbance. As the precision of design advances to a level of detailed engineering and construction documents, the precise alignment and boundaries of landscape disturbance would be refined. Therefore, the final alignment can be adjusted during this design development process to minimize habitat effects and tree loss. The results reported in this document provide accurate and reasonable estimates for purposes of environmental impact assessment and selection of an alternative.

EFFECTS ON VEGETATION RESOURCES AND SENSITIVE HABITATS

ALTERNATIVES A AND B

Direct and Indirect Effects

Common Vegetation Loss and Tree Removal

Portions of each alternative shared-use path alignment and associated facilities (e.g., bridges, walls, undercrossings, at-grade crossings, and trailhead parking facilities) would be constructed or expanded in areas supporting Jeffrey pine forest, huckleberry oak chaparral, greenleaf manzanita chaparral, and montane riparian communities, and ruderal/developed areas. Table 4.4-2 summarizes permanent and temporary effects on common vegetation for each action alternative. Permanent effect is based on the assumed permanent shared-use path corridor and other facility footprints that would remain following project construction. Additional temporary effect is the maximum amount, in addition to what would remain as a permanent footprint following project construction, assumed for temporary construction. These impacts are considered temporary because these areas would be restored and revegetated following construction.

As shown in Table 4.4-3, Alternative A would remove an estimated 128 trees that are less than 24 inches dbh, 45 of which are greater than 14 inches dbh (i.e., the tree size that would require a TRPA permit for removal). The trees to be removed would primarily include Jeffrey pine and white fir trees. Four trees larger than 24 inches dbh would be removed, one of which may be retained by adjustments to the path during latter phases of detailed design development. Alternative B would remove an estimated 271 trees that are smaller than 24 inches dbh, 112 of which are greater than 14 inches dbh (Table 4.4-3). The trees to be removed would primarily include pines and firs. Nine trees over 24 inches dbh would be removed for the Alternative B alignment. Alternative B would also require the removal of portions of existing willow and alder stands concentrated near Tunnel Creek and Bonpland Creek.

With limited exceptions, Section 61.1.4, "Old Growth Enhancement Protections," of the TRPA Code prohibits the removal of trees greater than 24 and 30 inches dbh in eastside and westside forest types, respectively. Most of the North Demonstration Project area has been classified as chaparral communities that also support abundant trees, but also includes some eastside forest (Jeffrey pine) communities. Section 61.1.4 allows private landowners to remove trees larger than these size classes provided the landowner follows one of the planning processes identified in that section of the Code. However, Trees larger than 30 inches dbh in westside forest types and larger than 24 inches dbh in eastside forest types may be removed for large public utilities projects, if

Table 4.4-2 Acreage of Permanent and Additional Temporary Disturbance of Vegetation Communities/Habitat Types for Each Action Alternative and Segment Option

Vegetation Community/ Habitat Type	Alternative A								Alternative B							
	Options A-1A, 1B, 1C		Option A-1D		Options A-2A, 2B, 2C		Option A2-D		Option B-1A		Option B-1B		Option B-2A		Option B-2B	
	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.
Jeffrey Pine	0.7	0.3	0.7	0.3	0.7	0.3	0.7	0.3	2.0	0.6	2.1	0.6	2.0	0.6	2.1	0.6
Huckleberry Oak Chaparral	3.9	1.0	4.2	1.1	3.9	1.0	4.2	1.1	4.2	1.0	4.1	1.0	4.2	1.0	4.1	1.0
Greenleaf manzanita chaparral	-	-	-	-	-	-	-	-	1.0	0.1	1.0	0.1	1.0	0.1	1.0	0.1
Montane Riparian	0.1	0.1	0.04	0.1	0.1	0.1	0.04	0.1	-	0.04	-	0.04	-	0.04	-	0.04
Total Native Habitats	*4.7*	*1.4*	*4.9*	*1.5*	*4.7*	*1.4*	*4.9*	*1.5*	*7.2*	*1.7*	*7.2*	*1.7*	*7.2*	*1.7*	*7.2*	*1.7*
Ruderal/Developed	1.9	2.0	1.9	2.0	2.0	1.9	2.0	1.9	0.8	1.7	0.8	1.7	0.8	1.7	0.9	1.7

Source: Adapted by Ascent Environmental 2013

Table 4.4-3 Number and Size Classes of Trees Removed by Alternative

Alternative/Segment	Diameter at Beast Height (dbh) in Inches (")			Total Trees Removed
	6 to 14"	14 to 24"	>24"	
Alternative A				
Segment 1	26	26	3	55
Segment 2	27	14	1	42
Segment 3	30	5	0	35
Alternative A Total	83	45	4	132
Alternative B[1]				
Segment 1	26	26	3	55
Segment 2	109	65	6	180
Segment 3	24	21	0	45
Alternative B Total	159	112	9	280

[1] If the Memorial Point Connector was not constructed as part of Alternative B, then nine trees fewer would be removed; six of the trees would be 14 inches dbh or greater.

Source: Lumos & Associates 2012; Adapted by Ascent Environmental 2013

TRPA finds there is no other reasonable alternative. Additionally, Section 61.1.4(A)(7) of the TRPA Code states that, for EIP Projects, "Trees larger than 30 inches dbh in the westside forest types and larger than 24 inches dbh in eastside forest types may be removed when it is demonstrated that the removal is necessary for the activity." The North Demonstration Project is an EIP Project (EIP No. 03.01.02.17) and is subject to this Code provision and allowance, so eastside forest trees greater than 24 inches dbh in the APE may be removed after demonstrating that removal is necessary.

If a project would result in "substantial tree removal" as defined by TRPA, a tree removal or harvest plan must be prepared by a qualified forester. The required elements of this plan, and TRPA's review process for tree removal plans, are described in Section 61.1.5 of the TRPA Code. Substantial tree removal is defined in Section 61.1.8 of the TRPA Code as activities on project areas of 3 acres or more and proposing the removal of more than 100 live trees 14 inches dbh or larger. Alternative A would require removal of an estimated 45 trees over 14 inches dbh. Alternative B would require removal of over twice as many of this size class of trees as Alternative A, i.e., an estimated 112 trees. Similarly, Alternative B would result in over twice as many trees over 24 inches dbh compared to Alternative A (four trees for Alternative A and nine trees for Alternative B).

Because Alternative B would result in the removal of approximately 121 trees 14 inches dbh or larger, it would be considered a substantial tree removal effect under the TRPA Code. A tree removal and harvest plan would be prepared and submitted to TRPA, if Alternative B is selected. Implementation of Alternative A would not result in substantial tree removal. As stated in Section 61.1.5 of the TPRA Code, "the plan shall set forth prescriptions for tree removal, water quality protection, vegetation protection, residual stocking levels, reforestation, slash disposal, fire protection, and other appropriate considerations. The plan, as approved by TRPA, shall become a part of the project and prescriptions contained in the plan shall be conditions of approval."

Although tree and other vegetation removal would occur under Alternatives A and B, the effect areas for forest vegetation types (Jeffrey pine) summarized in Table 4.4-2 do not indicate the amount of forest overstory/canopy removed or converted; the values in Table 4.4-2 represent temporary and permanent effect areas within the forest understory as a result of shared-use path construction (i.e., the ground-level footprint). Because tree removal within these forest vegetation types would be minimized or avoided in some locations by constructing the path between or around individual trees where feasible, the loss or conversion of forest canopy would be substantially less than the understory disturbance values depicted in Table 4.4-2.

As described in the "List of Design Features" at the beginning of this EA, Design Feature BIO-5 would ensure that alignments under each action alternative would minimize removal of live trees to the extent practicable, particularly trees greater than or equal to 24 inches dbh. In addition, Design Feature BIO-1 minimizes ground and vegetation disturbance to avoid loss of native vegetation. While common vegetation would be permanently and/or temporarily removed or disturbed during construction of Alternative A or Alternative B, as quantified and summarized in Table 4.4-2, the loss of this amount of common habitat from the region would not substantially reduce the quantity or quality of these habitats in the region and would not result in a change in diversity or distribution of species in the region or result in a substantial change in local population numbers of any common plant or tree species or any unique, rare, or endangered species of plants or animals. Permanent and temporary loss and disturbance that would occur under the action alternatives would not substantially reduce the size, continuity, or integrity of any common vegetation community or habitat type or interrupt the natural processes that support common vegetation communities in the project area. Integration of the design features into project design would require that vegetation removal is minimized to the extent feasible and that habitat is restored to pre-project conditions in temporary construction areas.

Introduction and Spread of Invasive Weeds

Cheatgrass is an invasive species and noxious weed that was documented in the study area during project surveys. Cheatgrass was found in disturbed areas and openings along most of the study area. Cheatgrass is also continuously distributed along SR 28. Other noxious weed species not documented in the study area but known

to occur in the region include sulphur cinquefoil, bull thistle, Canada thistle, Russian thistle, Klamath weed, lens-podded hoary cress, and woolly mullein.

Construction of a new shared-use path and associated facilities could create a new pathway for the introduction and spread of noxious weeds into areas that are not presently infested. Construction would involve temporary ground-disturbing activities in native vegetation types, which would temporarily create areas of open ground that could be colonized by nonnative, invasive weed species from inside or outside of the project area. Invasive weeds and other species could inadvertently be introduced or spread in the project area during grading and construction activities, if nearby source populations passively colonize disturbed ground, or if construction and personnel equipment is transported to the site from an infested area. Over the long-term, bicyclists and walkers using the shared-use path could inadvertently pick up noxious weed seeds as they pass through infested areas and transport them to presently uninfested areas.

Design features have been incorporated to substantially reduce the potential adverse effects of noxious weeds and are discussed in detail in the "List of Design Features" at the beginning of this EA (Design Features BIO-8 through BIO-10). Design features include general measures to control the introduction and spread of noxious weed and invasive plant species during construction and restore native vegetation in areas disturbed by construction. Project design features require development of an invasive plant/noxious weed monitoring and adaptive management plan that would be implemented for a minimum of 3 years following construction of the shared-use path. Implementing these design features would eliminate or substantially reduce the potential to introduce and spread noxious weeds and invasive plant species as a result of project implementation.

Disturbances to Stream Environment Zones and Waters of the U.S.

Field mapping of TRPA regulated land capability was competed by TTD consultants in 2013 (Cardno ENTRIX 2013). As part of this process, SEZ boundaries within the project area were determined and mapped. The estimated area of SEZ affected by construction of the shared-use path was calculated for each alignment and option using this information. Quantification of SEZ effects may be additionally refined as the project design is further developed and the shared-use path alignment is finalized.

Table 4.4-4 summarizes estimated permanent and temporary effects on SEZs for each action alternative. Permanent effects would primarily involve conversion of common vegetation to a shared-use path, wall, or bridge facilities. The area of permanent effect includes the following:

- all disturbed, non-path, bridge, or wall areas with slopes greater than 30 percent assumed to be stabilized with rock or engineered slope protection;
- downhill walls (mechanically stabilized earth or cement) with a 1 foot width (after 2 foot shoulder);
- uphill rockery walls, 4 foot average width plus 2 feet of backfill;
- shared-use path footprint and shoulder, 14 foot width;
- bridge piers, 50 foot spacing with 16 square feet of permanent disturbance per pier; and
- bridge abutments/wing walls, 50 square feet per bridge.

Additional temporary effect is the maximum amount, in addition to what would remain as a permanent footprint following the project construction, assumed for temporary construction. This is based on assuming a 25 to 35-foot-wide construction corridor along the shared-use path alignment, with the addition of temporary staging and contractor turn-around areas, minus the area of permanent effect described above. The width of construction disturbance varies with the steepness of the cross slope as shown in Table 3-3 in Chapter 3, "Alternatives."

Table 4.4-4 Summary of Estimated Effect to SEZs and Jurisdictional Waters for Alternatives A and B		
Alternative/Option	Permanent Effect (Acres)	Additional Temporary Effect (Acres)
A-1A	0.06	0.06
A-1B	0.06	0.06
A-1C	0.06	0.06
A-1D	0.05	0.07
A-2A	0.06	0.06
A-2B	0.06	0.06
A-2C	0.06	0.06
A-2D	0.05	0.07
B-1A	--	0.04
B-1B	--	0.04
B-2A	--	0.04
B-2B	--	0.04
Source: Cardno ENTRIX 2013		

Both alternatives would cross Tunnel Creek and Bonpland Creek and the associated SEZs. Alternative A would cross Tunnel Creek with a 40-foot-long, pre-fabricated bridge structure. Alternative B would cross Tunnel Creek farther upstream and would require a 95-foot-long, pre-fabricated bridge structure. Bonpland Creek would be crossed by a 40-foot-long, prefabricated bridge structure for Alternative A, and an 80-foot-long, prefabricated bridge structure for Alternative B. Alternative A would result in temporary and permanent effects to SEZs resulting from bridge construction and the placement of bridge abutments, wing-walls, and piers. Alternative B would result in temporary SEZ effects resulting from bridge construction. Because the Alternative B bridges are wider than the SEZ areas of Tunnel Creek and Bonpland Creek, no permanent SEZ effects would occur under this alternative. Design features require minimizing effects to SEZs by crossing perpendicular to SEZs at narrow points (Design Feature BIO-13) and implementing BMPs (Design Features BMP-1 through BMP-12). Equipment and materials storage and staging for construction of the crossings would be restricted to designated contractor staging areas (Design Feature BMP-1). Riparian/stream/SEZ and soil restoration actions would be developed as mitigation for potential effects on SEZs, where appropriate (Design Feature BIO-13). These actions could include restoring roads and trails inside or adjacent to SEZs, and rerouting these features to less sensitive areas to provide a net benefit to SEZs; implementing or upgrading long-term BMPs and revegetating disturbed areas within riparian zones; controlling conifer encroachment into SEZs; and restoring stream beds and banks to promote additional riparian habitat establishment and increased hydrologic function. Appropriate restoration actions, methods, locations, and amount would be developed based on the types and magnitude of project effects on SEZs, as well as site specific and watershed-level opportunities and constraints for SEZ enhancement. Disturbance to SEZs would be fully mitigated or restored at 150 percent of the amount disturbed in accordance with Sections 30.5.1.B (5) and 30.5.2.B of the TRPA Code (Design Feature BIO-13).

A draft wetland delineation was conducted in 2012 which identified jurisdictional waters of the U.S. within the project area (NCE 2012). This report did not identify any jurisdictional wetlands within the project area; however, both Tunnel Creek and Bonpland Creek were identified as jurisdictional perennial streams. In addition, a drainage near Memorial Point was identified as a jurisdictional intermittent drainage. Because the bridges at Tunnel Creek and Bonpland Creeks would completely span the streams, and because no construction activities would take place within the stream, there would be no temporary or permanent effects to perennial streams.

Both Alternative A and B would cross the intermittent drainage near Memorial Point, which could affect up to 0.02 acre of this jurisdictional water feature.

The wetland delineation will be submitted to the USACE for verification, and the final shared-use path would be designed to avoid waters of the U.S. to the maximum extent practicable (Design Feature BIO-11). An application for a Section 404 of the CWA permit would be submitted during subsequent project permitting and a mitigation plan would be developed to ensure no net loss of acreage or function. TTD would comply with all conditions of the Section 404 permit. Any disturbed areas designated as jurisdictional waters of the U.S. would be restored to pre-project conditions following construction, except where permanent structures (e.g., bridge footings) preclude such restoration (Design Feature BIO-12).

With implementation of the design features, project implementation would not substantially affect SEZs or potential jurisdictional waters of the U.S. Additionally, effects on SEZs and potential waters of the U.S. would be mitigated through the CWA permitting process and enhancing or restoring SEZ habitat as needed.

Cumulative Effects

With the resource-protection design features incorporated into the project, implementation of the North Demonstration Project, either Alternative A or B, in combination with other related projects in the vicinity (see Table 4.1-1 for a complete list of projects considered in this analysis), would not result in an adverse cumulative effect on native vegetation communities, SEZs, wetland habitats and waters of the U.S., sensitive plant species, or noxious weeds. Related projects that would potentially result in impacts to native vegetation communities, SEZs, wetland habitats and potential waters of the U.S., or noxious weeds that are similar to those described for the proposed project (Alternative A or B) include projects such as future phases of the Nevada Stateline-to-Stateline Bikeway, Incline Fuels Reduction and Healthy Forests Restoration Project, the Boulder Bay Project, and upgrades to the IVGID sewer export line and pump station. Additionally, all related projects listed in Table 4.1-1 would potentially result in impacts to sensitive plant species or noxious weeds that are similar in nature to the proposed project. However, these related projects, as well as the North Demonstration Project, would individually be required to avoid, minimize, and/or compensate for impacts to vegetation communities, including SEZs, wetlands, sensitive species or noxious weeds. In particular the North Demonstration Project would be required to minimize the loss of native species by restricting ground and vegetation disturbances to within the marked construction corridor, revegetation with appropriate native planting mixes, and retaining live trees greater or equal to 24 inches dbh; minimizing impacts to rare or sensitive plant communities, where feasible, by avoiding path alignments in SEZs and other low capability lands; and minimizing the potential for spread of invasive weeds by implementing standard weed-free construction BMPs (e.g., use of certified weed free materials, equipment washing, etc.). Therefore, the North Demonstration Project would not result in adverse cumulative effects on vegetation communities and related resources.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed. Under this alternative, no shared-use path or associated facilities would be constructed within the project area. Therefore, under Alternative C, there would be no change in existing vegetation conditions within the project area. Alternative C would have no effects on common vegetation, sensitive plant species, SEZs and jurisdictional waters, or noxious weeds, since it would not change habitats in the project area in any way.

Cumulative Effects

Alternative C would not contribute to cumulative effects on vegetation resources because it would not cause any change in terrestrial or aquatic habitat conditions.

EFFECTS ON WILDLIFE RESOURCES

ALTERNATIVES A AND B

Direct and Indirect Effects

Common Wildlife

Several common resident and migratory wildlife species use habitats in the project area for foraging, shelter, and breeding. Common species in the project area include black bear (*Ursus americanus*), Douglas' squirrel (*Tamiasciurus douglasii*), raccoon (*Procyon lotor*), coyote (*Canis latrans*), and several bird and other wildlife species. Effects of each alternative on vegetation communities and associated wildlife habitats are quantified and discussed in "Vegetation," "Direct and Indirect Effects," above. Some regionally and locally common wildlife species would be subject to direct effects including construction disturbance and a minor loss and fragmentation of habitat, and indirect effects such as increased recreation disturbance.

Regionally and locally common wildlife species could be disturbed over the long term by operation and use of the shared-use path and related facilities, through increased and regular human intrusion in portions of the study area where trails and roads do not presently exist. Increased recreational use of these areas would further reduce the habitat value for wildlife.

Much of the shared-use path and associated facilities under Alternative A or B would be located within or near areas that presently support roads or trails, high levels of recreation and other use, and otherwise disturbed or degraded habitats. Therefore, the proposed shared-use path is not expected to substantially increase disturbance levels in the project area above existing levels for most common species. These common species are relatively abundant locally and regionally, and are not limited by the availability of habitat in the region. Habitat in the project area is not considered critical or limiting to the presence or viability of common wildlife populations in the region. Implementing Alternative A or B would not cause wildlife populations to decrease below self-sustaining levels, or result in a change in species diversity.

Special-Status Wildlife

Nesting Osprey and TRPA Disturbance Zones

The study area includes two osprey nest sites on the east side of SR 28 along the proposed Alternative B shared-use path alignment–one nest ("MMP08") is located within approximately 200 feet of and directly above the proposed shared-use path and at-grade crossing at Memorial Point; the second nest ("MMP05") is located within approximately 10 feet of and directly above the proposed path alignment just north of Bonpland Creek (Exhibits 4.4-4 and 4.4-5). TRPA maintains a nondegradation standard within a 0.25-mile buffer zone ("disturbance zone") around each osprey nest site. The project study area and proposed shared-use path alignments cross the TRPA-designated disturbance buffer zones around these two nests. Because the disturbance buffer zones cover the forest from the lake shore to 1,800 feet east and upslope of the lake shore, it would not be feasible for the alignment of either shared-use path alternative (or any other adjusted alignment within the study area corridor) to avoid crossing at least a portion of both zones. Therefore, adjustments to the alignment of the shared-use path in the vicinity of the osprey nests could not feasibly eliminate the encroachment into the buffer zones of either nest.

A third nest ("SAH09") is located southwest of the study area near Sand Harbor; although the nest site is not within the study area, its 0.25-mile disturbance zone includes a small portion of the southern terminus of the project area along SR 28. Because of the distance of the path alignment to the nest and the long-standing presence of other human disturbance closer to the nest, the nesting success at nest SAH09 would not be adversely affected by the construction and operation of the shared-use path.

Exhibits 4.4-4 and 4.4-5 show the location of these nests and TRPA disturbance zones in relation to the proposed Alternative A and Alternative B alignments. Nests “MMP08” and “SAH09” have been active consistently during the last several breeding seasons, including 2013. Table 4.4-5 shows the linear feet of proposed shared-use path within osprey disturbance zones under each alternative and option; Table 4.4-6 shows the acreage of permanent and additional temporary disturbance within osprey disturbance zones.

In the short term, project construction activities could temporarily disturb ospreys and/or their habitat located within the study area. Temporary disturbances resulting from noise and increased human activity within osprey habitat could affect foraging, movement, and reproductive activity. Such disturbances may cause individuals or breeding pairs to temporarily leave an area or abandon nests to avoid the disturbance. However, these potential impacts would be avoided through implementation of Design Feature BIO-15. This measure requires conducting preconstruction surveys for nesting ospreys, and implementing an appropriate exclusionary buffer and limited operating period to avoid or minimize effects of construction-related disturbance on nesting activity and breeding success. Recognizing that the expected nesting period would be from April to August, project engineers have indicated that it is feasible to construct those portions of the path within the buffer zone during the limited timeframe that would avoid disturbance of the nests during construction (such as after the end of the nesting period and before the onset of the wet season). It is likely that the limitations on construction period could cause construction activities to extend over multiple construction seasons. This is more likely the case with Alternative B than Alternative A, given that the permitting agencies may waive the construction restrictions in locations across the highway from actual nest sites.

Construction and operation of Alternative A would not bring pedestrians or bicyclists in closer contact to the Memorial Point osprey nests during the sensitive breeding season, because it would be located west of SR 28. Osprey have continued to use both nests MMP05 and MMP08 east of SR 28 despite the long-standing human activity in the area, including numerous motor vehicles, pedestrians, and bicyclists located closer to the nests than the alignment of Alternative A. Because the osprey using these nests have demonstrated acclimation to this existing vehicle traffic and recreation use along SR 28 in this area (including a network of existing unimproved trails west of SR 28 below the Memorial Point rest area), locating a new shared-use path adjacent to and on the west side of SR 28 in this area would not degrade osprey habitat measurably above existing levels and would not cause additional disturbance to use of the nests. Therefore, potential impacts to the Memorial Point osprey nests (MMP05 and MMP08) as a result of constructing and operating Alternative A would not be substantial. Additionally, Design Feature BIO-15 requires installing interpretive and protective signage within osprey disturbance zones along Alternative A, which could result in some benefits to osprey under Alternative A, by concentrating existing patterns of human use and disturbances along unimproved footpaths in these areas into a smaller and more predictable footprint. Design Feature BIO-2 also includes path design and other measures to minimize off-path disturbance.

Over the long term, under Alternative B, constructing a new shared-use path on the east side of SR 28 near the Memorial Point osprey nests would bring recreationists in close contact to active nests during the sensitive breeding season, and increase the level of disturbance to nesting pairs. The sensitivity of ospreys to human disturbance varies considerably by geographic region, the type and context of disturbance, and the specific individual or pair of birds. Some birds or pairs tolerate human disturbances more than others (Poole et al. 2002); this is apparent at Lake Tahoe, where some pairs nest very close to frequent disturbances (e.g., Memorial Point), while others nest in remote locations (TRPA 2002). The highest density and abundance of osprey nests in the Tahoe Basin are located at Emerald Bay, which receives some of the highest levels of recreation use (including power boating) in the area during the osprey breeding season.

Table 4.4-5 Linear Feet of Proposed Shared-Use Path Within Osprey Disturbance Zones for Each Action Alternative and Segment Option

Nest ID	Alternative A				Alternative B							
	Options A-1A, 1B, 1C	Option A-1D	Options A-2A, 2B, 2C	Option A2-D	Option B-1A w/MP	Option B-1A wo/MP	Option B-1B w/MP	Option B-1B wo/MP	Option B-2A w/MP	Option B-2A wo/MP	Option B-2B w/MP	Option B-2B wo/MP
MMP05	2,414	2,976	2,414	2,976	2,817	2,817	2,817	2,817	2,817	2,817	2,817	2,817
MMP08	2,517	3,253	2,517	3,253	3,449	2,737	3,449	2,737	3,449	2,737	3,449	2,737
SAH09	521	521	521	521	603	603	618	618	603	603	618	618
Total[1]	**4,742**	**5,939**	**4,742**	**5,939**	**5,843**	**5,131**	**5,931**	**5,219**	**5,843**	**5,131**	**5,931**	**5,224**

[1]TRPA osprey disturbance zones around nests MMP05 and MMP08 overlap with each other. Total values shown here are for the merged boundaries of disturbance zones to avoid double-counting the areas of overlap; therefore, column values do not sum to the total in some cases.
Source: Adapted by Ascent Environmental 2013

Table 4.4-6 Acreage of Permanent and Additional Temporary Disturbance Within Osprey Disturbance Zones for Each Action Alternative and Segment Option

Nest ID	Alternative A								Alternative B															
	Options A-1A, 1B, 1C		Option A-1D		Options A-2A, 2B, 2C		Option A2-D		Option B-1A w/MP		Option B-1A wo/MP		Option B-1B w/MP		Option B-1B wo/MP		Option B-2A w/MP		Option B-2A wo/MP		Option B-2B w/MP		Option B-2B wo/MP	
	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.
MMP05	1.3	0.3	1.5	0.3	1.3	0.3	1.5	0.3	1.6	0.3	1.6	0.3	1.6	0.3	1.6	0.3	1.6	0.3	1.6	0.3	1.6	0.3	1.6	0.3
MMP08	1.3	0.2	1.6	0.4	1.3	0.2	1.6	0.4	1.9	0.4	1.6	0.3	1.9	0.4	1.6	0.3	1.9	0.4	1.6	0.3	1.9	0.4	1.6	0.3
SAH09	0.3	0.1	0.3	0.1	0.3	0.1	0.3	0.1	0.2	0.1	0.2	0.1	0.3	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.3	0.2	0.3	0.2
Total[1]	**2.4**	**0.6**	**2.7**	**0.7**	**2.4**	**0.6**	**2.7**	**0.7**	**3.0**	**0.8**	**2.7**	**0.7**	**3.1**	**0.8**	**2.8**	**0.7**	**3.0**	**0.8**	**2.7**	**0.7**	**3.1**	**0.8**	**2.8**	**0.7**

[1]TRPA osprey disturbance zones around nests MMP05 and MMP08 overlap with each other. Total values shown here are for the merged boundaries of disturbance zones to avoid double-counting the areas of overlap; therefore, column values do not sum to the total in some cases.
Source: Adapted by Ascent Environmental 2013

In general, ospreys can habituate to human activity nearby. Throughout the species' range, its nesting distribution generally confirms a level of tolerance to relatively high levels of disturbance associated with highways and other roads, boat traffic, neighborhoods, and buildings. The type, duration, timing, and predictability of disturbances appear important to birds at specific locations. Pairs that select and initially nest near human activities typically develop a high tolerance to disturbance; however, birds that select areas away from human infrastructure may be sensitive to human activities (Poole et al. 2002). In the Tahoe Basin, where ospreys have established nests near roads, constant vehicle traffic does not appear to disturb individuals. However, humans approaching nests on foot often disturb and elicit agitation calls from ospreys. Also, breeding ospreys are likely most sensitive during the incubation to early nestling stages (approximately April to August). Human disturbances during this period can cause adults to abandon nests for long periods of time, resulting in mortality of embryos and nestlings (Van Daele and Van Daele 1982, Levenson and Koplin 1984).

As proposed, Alternative B would be located directly below nests MMP05 and MMP08; it would also be clearly visible to (i.e., not screened from) birds using these nests. Whether this increase in disturbance would cause abandonment or nest failure at those locations is unknown. The Memorial Point osprey pairs are clearly habituated to existing traffic and other disturbances within and west of the SR 28 corridor, and have selected their nest sites under those existing conditions. However, it is reasonable to assume that human activities associated with a new shared-use path in such close proximity to the nests, particularly during the incubation and nesting stages, could disturb nesting birds, reduce nest success, or cause abandonment by introducing new disturbance sources at the nest during this sensitive period (Van Daele and Van Daele 1982, Levenson and Koplin 1984). Therefore, Alternative B would have a substantial potential to cause adverse effects on the success of both osprey nests next to this route (MMP05 and MMP08).

Although construction and operation of Alternative B would likely disturb the Memorial Point osprey nests, effects on the overall Tahoe Basin osprey population may not be substantial. The osprey population has been increasing and the number of active nests (28) has been consistently well above TRPA's threshold standard for the species (four nests). Therefore, disturbances to these nest sites would not conflict with TRPA threshold attainment for osprey. However, regardless of the biological significance of population-level effects on osprey, TRPA maintains a nondegradation standard for habitat within osprey disturbance zones. For areas outside of TRPA urban plan areas, Section 62.4.1, "Disturbance Zones," of the TRPA Code states that the habitat in TRPA-designated disturbance zones around osprey nests "shall not be manipulated in any manner unless such manipulation is necessary to enhance the quality of the habitat." Section 62.4.3, "Environmental Documents," states that "applicants for projects within disturbance zones shall submit with their applications appropriate environmental documentation prepared by a biologist that includes specific recommendations for avoiding significant adverse impacts to the … species."

To meet TRPA Code requirements, it was determined that habitat enhancement for osprey must be a project objective and would be required to compensate for significant effects of Alternative B and improve osprey habitat conditions overall in the Tahoe Basin. Design Feature BIO-15 would be implemented to meet this goal. Although implementation of Alternative A is not expected to significantly affect osprey, TRPA would similarly require habitat enhancement as a project objective, because project construction and operation would occur within osprey disturbance zones. Design Feature BIO-15 requires that an Osprey Habitat Enhancement and Management Plan will be developed and implemented. The plan would include objectives, measures, and techniques to enhance osprey habitat within the affected TRPA osprey disturbance zones and/or other osprey disturbance zones in the Tahoe Basin where enhancement opportunities could be maximized.

The primary approaches identified to enhance nesting habitat for osprey include active long-term snag recruitment in appropriate locations and reducing existing disturbance levels in appropriate locations near nests. Potential techniques for snag recruitment over time include vegetation management to promote large tree and snag development, and creating snags by topping tall trees.

Reducing existing disturbance levels in appropriate locations near nests could include decommissioning, rerouting, or otherwise managing certain roads and trails within disturbance zones. These actions would first require an assessment and prioritization of all disturbance zones, and specific location within those zones, to determine those that could be enhanced effectively, and where benefits of enhancement would be maximized. Ascent Environmental has prepared some initial GIS analyses and habitat models to identify possible management zones to concentrate osprey conservation actions, based on distance to water bodies, proximity to Lake Tahoe shorezone fish habitat types, current and historic osprey nest distribution and concentrations, and other variables. Additionally, an analysis of road and trail density within current and historic osprey buffer zones identified approximately 45 miles of road and 32 miles of trail within osprey buffer zones; some of these could be candidates for restoration or management. A performance standard of the plan would be no net reduction in candidate osprey nest sites within the designated management areas. This would be accomplished by identifying snag recruitment locations and implementing management actions to provide nest sites. Other specific elements of the Osprey Habitat Enhancement and Management Plan, such as the locations, techniques, and amount of required enhancement would be developed in close coordination with TRPA and NDOW. With the implementation of the Osprey Habitat Enhancement and Management Plan, the effect of the construction and operation of Alternative B would be reduced to less than significant.

As described in Design Feature BIO-15, if Alternative A is selected, coordination with TRPA will occur to determine whether an Osprey Habitat Enhancement and Management Plan will be required to meet Code requirements, or whether more focused or limited measures to achieve habitat enhancement as part of the project could be implemented.

Bald Eagle

Bald eagle does not nest in the study area, and the study area is not located within a TRPA-designated bald eagle threshold site or disturbance zone. The closest bald eagle nesting area is located at Marlette Lake. Bald eagle is not expected to regularly use habitat in the study area; however, larger Lake Tahoe near the study area provides foraging habitat during winter and summer.

Nesting or foraging habitat for bald eagle would not be removed or altered as a result of implementing Alternative A or B. Impacts to bald eagles may occur as a result of tree removal near Lake Tahoe or by changed movement and foraging patterns caused by construction-related activities. Individuals present in the project area would likely relocate temporarily to avoid construction areas. If bald eagles use the study area or immediate vicinity for foraging, project construction could temporarily disturb their foraging activities. However, because of the presence of existing recreation use, vehicle travel, vegetation/forest management, and other activities throughout the study area, the existing disturbance level is relatively high; additional construction-related disturbance would not substantially affect the foraging patterns of bald eagle. Also, abundant and suitable foraging habitat is available in other areas nearby. In addition, during the winter months, when bald eagles are most abundant in the project region, construction activity would not occur. Therefore, potential effects of project construction on bald eagle breeding activities, nest sites and young, or reproductive success are not expected. Project implementation would not substantially affect the distribution, breeding productivity, or local population size of bald eagle.

Mule Deer

The project area is at the edge of the range for the Loyalton-Truckee and Carson River mule deer herds. Deer sign (scat) was observed in the study area during project reconnaissance surveys. However, as described previously, deer are not expected to use the project area for fawning. Mule deer may occasionally migrate through or forage in the project area; if so, short-term construction and increased recreation levels associated with Alternative A or B could infrequently disturb individuals. However, because the project area is not expected to support fawning mule deer, and Alternative A or B would not substantially affect the composition, structure, or abundance of potential mule deer foraging or migratory habitat, any potential effects of Alternative A or B on mule deer individuals would be minor.

Sierra Nevada Snowshoe Hare

Montane riparian, chaparral, and conifer forest habitats in the project area provide potential habitat for snowshoe hare, and the species has been documented within 0.2 mile east of the project area (NNHP 2011). In the short term, activities related to construction of Alternative A or B could temporarily disturb snowshoe hare and/or its habitat within the project area. If snowshoe hare uses the project area for foraging or breeding, increased noise, human activities, or other factors associated with construction activities (e.g., vegetation removal, clearing, and excavation) could temporarily disturb foraging, movement, or reproductive activities and temporarily displace individuals. Also, individuals could alter their behavior by avoiding the project area during construction. In addition, mortality or injury could occur as a result of collision with construction equipment, although individuals are mobile and would likely avoid active construction areas.

Sierra Nevada snowshoe hare is a potential prey species for raptors and mammal predators (e.g., coyote). Vegetation removal during construction could reduce cover and increase predation risk for this species, if it uses habitats along the new trail corridor. However, because the trail would be constructed mostly within areas where trees and shrubs are common and dense, and abundant potential habitat and cover are available adjacent to the project area, no substantial increases in predation risk are anticipated.

In addition to potential temporary effects on individuals described above, vegetation removal for establishment of the shared-use path and stabilization of disturbed areas using rock or engineered slope protection would also result in permanent loss or disturbance of potential habitat for snowshoe hare. Areas where temporary habitat loss and disturbance would occur would be revegetated as part of the proposed project.

With integration of the design features to minimize impacts to SEZs, riparian habitats, and common vegetation (described previously for those resources), Alternative A or B would not be expected to substantially affect Sierra Nevada snowshoe hare. Although the proposed project would result in habitat loss and could adversely affect individuals locally, the magnitude and intensity of potential adverse effects are not expected to substantially affect habitat availability in the region, or affect the species' distribution, breeding productivity, local population size, or regional population.

Cumulative Effects

With the resource-protection design features incorporated into the project, implementation of the North Demonstration Project, either Alternative A or B, in combination with other related projects in the vicinity (see Table 4.1-1 for a complete list of projects considered in this analysis) is not expected to result in adverse cumulative effects on the composition, structure, or abundance of suitable habitat for common or special-status wildlife species. Potential direct or indirect effects resulting from implementation of Alternative A or B, as discussed above, are not likely to affect the viability of any species. Additionally, the proposed design features would be implemented to reduce, avoid, and/or compensate for potential construction-related disturbances to species most likely to be affected by these activities; these measures are specifically referenced in the above discussions of direct and indirect effects of Alternative A and B on wildlife. Related projects that could cumulatively impact wildlife resources affected by the proposed project (e.g., all fuels reduction, restoration, trails, and development projects) would be required to avoid, minimize, and/or compensate for adverse impacts to wildlife resources. Therefore, the project is not expected to result in adverse cumulative effects on wildlife resources.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed. Under this alternative, no shared-use path or associated facilities would be constructed within the project area. Therefore, under Alternative C, there would be no change in existing wildlife habitat conditions within the project area. Alternative C would have no new effects on wildlife resources, because it would not change

habitats in the project area in any way. Design Feature BIO-15, which includes preparing an Osprey Habitat Enhancement and Management Plan and/or other enhancement measures, would not be implemented under Alternative C.

Cumulative Effects

Alternative C would not contribute to cumulative effects on wildlife resources because it would not cause any change in habitat conditions.

4.4.3 CONSEQUENCES FOR TRPA ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

FISH HABITAT

This section summarizes the effects of implementing each of the action alternatives on the environmental thresholds established by TRPA for fish habitat. The Indicator Reporting Categories and associated Threshold Standards related to biological resources, including Fish Habitat, are summarized in Appendix C, Regulatory Background Information. Four fish habitat Indicator Reporting Categories have been established by TRPA:

- Lake Habitat,
- Stream Habitat,
- Instream Flows, and
- Lahontan Cutthroat Trout.

LAKE HABITAT

The Threshold Standard for the Lake Habitat Indicator Reporting Category is to apply a nondegradation standard to fish habitat in Lake Tahoe and achieve the equivalent of 5,948 total acres of excellent (prime) habitat. The current status of this Indicator Reporting Category is attainment with the Threshold Standard. Implementing the action alternatives would not affect Lake Tahoe or change fish habitat conditions in the lake; therefore, implementing any of the action alternatives would not affect attainment of this Threshold Standard.

STREAM HABITAT

The Threshold Standard for the Stream Habitat Indicator Reporting Category is to “maintain 75 miles of excellent, 105 miles of good, and 38 miles of marginal stream habitat.” The current status of this Indicator Reporting Category is unknown because of lack of data (TRPA 2012a). As discussed above in Section 4.4.2, “Environmental Consequences and Mitigation Measures, implementing Alternative A or Alternative B would not significantly alter stream habitat conditions in the project area. As described in Design Features BIO-11 through BIO-13 and BMP-1 through BMP-12, any effects to stream habitat or SEZs would be minimized and fully mitigated or restored at 150 percent of the amount disturbed in areas where impacts are unavoidable (as per TRPA Code Section 30.5). Therefore, implementation of the action alternatives would not affect attainment of the Stream Habitat Threshold Standard.

INSTREAM FLOWS

The Threshold Standard for the Instream Flow Indicator Reporting Category states that “until instream flow standards are established in the Regional Plan to protect fishery values, a nondegradation standard shall apply to instream flows.” The current status of the threshold is attainment. For the same reasons described for the Stream Habitat Indicator Reporting Category, no temporary or permanent impacts to stream flows or the

quality, amount, or function of aquatic resources result from Alternative A or Alternative B. At no time would instream flow be interrupted or altered by the construction of any of the potential stream crossings. Therefore, implementation of the action alternatives would not affect the attainment status of the Instream Flow Indicator Reporting Category.

LAHONTAN CUTTHROAT TROUT

The Threshold Standard for the Lahontan Cutthroat Trout Indicator Reporting Category is to "support, in response to justifiable evidence, State and Federal efforts to reintroduce Lahontan cutthroat trout." The current status of the threshold is attainment. Implementing the action alternatives would not change habitat conditions for Lahontan cutthroat trout in the project area, or conflict with reintroduction efforts. No aquatic habitats in the project area are currently known or expected to support Lahontan cutthroat trout; and, for the same reasons described for the Lake Habitat, Stream Habitat, and Instream Flows Indicator Reporting Categories, the condition of Lake Tahoe or streams in the Tahoe Region would not be impaired. Therefore, implementing any of the action alternatives would not affect attainment of the Threshold Standard.

VEGETATION

This section summarizes the effects of implementing each of the action alternatives on the environmental thresholds established by TRPA for vegetation. Four vegetation Indicator Reporting Categories have been established by TRPA:

- Common Vegetation,
- Uncommon Plant Communities,
- Sensitive Plants, and
- Late Seral and Old Growth.

COMMON VEGETATION

The Threshold Standard for the Common Vegetation Indicator Reporting Category includes increasing plant and structural diversity of forest and other vegetation communities through appropriate management practices as measured by diversity indices of native vegetation community richness, relative abundance, and pattern.
The Common Vegetation Indicator Reporting Category includes separate standards for diversity and pattern of vegetation types and relative abundance for conifer forest, meadow and wetland, shrub, and deciduous riparian vegetation types that are applied basin-wide. The Indicator Reporting Category also applies a nondegradation Threshold Standard for native deciduous trees, wetlands, and meadows to provide for increases in riparian associations consistent with the Soil Conservation Threshold Standard.

For conifer forests, the TRPA Threshold Standard is to maintain 15–25 percent of yellow pine and red fir forests in seral stages other than mature to ensure that relatively young age classes of these forest types are represented in the Tahoe Region. TRPA's metric for this Threshold Standard is the relative proportion of tree stands dominated by small and large diameter trees in seral stages other than mature (less than 10.9 inches in diameter at breast height). The Threshold Standard for shrub vegetation is to maintain no more than 25 percent of undisturbed vegetation cover in the basin in shrub-dominated associations. For meadow, wetland, and deciduous riparian vegetation types, the Threshold Standard is to maintain at least 4 percent of each of these types in the Tahoe Region. The current status of the common vegetation threshold is nonattainment (considered worse than target) overall and for the specific indicators of: 1) proportion of red fir and yellow pine stands in small diameter size classes; and 2) relative abundance of meadow, wetland, and deciduous riparian vegetation types. The Threshold Standards for the indictors of community species richness and relative abundance of the shrub vegetation type are attainment (at or better than target condition).

Implementing the action alternatives could affect between approximately 0.7 (Alternative A, all segment options) and up to 2.1 acres (Alternative B, depending on segment option) of conifer forest (Jeffrey pine, a type of yellow pine forest) (see Table 4.4-2). Implementing any of the alternatives would not affect the attainment status of the Threshold Standards for conifer forests, because none of the alternatives would affect the overall diversity or pattern of common vegetation types throughout the Tahoe Region, or reduce the amount of yellow pine and red fir stands within seral stages other than mature and/or characterized by small size classes. Although tree and other vegetation removal would occur in Jeffrey pine forest, the number, distribution, and sizes of trees removed would not substantially affect overall canopy cover or reduce the abundance of this vegetation type on the landscape. The effect areas for forest vegetation types (Jeffrey pine) summarized in Table 4.4-2 do not indicate the amount of forest overstory/canopy removed or converted; the values in Table 4.4-2 represent temporary and permanent effect areas within the forest understory as a result of shared-use path construction (i.e., the ground-level footprint). Because tree removal within these forest vegetation types would be minimized or avoided in some locations by constructing the path between or around individual trees where feasible, the loss or conversion of forest canopy would be substantially less than the understory disturbance values depicted in Table 4.4-2.

Implementing the action alternatives would result in the permanent disturbance or removal of up to 4.2 acres (depending on segment option) of shrub-dominated vegetation communities (huckleberry oak chaparral) under Alternative A, and up to 5.2 acres (depending on segment option) under Alternative B (huckleberry oak chaparral and greenleaf manzanita chaparral) (Table 4.4-2). This would not affect the attainment status of the common vegetation Threshold Standard for shrub communities, because it would not be sufficient to change the relative proportion of shrub-dominated vegetation cover in the Tahoe Region.

Implementing the action alternatives would result in loss of up to 0.1 acre (depending on alternative and segment option; see Table 4.4-2) of deciduous riparian vegetation; no additional wetland or meadow vegetation would be removed. As discussed above, short-term construction-related effects on riparian vegetation would be avoided or substantially reduced by implementing design features incorporated into the project, and meeting the terms and conditions of permits; and any loss of riparian habitat would be compensated to achieve a no net loss of these habitat types. Therefore, implementing the project would not conflict with the Threshold Standard of maintaining at least 4 percent meadow and wetland vegetation and 4 percent deciduous riparian vegetation in the Tahoe Region. Consequently, implementing the action alternatives would not reduce the distribution, abundance, and quality of common vegetation types over the region in a manner that would affect the attainment status of the common vegetation Threshold Standard.

Uncommon Plant Communities

The Threshold Standard for the Uncommon Plant Communities Indicator Reporting Category calls for providing the nondegradation of the natural qualities of any plant community that is uncommon to the Tahoe Region or of exceptional scientific, ecological, or scenic quality. The current status of this Threshold Standard is attainment overall, with some individual locations of uncommon plant communities in nonattainment (Upper Truckee Marsh, Pope Marsh, Osgood Swamp). No uncommon plant communities are known to occur within the project area. Therefore, none of the action alternatives would contribute to non-attainment of this Threshold Standard.

Sensitive Plants

The Threshold Standard for the Sensitive Plants Indicator Reporting Category is to maintain the following minimum number of population sites for TRPA special-interest plant species: Galena Creek rockcress (*Arabis rigidissima* var. *demota*) (seven sites), long-petaled lewisia (*Lewisia longipetala*) (two sites), Cup Lake draba (*Draba asterophora* var. *macrocarpa*) (two sites), Tahoe draba (*Draba asterophora* var. *asterophora*) (five sites), and Tahoe yellow cress (*Rorippa subumbellata*) (26 sites). The current status of this threshold is attainment

overall for long-petaled lewisia, Cup Lake draba, Tahoe draba, and Tahoe yellow cress. The attainment status of the Galena Creek rockcress indicator is unknown because of insufficient information.

As described in Section 4.4.2, "Environmental Consequences and Mitigation Measures," no TRPA special-interest plant species are expected to occur in the project area, due to existing disturbance, habitat modification, marginal habitat conditions for those species, or lack of recent occurrence records in the area. Additionally, no special-status plant species were observed during surveys of the project area for botanical resources. Therefore, the action alternatives would not affect the attainment status of the Sensitive Plants Threshold Standard.

LATE SERAL AND OLD GROWTH

The Threshold Standard for the Late Seral/Old Growth Indicator Reporting Category is to attain and maintain a minimum of 55 percent by area of forested lands within the Tahoe Region in a late seral or old-growth condition, distributed across elevation zones. Forested lands within TRPA-designated urban areas are excluded in the calculations for Threshold Standard attainment. The current status of this Threshold Standard is nonattainment (considerably worse than target) overall and for each elevation zone. None of the Jeffrey pine forest in the project area is considered late seral/old growth forest. Therefore, implementing any of the action alternatives would not affect the attainment status of this Threshold Standard.

WILDLIFE HABITAT

This section summarizes the effects of implementing each of the action alternatives on the environmental thresholds established by TRPA for wildlife habitat. Two wildlife habitat Indicator Reporting Categories have been established by TRPA:

- Special Interest Species, and
- Habitats of Special Significance.

SPECIAL INTEREST SPECIES

The Threshold Standard for the Special Interest Species Indicator Reporting Category is to provide a minimum number of population sites for six TRPA special-interest wildlife taxa: northern goshawk (*Accipiter gentilis*) (12 sites), osprey (*Pandion haliaetus*) (four sites), bald eagle (*Haliaeetus leucocephalus*) (two winter sites and one nesting site), golden eagle (*Aquila chrysaetos)* (four sites), peregrine falcon (*Falco peregrinus*) (two sites), and waterfowl (18 sites). Mule deer (*Odocoileus hemionus)* is also a special-interest species; however, no threshold site number for deer has been specified. Lands within TRPA-designated urban areas are excluded from the standards for threshold attainment. The current status of this Indicator Reporting Category is attainment of the Threshold Standard overall and for bald eagle nesting, osprey, and peregrine falcon. The current status for northern goshawk and waterfowl is nonattainment. The attainment status for golden eagle is unknown due to insufficient information. No attainment status has been established for bald eagle wintering or deer.

Northern Goshawk, Bald Eagle, Golden Eagle, Peregrine Falcon, Waterfowl, and Deer

None of the action alternatives would affect designated waterfowl threshold areas or breeding sites or disturbance zones for northern goshawk, bald eagle, golden eagle, and peregrine falcon. Additionally, as described in Section 4.4.2, "Environmental Consequences and Mitigation Measures," none of the action alternatives are expected to affect the distribution, breeding productivity, viability, or the regional population of any of these TRPA special-interest wildlife species. Therefore, implementing any of the action alternatives would not affect the attainment status for northern goshawk, bald eagle, golden eagle, peregrine falcon, or waterfowl.

Although deer is a TRPA special-interest species, no Threshold Standard has been adopted and no attainment target applies to this species. However, TRPA does not permit projects that would degrade fawning habitat or

fragment known migration corridors (TRPA 2012). As described in Section 4.4.2, "Environmental Consequences and Mitigation Measures," because the project area is not expected to support fawning mule deer and does not provide important foraging or migratory habitat, and Alternative A or B would not substantially affect the composition, structure, or abundance of potential mule deer foraging or migratory habitat, any potential effects of Alternative A or B on mule deer individuals would be minor.

Osprey

Section 4.4.1, "Affected Environment," and Section 4.4.2, "Environmental Consequences and Mitigation Measures," include a description of existing conditions for osprey in the project area, review of osprey sensitivity to disturbance, summary of the osprey population size and distribution in the Tahoe Region, and a full discussion of short- and long-term impacts as a result of project implementation.

The osprey population in the Tahoe Region has increased over the last several years. Between 1997 and 2011, the number of active nests ranged from approximately 13 (in 1997) to 28 (in 2005 and 2011). The status of the Tahoe Region's osprey population has been in attainment with the Threshold Standard for this species during the last five threshold evaluation periods (1991, 1996, 2001, 2006, and 2011). The TRPA threshold standard for osprey includes maintaining a minimum of four population sites (i.e., four nests).

As described above, there are two osprey nests near Memorial Point which have the potential to be adversely affected by implementation of the project. Construction and operation of Alternative A would not bring pedestrians or bicyclists in closer contact to the Memorial Point osprey nests during the sensitive breeding season, because it would be located west of SR 28. Osprey have continued to use these nests (located east of SR 28) despite the long-standing human activity in the area, including numerous motor vehicles, pedestrians, an bicyclists located closer to the nests than the alignment of Alternative A. Because the osprey using these nests have demonstrated acclimation to this existing vehicle traffic and recreation use along SR 28 in this area (including existing trails west of SR 28 below the Memorial Point rest area), locating a new shared-use path adjacent to and on the west side of SR 28 in this area would not degrade osprey habitat measurably above existing levels and would not cause additional disturbance to use of the nests.

As proposed, Alternative B would be located directly below the Memorial Point nests; it would also be clearly visible to (i.e., not visually screened from) birds using these nests. The Memorial Point osprey pairs are habituated to existing traffic and other disturbances within and west of the SR 28 corridor, and have selected their nest sites under those existing conditions. Despite this, there is the potential for human activities associated with a new shared-use path in such close proximity to the nests to adversely affect their success. However, since the osprey population in the Tahoe Region has been increasing (28 documented nests as of 2011) and the number of active nests has been consistently well above TRPA's Threshold Standard for the species (four nests), disturbances to the two Memorial Point nest sites as a result of Alternative B are not expected to conflict with TRPA Threshold attainment for osprey. Additionally, with the development and implementation of the Osprey Habitat Enhancement and Management Plan (described in Section 4.4.2, "Environmental Consequences and Mitigation Measures"), the effect of the construction and operation of Alternative B would be mitigated fully over time as the enhancement and mitigation plan is implemented, thereby preventing degradation of osprey habitat on a regional basis.

Habitats of Special Significance

The Threshold Standard for the Habitats of Special Significance Indicator Reporting Category is to apply a nondegradation standard to habitats consisting of deciduous trees, wetlands, and meadows while providing for opportunities to increase the acreage of such riparian associations. These opportunities include but are not limited to preserving existing naturally functioning SEZ lands in their natural hydrologic condition; restoring all disturbed SEZ lands in undeveloped, unsubdivided lands; and restoring 25 percent of the SEZ lands that have been identified as disturbed, developed, or subdivided, to attain a 5 percent total increase in the naturally

functioning SEZ land. The current status of the Indicator Reporting Category is attainment with the Threshold Standard. As described for the meadow, wetland, and deciduous riparian components of the Common Vegetation Threshold Standard, implementing the action alternatives could result in loss of up to 0.1 acre (depending on alternative and segment option; see Table 4.4-2) of deciduous riparian vegetation; no additional wetland or meadow vegetation would be removed.

Short-term construction-related effects on deciduous riparian vegetation would be avoided or substantially reduced by implementing design features incorporated into the project (described in Section 4.4.2, "Environmental Consequences and Mitigation Measures"), and meeting the terms and conditions of permits; and any loss of riparian habitat would be compensated to achieve a no net loss of these habitat types. Effects on riparian habitats would be mitigated through the CWA permitting process and enhancing or restoring SEZ habitat as needed. As described previously, appropriate restoration actions, methods, locations, and amount would be developed based on the types and magnitude of project effects on SEZs, as well as site specific and watershed-level opportunities and constraints for SEZ enhancement. Disturbance to SEZs would be fully mitigated or restored at 150 percent of the amount disturbed in accordance with Sections 30.5.1.B (5) and 30.5.2.B of the TRPA Code (Design Feature BIO-13). Consequently, implementing any of the action alternatives would not affect the attainment status of the Habitats of Special Significance Threshold Standard.

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4.5 EARTH RESOURCES: GEOLOGY, SOILS, LAND CAPABILITY AND COVERAGE

This section describes the existing geologic and soil conditions within the project area and provides an analysis of the potential geologic hazards and soils impacts associated with project implementation. The analysis includes a description of existing conditions, a discussion of any changes in or to geologic conditions, relevant soil properties, and a discussion of land capability and coverage. Potential environmental effects related to water quality resulting from soil erosion and other stormwater effects are addressed in Section 4.3, "Hydrology and Water Quality." A discussion of effects to SEZ habitat is found in Section 4.4, "Biological Resources."

There are many federal, state, and local regulations which are applicable to the project. The Federal Earthquake Hazards Reduction Act provides regulation targeted at reducing the risks to life and property from earthquakes within the United States. TRPA provides oversight for planning and natural resource protection within the Lake Tahoe Basin. TRPA's Regional Plan and Code of Ordinances specify policies for soil conservation, land capability and coverage, and limitations on development within the backshore. TRPA also has established Environmental Threshold Carrying Capacities specific to earth resources. At the local level, applicable regulations include the Washoe County Master Plan, Washoe County Development Code, and Washoe County Building Code. For more information regarding the specifics of these regulations, please refer Appendix C.

4.5.1 AFFECTED ENVIRONMENT

GEOLOGY

The project area is located in the Sierra Nevada geomorphic province. The Sierra Nevada is a tilted fault block with a gentle western slope and a steep, rugged eastern escarpment. It runs through eastern California and a small portion of western Nevada, from the Mojave Desert in the south to the Cascade Range and Modoc Plateau on the north, for more than 400 miles and averages 50 to 80 miles wide. The Sierra Nevada geomorphic province is primarily composed of massive granitic bedrock and remnants of metavolcanic and metasedimentary rocks (volcanic and sedimentary rocks subsequently subjected to substantial heat and pressure), and more recent volcanic and sedimentary rocks. It is bounded on the west by sedimentary rocks of the Great Valley geomorphic province and on the north by volcanic sheets extending south from the Cascade Range (California Department of Conservation, California Geological Survey [CGS] 2002).

The Lake Tahoe Basin is located in the northern Sierra Nevada, 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 Lake 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 Lake 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. Lacustrine 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 Lake Tahoe Basin and the unusually small drainage basin relative to the size of Lake Tahoe.

A review of the *Geologic Map of the Lake Tahoe Basin* (Saucedo 2005) indicates that the majority of the proposed shared-use path would be located on Cretaceous-era (145 to 65 million years ago) granitic rock, specifically Monzogranite of Spooner Summit of Grose (Ksgr). The northern terminus of the path (Alternatives A and B) would be located within Holocene-era (10,000 years ago to present) deposits, specifically Colluvium (Qc). The southern terminus of Alternative A (on the lake side of SR 28) at Sand Harbor would be located on Pleistocene-era (1.8 million to 10,000 years ago) Lacustrine terrace deposits (Qlt). The southern terminus of Alternative B (on the mountain side of SR 28) would be located on Holocene era Talus deposits (Qt).

TOPOGRAPHY

Slope of the land is an important consideration in development planning. Slopes, in conjunction with soil types, geological and seismic hazards, and scenic vistas, are potential limitations to development. Typically, challenges associated with development on slight slopes are minimal. Development on steep slopes, hillsides, and ridgelines have greater potential for erosion problems, have lower rates of revegetation, can degrade the aesthetic value of the natural environment and can also represent hazards to the land itself.

The project area is located on the Marlette Lake, California 7.5 minute U.S. Geological Survey (USGS) quadrangle map. The topography of the project site slopes from the east and northeast to the west and southwest. The project area is located between the elevations of 6,240 feet and 6,500 feet above mean sea level (amsl). The hill slopes throughout the project area range from 2 to greater than 50 percent (Table 4.5-1). Significant geographic features along this segment include Tunnel Creek and Bonpland Creek, both of which run through steep ravines into Lake Tahoe.

Table 4.5-1 Slope Categories within the Project Area

	Slope Category			
	0-15%	15-30%	30-50%	>50%
Percent of Project Area	17%	30%	36%	18%

Source: TRPA 2010 LiDAR data; Adapted by Ascent Environmental in 2013

SEISMICITY

The potential for seismic activity at a given project location is most often related to the proximity of faults, which are fractures or zones of closely associated fractures 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).

The project area is located in a seismically active region of the United States. Lake Tahoe lies within a tectonically active, asymmetric half-graben (down-dropped fault block). Evidence shows that pre-historic earthquakes of a magnitude of 7.0 have occurred on Tahoe Basin faults within the past 10,000 years. However, scientists believe that large quakes are “rare events” in the Tahoe Basin, meaning quakes of magnitude 6.5 or greater occur on individual faults about every 3,000 to 4,000 years (Segale and Cobourn 2005: p. 1).

Several faults have been mapped near the project area. The North Tahoe Fault, located beneath the lake, is a northeast-southwest trending fault, approximately 7 miles long. It is estimated to be capable of generating an earthquake of magnitude 7.0; however, it has been inactive for at least 10,000 years (Jennings 1994). The northeast-southwest trending Incline Village fault zone appears to be the landward extension of the submerged

North Tahoe Fault and also trends northeast towards the Truckee Meadows Fault. All three of these faults may be part of a system of normal faults that rupture together.

The north-south trending West Tahoe-Dollar Point Fault zone is another prominent normal slip fault zone in the Tahoe Basin. The West Tahoe Fault is submerged from Emerald Bay to McKinney Bay. The Dollar Point Fault is the northern continuation of the West Tahoe Fault northward from McKinney Bay. Both of these faults are likely to rupture together (Ichinose et al. 2000).

According to the Earthquake Shaking Potential Map for Portions of Eastern California and Western Nevada, the Incline Village area is considered to have a moderate potential for shaking caused by seismic-related activity (CGS 2005). The Nevada Seismological Laboratory catalog lists eight earthquakes with Richter magnitudes (M) of 4.2 or greater that have occurred since 1950 within approximately 18 miles of the center of Lake Tahoe (Smith et al. 2004). These include an approximately M 4.5 earthquake (at Tahoe Vista, approximately 5 miles west of the project area) on June 3, 2004. The 2004 event has been attributed to an increase in upper crustal seismicity following a deep dike swarm of 1,611 earthquakes in the Tahoe Vista area at the site of a deep magma injection event beneath Lake Tahoe (Smith et al. 2004). Recent seismic research in the Lake Tahoe Basin suggests that the potential for strong seismic shaking in the area may be greater than had been previously thought.

TSUNAMI/SEICHE

A tsunami is a series of waves that may result from a major seismic event that involves the displacement of a large volume of water and can 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 or massive landslide (above ground or underwater). A seiche results in a potentially damaging wave, similar to a tsunami, which may result from seismic activity near a large lake. A seiche may occur in (wave) periods that differ from a tsunami. But should the period of wave propagation occur simultaneously with a tsunami, it could result in cumulative seismic-related wave effects.

SOILS

Soils are a critical element in land-use planning and environmental analyses in the Lake Tahoe Region; the TRPA land capability districts are determined based on soil types. The Natural Resources Conservation Service (NRCS) 2007 Soil Survey update shows six soil map units within the project area. The Cagwin, Cassenai, Gefo and Inville soil types dominate these map units.

Cagwin and Cassenai are deep to very deep soils. The upper horizons are typically composed of gravelly loamy coarse sands that occur as mixed colluviums (material relocated by gravity) over residuum (material that has weathered in place) derived from the weathering of granodiorite, underlain by grus (actively decomposing granitic material) (NRCS 2007). These soils are highly permeable and somewhat excessively drained. This means that water moves quickly through the soil profile and away from the root zone of plants. These course textured granitic soils are notoriously droughty and have low or very low water holding capacity in the upper 60 inches. Both the Cagwin and Cassenai soils have very little structure in the upper horizons and are underlain by massive, dense but brittle, cemented grus. Disturbance of these soils in steep areas, especially when it involves the lower horizons, can lead to chronic sloughing and erosion. This type of structure, combined with their limited water holding capacity, can make successful revegetation of these soils a challenge in steep areas.

Gefo and Inville soils are also deep to very deep, well drained to somewhat excessively drained, highly permeable, and have low water holding capacity. These soils are found on outwash terraces and are formed in mixed alluvial materials from granodiorite and mixed sources. The typical Gefo soil profile consists of 12 to 15 inches of coarse loamy sand over coarse sand to a depth of 75 inches. The Inville soil profile is typically coarse

loamy sand to a depth of 12 inches underlain by extremely gravelly and extremely cobbly loamy sand to a depth of 56 inches. Inville soils have the most structural development of the soils within the project area and show some aggregate stability resulting from transportation of clay minerals into the middle of the profile.

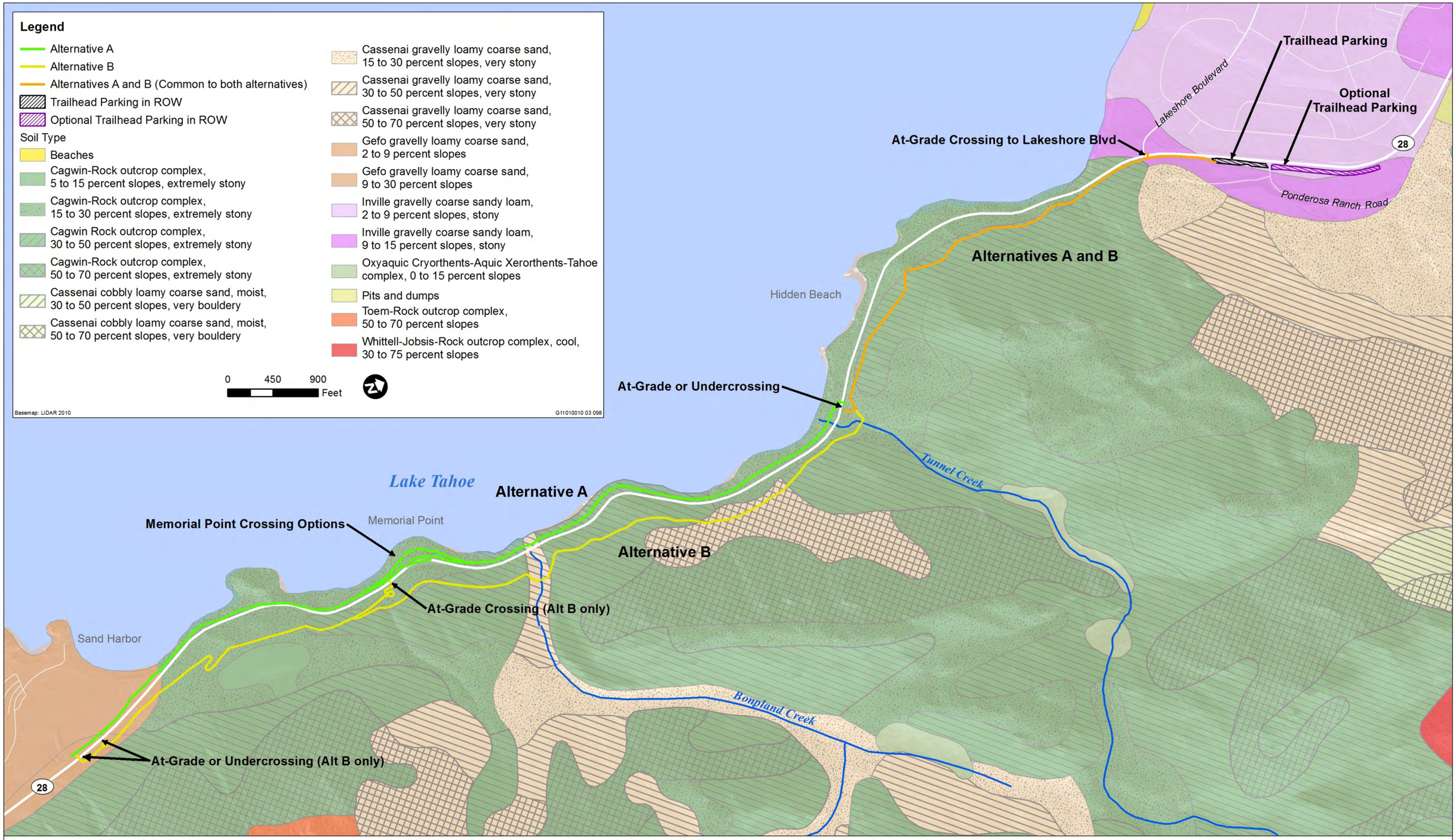
The NRCS Erosion Hazard rating for the soil of the project area estimates the risk of soil loss from sheet and rill erosion (erosion caused by overland flow of water) for disturbed soils where 50 to 75 percent of the soil surface has been exposed. This rating is based on slope and soil erosion factor K. Since the project area soils are structurally similar, the Erosion Hazard rating is driven by slope. Within the project area, soils on 2 to 15 percent slopes are rated as "slight," soils on 15 to 30 percent slopes are rates as "moderate," soil on 30 to 50 percent slopes are rated as "severe," and soil with greater than 50 percent slopes are rated as "very severe."

Table 4.5-2, which is based on NRCS soil survey data (NRCS 2007), lists the soil types and soil characteristics present along the proposed shared-use path alternative alignments. Exhibit 4.5-1 shows the location of project facilities in relation to the soil types.

Table 4.5-2 Soils within the North Demonstration Project Area

Soil Map Unit Name	% of Project Area	Shrink Swell Potential[1]	Permeability[2]	Erosion Hazard Rating[3]	Drainage	Concrete Corrosivity
Cagwin Rock outcrop complex, 30 to 50 percent slopes, extremely stony	39%	Low	High	Severe	Somewhat excessively drained	Low
Cagwin-Rock outcrop complex, 15 to 30 percent slopes, extremely stony	34%	Low	High	Moderate	Somewhat excessively drained	Low
Cassenai gravelly loamy coarse sand, 30 to 50 percent slopes, very stony	2%	Low	High	Severe	Somewhat excessively drained	Moderate
Cassenai gravelly loamy coarse sand, 50 to 70 percent slopes, very stony	5%	Low	High	Very Severe	Somewhat excessively drained	Moderate
Gefo gravelly loamy coarse sand, 2 to 9 percent slopes	4%	Low	High	Slight	Somewhat excessively drained	Moderate
Gefo gravelly loamy coarse sand, 9 to 30 percent slopes	2%	Low	High	Slight	Somewhat excessively drained	Moderate
Inville gravelly coarse sandy loam, 2 to 9 percent slopes, stony	8%	Low	High	Slight	Well drained	Moderate
Inville gravelly coarse sandy loam, 9 to 15 percent slopes, stony	5%	Low	High	Slight	Well drained	Moderate

Notes:
1 Based on percentage of linear extensibility. Shrink-swell potential ratings of "moderate" to "very high" can result in damage to buildings, roads, and other structures.
2 Based on standard U.S. Department of Agriculture (USDA) saturated hydraulic conductivity (Ksat) class limits; Ksat refers to the ease with which pores in a saturated soil transmit water.
3 Based on slope and soil erosion factor K. The erosion hazard rating estimates the risk of soil loss due to sheet and rill erosion after disturbance activities that expose 50 to 75 percent of the soil surface.
Source: NRCS 2007



Source: NRCS 2007; Adapted by Ascent Environmental 2013

Exhibit 4.5-1 Project Area Soils

LAND CAPABILITY AND COVERAGE

Chapter 30 of the TRPA Code sets forth regulations for the permissible amount of land coverage in the region. It implements provisions of the Goals and Policies concerning the land capability system, land capability districts (LCDs), prohibition of additional land coverage in certain LCDs, and transfer and mitigation of land coverage.

The LCDs within the project area are 1a, 1b (SEZ), 2, 4, and 6 (Bailey 1974). The majority of the project area is within LCD 1a (base allowable coverage of 1 percent). In addition, a portion of the project area is within LCD 4 (base allowable coverage of 20 percent), LCD 6 (base allowable coverage 30 percent), and two SEZ areas (LCD 1b, base allowable coverage 1 percent). The SEZ areas are associated with Tunnel Creek and Bonpland Creek, which transect the project corridor. In addition, a small portion of Alternative A would be located in the TRPA-regulated backshore, which is defined in Chapter 90 of the TRPA Code as the land area located between the high water line of the lake and the upland areas of instability or the wave run-up area (Cardno ENTRIX 2013).

Existing coverage within the project area includes dirt roads, road shoulders, and trails. The project is located within the Incline and Marlette Hydrologically Related Areas (HRAs). If additional land coverage is needed for a project, coverage can be purchased and transferred from within these HRAs. Restoration credit can be purchased from areas of the Lake Tahoe Basin outside of the Incline and Marlette HRA boundaries (Section 30.4.3.E of the TRPA Code).

4.5.2 ENVIRONMENTAL CONSEQUENCES AND RECOMMENDED MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The TRPA land classification system has been used to analyze potential effects to sensitive slopes, soils, and drainage conditions. The TRPA land classification system and coverage regulations were considered as criteria against which the project was evaluated. Based on TRPA's Initial Environmental Checklist, an alternative's effect on geology, soils, and land coverage would be considered adverse in terms of its context and intensity if it would:

- compact or cover soil beyond the limits allowed in Chapter 30 of the TRPA Code;
- result in a change in the topographic features of the site inconsistent with the natural surrounding conditions;
- change the undisturbed soil or native geologic substructures or grading in excess of 5 feet, unless TRPA makes the findings set forth in Section 64.7.B of the TRPA Code, in which case such grading is permissible;
- continue or increase wind or water erosion of soils;
- result in changes in siltation, deposition, or erosion that could modify the channel of a river or stream or the bed of a lake;
- result in unstable soil conditions during or after completion of the project; or
- expose people or property to geologic hazards such as earthquakes, landslides, avalanches, or similar hazards.

METHODS AND ASSUMPTIONS

Evaluation of potential geologic and soils impacts was based on a review of documents pertaining to the project site, including the Washoe County Master Plan, the NRCS Soil Survey of Tahoe Basin Area (NRCS 2007), TRPA regulations and planning documents, and published and unpublished geologic literature. The information obtained from these sources was reviewed and summarized to establish existing conditions and to identify

potential environmental effects, based on the standards of significance presented above. In determining the level of significance, the analysis assumes that the proposed project would comply with relevant federal, state, and local ordinances and regulations.

The effects of the proposed project on the TRPA Soil Conservation threshold reporting categories are assessed separately in "Consequences for TRPA Environmental Threshold Carrying Capacities" at the end of this section.

LAND COVERAGE

ALTERNATIVES A AND B

Direct and Indirect Effects

Design features incorporated into the project design would limit effects to sensitive land capability districts, LCDs 1a and 1b, through elevated shared-use path design and restoration elements (Design Features BMP-3, BMP-4, and BIO-13), as described in the "List of Design Features" at the beginning of this EA.

Both of the shared-use path action alternatives (Alternatives A and B) are designed to maximize the use of existing coverage. However, both action alternatives would create new coverage in accordance with TRPA's land coverage regulations. Implementation of the project would result in additional coverage within LCDs 1a, 1b, 4 and 6. Alternative A would also result in additional coverage in the backshore. Land coverage and land disturbance can be permitted in the backshore for public outdoor recreation facilities provided that the project meets the conditions of Section 85.5.1 of the TRPA Code. This includes mitigation through restoration of land in the backshore or in SEZ in the amount of 1.5 times the areas of land disturbed or covered by the project. Table 4.5-3 provides a preliminary summary of coverage increases by LCD for Alternatives A and B. The preliminary coverage numbers would be refined as the design process progresses and prior to TRPA permit acknowledgement, but the information contained herein is representative of the nature of the land coverage changes associated with the action alternatives.

Table 4.5-3 Summary of Preliminary Land Coverage Increases by Segment and LCD for Alternatives A and B[1]

Segment/Alternative	Square Feet (sf) by LCD					Total (sf)	Total (acres)
	1a	1b	4	6	Backshore		
Alternative A: Lake Side							
Segment 1: Incline Village to Tunnel Creek	53,469	--	3,776	5,310	--	62,555	1.44
Segment 2: Tunnel Creek to Memorial Point	42,107	1,378	--	8,469	1,082	53,036	1.22
Segment 3: Memorial Point to Sand Harbor	30,016	--	5,563	16,195	1,046	52,820	1.33
LCD Total (sf)	*125,592*	*1,378*	*9,339*	*29,974*	*2,128*	*168,411*	--
LCD Total (acres)	*2.88*	*0.03*	*0.21*	*0.69*	*0.05*		*3.87*
Alternative B: Mountain Side							
Segment 1: Incline Village to Tunnel Creek	53,469	--	3,776	5,310	--	62,555	1.44
Segment 2: Tunnel Creek to Memorial Point	72,382	--	9,190	--	--	81,571	1.87
Segment 3: Memorial Point to Sand Harbor	4,739	--	15,520	17,297	--	37,556	0.86
LCD Total (sf)	*130,590*	--	*28,486*	*22,607*	--	*181,683*	--
LCD Total (acres)	*3.00*	--	*0.65*	*0.52*	--	--	*4.17*

Table 4.5-3 Summary of Preliminary Land Coverage Increases by Segment and LCD for Alternatives A and B[1]

Segment/Alternative	Square Feet (sf) by LCD					Total (sf)	Total (acres)
	1a	1b	4	6	Backshore		
Parking Area							
Trailhead Parking	--	--	--	19,821	--	19,821	0.46
Optional Parking	--	--	--	22,628	--	22,628	0.52
Totals (with Trailhead Parking [No Optional Parking])							
Alternative A (sf)	125,592	1,378	9,339	49,795	2,128	188,232	
Alternative A (acres)	2.88	0.03	0.21	1.14	0.05	--	4.32
Alternative B							
With Memorial Point Connector (sf)	130,590	--	28,486	42,428	--	201,504	
With Memorial Point Connector (acres)	3.00	--	0.65	0.97	--	--	4.63
Without Memorial Point Connector (sf)[2]	121,996	--	28,486	42,428	--	192,910	
Without Memorial Point Connector (acres)[2]	2.80	--	0.65	0.97	--	--	4.43

Note: The increases in land coverage shown in this table reflect the option that would result in the greatest increase in coverage. For Alternative A, this is Option A-2D and for Alternative B this is Option B-2B.
[1] Totals may not sum due to rounding.
[2] If the Memorial Point connector proposed as part of Alternative B were not constructed, this would reduce the Alternative B land coverage by 8,594 sf in LCD 1a.
Source: Cardno ENTRIX 2013; Lumos & Associates 2013; adapted by Ascent Environmental in 2013

Section 30.4.6 of the TRPA Code provides an exemption from land coverage calculations for Non-Motorized Public Trails, include shared-use paths similar to the proposed project. To qualify for this exemption, the proposed shared-use path must be identified in Map 5 of the Regional Plan, "Bicycle and Pedestrian Facilities;" open to the public in perpetuity, at no cost; be routed to minimize disturbance of sensitive lands and removal of large trees and riparian vegetation; meet industry standard engineering criteria; provide elevated stream crossings; incorporate appropriate BMPs; and minimize disturbance to sensitive wildlife habitat. The proposed shared-use path (either action alternative) meets these requirements.

The coverage exemption does not apply to the proposed trailhead parking facilities associated with the proposed action alternatives. The land coverage necessary for the creation of the trailhead parking area (Exhibits 3-8 and 3-9) would be obtained and purchased from within the Incline HRA. Prior to TRPA permit acknowledgement, TTD would be required to demonstrate evidence of purchase and transfer of the required coverage, and restoration of any relocated coverage, in accordance with TRPA regulations. Because the coverage increases associated with the action alternatives would occur in accordance with TRPA regulations, the action alternatives would not result in adverse effects as it relates to land coverage and land capability.

Cumulative Effects

The related on the ground development projects in the Washoe County portion of the Tahoe Basin (as listed in Table 4.1-1) as well as the North Demonstration Project, either Alternative A or B, have the potential to increase coverage in the Basin. However, all these projects, as well as the North Demonstration Project, are required to adhere to the land coverage regulations in Chapter 30 of the TRPA Code.

The North Demonstration Project, except the proposed trailhead parking, would be exempt from land coverage calculation as provided for in Section 30.4.6 of the TRPA Code. This land coverage exemption for shared-use path and other trail facilities contemplated in the Regional Transportation Plan was evaluated in the Regional Plan EIS and Regional Transportation Plan EIR/EIS and was found to have a less than significant effect on region-

wide coverage after implementation of mitigation measures which were codified and are now reflected in the TRPA Code section cited above.

The potential land coverage exemption for portions of the North Demonstration Project would only apply to the proposed shared-use path, and because non-exempt portions of the proposed project (i.e., trailhead parking), as described above, and all related projects that result in additional coverage in Table 4.1-1 would be limited to the percent coverage allowed for each LCD set forth in Chapter 30 of the TRPA Code or would be required to mitigate coverage in excess of the base allowable by identifying, purchasing, and transferring coverage from off-site parcels in accordance with Chapter 30 of the TRPA Code. Therefore, related projects listed in Table 4.1-1 as well as the North Demonstration Project would not result in adverse cumulative effects related to increases in coverage.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed; there would be no relocation, removal, or addition of coverage to any project parcels. Therefore, under Alternative C, there would be no change in land coverage within the project area attributed to the proposed project.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to increases in coverage.

SITE TOPOGRAPHY, GRADING, AND SOIL EROSION

ALTERNATIVES A AND B

Direct and Indirect Effects

Although the proposed shared-use path action alternatives (Alternatives A and B) would generally follow the natural contours of the existing topography, both action alternatives would require excavation and placement of fill for path construction, bridges, and retaining walls. As shown in Table 4.5-1, over 50 percent of the project area is located on slopes of 30 percent or greater. The project area is also dominated by granitic soils (Cagwin and Cassenai, Table 4.5-2), which can be difficult to stabilize once disturbed. Construction activities would result in the temporary disturbance of soil and would expose disturbed areas to storm events. Rain of sufficient intensity and duration could dislodge soil particles, generate runoff, and cause localized erosion. Soil disturbance during the summer months could result in loss of topsoil because of wind erosion or thundershower event. Additionally, both proposed alignments cross two SEZs (Tunnel Creek and Bonpland Creek).

The NRCS Erosion Hazard rating for the soils within the project area estimates the risk of soil loss from sheet and rill erosion (erosion caused by overland flow of water) for disturbed soils where 50 to 75 percent of the soil surface has been exposed (NRCS 2007). Since the project area soils are structurally similar, the Erosion Hazard rating within the project area is driven by slope. Soils on 2 to 15 percent slopes are rated as “slight,” soils on 15 to 30 percent slopes are rates as “moderate,” soil on 30 to 50 percent slopes are rated as “severe,” and soil with greater than 50 percent slopes are rated as “very severe.” A rating of “slight” indicates that erosion is unlikely under ordinary climatic 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 without costly erosion-control measures, significant erosion is expected and loss of soil productivity and off-site damage are likely.

A slope map of the project area was created using high resolution LiDAR elevation data in order to more accurately determine the acreage of each slope class and Erosion Hazard rating category for the action alternatives (Table 4.5-4). As shown in Table 4.5-4, approximately half of the disturbance area for either alternative would be located in areas with a Severe or Very Severe Erosion Hazard rating. Without the use of appropriate slope stabilization techniques increased erosion from wind and water is likely in these areas.

Table 4.5-4 Slope Class and Erosion Hazard Rating for Alternatives and Options

Alternative and Option[1]	Acres of Disturbance by Erosion Hazard and Slope Class				Total Disturbance (Acres)[2]
	Slight (0-15%)	Moderate (15-30%)	Severe (30-50%)	Very Severe (>50%)	
Trailhead Parking Area	0.50	--	--	--	0.50
Optional Additional Trailhead Parking	0.78	--	--	--	0.78
Alternative A					
A-1D	1.79	2.57	2.88	1.96	9.2
A-1ABC	1.76	2.32	2.7	1.97	8.75
A-2D	1.75	2.57	2.88	1.95	9.15
A-2ABC	1.78	2.34	2.71	1.97	8.8
Alternative B					
B-1A	1.41	3.09	3.86	1.35	9.71
B-1B	1.62	3.13	3.95	1.41	10.11
B-2A	1.53	3.19	3.93	1.37	10.02
B-2B	1.64	3.15	3.96	1.4	10.15

[1] Options are described in Table 3-2, Naming Convention for Alternatives and Options.
[2] Note that disturbance numbers are greater than permanent coverage numbers in Table 4.5-3, because not all areas of disturbance will result in permanent impervious surfaces. In most cases, the disturbed areas will either be restored or treated with BMPs.
Source: TRPA 2010 LiDAR data and NRCS 2007; Adapted by Ascent Environmental in 2013

The potential for increased wind and water erosion of the soils within the project area would be minimized through design features incorporated into the project (see Design Features BMP-6 and BIO-9, as described in the "List of Design Features" at the beginning of this document). All areas disturbed during project construction would be stabilized. A subset of the disturbance area would be converted to the finished footprint of the shared-use path and parking area. A restoration plan would be developed by a Restoration Ecologist or qualified botanist. Disturbed areas outside of the path footprint with less than 20 percent slopes would be restored and revegetated. In areas with slopes between 20 and 30 percent, the soil would be stabilized using a combination of biotechnical and revegetation methods which may include planted geotextiles (an engineered soil stabilization fabric anchored with plants) or rock reinforcement in isolated areas. Disturbed slopes greater than 30 percent would be stabilized using bio-engineering methods, which may include shallow terracing or rock slope protection (rip-rap).

Design features incorporated into the project would: minimize soil erosion and effects to SEZ areas by limiting surface disturbance to between May 1 and October 15; require implementation of temporary and permanent water quality BMPs; include development of a spill prevention plan; require restoration and design elements (e.g., bridges) in sensitive areas; prevent stockpiles from entering stream channels; use existing disturbed areas for staging and storage; restore soil function and organic matter post project implementation; and restore protective ground and vegetative cover (see Design Features BMP-1 through BMP-12 and BIO-9).

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 unless certain criteria are met (Section 33.3.6[B] of the TRPA Code). Construction of the shared-use path for both action alternatives would require excavation below 5 feet in many locations. Approximately 40 percent of the length of either alternative would require excavations deeper than 5 feet for construction of walls greater than 4 feet in height. Additionally, excavation greater than 5 feet would be required for the bridge abutments for the crossings at Tunnel Creek and Bonpland Creek in Alternative B, and for the footings to support approximately 1,300 feet of elevated bridge structure for Alternative A. Excavations to a depth of 16 to 18 feet would be required for construction of the optional SR 28 undercrossings just north of Tunnel Creek and at Sand Harbor.

In areas 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.

A Soils/Hydrologic report was completed as a component of the design phase for the optional undercrossing just north of Tunnel Creek (Lumos & Associates 2012). This study assessed the hydrologic features of the soil profile to a depth of 20 feet below ground surface. No groundwater was encountered and the seasonal high groundwater elevation was reported at 20 feet below ground surface. This study indicates that the elevation of seasonal groundwater is likely to occur well beneath the necessary depth of excavation for most components of the shared-use path. Groundwater is likely to be encountered at a shallower depth near SEZ areas; however, Design Feature BMP-2 includes a dewatering plan for locations where groundwater may be encountered. The dewatering plan would include measures to be taken in the event that groundwater is encountered as a result of excavation below 5 feet such that there would not be an adverse effect on SEZ vegetation or groundwater. Additional Soils/Hydrologic reporting would occur in other locations at the request of TRPA and prior to permit acknowledgement.

The successful implementation of the above-described project design features and adherence to TRPA grading regulations and Washoe County Grading Permit conditions would minimize potential effects from grading and soil erosion.

Cumulative Effects

The related projects listed in Table 4.1-1 as well as the North Demonstration Project, either Alternative A or B, would be required to: minimize soil erosion and effects to SEZ areas by limiting surface disturbance to between May 1 and October 15; include project design features or mitigation measures such as preventing soil stockpiles from entering stream channels, using disturbed areas for staging and storage, restoring soil function and organic matter post project implementation; comply with TRPA, NDEP, and Washoe County regulations; develop a spill prevention plan; and implement BMPs that are expected to offset each project's short-term (construction) and long-term (operational) effects related to soil erosion, sedimentation, or release of pollutants. Furthermore, all related projects would be required to adhere to the requirements in Chapter 33, "Grading and Construction," of the TRPA Code that protect against adverse effects from excavation, filling, and clearing, due to such conditions as exposed soils, unstable earthworks, or groundwater interference. Therefore, the North Demonstration Project and related projects in the Washoe County portion of the Tahoe Basin (as listed in Table 4.1-1) would not result in adverse cumulative effects related to grading and soil erosion.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed; therefore, this alternative would not contribute to soil erosion or exceed designated grading regulations. Therefore, under Alternative C, there would be no project-related effects to soils within the project area.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no grading and would not contribute to potential cumulative effects related to grading or soil erosion.

SEISMIC AND GEOLOGIC HAZARDS

ALTERNATIVES A AND B

Direct and Indirect Effects

Lake Tahoe lies in an intermontane basin bounded by normal faults. Active faults are located in the project vicinity. According to the Earthquake Potential Map for Portions of Eastern California and Western Nevada (Saucedo 2005, CGS 2005), the Incline Village area is considered to have a moderate potential for shaking caused by seismic-related activity (CGS 2005). The action alternatives (Alternatives A and B) would include construction of a shared-use path, parking, retaining walls, and elevated bridge structures over creek crossings and in areas of steep side slopes. The project does not include any buildings intended for human occupation. Project structures would be designed and constructed in accordance with the AASHTO seismic bridge design specifications as well Washoe County design requirements (as required by law). Compliance with these design and construction standards would provide adequate assurance that the effects of seismic ground shaking on developed structures would not produce undue risk.

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, thus becoming similar to quicksand. 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. 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 walls, and slope instability. The soils within the project area are course textured with a high rock content and low water holding capacity. These features combined with the high depth to groundwater create little potential for liquefaction to occur within the project area. However, proposed project structures would be designed and constructed in accordance with the current design requirements of UBC Seismic Zone 3 as well Washoe County design requirements (as required by law) that are intended to reduce the risk of injury or property damage from seismic hazards, including strong ground shaking and liquefaction.

Ichinose et al. (2000) show through simulations modeling wave propagation for various earthquake scenarios that if a large earthquake were to occur (approximately magnitude 7.0), a potential exists for both tsunami and seiche-related waves up to 30 feet to occur along the shore of Lake Tahoe. While components of Alternative A would occur within 30 feet of the elevation of Lake Tahoe, these areas are directly adjacent to a busy state highway and are already popular recreation areas. Alternative B would be located well outside of the range of a 30 foot wave except in the area of Sand Harbor, which is already a popular recreation site. Therefore, implementation of the project would not create a situation that exposes additional people to tsunami or seiche hazards.

The proposed shared-use path alternatives would be constructed in soil types that are dominantly very stony, gravelly loamy coarse sands to or sandy loams, which have a low shrink/swell potential, high permeability, and slight to very severe erosion hazard (Table 4.5-2). No previous landslides have been mapped in the location of planned project facilities, however some granitic soils within the project area may be prone to instability once disturbed (see discussion under Section 4.5.1, "Affected Environment"). Design features incorporated into the project would minimize the disturbance footprint to the greatest extent possible and stabilize disturbed areas (Design Features BMP-3, BMP-4, BMP-6, BMP-11, BMP-12, BIO-1, BIO-2, BIO-9, and BIO-13). Additionally, because some areas within the project boundary exceed 50 percent slopes, and because some areas of paralithic granitic subsoil (grus) may be prone to instability once disturbed, a detailed geotechnical report would be conducted prior to final design to identify any slope instability issues and the maximum slope for construction to occur. Design Feature SOIL-1 includes preparation of a Geotechnical Report by a registered professional geologist or engineer that will be used to develop the final design of all project components to ensure that the potential for landslides, slope instability, seismic events, and all applicable codes and seismic standards are adequately addressed in the design and construction of the project. The final design will be reviewed and approved by a Professional Engineer registered in the State of Nevada prior to construction.

Implementation of the design features described above would ensure that implementation of the project would not result in the creation of unstable slopes that would subject recreational users to an increased hazard.

Cumulative Effects

The related projects listed in Table 4.1-1 as well as the North Demonstration Project, either Alternative A or B, would be required to be designed and constructed in accordance with AASHTO design requirements, relevant Uniform Building Code Seismic Zone 3 requirements, as well Washoe County design requirements (as required by law). Washoe County has adopted the building codes set forth in the 2012 International Building Code (IBC). In addition, related projects would be required to implement seismic design recommendations contained in project-specific geotechnical reports. Therefore, the North Demonstration Project and related projects in the Washoe County portion of the Tahoe Basin (as listed in Table 4.1-1) would not result in adverse cumulative effects related to seismic or geologic hazards.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path as described under Alternatives A and B would not be constructed; therefore, this alternative would not result in increased risk of injury or property damage from strong seismic ground shaking, landslides, or associated geologic hazards. Therefore, under Alternative C, there would be no project-related effects to geologic hazards within the project area.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no new structures and would not contribute to cumulative effects related to seismic or geologic hazards.

4.5.3 CONSEQUENCES FOR TRPA ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

This section describes the effects of implementing the action alternatives on the thresholds established for soil conservation by TRPA. Two soil conservation threshold reporting categories have been established by TRPA:

- Impervious Cover (land coverage), and
- Stream Environment Zone (SEZ).

According to the 2011 Threshold Evaluation (TRPA 2012a), status for the Impervious Cover threshold reporting category is "At or somewhat better than target" with an unknown trend, and "Considerably worse than target" for the Stream Environmental Zone threshold reporting category with a trend toward moderate improvement.

IMPERVIOUS COVER

On a region-wide basis, Bailey land capability classes in compliance are LCD 1a, 1c, 3, 4, 5, 6, and 7. LCDs 1b and 2 are not in attainment (TRPA 2012a), because existing coverage is in excess of the base allowable for these LCDs.

In recognizing the environmental benefits of walking and bicycling as a means of non-motorized transportation, the recently adopted update to the TRPA Regional Plan (Section 30.4.6 of the TRPA Code) incorporates a land coverage exemption for facilities such as the North Demonstration Project that accommodate these activities. In order to qualify for this exemption, a shared-use path must be identified in the Regional Plan map of "Bicycle and Pedestrian facilities;" open to the public in perpetuity, at no cost; be routed to minimize disturbance of sensitive lands and removal of large trees and riparian vegetation; meet industry standard engineering criteria; provide elevated stream crossings; incorporate appropriate BMPs; and minimize disturbance to sensitive wildlife habitat (TRPA 2012b).

The proposed shared-use path (Alternatives A and B) would be constructed in accordance with the above criteria and, as such, would not be subject to land coverage calculations. The potential consequences of this exemption related to the TRPA Impervious Cover Threshold were evaluated in the Regional Plan EIS and the Regional Transportation Plan EIR/EIS. The Regional Plan focuses on removing coverage in LCD 1b (SEZ) through a variety of incentive programs. Implementation of the Regional Plan is expected to result in a net reduction in SEZ coverage and move the coverage threshold towards attainment.

Coverage associated with the North Demonstration Project was accounted for in the EIS and EIR/EIS analyses, and is a subset of the 52 acres of coverage that would be exempted under the new regulations. Of the 52 acres of increased land coverage, approximately 4 acres were designated for the North Demonstration Project (TRPA 2012c). Table 4.5-5 presents the estimated net increase in land coverage resulting from implementation of the project (as reported in Table 4.5-3 earlier in this section) as well as the amount of coverage that was contemplated for the North Demonstration Project in the Regional Plan EIS.

Table 4.5-5 Comparison of Project-Level Estimated Increase in Acreage of Land Coverage with Land Coverage Estimate from the Regional Plan EIS

Land Capability District	Project-Level Coverage Increases[1]		RPU Coverage Increase for North Demonstration Project[2]
	Alternative A	Alternative B	
Backshore	0.05	--	--
1a	2.88	3.00	1.44
1b	0.03	--	0.04
2	--	--	2.28
4	0.21	0.65	--
6	0.69	0.52	0.42
Totals[3]	**3.87**	**4.17**	**4.18**

Notes:
[1] See Table 4.5-3. Note: coverage increases shown here exclude proposed trailhead parking areas, which are not subject to the exemptions in Section 30.4.6 of the TRPA Code.
[2] Estimated based on GIS data obtained from TRPA that corresponds to the exempted shared-use path network considered in the Regional Plan EIS.
[3] Totals may not sum due to rounding.
Source: TRPA 2012c; Lumos & Associates 2013; adapted by Ascent Environmental in 2013

The EIS analysis of coverage was based on the 1974 Bailey Map. A project-specific Land Capability Study was completed for the North Demonstration Project in 2013 (Cardno ENTRIX 2013). This study indicates the occurrence of LCDs 1a, 1b, 4 and 6 within the project area, and does not indicate the presence of LCD 2, which is currently not in attainment. The 2011 Threshold Evaluation indicated approximately 5,000 acres of coverage remaining in LCDs 4 and 6, and the increased coverage associated with the project (both action alternatives) would not affect the threshold status of these LCDs.

LCD 1b (SEZ) is currently in nonattainment and implementation of Alternative A would increase land coverage in LCD 1b by 0.03 acres (1,378 square feet); however this increase in coverage has already been accounted for in the Regional Plan EIS (Table 4.5-5). The Regional Plan EIS projected that the land coverage exemption for non-motorized trails collectively would result in an increase in coverage of 7 acres of land in LCD 1b. However, the EIS projected an overall net decrease of 7 acres of coverage in land in LCD 1b as a result of restoration of existing land coverage in developed areas (TRPA 2012c). Alternative B would not increase coverage in LCD 1b.

Design features built into the project would minimize coverage effects to sensitive land coverage types such as SEZs (discussed earlier in this section and in Section 4.4, “Biological Resources”). While the proposed project would result in an increase in land coverage in LCDs 1b (Alternative A only), 1a, 4, and 6, any new coverage would be consistent with TRPA land coverage regulations and consistent with what had already been contemplated for the project such that implementation of the project would not impede progress toward attainment of the TRPA threshold reporting category for Impervious Cover.

STREAM ENVIRONMENT ZONE

Attainment of the SEZ threshold is tracked basin wide and tracked for three categories: naturally functioning SEZs; SEZs in undeveloped, unsubdivided lands; and SEZs in disturbed, developed, or subdivided areas. The SEZ threshold has a nonattainment status.

Design features incorporated into the project would: minimize soil erosion and effects to SEZ areas by limiting surface disturbance to between May 1 and October 15; require implementation of temporary and permanent water quality BMPs; include development of a spill prevention plan; require restoration and design elements (e.g., bridges) in sensitive areas; prevent stockpiles from entering stream channels; use existing disturbed areas for staging and storage; restore soil function and organic matter post project implementation; and restore protective ground and vegetative cover (see Design Features BMP-1 through BMP-12 and BIO-9). Because protective measures are incorporated into the design of the action alternatives that protect SEZ areas and coverage increases in SEZ areas would occur consistent with TRPA regulations and that contemplated in the Regional Plan EIS, the action alternatives would not be expected to impede or degrade the attainment of the SEZ threshold reporting category.

4.6 SCENIC RESOURCES

This section describes the visual setting in the project area and the potential effects of Alternatives A, B, and C on scenic resources. The analysis in this section is based on an evaluation conducted by Tom Packard & Associates for the North Demonstration Project. A summary of applicable regulations under which the action alternatives would be implemented is provided in Appendix C.

4.6.1 AFFECTED ENVIRONMENT

VISUAL CHARACTERISTICS OF THE PROJECT AREA

The proposed North Demonstration Project would extend approximately 3 miles from Incline Village to Sand Harbor. In this area, the terrain rises steeply on the east side of SR 28 and drops toward the lake on the west side of the highway. SR 28 runs near and parallel to the lake within the project area and is approximately 20 to 130 feet above the water. Other than the highway itself, development within the project area is limited. Public facilities include Hidden Beach, the Memorial Point roadside vista point, and Sand Harbor, all of which are popular recreation and viewing destinations. Approximately 10 private residences are located near the northern end of the proposed shared-use path along the west side of SR 28 between the highway and the lake. Three residences are located on the east side of SR 28 in the Rocky Point Subdivision, downslope from the proposed shared-use path.

An overhead utility line extends parallel to and east of SR 28 on the slope above the highway. The line is generally unobtrusive in views from the road and the lake due to the existing tree cover on the slope. However under certain daylight conditions, segments of the overhead line become more noticeable as they reflect sunlight. Above the highway, the forest cover is generally fairly dense with an understory of shrubs. In some locations tree cover is sparse. Rock outcrops are prominent in certain locations. A mix of vegetation occurs on the slope below the highway consisting of various shrubby plants with some trees among many rocks and boulders. The density of trees below the highway varies considerably depending on the steepness of the slope and soil conditions. Some areas are very steep. Most of the slope directly above the shoreline is rocky, often with picturesque boulders at the water's edge. Some locations along the water's edge include disturbed areas that are remnants from construction of the highway. Sandy beaches occur in only a few places.

SR 28 is a designated National Scenic Byway. Outstanding scenic vistas are experienced from many places along the road. SR 28 is a two-lane highway with narrow shoulders. A metal-beam guard rail runs almost continuously along its west side throughout most of the project limits. Roadside parking is allowed in places where there is sufficient room but is otherwise prohibited. Some trails exist on the west side of the highway. They run along the top of the slope with spurs that lead to the water's edge in places. Trails in the vicinity of Hidden Beach are well worn from heavy use. They are unseen from the highway and are mostly unobtrusive in views from the lake. Tunnel Creek Road, the Flume Trail, and the Tahoe Rim Trail are east of and above SR 28 but are unseen from the highway and the lake due to tree cover, topography, and distance from viewers.

On slopes immediately above and below the highway, a cover of rock known as "rip-rap" has been applied in various places for erosion control purposes. The color and texture of the rip-rap in some locations contrasts with the adjacent, naturally occurring rock material. These effects are visible from the highway and from the lake. In some places highway cut slopes have a strong color contrast with adjacent, undisturbed slope material. This is especially true near the north end of the project where a large highway cut exists on the east side of SR 28 just south of the intersection with Lakeshore Boulevard. The exposed material is much lighter than its surroundings. The strong contrast can be seen locally and from many miles away. A wood retaining wall or timber wall is present in many places along the west side of SR 28 just beyond the metal guard rail. The retaining wall is at the top of the slope that descends to the lake and creates a narrow bench behind the guard rail that is often used by pedestrians as a walkway. The wood members are held in place by galvanized metal posts set about 2 to 3 feet apart. The reflective metal posts contrast strongly with the brown wood face of the wall. This makes them highly conspicuous in views from the lake. See Exhibits 4.6-1 through 4.6-6 for a series of photos that depict the conditions described above.

Source: Provided by Tom Packard and Associates in 2013

Exhibit 4.6-1 Terrain, Vegetation, and Rocky Shoreline in the Project Area

Source: Provided by Tom Packard and Associates in 2013

Exhibit 4.6-2 Typical Scenic Vista within the Project Area

Source: Provided by Tom Packard and Associates in 2013

Exhibit 4.6-3 Vegetation above SR 28

Source: Provided by Tom Packard and Associates in 2013

Exhibit 4.6-4 Vegetation, Guard Rail, and Wood Retaining Wall Below SR 28, Power Line Above the Highway

Source: Provided by Tom Packard and Associates in 2013

Exhibit 4.6-5 Rock Material (Rip Rap) used for Erosion Control

Source: Provided by Tom Packard and Associates in 2013

Exhibit 4.6-6 Large Highway Cut Slope near Lakeshore Boulevard

SCENIC THRESHOLD RATINGS IN THE PROJECT AREA

The project is within TRPA Roadway Travel Unit 26, Sand Harbor, and Shoreline Travel Unit 24, Sand Harbor. It also includes approximately 0.5 mile of the southern end of Shoreline Travel Unit 23, Crystal Bay. The project area extends from Incline Village south to Sand Harbor, which is a TRPA-listed public recreation area identified in the 1993 Lake Tahoe Basin Scenic Resource Evaluation. The current TRPA threshold composite rating for Roadway Travel Unit 26, Sand Harbor, is 27; the rating for Shoreline Travel Unit 24, Sand Harbor, is 12 and the rating for Shoreline Travel Unit 23, Crystal Bay, is 7.5 (TRPA 2012). The ratings for Roadway Travel Unit 26 and Shoreline Travel Unit 24 exceed the minimum scenic threshold standard. Shoreline Travel Unit 23 is currently below the minimum threshold standard.

The southern terminus of the project is at Sand Harbor. Some parts of the shared-use path would be seen from certain public use areas of within the park. There are nine scenic resources identified in the 1993 TRPA inventory of public recreation areas that are associated with Sand Harbor. Five of these are views from the park and four are natural features of Sand Harbor. Of the five views from the recreation area, only one, View 4-4, View of Sand Harbor from the North Side of Sand Point, would include the shared-use path. The current composite scenic threshold rating for View 4-4 is 16, the same as it was in 1993.

4.6.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The questions in the TRPA Initial Environmental Checklist were used to evaluate the project's impact on scenic resources under TRPA regulations. Items on the checklist pertaining to scenic resources were considered as criteria against which the project was evaluated. The context and intensity of an alternative's potential to adversely affect scenic resources were evaluated based on whether the project would:

- be visible from any state or federal highway, Pioneer Trail, or from Lake Tahoe;
- be visible from any TRPA-listed public recreation area or TRPA-designated bicycle trail;
- block or modify an existing view of Lake Tahoe or other scenic vista seen from a public road or other public area;
- be inconsistent with the height and design standards required by the applicable ordinance or Community Plan; or
- be inconsistent with the TRPA Scenic Quality Improvement Program (SQIP) or Design Review Guidelines.

METHODS AND ASSUMPTIONS

A Preliminary Scenic Impact Assessment of the project was carried out in 2009. The report resulting from that study is included in Appendix E. The purpose of the study was to determine whether a shared-use path along the west side of SR 28 between the highway and lake or on the slopes above the east side of the highway could be feasibly developed without causing a decrease in TRPA scenic threshold ratings. A contrast rating analysis was used to evaluate the potential scenic impact of Alternatives A and B. It considered views from the lake and from SR 28. A project's contrast rating score determines how much visible square footage is allowed for a structure's surfaces that face the lake. The higher the contrast rating score, the more visible square footage is allowed up to a maximum.

Assumptions about the characteristics of a typical bridge structure and a typical retaining wall were developed for the analysis. Surfaces of a structure that face the lake are included in the contrast rating analysis. Assumptions for a typical bridge section included a deck thickness of 2.5 feet, columns every 50 feet with dimensions of 2 feet in width and 8 feet in height, and a safety railing up to 48 inches high with maximum 4-inch openings. These dimensions yield a total area of 376.5 square feet of surfaces that directly face the lake per

100 linear feet of structure. It was assumed that the columns and edge of the pathway deck would have a heavily textured surface, that their color would closely match the color of the natural stone on the slope where the bridge structures would be located, and that there would be no screening of the columns, deck, or safety rail. It was assumed that retaining walls would also include an up to 48-inch safety rail, would have a highly textured rock face that would match the color of the surrounding natural rock, and that the bottom edge and side edges of the wall would be screened from view. The existing metal beam guard rail and low timber retaining walls along SR 28 that are in view from the lake were included in the analysis.

The study found that, with implementation of certain design parameters, a shared-use path on either side of SR 28 between Tunnel Creek and Sand Harbor would not cause a decline in TRPA scenic threshold ratings. The design parameters to achieve this would be feasible to implement.

As a study tool for this EA, a set of illustrations of the project have been prepared to demonstrate the appearance of the project in nine different views. They illustrate the planned alignment of the path and structural features that would be required including walls and bridges. Exhibit 4.6-7 includes a map depicting the location and direction of view for the nine illustrations. The existing views and illustrations are presented in Exhibits 4.6-8 through 4.6-16. Because specific features of the shared-use path have not been designed at this stage, the aesthetic character of the project as shown in the illustrations is conceptual, but provides a reasonable representation of its potential appearance. Details regarding form, materials, colors, and textures would be determined during final design. They would conform to the specifications and performance standards described in Design Features SCE-1 through SCE-4 (see “List of Design Features” at the beginning of this document).

VISIBILITY OF THE PROJECT

ALTERNATIVES A AND B

Direct and Indirect Effects

Chapter 3, “Alternatives,” provides a complete description of the shared-use path associated with Alternatives A and B. Exhibits 3-2 through 3-5 show the alternative alignments. A complete set of the preliminary engineering plans for both action alternatives, which provided the basis for the illustrations, are included in Appendix B. Alternatives A and B would follow the same alignment on the east side of SR 28 from the trailhead parking area to Tunnel Creek. At Tunnel Creek the route would either drop down to and cross SR 28 via a constructed undercrossing or an at-grade crossing (Alternative A), or would climb slightly and cross Tunnel Creek on a new bridge (Alternative B). Alternative A would continue south in the area between SR 28 and the lake to Sand Harbor. Alternative B would remain on the hillside east of and above SR 28 to Sand Harbor, where it would cross SR 28 through an undercrossing or via an at-grade crossing. Alternative B would include a SR 28 crossing at Tunnel Creek to provide access to Hidden Beach and a connector path providing access to Memorial Point that descends the hillside to a point where the path would cross SR 28 via an at-grade crossing. Based on input from NDSP (the land manager at this location), the connector path at Memorial Point is an element of the project that NDSP may seek to remove during final design.

Alternatives A and B would begin at the proposed trailhead parking area in the NDOT right-of-way on the east side of SR 28. The path would initially flank Ponderosa Ranch Road. It would begin at the south end of the parking area where the existing shoulder is wide (Exhibit 4.6-8). The path would begin to veer away from the roadway as it heads southward and climbs the slope. A crossing with a pedestrian refuge would be provided at Lakeshore Boulevard (Exhibit 4.6-9). The transition up the slope would require a retaining wall along and facing the highway (Exhibit 4.6-10). The proposed trailhead parking area, the path, and the retaining wall would be visible from SR 28 and adjacent areas. Once the path is on the hillside above the highway, it would be mostly out of view from SR 28 due to screening by topography and vegetation. From the lake, the path above the road would be within view, but would be partially or completely screened by vegetation. Opportunities exist to provide scenic overlooks along the path, especially at locations where the path is highest in elevation (Exhibit 4.6-11).

Source: provided by Design Workshop in 2013

Exhibit 4.6-7

View Point Key

Existing View

Illustrated View with Project

Source: Photo by Tom Packard and Associates in 2013; Illustration by Design Workshop in 2013

Exhibit 4.6-8 View Point 1 (Alternatives A and B), Northern Terminus of Shared-Use Path Looking North

Existing View

Illustrated View with Project

Source: Photo by Tom Packard and Associates in 2013; Illustration by Design Workshop in 2013

Exhibit 4.6-9 View Point 2 (Alternatives A and B), Crossing at Lakeshore Boulevard Looking North

Existing View

Illustrated View with Project

Source: Photo by Tom Packard and Associates in 2013; Illustration by Design Workshop in 2013

Exhibit 4.6-10 View Point 3 (Alternatives A and B), Rocky Point Looking North

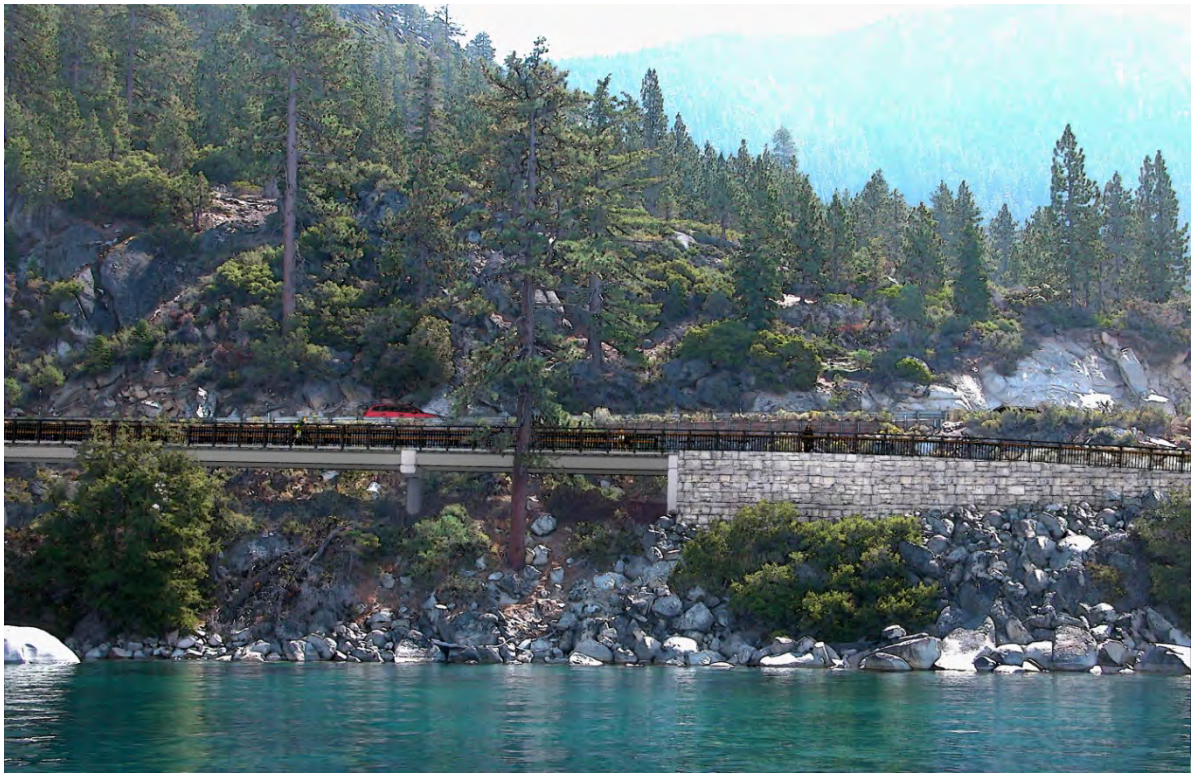
Existing View

Illustrated View with Project

Source: Photo by Tom Packard and Associates in 2013; Illustration by Design Workshop in 2013

Exhibit 4.6-11 View Point 4 (Alternatives A and B), Scenic Overlook Looking West

Existing View



Illustrated View with Project

Source: Photo by Tom Packard and Associates in 2013; Illustration by Design Workshop in 2013

Exhibit 4.6-12 View Point 5 (Alternative A), View of Bridge Structure and Retaining Wall from Lake Tahoe

Existing View

Illustrated View with Project

Source: Photo by Tom Packard and Associates in 2013; Illustration by Design Workshop in 2013

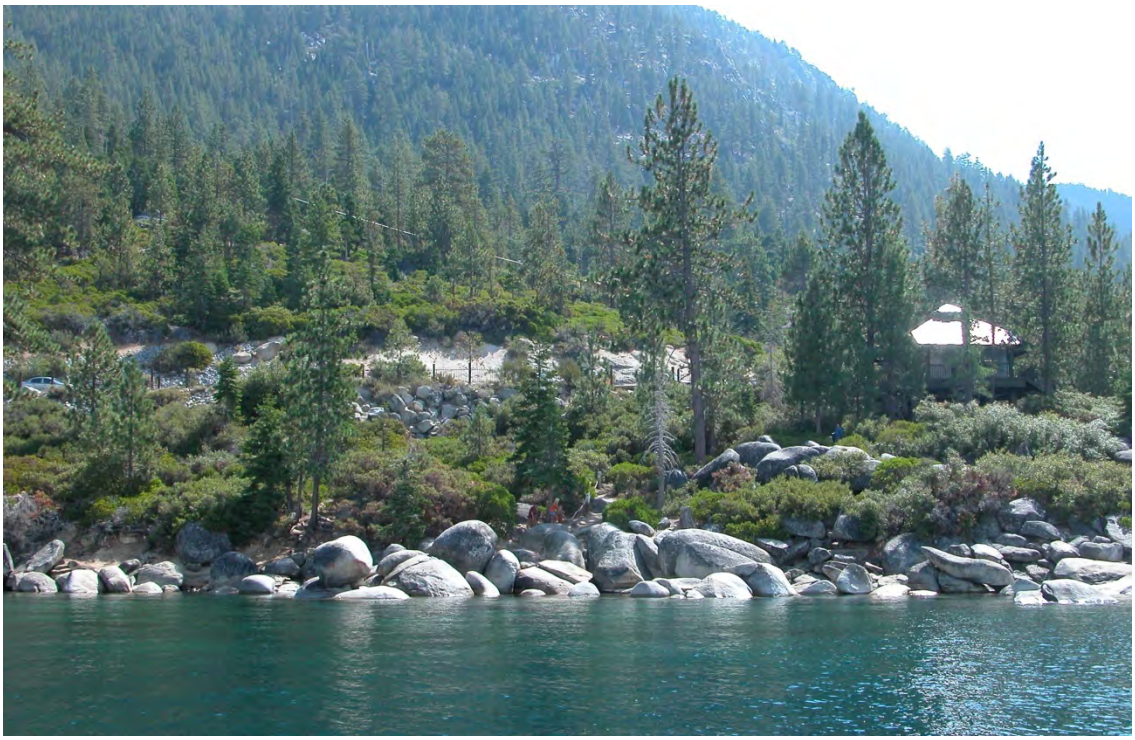
Exhibit 4.6-13 **View Point 6 (Alternative A), SR 28 Looking South**

Existing View

Illustrated View with Project

Source: Photo by Tom Packard and Associates in 2013; Illustration by Design Workshop in 2013

Exhibit 4.6-14 **View Point 7 (Alternative A), Memorial Point Looking North**



Existing View

Illustrated View with Project

Source: Photo by Tom Packard and Associates in 2013; Illustration by Design Workshop in 2013

Exhibit 4.6-15 View Point 8 (Alternative A), View of Memorial Point from Lake Tahoe

Existing View

Illustrated View of Project

Source: Photo by Tom Packard and Associates in 2013; Illustration by Design Workshop in 2013

Exhibit 4.6-16 **View Point 9 (Alternative A), Sand Harbor Looking East**

At Tunnel Creek, the proposed alignments of Alternative A and Alternative B diverge; Alternative A traverses the slope below SR 28 next to the lake and Alternative B remains on the hillside above the highway. Due to the steepness of the terrain, both alternatives would require use of retaining walls and/or bridge structures for construction. Based on the current design, the maximum amount of potentially visible surface area (vertical surface area) resulting from the construction of retaining walls, bridge structures, and safety railings is not substantially different for Alternative A (73,791 square feet) and Alternative B (77,153 square feet). To viewers looking shoreward from Lake Tahoe, Alternative A would likely be more noticeable due to its closer proximity to on-lake viewers, while Alternative B would be more distant and more frequently screened by existing topography and forest vegetation. Because Alternative B would have limited visibility from SR 28 and from Lake Tahoe, the following discussion is focused on Alternative A.

South of Tunnel Creek Alternative A would proceed south along the slope west of and below SR 28 next to the lake. The position of the path on the slope below the highway was chosen based on the results of the Preliminary Scenic Impact Assessment (Appendix E). Wherever feasible, the path was placed far enough down the slope so as to be out of view by motorists on the highway. In most cases persons on the highway traveling in either direction would not see the path facility, including the outside safety rail when looking directly out at the lake. The path would be below the line of sight from the road and out of view (Exhibits 3-7 and 4.6-12). The highway curves left and right as it conforms to the topography within the project area. At the curves the slope below the road may be visible, especially for persons traveling south, depending on the density of roadside vegetation. In these instances the path would be briefly visible, even though it is below the elevation of the highway. The path would be seen against the slope in these cases, not against the lake (Exhibit 4.6-13). It would also be seen at Memorial Point where the path would transition from the slope below the road and rise to conform to the north and south ends of the vista point parking lot. The path would be seen by highway motorists and persons stopping at the vista point. Visitors would have opportunities for unobstructed views of the lake and shoreline by walking onto the path from the vista point parking lot (Exhibit 4.6-14). Various options are being considered for aligning the path across the Memorial Point parking lot. As an alternative to crossing the lot, alignment of the path around the west side of the restroom building is being considered as Option D. Exhibit 4.6-15 shows the view from the lake at Memorial Point and illustrates the path joining the north end of the parking lot, and Option D around the west side of the restroom building.

The southernmost leg of Alternative A would be visible from the beach and boat ramp area on the north edge of Sand Harbor west of the boat launch. The view from this location is identified as View 4-4, a scenic resource, from Sand Harbor. The 1993 inventory notes that the views from this area extend for miles to the north and include the area surrounding Crystal Bay with more development seen than in other views from the park. The shared-use path would be seen on the slope just below SR 28 as a linear feature parallel to the highway, screened intermittently by trees and topography. The distance of the view to the path would be from 725 feet to 1,275 feet (Exhibit 4.6-16), which would reduce its prominence at the more distant end of the view range. A portion of the path would be seen at closer range where it enters the Sand Harbor Management Area of the park. The presence of the shared-use path in this view would not affect the travel unit's scenic threshold rating, because of its location, the existing presence of the highway and timber wall, intermittent vegetation and topographic screening, and the distance of most of the view.

While portions of the shared-use path would be visible from SR 28, Lake Tahoe, and places within Sand Harbor, the path alignment for Alternative A and Alternative B would provide many viewing opportunities along its three-mile length for the public to experience and enjoy the scenic beauty of Lake Tahoe and the surrounding area. The appearance and character of the proposed facility would be compatible with and complement the setting, because shared-use trails are present in many locations around the Region. The intent of the design objectives for the path is to exhibit aesthetic qualities that convey Tahoe style, such as in materials, surfaces, colors, and other design details. The project would be a scenic amenity, not only as a place from which the public may view the landscape, but also as a design feature that contributes positively to the scenic quality of the area.

Cumulative Effects

Of the related projects listed in Table 4.1-1, only the IVGID Sewer Export Pump Station Upgrade Project involves development within the same travel units as the North Demonstration Project. The upgraded pump station is set back 50 feet from SR 28 and is partially screened. It is not a highly conspicuous visual feature. Therefore, the North Demonstration Project would not result in adverse cumulative effects related to visibility of development when considered with the projects listed in Table 4.1-1.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path would not be constructed and there would be no change to the existing visual environment. Therefore, Alternative C would have no effects related to views of the project.

Cumulative Effects

Under Alternative C, the shared-use path would not be constructed and there would be no change to the existing visual environment. Therefore, Alternative C would not result in cumulative effects related to views from SR 28 and the lake.

EFFECTS ON VIEWS

ALTERNATIVES A AND B

Direct and Indirect Effects

The proposed shared-use path is a linear facility. It would consist of a paved surface at ground level with retaining walls in areas of steep side slopes and bridges for crossing small streams and to span deep, narrow valleys. The position of the path in Alternative A south of Tunnel Creek would be below SR 28 far enough down the slope so as to be out of view from the highway. The path facility, including the outside safety rail, would not interfere with views of the lake. In Alternative B the path would remain on the slope east of and above the highway. There would be no potential for Alternative B to interfere with views of the lake or other scenic vistas. The shared-use path would provide new viewing opportunities for extensive vistas of this highly scenic area.

Alternatives A and B would be visible to varying degrees from the lake when looking toward the shore and, at certain view angles, from SR 28. The shared-use path would be an added feature to the existing scene, but would not block or disrupt views. The design of the path would feature extensive use of rock material and colors that match and complement the surroundings. Based on design objectives for the path, its character would be appropriate for the setting in terms of materials, surfaces, colors, and other design features.

Alternative A would provide outstanding, unobstructed views of the lake because it would be relatively close to the water and would follow the curving shoreline for an extended length of the path. At the same time it would be more noticeable in views from the lake looking toward the shore, because of its proximity to the lake. Alternative B would be better screened by forest vegetation and would mostly be outside the focus of attention of persons traveling on SR 28 (i.e., with most viewers focusing on the lake, rather than the forest hillside). Alternative B would be in proximity to the existing overhead utility line that is east of and parallel to the highway. The utility line would be in view from the new shared-use path in Alternative B, which would intrude into some of the available lake vistas.

Cumulative Effects

None of the related projects listed in Table 4.1-1 would have an effect on views within the same travel units as the North Demonstration Project. Similarly the shared-use path would not adversely affect views. Therefore, the

North Demonstration Project when considered with the projects listed in Table 4.1-1 would not result in adverse cumulative effects on views.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path would not be constructed and there would be no change to the existing visual environment. Therefore, Alternative C would have no effects related to views of the project.

Cumulative Effects

Under Alternative C, the shared-use path would not be constructed and there would be no change to the existing visual environment. Therefore, Alternative C would not result in cumulative effects related to views from SR 28 and the lake.

CONSISTENCY WITH DESIGN STANDARDS, SQIP, AND DESIGN REVIEW GUIDELINES

ALTERNATIVES A AND B

DIRECT AND INDIRECT EFFECTS

The North Demonstration Project shared-use path would comply with TRPA, Washoe County, and NDOT design standards. The project would conform to the Regional Design Principles for rural transitional and rural visual environments described in the TRPA Design Review Guidelines (TRPA 1989). The proposed trailhead parking at the north end of the project would be designed in accordance with TRPA guidelines. It would provide organized paved parking to replace existing shoulder parking displaced by the shared-use path. It would feature 31 angled parking spaces. Two would be designated for handicapped persons. A 5-foot wide sidewalk would be located along the eastern edge of the parking area. A landscaped median and raised curb would separate the parking area from SR 28. Landscaping would consist of hardy native vegetation tolerant of loading from snow removal. All other features of the shared-use path would be consistent with applicable design standards and design review guidelines.

The SQIP (TRPA 1989a) was adopted to provide a program for implementing physical improvements to the built environment in the Lake Tahoe Basin. The SQIP was incorporated into and became a component of the EIP in 2001 (TRPA 2001). The shared-use path would be consistent with the SQIP's Goal #2 for roadway and shoreline travel units, which is to improve the accessibility of Lake Tahoe for public viewing and to enhance the opportunities to view the lake. Alternatives A and B would increase opportunities for views of scenic features, especially Lake Tahoe. The project would provide an aesthetically pleasant experience of moving through the project area with an emphasis on the natural environment and Lake Tahoe in particular.

The SQIP is an overall action plan to specifically improve the scenic quality of roadway and shoreline travel routes that do not meet the scenic resources thresholds. It is intended to contribute to the attainment of the scenic quality thresholds. Travel routes that are within nearly the entire limits of the North Demonstration Project currently meet scenic resources thresholds. An exception is Shoreline Travel Unit 23, Crystal Bay, which does not meet the scenic threshold standard. Approximately 0.5 mile of the study area at the north end of the project is within this travel unit. The shared-use path would be east of the highway in this area, not between the highway and the lake. There are two scenic improvement projects described in the EIP within the limits of the North Demonstration Project. Both are in Roadway Travel Unit 26, Sand Harbor. EIP Project 04.02.01.12 involves reducing the contrast of rock revetment placed on roadside slopes for erosion control purposes by vegetating and staining the rock. EIP Project 04.02.01.11 involves screening views of the maintenance facility at Sand Harbor from SR 28. As part of the proposed North Demonstration, TTD would implement both of these EIP

projects (see Chapter 3, "Alternatives"). In addition, TTD proposes to treat the existing large highway cut on the east side of SR 28 near Lakeshore Boulevard at the north end of the project and the existing metal posts that support the wood retaining wall along the west side of SR 28 with a darkening stain. This would eliminate the high contrast of these features and would thus improve scenic quality in the SR 28 corridor.

Cumulative Effects

The North Demonstration Project would be consistent with all applicable design standards, the SQIP, and design review guidelines. Therefore, when considered with the projects listed in Table 4.1-1, the North Demonstration Project would not result in adverse cumulative effects related to consistency with design standards, the EIP, or design review guidelines. Conversely, the project would correct certain conditions that have adversely affected scenic quality.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path would not be constructed and there would be no change to the existing visual environment. Therefore, questions of consistency with design standards, the SQIP, or design review guidelines do not apply to Alternative C.

Cumulative Effects

Under Alternative C, the shared-use path would not be constructed and there would be no change to the existing visual environment. Therefore, the project would not contribute to any cumulative effects related to questions of consistency with design standards, the SQIP, or design review guidelines do not apply to Alternative C.

CONSEQUENCES FOR TRPA ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

This section describes the effects of the project alternatives on TRPA environmental thresholds for scenic resources. Four scenic threshold reporting categories have been established by TRPA:

- Travel Route Ratings,
- Scenic Quality Ratings,
- Bike Trail and Public Recreation Area Scenic Quality Ratings, and
- Community Design.

The North Demonstration Project would be within one TRPA Roadway Travel Unit and two Shoreline Travel Units. Each of the travel units has a numeric scenic threshold rating. When the rating is equal to or above the applicable numeric scenic threshold standard, the unit meets or exceeds the standard, and is therefore in attainment. Otherwise the unit is below the standard and not in attainment. Also, the project would extend to the entrance of Sand Harbor, a TRPA-listed public recreation area. TRPA-listed public recreation areas have numeric threshold ratings for scenic resources that are associated with the recreation area. The project therefore has the potential to affect TRPA scenic thresholds. At the outset of environmental studies, TRPA was consulted regarding evaluation of scenic effects of the project. During those discussions, it was agreed that a contrast rating analysis would be the most suitable means of evaluating the potential scenic effects of the project. The contrast rating analysis methodology is described in Appendix G of the TRPA Design Review Guidelines. It was further agreed that if the project could achieve a sufficiently high contrast rating score, it would be reasonable to conclude that the project would not cause a decrease in TRPA scenic threshold ratings.

A project's contrast rating is determined using a standardized TRPA method. It considers the color and texture of proposed surfaces, the number of planer surfaces a feature would have, and how much of a project's outer

edges would be visible. The method uses a spreadsheet template developed by TRPA to calculate a composite contrast rating score for a project. The composite score determines how many visible square feet of surfaces that face the lake are allowed. The higher the contrast rating score, the more visible square feet of surfaces that are allowed, up to a maximum.

For Alternative A, assumptions about the characteristics of a typical bridge structure and a typical retaining wall were developed based on engineering studies of the project (as described under "Methods and Assumptions"). The existing metal beam guard rail and low timber retaining walls along the west side of SR 28 were included in the analysis. Without retaining walls, the combined surface area for a bridge structure and safety railing, the guard rail, and timber walls was calculated to be 677 square feet per 100 linear feet. The composite contrast rating for the bridge structure, guard rail, and timber walls was calculated at 21. A composite contrast rating of 21 translates to an allowable visible surface area of 680 square feet, slightly more than the 677 square feet required for the design used in the analysis. The analysis for Alternative A was carried forward to include retaining walls. It showed that retaining walls up to 8 feet high for the entire length of the trail could be used without exceeding the allowable total lakefront surface area determined by the calculated composite contrast rating score.

While retaining walls would add to the total lakefront surface area per 100 linear feet of the project, they would also yield a somewhat higher composite contrast rating score, thus increasing the allowable lakefront surface area. This is due to the visual characteristics (color, texture, exposed edges) of the proposed rock walls. The analysis that used an average of 8 foot high retaining walls was conservative; while Alternative A would likely include retaining walls that exceed 8 feet in height, wall heights in many locations would be below 8 feet. An analysis of the total surface area for Alternative A at this preliminary plan level determined that wall heights on average would be below 8 feet, so the project would not decrease the travel unit's scenic threshold rating.

For the analysis of Alternative B on the east side of SR 28, it was assumed that a typical 100-foot segment of the shared-use path would have a maximum retaining wall height of 12 feet. The wall could either be on the uphill side of the shared-use path to contain a cut slope, below it on the downhill side to contain a fill slope, or both in cases where a bench would need to be cut, but that the combined height of the walls in this case would be no more than 12 feet. Walls on the downhill side of the shared-use path would require an up to 48-inch high safety rail. These dimensions yield a total area of 1,200 square feet for wall surfaces that face the highway per 100 linear feet and up to 63 square feet for a safety rail. It was further assumed that the wall surfaces would be made of rough-hewn timbers or a stone-like surface pattern, that the color of the walls would closely match the surrounding hillside conditions, and that some screening of the edges of the walls would be achieved. Under these circumstances the calculated composite contrast rating of the retaining walls was 26, which yields an allowable visible surface area of 1,365 square feet, more than the 1,263 square feet assumed to be required based on the design parameters used for the analysis. The analysis is conservative (i.e., tending to overstate the effect), yet still is within the maximum allowable visible surface area. The actual visible surface area is likely to be closer to 500 square feet (based on an average wall height of 5 feet) depending on final design. Additionally, existing trees would screen portions of the view of path retaining walls from SR 28, further reducing the total visible surface area.

In summary, the analysis conducted in support of this EA finds that the required surface area for either Alternative A or B would be within the allowable surface area. A shared-use path with the characteristics and dimensions used in the analysis would be allowed under Chapter 66 of the TRPA Code. It is, therefore, concluded that under these circumstances the project would not cause a decrease in TRPA scenic thresholds.

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4.7 RECREATION

This section describes existing recreational uses and facilities in the project vicinity and presents an analysis of potential effects to such facilities, as well as the creation of new outdoor recreation opportunities, resulting from implementation of Alternatives A through C. A discussion of the regulatory environment specific to recreation can be found in Appendix C. The discussion below assumes that the current policy of NDSP, which does not allow walk-in entrance to Sand Harbor for pedestrian safety reasons (effective June 15, 2012), would be amended to allow walk-in and bicycle-in access to the park via the proposed shared-use path. However, if NDSP decided not to amend this policy as a management response to existing capacity constraints at Sand Harbor during peak periods, then users of the shared-use path would not be allowed access to Sand Harbor during those periods.

As discussed in Section 4.2, "Land Use, Socioeconomics, and Environmental Justice," and Appendix D of this document, Alternatives A through C are consistent with the TRPA Regional Plan Recreation Element goals and policies relevant to the proposed project, as well as with those policies pertaining to recreation in PAS 047, PAS 049, PAS 055, and the Ponderosa Ranch Community Plan. Therefore, consistency with applicable TRPA goals and policies related to recreation is not discussed further in this section.

TRPA had developed the Persons At One Time (PAOT) system to establish the capacity of certain types of developed recreation sites. The PAOT system does not apply to dispersed recreation sites such as shared-use paths, other trails, and cross country ski courses (TRPA 2006). Additionally, the proposed shared-use path would not alter the developed recreation sites within the project vicinity such that the number of PAOTs assigned to such sites would need to be increased or otherwise affected. For the purposes of this EA, capacity of existing recreation sites in the project vicinity was analyzed using methods consistent with the 2005 Regional Recreation Plan Recreation Assessment (TRPA 2005) and the Sand Harbor Recreational Capacity Study (NDSP 2011).

4.7.1 AFFECTED ENVIRONMENT

Recreational opportunities in the Tahoe Basin are abundant and diverse, with activities generally associated with Lake Tahoe's open water (e.g., swimming, motorized and non-motorized boating, personal watercraft use, and fishing), shoreline (e.g., sunbathing, beach play, picnicking, camping, bicycling, and sightseeing), and the terrain surrounding the lake (e.g., hiking, mountain biking, snowshoeing, skiing, and snowboarding). The following describes existing recreation sites within the project area and in the project vicinity. Information on existing facilities, capacity, and current usage at each recreation site is summarized below.

HIDDEN BEACH

Hidden Beach is the northernmost beach area within the Lake Tahoe Nevada State Park, Sand Harbor Management Area. This secluded beach is located just west of SR 28, approximately 0.5 mile south of its intersection with Lakeshore Boulevard. The beach is strewn with large boulders at its margins. No official parking area or signage exists for this beach and it is predominantly used by repeat visitors and local residents who are aware of its location. The area is served by one vault toilet, but no other restrooms nor running water are available.

The square footage of available beach varies greatly depending on the water level of Lake Tahoe. During a high water year, the available beach is restricted to approximately 41,500 square feet. When water levels are low, the available beach expands to approximately 79,400 square feet. The average available beach area (including boulder areas) is 60,471 square feet (TTD 2013: Table 12). The desired density for a dispersed beach, such as Hidden Beach, ranges from 150 (TRPA 2005) to 323 square feet per person (NDSP 2011). Based on this desired

density range, during average lake level conditions the desired capacity of the beach would range from 187 to 403 persons at a given time. During peak-hours, the beach is currently supporting 374 persons with a density of approximately 162 square feet per person (TTD 2013: p. 71). Therefore, under existing conditions and during peak periods (weekends and holidays in July and August), Hidden Beach meets TRPA's desired density standard, but exceeds the desired density standard developed by NDSP. Monthly and annual data derived from visual vehicle count estimates by NDSP indicate that the annual visitation at this recreation site is approximately 72,600 visitors, with a summer season (June, July, and August) average of 680 visitors per day.

MEMORIAL POINT SCENIC OVERLOOK

The Memorial Point Scenic Overlook is located approximately 1 mile north of Sand Harbor on the west side of SR 28 within the Lake Tahoe Nevada State Park, Sand Harbor Management Area. This roadside overlook and rest area is easily accessible with a well-marked sign on SR 28. There is a short trail that leads to the lake with beautiful vistas of the lake and interpretive signs on the region's geology, history, and natural history. Memorial Point has a four-unit restroom and a drinking fountain.

There are 28 paved parking spaces at Memorial Point, of which 18 are signed as 20-minute spaces and two are handicapped spaces. An average of 76,600 vehicles per year entered the site annually between 2008 and 2010. During the peak-use summer months, the monthly average number of vehicles entering Memorial Point over this three-year period was 8,322, 11,362, and 10,092 vehicles, respectively, in June, July, and August. Average parking use levels at Memorial Point were above 80 percent of capacity during the month of July over the three-year period analyzed (with the assumption of 15 turnovers of each space per day, which most closely matches the short duration of most visits). Parking along SR 28 functions as overflow when the primary parking areas are full. This overflow capacity is limited by parking prohibitions and the distance visitors are willing to walk. It should also be noted that Sand Harbor visitors commonly park at Memorial Point and walk along the lake shore trail to Sand Harbor, leaving the vehicle for several hours and using a portion of the parking capacity intended for Memorial Point visitors (NDSP 2011). The use of this trail has been reduced with the newly adopted policy prohibiting walk-in access during peak summer months.

Memorial Point provides a short path to a scenic viewpoint of Lake Tahoe, but it does not have beach access to Lake Tahoe. The lake is separated from the path and viewpoint by existing boulders and rocks.

SAND HARBOR

Sand Harbor is the southernmost beach area within the Lake Tahoe Nevada State Park, Sand Harbor Management Area. Sand Harbor is located approximately 3 miles south of Incline Village on SR 28. It is the most heavily used portion of Lake Tahoe Nevada State Park, receiving 700,000 to 900,000 recreation visits annually. Sand Harbor is a triangular peninsula that covers approximately 53 acres, with a wide sandy beach, rocky coves, shady forested areas, and panoramic lake views. The Lake Tahoe Shakespeare Festival is held at Sand Harbor in July and August, and the Sand Harbor Music Series provides live music lake side on Monday and Friday nights through the summer.

Sand Harbor provides the following recreational facilities (NDSP 2011):

- The Main Beach is a narrow (100 to 150-foot-wide) 2,500-foot-long stretch of sandy beach on the south side of the peninsula. Two parking areas and four restrooms serve the Main Beach. The Main Beach is open year round as follows: from 8:00 a.m. to 7:00 p.m. between May 1 and Memorial Day; from 8:00 a.m. to 9:00 p.m. between the day after Memorial Day and Labor Day; from 8:00 a.m. to 7:00 p.m. between the day after Labor Day and September 30; and from 8:00 a.m. to 5:00 p.m. between October 1 and April 30. Beaches are patrolled by NDSP staff from Memorial Day through Labor Day.

- The Family Picnic Area is south of the main Sand Harbor entrance with an open forest setting and 57 picnic tables and grills, two restrooms, several bear-proof garbage/recycling receptacles, and a hot coal safety area.
- The Group Use Area provides views of Lake Tahoe with 12 picnic tables, a large barbeque, electricity, sink with running water, and granite counter. The Group Use Area is served by parking spaces, a restroom, and bear-proof garbage/recycling receptacles.
- Diver's Cove is situated on the shore adjacent to the Group Use Area, providing a more enclosed beach setting than the Main Beach. Boulders and sandy areas are interspersed along the lake shore in this area. Scuba divers use this area to enter and exit the water.
- The 5,000-square foot Sand Harbor Visitor Center and concession building (gift shop and restaurant) are located adjacent to the main parking lot.
- The Boat Ramp Area is served by a separate entrance from SR 28 and provides a four-lane boat ramp with three boarding docks. The Boat Ramp area also has additional motor vehicle and boat trailer parking, a restroom, and bear-proof garbage/recycling receptacles.
- The Sand Harbor to Memorial Point Trail is a short, 0.5 mile, trail that offers a link from Sand Harbor to Memorial Point and provides access to many secluded beach and rock areas.
- The approximately 0.3 mile Sandy Point Nature Trail is a handicap-accessible trail with three kiosks, six interpretive signs, and views of Lake Tahoe.

Parking Capacity and Usage

Parking is available at Sand Harbor as follows:

- Sand Harbor Main Area – approximately 532 vehicle spaces (combination of main parking lot, south parking lot, and spaces along the road between the two lots)
- Sand Harbor Group Use Area – 26 reserved parking spaces
- Sand Harbor Boat Ramp Area – 59 vehicle-trailer spaces and 16 vehicle spaces that are reserved/signed as car-top boat (kayak) spaces. Vehicles with short trailers can sometimes fit an additional group member's vehicle in the space. The vehicle-trailer spaces may also be used by two vehicles without trailers when the boat ramp is closed due to low water.
- Overflow on SR 28 – Parking along SR 28 used to function as overflow when the primary parking areas were full. It presented a serious traffic congestion and pedestrian safety concern. This overflow role of SR 28 has been eliminated by parking restrictions and the July 2012 NDSP prohibition against walk-in visitors at Sand Harbor.

At Sand Harbor, parking is the primary, limiting user-capacity factor and is, therefore, the primary facility-related constraint on use levels at the park. On average (during the years of 2008–2010), approximately 96,500 vehicles entered Sand Harbor at the main entrance annually. During the peak-use summer months, the monthly average of vehicles entering Sand Harbor over a three-year period was 12,221, 28,853, and 26,767 vehicles in June, July, and August, respectively. Sand Harbor was temporarily closed to additional vehicles during peak summertime periods for approximately 47 days in 2010 because parking lots became full. During these times, many parking spaces were occupied by the same visitors' vehicles from mid-morning through mid-afternoon, when park usage (and parking demand) is greatest. Additionally, an average of 29,400 vehicles per year (during the years of 2008-2010) entered the Boat Ramp Area of Sand Harbor. While vehicle access is available year round at the Boat Ramp Area, the ramp is not necessarily usable for launching motorcraft (i.e., boats cannot be safely launched) during all months of the year. Parking use levels at both the main Sand Harbor parking area and the Boat Ramp parking area were documented consistently at 80 to 95 percent of capacity through June and July (with the assumption of one turnover of each space per day in the main parking area and three turnovers per day in the

Boat Ramp Area). This demonstrates the high parking occupancy that is the summer-season norm at Sand Harbor and confirms that parking demand regularly reaches or exceeds capacity (NDSP 2011).

BEACH CAPACITY AND USAGE

The capacity of beach area at Sand Harbor varies based on the water level in Lake Tahoe. At low water conditions (as in 2004), Sand Harbor has approximately 414,300 square feet of beach area. However, in high water conditions (as in 2006), the beach area is reduced to approximately 183,800 square feet, a 56 percent difference in maximum and minimum beach area depending on low or high lake levels. The average available beach area at Sand Harbor is 299,040 square feet (TTD 2013: p. 71).

The Sand Harbor Recreational Capacity Study proposed a maximum density standard for developed beaches of 162 square feet per person, although the park is not currently managed for this density during peak season (NDSP 2011: pp. 51 and 52). The TRPA density standard for a developed beach is 100 square feet per person (TRPA 2005: p. 16). These density standards seek to define the desired capacity of the developed beach at Sand Harbor (which is the maximum number of beach users at one time that would retain a desired visitor experience, rather than a physical capacity). The standards would range from 1,846 to 2,990 persons using the developed beach at one time, based on the average available beach area and the two density standards, i.e., 162 square feet per person (NDSP) and 100 square feet per person (TRPA), respectively.

The Sand Harbor Recreational Capacity Study concluded that during the peak summer season, recreation use at Sand Harbor is exceeding the recreational capacity of the area. The spatial or physical capacity of the beach area is only occasionally exceeded during low water years, but it is frequently exceeded in high water years during peak use (NDSP 2011). Table 4.7-3 shows that, except for summer holiday weekends, use of Sand Harbor is consistent with the desired conditions (not exceeding capacity) established by TRPA and NDSP during average lake level conditions. Elsewhere within the park, certain individual use areas (i.e., the Main Beach, Diver's Cove, and Boat Ramp) are routinely exceeding capacity.

Regardless of desired conditions, the existing management challenge at Sand Harbor described by NDSP staff and articulated in the Sand Harbor Recreational Capacity Study is the ability of current staffing levels to adequately meet day-to-day management needs during the peak season. The routine management challenges include providing a sufficient number of lifeguards and sufficient patrol presence on the beaches, managing traffic flow and parking utilization within the park, and keeping up with constant site maintenance needs, particularly for restrooms (NDSP 2011: p. 158). This concern has been consistently voiced by NDSP during on-going consultation related to the North Demonstration Project.

EXISTING BICYCLE AND PEDESTRIAN TRAILS

SR 28 provides the primary access to much of the area. Existing shared-use paths and other trail facilities in the project area are described below (Exhibit 3-2).

LAKESHORE BOULEVARD SHARED-USE PATH

The Lakeshore Boulevard Shared-Use Path is an approximately 2.5-mile path that parallels Lakeshore Boulevard from Gateway Park on SR 28 to the southern junction of SR 28 and Lakeshore Boulevard. This 8-foot-wide meandering path is popular with joggers and provides access to developed recreation sites, Incline Village beaches, and views of scenic estates. The path crosses numerous driveways and is located on both sides of the roadway. This path is a component of the larger Nevada Stateline-to-Stateline Bikeway and overall regional shared-use path network.

FLUME TRAIL

The Flume Trail runs from Marlette Lake in the Lake Tahoe Nevada State Park backcountry, toward Incline Village along the path of a historic logging flume. For most of its length, the trail grade is gradual, dropping approximately 40 feet in elevation per mile, but traverses across very steep slopes and offers un-obstructed views of Lake Tahoe, 1,600 feet below. The trail is typically ridden south to north, with users exiting to SR 28 at Tunnel Creek or following Tunnel Creek Road to Ponderosa Ranch. During summer months, a concessionaire provides a shuttle service between the Tunnel Creek Station Café in Incline Village and Spooner Lake near the upper trailhead.

TAHOE RIM TRAIL

The Tahoe Rim Trail includes 165 miles of single-track, multi-use trail. Hiking and horseback riding are allowed on all portions of the trail, while mountain biking is allowed on the trail except in wilderness areas, Lake Tahoe Nevada State Park, and segments that overlap with the Pacific Crest Trail. The Tahoe Rim Trail parallels SR 28 high above Lake Tahoe and Marlette Lake.

DISPERSED LAKE ACCESS POINTS AND TRAILS

Numerous trails and footpaths exist within the project area, many of which are not officially designated as trails by NDSP. These trails and trail networks provide access to dispersed recreation sites and beaches. Approximately five developed access points providing stairs from SR 28 to adjacent beaches exist between Hidden Beach and Sand Harbor. An unauthorized network of trails (sometimes called social trails or volunteer trails) is located behind the SR 28 guardrail; the trails provide access to Hidden Beach. Additionally, trail improvements at Memorial Point provide interpretative opportunities for viewpoint users. Improved and unimproved trails within the project area are shown on the preliminary engineering plans (Appendix B) and Exhibits 3-14, 3-15, and 3-18 through 3-21.

INCLINE VILLAGE PARKS AND RECREATION FACILITIES

Other recreational facilities within the project vicinity include:

- Recreation Center – the 37,000-square foot recreation and fitness complex includes cardiovascular room, weight training area, group fitness classes, and indoor pool. The Center offers a selection of programs and equipment to the public.
- Tennis Center – eleven courts and pro shop next to the Recreation Center.
- Ski Beach, Incline Beach, and Burnt Cedar Beach – These beaches are exclusively for those with valid Incline Village General Improvement District recreation passes. Ski Beach has a boat launch facility, picnic areas, bocce ball court, and volleyball court as well as kayak/canoe storage rentals. Incline Beach is a sandy beach and swimming area with picnic areas and a snack bar. Burnt Cedar Beach has a private sandy beach area, a playground, and a heated outdoor swimming pool.
- Diamond Peak Ski Resort – located minutes from Incline Village, this ski resort is family-friendly with 30 runs, including beginner, intermediate and advanced runs.
- The par 72 Championship Golf Course (955 Fairway Boulevard) and par 58 Mountain Golf Course (690 Wilson Way) are both 18-hole courses in Incline Village.
- Incline Skate Park – located at Tahoe Boulevard and Southwood Boulevard, the skate park offers beginner, intermediate, and advanced sections with various bowls, ramps, and rails.
- Incline Park – located at 939 Southwood Boulevard, Incline Park consists of two softball/baseball fields and a disc golf course located adjacent to the Recreation Center and Skate Park.

- Preston Field – located at 700 Tahoe Boulevard, this field is perfect for playing softball and baseball.
- Village Green – located at 960 Lakeshore Boulevard, there is a multi-use field with a trail and creek that run around the edges of it.

Construction of the North Demonstration Project would not be anticipated to influence use levels of these Incline Village recreational facilities, because of their distance from the proposed shared-use path. In addition, many of these facilities are open only to residents of Incline Village or through membership subscriptions.

4.7.2 ENVIRONMENTAL CONSEQUENCES AND RECOMMENDED MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Based on the TRPA Initial Environmental Checklist, a project would result in a significant adverse effect on recreation if it would:

- result in a decrease or loss of public access to any lake, waterway, or public lands;
- result in a reduction of public access to public recreation areas or public recreation opportunities;
- create substantial, unmet additional demand for recreation facilities; or
- result in conflicts between recreation uses, either existing or proposed.

The effects of the project on TRPA recreation thresholds ("Quality Experience and Additional Access" and "Fair Share of Resource Capacity") are discussed separately at the end of this section.

Because the proposed project is a recreational facility and has been designed to specifically meet the demand for high-quality, outdoor recreation opportunities in the Tahoe Basin, the "unmet additional demand" significance criterion is not discussed further in this document. However, because implementation of the project would provide enhanced access to existing recreational facilities, this effect is analyzed below.

METHODS AND ASSUMPTIONS

One of the key factors influencing the recreation effects of the project is the predicted level of use of the proposed shared-use path. The anticipated level of bicycle and pedestrian activity on the proposed North Demonstration Project shared-use path was estimated as part of the traffic analysis conducted in support of this EA and described in Section 4.9, "Traffic, Parking, and Transit." The traffic analysis estimated the number of shared-use path users during three time periods: daily, peak hour, and annual (LSC 2009; LSC 2012). A summary of total estimated usage along the North Demonstration Project for Alternatives A and B is presented in Table 4.9-4 in Section 4.9. Alternative A is projected to attract approximately 35 percent more users than Alternative B, because its alignment would serve a wider range of users and its lakeside location offers spectacular views of the lake that are expected to attract visitors. These estimates include existing pedestrians and bicyclists along SR 28 within the project vicinity that would be expected to use the shared-use path.

The discussion herein regarding the proposed project's effect on capacity at existing recreation sites uses NDSP's more restrictive density standard. TRPA's density standards are met at Hidden Beach and Sand Harbor with both action alternatives (except on during peak hours on holiday weekends) (Table 4.7-3).

INCREASED PUBLIC ACCESS AND RECREATIONAL OPPORTUNITIES

ALTERNATIVES A AND B

Direct and Indirect Effects

Separated bicycle facilities are not available along most of the Nevada side of Lake Tahoe. Implementation of either Alternative A or B would result in the creation of an approximately three-mile-long, shared-use path extending south from the Incline Village area to Sand Harbor, consistent with the path envisioned in the Lake Tahoe Bicycle and Pedestrian Plan and the Lake Tahoe Regional Transportation Plan. One of the main purposes of the North Demonstration Project, and broader Nevada Stateline-to-Stateline Bikeway project, is to provide a recreation access opportunity to link public beaches and coves along the east shore. Alternatives A and B would provide a separated, shared-use path that links and provides non-motorized public access from community centers and neighborhoods within Incline Village to recreation areas, including Hidden Beach, Memorial Point, and Sand Harbor. These popular recreation areas are generally accessed by automobile only at this time (except for seasonal transit service that is provided from Incline Village to Sand Harbor during peak summer months). In addition, the proposed shared-use path would connect to the existing shared-use path on Lakeshore Boulevard in Incline Village, which intersects with a shared-use path on Southwood Boulevard and Northwood Boulevard, as well as a bicycle path on Mt. Rose Highway (SR 431). The North Demonstration Project is envisioned to eventually connect with other segments of the Nevada Stateline-to-Stateline Bikeway project to form a continuous shared-use path along the east side of Lake Tahoe.

Both Alternatives A and B would provide a new, high-quality, recreation opportunity, while protecting and enhancing the quality, integrity, and character of existing recreation opportunities (see impact discussions below). The shared-use path would serve a broad spectrum of users by meeting AASHTO and ADA design standards, wherever feasible. The shared-use path would enhance public access to lakefront recreation opportunities including beaches, natural areas, open space, trails, restrooms, concessions (e.g., kayak and bicycle rentals), high quality views, and food and beverage service. The proposed shared-use path would support Washoe County's Recreation Goals and Policies, the recommendations of the NDSP Sand Harbor Recreational Capacity Study, TRPA's Goals and Policies from the Recreation Element related to increased recreational access (see Appendix D), as well as support the goals of the TRPA Tahoe Region Bicycle and Pedestrian Plan and the TMPO Regional Transportation Plan. Therefore, both action alternatives would result in a ***beneficial effect*** related to increased recreational opportunities.

Cumulative Effects

Several projects identified in Table 4.1-1 would expand and/or enhance recreational opportunities in the immediate project vicinity and in the Tahoe Basin. Because implementation of either action alternative would result in the construction of a shared-use path that contributes to the network of recreational opportunities, it would be expected to contribute to a cumulative beneficial recreation effect.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed. Therefore, the inventory of existing recreation facilities would remain unchanged from existing conditions.

Cumulative Effects

Several projects identified in Table 4.1-1 would expand and/or enhance recreational opportunities in the immediate project vicinity and in the Tahoe Basin. Under Alternative C, no shared-use path would be constructed. As such, Alternative C would not increase or enhance the inventory of existing recreation facilities and would not contribute to any cumulative beneficial recreation effects.

INCREASE IN DEMAND FOR AND USE OF EXISTING RECREATION FACILITIES

ALTERNATIVES A AND B

Direct and Indirect Effects

Implementation of either action alternative would result in changes to public access and recreation use within the study area. The proposed shared-use path would provide additional connectivity and non-automobile access to existing recreation areas including Hidden Beach, Memorial Point, and Sand Harbor, as well as the existing system of developed and social trails. These recreational facilities currently experience peak demand during holidays and weekends during the summer, primarily in July and August. During peak-use days, the capacity of certain recreation sites and facilities in the project area have been reached or exceeded under current conditions, which has created site and facility management difficulties for NDSP. Because of the connectivity of the shared-use path to these recreation facilities, as well as expected publicity about the project on trail maps and visitor brochures, both action alternatives would increase use of these recreation areas, which could exacerbate existing site management challenges during peak periods.

The best data available regarding the habits of shared-use path users is the Camp Richardson surveys and counts presented in the Lake Tahoe Basin Bicycling and Walking Monitoring Report: July-August 2009 (TRPA 2009). This report surveyed the shared-use path users at various separated bicycle facilities within the Tahoe Basin and included a focused study of the users near Camp Richardson. This included a survey question of "If you are going or have been to the beach today, how long will you/did you stay?" Table 4.7-1 summarizes the results of this survey.

Table 4.7-1 Shared-Use Path Users Length of Stay at Beaches

Length of Stay at Beaches		% Respondents
Response Choice	(Hours)	
< 30 min	0.33	47%
30-60 min	0.75	29%
1-3 hrs	2.00	21%
3 or more hrs	6.00	3%
Weighted Average	**0.97**	

Source: TRPA 2009

The data in Table 4.7-1 is generally consistent with the expectations for the North Demonstration Project shared-path users, though anecdotally NDSP has observed that the length of stay may be longer at Sand Harbor than at Camp Richardson recognizing that the Camp Richardson area provides other recreational amenities (e.g., restaurants, interpretive trails, horse stables) that are not available in the Sand Harbor Management Area. While many users may have a primary trip purpose of a long beach visit (over 1 hour), many users would also be using the path for recreational travel, exercise, or lake viewing with a relatively short stay expected to occur at the beach. Based on the data in Table 4.7-1, the weighted average length of stay is estimated at 1 hour.

The Monitoring Report also provides hourly counts of shared-use path users at the Camp Richardson Trail between 7:00 a.m. and 6:00 p.m. The monitoring indicated that the peak hour of path use was between 1:00 p.m. and 2:00 p.m., where 15.4 percent of path users were observed. Conservatively assuming no path use beyond this overall survey period, this indicates that the ratio of peak shared-use path users on the beach to the increase in daily corridor visitors generated by the path is 0.154 (Peak Hour Factor).

Tables 4.7-2 and 4.7-3 present the projected net increase in use a Hidden Beach, Memorial Point, and Sand Harbor resulting from construction of the proposed project. The data presented in these tables was adapted from the usage data shown in Table 4.9-4 to exclude existing pedestrian and bicycle use within the project area. Table 4.7-2 provides the daily and annual projected increase in use, and Table 4.7-3 provides the increase in "peak-hour use" at each site derived from the daily use shown in Table 4.7-2 and the Peak Hour Factor discussed above.

Based on the projected use of the proposed shared-use path in either Alternative A or Alternative B, and based on existing recreation use characteristics at the primary sites and facilities in the project area, the North Demonstration Project is anticipated to increase demand for and use of Hidden Beach, Memorial Point, Sand Harbor, and existing trails, as described below.

Hidden Beach

Hidden Beach would be the closest developed recreation site to Incline Village that would become accessible from the trailhead of the proposed shared-use path and, as a result, would likely see the largest percent increase in use relative to existing conditions.

As shown in Table 4.7-2, it is estimated that 24,605 shared-use path users would access Hidden Beach annually ("Grand Total Increase" for Hidden Beach) with Alternative A. This predicted usage yields an estimated increase from the current use of 680 persons per day to a total of 848 persons per peak summer day at Hidden Beach. The "peak-hour use" (shown in Table 4.7-3 and described above) would increase by 26 users for a total peak-hour usage of 400 visitors. The capacity of Hidden Beach at average lake level, based on NDSP's density standard is 187 persons at one time. Currently, the peak use at Hidden Beach is 374 users. Therefore, under existing conditions, Hidden Beach is already exceeding NDSP's desired condition. Implementation of Alternative A would exacerbate this condition by adding up to an estimated 26 persons at one time during the peak hour. This additional demand would increase the density of beach use, resulting in an average of 11 square feet less of available beach area per person.

The predicted increase in use at Hidden Beach would be slightly less for Alternative B, compared to Alternative A, with a projected increase of 21,610 visitors annually and a new peak-season daily use of 828 persons. "Peak-hour use" at Hidden Beach would be estimated to increase by 23 users for a total peak-hour use of 397 persons at one time. Like Alternative A, Alternative B would exacerbate an existing condition that exceeds NDSP's desired visitor density levels during peak periods. The increase in use would contribute to existing management challenges within the Sand Harbor Management Area.

Hidden Beach is serviced by one vault toilet and one trash receptacle. During the summer, NDSP staff visit the site once per day to empty the trash and clean the toilet. According to NDSP staff, the vault toilet currently is pumped on about a 2-year interval, which requires closure of the SR 28 south bound traffic lane. The greater estimated use at this recreation site could increase the staffing requirements, require installation of an additional vault toilet, and/or result in more frequent service of the existing facilities. If Alternative A is selected, the western pullout and road providing emergency vehicle access at the Tunnel Creek crossing would allow the pump truck servicing the Hidden Beach vault toilet to park safely without obstructing traffic. Additionally, both action alternatives would provide safe parking and highway crossing for NDSP rangers or maintenance staff that frequently visit Hidden Beach. Therefore, although the increased use could require greater service frequency, the project would improve the ease and safety of servicing the vault toilet and monitoring the beach, ameliorating the condition depicted in Exhibit 2-1 in Chapter 2, "Purpose and Need."

Table 4.7-2 North Demonstration Project Projected Visitor Use at Hidden Beach, Memorial Point, and Sand Harbor

Point of Origin	Net Increase in Path Use (OWT)[1]		Net Increase in # of Path Users[2]		Net Increase in # of Users								
					Hidden Beach			Memorial Point			Sand Harbor		
	Daily	Annual	Daily	Annual	% of Users Stopping[4]	Daily	Annual	% of Users Stopping[4]	Daily	Annual	% of Users Stopping[4]	Daily	Annual
Alternative A													
From Northern Terminus													
Bicycle	483	70,800	242	35,400	30%	72	10,620	20%	48	7,080	70%	169	24,780
Pedestrian	195	28,600	98	14,300	70%	68	10,010	15%	15	2,145	15%	15	2,145
Total	678	99,400	339	49,700	--	141	20,630	--	63	9,225	--	184	26,925
From Memorial Point													
Bicycle	83	12,000	42	6,000	20%	8	1,200	--	--	--	80%	33	4,800
Pedestrian	158	23,000	79	11,500	10%	8	1,150	--	--	--	80%	63	9,200
Total	241	35,000	121	17,500	--	16	2,350	--	--	--	--	96	14,000
From Sand Harbor													
Bicycle	50	7,000	25	3,500	20%	5	700	10%	3	350	--	--	--
Pedestrian	250	37,000	125	18,500	5%	6	925	5%	6	925	--	--	--
Total	300	44,000	150	22,000	--	11	1,625	--	9	1,275	--	--	--
Grand Total Increase	***1,219***	***178,400***	***610***	***89,200***	--	***168***	***24,605***	--	***72***	***10,500***	--	***280***	***40,925***
Existing Use[4]	--	--	--	--	--	680	72,600	--	1,491	255,298	--	5,733	496,286
% Increase in Use Over Existing Conditions	--	--	--	--	--	**25%**	**34%**	--	**5%**	**4%**	--	**5%**	**8%**
Alternative B													
From Northern Terminus													
Bicycle	398	58,000	199	29,000	30%	60	8,700	5%	10	1,450	70%	139	20,300
Pedestrian	195	28,600	98	14,300	70%	68	10,010	15%	15	2,145	15%	15	2,145
Total	593	86,600	297	43,300	--	128	18,710	--	25	3,595	--	154	22,445
From Memorial Point													
Bicycle	83	12,000	42	6,000	20%	8	1,200	--	--	--	80%	33	4,800
Pedestrian	53	8,000	27	4,000	15%	4	600	--	--	--	80%	21	3,200
Total	136	20,000	68	10,000	--	12	1,800	--	--	--	--	54	8,000

Table 4.7-2 North Demonstration Project Projected Visitor Use at Hidden Beach, Memorial Point, and Sand Harbor

Point of Origin	Net Increase in Path Use (OWT)[1]		Net Increase in # of Path Users[2]		Net Increase in # of Users								
					Hidden Beach			Memorial Point			Sand Harbor		
	Daily	Annual	Daily	Annual	% of Users Stopping[4]	Daily	Annual	% of Users Stopping[4]	Daily	Annual	% of Users Stopping[4]	Daily	Annual
From Sand Harbor													
Bicycle	50	7,000	25	3,500	10%	3	350	10%	3	350	--	--	--
Pedestrian	100	15,000	50	7,500	10%	5	750	5%	3	375	--	--	--
Total	150	22,000	75	11,000	--	8	1,100	--	5	725	--	--	--
Grand Total Increase	***879***	***128,600***	***440***	***64,300***	--	***148***	***21,610***	--	***30***	***4,320***	--	***208***	***30,445***
Existing Use[3,4]	--	--	--	--	--	680	72,600	--	1,490	255,300	--	5,730	496,300
% Increase in Use Over Existing Conditions	--	--	--	--	--	**22%**	**30%**	--	**2%**	**2%**	--	**4%**	**6%**

Notes: OWT = One-Way Trips; totals may not sum due to rounding of added entries.

1 Data obtained from Memorandum to Ascent Environmental regarding Nevada Stateline-to-Stateline North Demonstration Project Use Forecasts (LSC 2012).
Annual Net Increase is based on the following:
- Figures for Memorial Point and Sand Harbor use (Table C) are based on percentages of existing use and reflect one-way trips originating and ending at these locations.
- Figures for the Northern Trail Terminus include existing bicycle and pedestrian trips in the corridor which must be subtracted to reach net increase in use.
- Net Increase in Users = [Total Best Daily Use Estimate - (Existing Trips in Corridor)] x Annual/Daily Factor

2 Number of users is equivalent to OWT divided by 2. Numbers rounded to the nearest whole number.

3 Monthly and Annual Hidden Beach data was obtained from unpublished NDSP records and represents an average of the years 2010, 2011, and 2012.

4 NDSP, Sand Harbor Recreational Capacity Study, 2011; LSC Transportation Consultants, Inc. 2012 (February 3). Memorandum to Ascent Environmental regarding Nevada Stateline-to-Stateline North Demonstration Project Use Forecasts.

Source: Adapted by Ascent Environmental 2013

Table 4.7-3 North Demonstration Project Projected Impact on Carrying Capacity/Desired Conditions

Recreation Site	Average Beach Area (ft²)[1]	Carrying Capacity/Desired Conditions				Existing Peak-Hour Use		Project-Related Net Increase in Peak-Hour Use (# of Users)[7]		Projected Peak-Hour Use (Existing + Project)			
		Relevant Desired Density Standards (ft²/person)		# of Users at One Time Based on Desired Conditions[4]		# of Users[5]	Density (ft²/person)[6]			# of Users		Density (ft²/person)	
		NDSP[2]	TRPA[3]	NDSP	TRPA			Alt A	Alt B	Alt A	Alt B	Alt A	Alt B
Sand Harbor													
Weekend Max. Day	299,040	162	100	1,846	2,990	2,972	100	43	32	3,015	3,004	99	100
Weekend Ave. Day						1,201	249			1,244	1,233	240	243
Weekday Max. Day						1,155	259			1,198	1,187	250	252
Weekday Ave. Day						670	446			713	702	420	426
Memorial Point	NA	NA	NA	NA	NA	44	NA	11	5	55	49	NA	NA
Hidden Beach	60,471	323	150	187	403	374	162	26	23	400	397	151	152

NA = Not Applicable.
[1] Based on average of low (2004) and high (2011) water years (TTD 2013: p. 71).
[2] Desired density standards for low and high-density beach use (NDSP 2011: pp. 51 and 52).
[3] Desired density standards for developed and dispersed beaches (TRPA 2005: p. 16). Sand Harbor is defined as a developed beach. Hidden Beach is defined as a dispersed beach.
[4] Formula: Number of Users = Average Beach Area / Density Standard
[5] Number of users information was obtained from:
Sand Harbor
- Weekend Max. Day = the peak-hour on the maximum peak day (holiday weekend) based on available parking capacity (TTD 2013: p. 71)
- Weekend Ave. Day = the peak-hour on the average holiday and weekend peak day (NDSP 2011: p. 40)
- Weekday Max. Day = the peak-hour on the maximum weekday (NDSP 2011: p. 45)
- Weekday Ave. Day = the peak-hour on the maximum weekday (NDSP 2011: p. 44)

Memorial Point (NDSP 2011: p. 29)
Hidden Beach (TTD 2013: p. 71)
[6] Formula: Density (ft²/person) = Average Beach Area / Number of Users
[7] See Table 1: Visitor Use Projections. Derived from Daily Net Increase using a peak hour factor of 0.154 (LSC 2012). Percent of Alternative B users crossing SR 28 was interpolated to represent the percentage of users targeting the developed recreation site served by that crossing. For users originating at the Northern Terminus, 88 percent of users are new and 12 percent are existing users. Data obtained from Memorandum to Ascent Environmental regarding Nevada Stateline-to-Stateline North Demonstration Project Use Forecasts (LSC 2012).
Source: Adapted by Ascent Environmental 2013

Hidden Beach is not marked with signage, and it is currently difficult to access and offers limited sanitary facilities. Construction of the North Demonstration Project would make Hidden Beach safer to access and easier to find. It may also alter the user demographic to include a wider range of ages and an increase in use by family groups, because of the greater ease of access (i.e., a level, safer, paved path with a reasonable walking distance from designated parking). Additionally, the proposed shared-use path would facilitate access by NDSP staff, law enforcement officers, and emergency responders.

Memorial Point

As described above, it is estimated that for Alternative A, 10,500 users annually would access Memorial Point from the shared-use path. This predicted usage yields a projected increase from the current estimated use of 1,490 to a total of 1,563 persons per peak summer day at Memorial Point. The peak-hour use (shown in Table 4.7-3 and described above) would increase by an estimated 11 users for a total peak-hour usage of 55 visitors. Memorial Point does not have beaches and visitors to the site have been observed to usually stay only long enough to enjoy the short trails, lake views, and overlooks before returning to their car. The user density of the site is limited by the available parking spaces; the ecological conditions and facility use levels are within the capacity of the site (NDSP 2011). Overall, Alternative A would increase visitation to Memorial Point by an estimated 4 to 5 percent.

The increased use resulting from implementation of Alternative B would be slightly less than Alternative A, with a projected annual increase of 4,320 users and a new peak-season, daily use of 1,520 persons. “Peak-hour use” at Memorial Point would be an estimated 49 persons at one time. Overall, Alternative B would create a 2 percent increase in visitation to Memorial Point.

Some Memorial Point users leave their car at Memorial Point and use trails along the lake shore to access Sand Harbor. The precise number has not been measured. This use would continue after construction of the shared-use path. If this type of use becomes undesirable, it could be addressed through management changes, such as limiting all parking to a short duration. Currently, visitors at Memorial Point have an average length of stay of 34 minutes and 18 of the 28 parking spaces are signed as 20-minute parking (NDSP 2011). Applying time limits to all spaces and/or stricter parking enforcement could provide effective approaches for limiting undesirable multi-hour parking at Memorial Point, which would substantially decrease, and potentially eliminate, use of this parking area to access Sand Harbor. The long term O&M Plan for the shared-use path would include an adaptive management strategy and is discussed in detail in Section 3.4, “Long Term Operations and Maintenance.”

Sand Harbor

As shown in Tables 4.7-2 and 4.7-3, it is estimated that for Alternative A 40,925 users annually would access Sand Harbor from the shared-use path. This usage would yield an increase in persons per peak summer day at Sand Harbor from the current estimated use of 5,733 users to a total of 6,013 users. The “peak-hour use” (shown in Table 4.7-3 and described above) would increase by an estimated 43 users for a total peak-hour usage ranging from 713 visitors on the average weekday to 3,015 visitors on a peak holiday weekend in July and August. Alternative B would generate 11 fewer visitors during the peak hour than Alternative A. The capacity of Sand Harbor, based on the NDSP density standard, is 1,846 persons at one time, assuming an average lake elevation.

Table 4.7-3 shows that with implementation of the project (either Alternative A or B), use of Sand Harbor would remain consistent with the NDSP desired use density conditions (i.e., not exceeding capacity) during average lake elevation, except on peak summer holiday weekends. Implementation of Alternatives A and B would add to and exacerbate peak period (i.e., summer holiday weekend) use levels that currently exceed the NDSP desired user density standard. The project would effectively reduce the amount of beach area available per person.

Sand Harbor is a very popular recreation site, particularly during the summer. During the peak season, the existing use levels are at or exceeding the site and facility capacity (NDSP 2011). During the peak summer

months the park is often temporarily closed to additional vehicles when the parking lot becomes full. In 2010, the Sand Harbor parking areas were temporarily closed on 47 summer days (nearly 50 percent of the summer season), because parking had reached capacity (NDSP 2011). The Sand Harbor entrance typically reopens for parking at 3:00 p.m., which is the average time when enough vehicles have left the parking lot so that it would not re-fill to capacity after opening it to additional vehicles again (NDSP 2011). It is not expected that path users would park at Sand Harbor solely for the purpose of accessing the shared-use path, because parking limitations at Sand Harbor are well known and, with most visitors approaching from the north, alternative parking closer to or within Incline Village would be available (LSC Transportation Consultants, Inc. 2012). It is likely, however, that visitors coming to use facilities at Sand Harbor would also use the path as part of their activities, because the path would be easily accessible to Sand Harbor visitors. The path would provide an alternative recreation experience for park users during the busy summer months and would effectively expand the available recreational opportunities, which corresponds with the recommendations of the Sand Harbor Recreational Capacity Study (NDSP 2011).

Existing Trails

Numerous, unauthorized volunteer trails exist within the project area and would likely see an increase in use from the implementation of Alternative A or B. The existing and projected levels of use for these trails have not been quantified, because survey data for unauthorized trail use does not exist. The trails were created over time by visitors accessing dispersed beaches or unimproved view points. The shared-use path would include connections to the larger of these trails and would provide access to the recreation sites that these trails target. In some cases, volunteer trails that fall within the footprint of the proposed path would be eliminated through the construction process. In other cases, volunteer trails would no longer be needed, because the shared-use path would provide an authorized trail connection to the desired destination. While it is speculative to predict an outcome regarding the ultimate number of volunteer trails created by the public in the project area (i.e., by their nature, they are unauthorized), the project is not expected to increase the extent or use of volunteer trails, because these trails are readily established now and some will no longer exist, nor be necessary, after the shared-use path is constructed. Because volunteer trails are typically unplanned and frequently do not meet trail design standards, they are more prone to environmental and management problems, such as erosion and trail degradation. The potential effects of continued establishment and use of volunteer trails would be addressed in coordination with NDSP through the adaptive management strategy within the O&M Plan.

Conclusion

The proposed shared-use path would increase visitation at the developed recreation sites within the project area that are at or nearing capacity during summer peak-use periods. The projected increase in use associated with the project would exacerbate existing management challenges at these peak times. While the shared-use path would create an increase in use at Sand Harbor, these trail users (i.e., generally pedestrians and bicyclists) would not increase parking demand—one of the primary capacity constraints at Sand Harbor. Additionally, the construction of the path would provide and alternate recreation option for Sand Harbor visitors and would assist with dispersal of users during the peak season.

Although the projected increase in peak-hour use is incremental relative to existing conditions, it should be noted that park resources and staffing have been reduced due to budget constraints and NDSP is concerned about any increase in use at peak times. The increased usage of existing recreational facilities resulting from implementation of the North Demonstration Project could require additional staffing, cleaning, and maintenance at Sand Harbor, Memorial Point, and Hidden Beach. Construction of the proposed project would increase the ease and safety of maintaining the Hidden Beach facilities. Additionally, Alternative A and would allow NDSP personnel to safely and quickly monitor other unimproved beach areas between Hidden Beach and Sand Harbor, while Alternative B would increase access for both visitors and NDSP personnel to public lands east of SR 28. Although responsibility has not yet been determined for all long-term maintenance and upkeep of the shared-use path and trailhead parking (discussions among NDSP, Washoe County, and/or NDOT are ongoing),

NDSP would be responsible for maintenance of facilities throughout the Sand Harbor Management Area, including the facilities at Hidden Beach, Memorial Point, and Sand Harbor.

As stipulated in the Interlocal Agreement among the partnering agencies, and as described in Section 3.4, an O&M Plan for the North Demonstration Project would be developed prior to construction. This plan would detail responsibilities for maintenance and management strategies for controlling access to developed sites from the shared-use path, describe potential funding mechanisms, and establish an adaptive management strategy to respond appropriately to issues as they arise. In addition to the inclusion of adaptive operations and maintenance techniques incorporated into the project, signage would be incorporated into the project that would notify visitors of periods when Sand Harbor is closed to shared-use path users (see Design Features REC-1 and REC-4). Implementation of these and other design features would minimize the effects on current park management challenges resulting from the increase in use of the recreation sites in the project area during summer peak periods.

Cumulative Effects

Implementation of either action alternative would increase demand for and use of existing recreational facilities by providing additional bicycle and pedestrian connectivity and non-automobile access to existing recreation areas, including Hidden Beach, Memorial Point, and Sand Harbor, as well as the existing trail system. Projects outlined in Table 4.1-1, including a potential future East Shore Express Shuttle stop at Tunnel Creek and subsequent phases of the Nevada Stateline-to-Stateline Bikeway Project, would create a minimal increase in use/demand at existing recreational facilities. The potential expansion of East Shore Express shuttle service would be coupled with restrictions to shoulder parking and is intended to provide an alternative form of access for existing users, rather than to facilitate an increase in use. The completion of the remainder of the Nevada Stateline-to-Stateline Bikeway could result in an approximately 7 percent increase in use of the North Demonstration Project section of the bikeway. However, the users drawn by expansion of the path would be planning to bicycle or walk for a greater distance and would be less likely to spend time at the developed facilities within the vicinity of the North Demonstration Project. Additionally, with implementation of Design Features REC-1 and REC-4 incorporated into the project, the project's contribution to the cumulative demand would be minimized such that there would not be a residual adverse effect on existing recreational facilities. Therefore, the project is not expected to contribute considerably to substantial cumulative effects on existing recreation facilities.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed. Therefore, the use of existing recreation facilities would remain unchanged from existing conditions.

Cumulative Effects

Projects outlined in Table 4.1-1, including a future East Shore Express bus stop at Tunnel Creek and subsequent phases of the Nevada Stateline-to-Stateline Bikeway Project would create a minimal increase in use/demand at existing recreational facilities. However, under Alternative C, no shared-use path would be constructed; therefore, Alternative C would not contribute to any cumulative increases in use of existing recreation facilities.

CONFLICTS WITH EXISTING OR PROPOSED RECREATION USES

ALTERNATIVES A AND B

Direct and Indirect Effects

Neither action alternative would result in substantial conflicts with any existing or planned recreation facilities nor any known planned bicycle/pedestrian trails, including those identified in the TRPA Bicycle and Pedestrian Plan, which contains a goal of having a public-access, shared-use path between Incline Village and Sand Harbor. The Bicycle and Pedestrian Plan shows proposed bicycle lanes that would ultimately encircle Lake Tahoe and include SR 28 on the Nevada side of the Lake. It is a stated project goal to construct a separated, shared-use path designed to meet ADA and AASHTO standards, where feasible, to serve a broad spectrum of users. In addition, the North Demonstration Project is intended to meet 15 design principles established by the 10 partnering agencies that are overseeing project planning, design, and environmental review in full recognition of the existing recreational uses in the project area.

Mixing trail uses (e.g., pedestrians and bicyclists) on a single shared-use path has the potential to result in conflicts between users. In addition, introducing a new path could create user conflicts at intersections with existing trails or at access points to other recreational facilities, such as Memorial Point or Sand Harbor. User conflicts are an important social concern, but do not represent an environmental impact. They would be minimized through appropriate path design (e.g., width and grade), routing of the shared-use path to meet objectives of existing recreation facilities (Design Feature REC-1) and the use of informational signage that designates allowed uses (Design Features REC-2 through REC-4). Signage would be developed and installed at the North Demonstration Project northern and southern trailheads, at connection points with other trails and recreational facilities, and in other areas where necessary to alert users of possible obstacles or changes in the shared-use path, such as “Trail Terminus Ahead,” to provide clear direction for all users. The shared-use path would maintain connections with most existing trails (some existing social trails would be replaced by the project or would no longer be needed) and trail destinations and in many cases would provide improved access to dispersed recreation sites, such as Hidden Beach.

Recognizing the design features being incorporated into the project design to minimize and monitor potential user conflicts and the adherence to ADA and AASHTO design standards that account for a mix of users, neither action alternative would be expected to result in a substantial conflict with existing or proposed recreation uses.

Cumulative Effects

The projects in Table 4.1-1, including a potential future shuttle stop at Tunnel Creek and subsequent phases of the Nevada Stateline-to-Stateline Bikeway Project, would not be expected to contribute to use conflicts within the project area. Potential user conflicts related to the North Demonstration Project would be minimized through appropriate design, routing of the shared-use path to meet objectives of existing recreation facilities (Design Feature REC-1), and the use of informational signage that designates allowed uses (Design Features REC-2 through REC-4). Furthermore, the trail design for either Alternative A or B adheres to ADA and AASHTO design standards that account for a mix of users. Therefore, neither action alternative would be expected to contribute to cumulative conflicts with existing or proposed recreation uses.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no paved bikeway or shared-use path would be constructed. Therefore, there would be no conflicts on the proposed shared-use path, nor would there be conflicts with users of existing recreation facilities.

Cumulative Effects

The projects in Table 4.1-1, including a future bus stop at Tunnel Creek and subsequent phases of the Nevada Stateline-to-Stateline Bikeway Project, would not be expected to contribute to use conflicts within the project area. Under Alternative C, no shared-use path would be constructed and there would be no project-related increase in conflicts with existing recreational facilities. Therefore, Alternative C would not contribute to any cumulative increases in use conflicts.

4.7.3 CONSEQUENCES FOR TRPA ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

This section summarizes the effects of implementing the action alternatives on the environmental thresholds established by TRPA for recreation. As mentioned in Section 4.7.2, above, two recreation threshold reporting categories have been established by TRPA:

- Quality of Recreation Experience and Access to Recreational Opportunities (in attainment): "It shall be the policy of the TRPA Governing Body in development of the Regional Plan to preserve and enhance the high-quality recreational experience including preservation of high-quality undeveloped shorezone and other natural areas. In developing the Regional Plan, the staff and Governing Body shall consider provisions for additional access, where lawful and feasible, to the shorezone and high-quality undeveloped areas for low density recreational uses."
- Fair Share Distribution of Recreation Capacity (in attainment): "It shall be the policy of the TRPA Governing Body in development of the Regional Plan to establish and ensure a fair share of the total Basin capacity for outdoor recreation is available to the general public."

Adopted threshold standards for recreation are statements of policy, rather than a numerical standard. These adopted threshold standards direct TRPA to adopt policies that would preserve and enhance high-quality recreational experiences, and provide additional access to the shorezone and other areas for dispersed recreational uses. These threshold standards also direct TRPA to "…establish and ensure a fair share of the total basin capacity for outdoor recreation is available to the general public." The goal of the Recreation element of the Regional Plan is to promote and manage recreational improvements to achieve these recreation threshold standards, and "ensure equilibrium between the region's natural endowment and its manmade environment."

QUALITY OF RECREATION EXPERIENCE AND ACCESS TO RECREATIONAL OPPORTUNITIES

Alternatives A and B would provide a shared-use path that links Incline Village to Sand Harbor, with connections to Hidden Beach and Memorial Point. These recreation areas along the east shore are generally only accessed by automobile, and therefore, the proposed project would improve pedestrian and bicycle access to these recreation sites. The North Demonstration Project is also planned to eventually connect with other segments of the Nevada Stateline-to- Stateline Bikeway Project to help form a continuous trail around the east side of Lake Tahoe. As documented in Section 4.2, "Land Use, Socioeconomics, and Environmental Justice" and Appendix D of this document, Alternatives A and B are consistent with the TRPA Regional Plan Recreation Element goals and policies relevant to the proposed project, as well as with those policies pertaining to recreation in PAS 047, PAS 049, PAS 055 and the Ponderosa Ranch Community Plan. In addition, the alternatives would support Washoe County's Recreation Goals and Policies, the recommendations of the Sand Harbor Recreational Capacity Study, and the goals of the TRPA Bicycle and Pedestrian Plan and TMPO Regional Transportation Plan.

The North Demonstration Project would provide a new high-quality recreation opportunity and enhance accessibility to existing recreation opportunities. The shared-use path would serve a broad spectrum of users by meeting AASHTO and ADA design standards, wherever feasible. The shared-use path would enhance public

access to lakefront recreation opportunities, including beaches, natural areas, open space, restrooms, concessions (e.g., kayak and bicycle rentals), pedestrian and/or bicycle access, high quality views, and food and beverage service.

As described earlier in this section, implementation of the project would increase use at existing recreation sites, which would not cause these sites to exceed the density standards established by TRPA with average lake levels, except for peak holiday weekends in the summer, when the density of Sand Harbor beach use is projected to be higher than the desired condition. Under existing conditions, Hidden Beach is already exceeding NDSP's desired condition. Implementation of the action alternatives would exacerbate this condition by adding up to 26 persons at one time during the peak hour. Also, implementation of the action alternatives would add to and exacerbate peak period (i.e., summer holiday weekend) use levels at Sand Harbor that currently exceed NDSP's desired user density standard. The projected increase in use could contribute to existing management challenges within the Sand Harbor Management Area. Because management responses to this situation are included in an O&M Plan for the project and the density standard-exceedance would occur during a limited number of peak-use periods on summer holiday weekends, the project would not result in a decrease in the quality of the recreation experiences. Additionally, the proposed project would offer an alternative recreation activity option when the existing facilities are at or near capacity, helping to disperse use and manage user density. Therefore, the action alternatives would contribute positively toward the continued attainment of this recreation threshold standard.

Under Alternative C, existing recreational opportunities or capacities would not change. Therefore, implementing Alternative C would not cause any changes to the existing threshold standard attainment status.

FAIR SHARE DISTRIBUTION OF RECREATION CAPACITY

Alternatives A and B would result in the construction of a separated, shared-use path between Incline Village and Sand Harbor with connections to Hidden Beach and Memorial Point. The project would provide a new high-quality recreation opportunity for pedestrians and bicyclists.

The attainment of this threshold standard is generally based on indicator units that are characterized by the cumulative accounts of PAOT disposition (when applicable), the facility development of non-PAOT projects, and land acquisition for recreation. PAOTs do not apply to or translate well for dispersed recreation activities, such as trail hiking, nor are they an indication of visitation to a recreation facility. In the latter context, visitation means the total number of persons that have been to a site over the course of a specified time period (turnover), whereas PAOTs are an indication of the number of patrons a site was designed to accommodate at one particular point in time (TRPA 2006; Chapter 10). As such, recreation projects including hiking and riding trails do not require PAOT assignments (TRPA 2006; Chapter 10).

Sand Harbor is currently at capacity and is frequently full (gate closed) during peak season. The park has well established procedures for limiting access when the park is at capacity. The proposed increase in users would not alter the number of peak summer days during which temporary park closures must occur because of a full parking lot. The path would provide an alternative recreation experience when Sand Harbor is closed and would provide improved access to dispersed recreation sites.

Both action alternatives would enhance outdoor recreation opportunities available to the general public. Therefore, the action alternatives would contribute positively towards the continued attainment of this threshold standard.

Under Alternative C, existing recreational opportunities or capacities would not change. Therefore, implementing Alternative C would not cause any changes to the existing threshold attainment status.

4.8 ARCHAEOLOGICAL AND HISTORICAL RESOURCES

This section describes the existing archaeological, historical, and paleontological resources within the North Demonstration Project area and provides an analysis of the potential effects to these resources related to implementation of the project alternatives. A standalone heritage resource inventory and evaluation report prepared for the North Demonstration Project by consulting archaeologist, Susan Lindström, Ph.D, RPA, provides detailed information on the physical setting; prehistory of the Northern Sierra Nevada – including the Lake Tahoe Basin; the ethnohistory of the project area (the Washoe Tribe); and the Euro-American history of the project area. A redacted version (sensitive information indicating the precise location of resources is withheld) of the inventory and evaluation report is included as Appendix F to this EA. A summary of applicable regulations under which the action alternatives would be implemented is provided in Appendix C.

As described in Section 4.1, "Approach to Environmental Analysis," relevant federal laws and executive orders are discussed at the beginning of each resource section. Compliance with Section 106 of the National Historic Preservation Act (NHPA; Public Law 89-665, as amended) is discussed under the header "Disturbance to Potentially Significant Documented Cultural Resources" below. The discussion under the header "Native American Consultation" describes the required consultation actions that have occurred in accordance with Executive Order 13175 (Indian Trust Assets and Native American Consultation). Indian Trust Assets (ITAs) are legal interests in property held in trust by the U.S. for Native American tribes or individuals. The Secretary of the Interior, acting as the trustee, holds many assets in trust. Examples of trust assets include lands, minerals, hunting and fishing rights, and water rights. The U.S. has an Indian trust responsibility to protect and maintain rights reserved by or granted to Native American tribes or individuals by treaties, statutes, and executive orders. This requires federal agencies to carry out activities in a manner that avoids adverse impacts to ITAs when possible. When adverse impacts cannot be avoided, appropriate mitigation or compensation will be provided. Tribal lands ITAs consist of lands that have been deeded to tribes or upon which tribes have a historical legal claim. However, there are no such lands within or in the immediate vicinity of the project area and, for this reason, it was determined that the North Demonstration Project would have no impact on ITAs.

4.8.1 AFFECTED ENVIRONMENT

ARCHAEOLOGICAL AND HISTORICAL RESOURCES

The following summarizes information contained in the standalone heritage resource inventory and evaluation report prepared for the North Demonstration Project (Appendix F).

To identify existing documented resources, research was conducted at the Nevada State Museum Annex, the LTBMU offices, and the Lake Tahoe Historical Society and Nevada Historical Society offices; through the on-line Nevada Cultural Resource Information System database maintained by the Nevada Office of Historic Preservation; and via consultation with the Washoe Tribe of Nevada and California. Documentation of three existing resources was found as a result of the research.

Table 4.8-1 summarizes the results of the prefield research efforts, which revealed that six archaeological studies have been conducted within or adjacent to the project Area of Potential Effect (APE). The project APE was drawn to include all areas of potential disturbance associated with the North Demonstration Project action alternatives. These studies identified that at least two historic linear sites (Historic SR 28 and Tunnel Creek Road) and one National Register of Historic Places (NRHP) District (the Marlette Lake Water System) occur within or near the project APE (Table 4.8-2).

Table 4.8-1 Previous Archaeological Investigations Within or Near Project APE			
Report Number	Title	Author/Date	Documented Resources
16-278	SR 28 WA-4.98 to 10.99. Lakeshore Boulevard north to the Nevada-California State Line	Stearns and Matranga 1981	None
16-714	Memorial Point Overlook and SR Overlay (NDOT)	Drews 1995	None
18-42	Overview	Seelinger 1978	None within North Demonstration Project APE
18-398	Archaeological Survey of 2,489 Acres in Lake Tahoe Nevada State Park	Lindström et al. 2002	26Wa6933; Historic Tunnel Creek Road
CRR-05-19-235 / R1987051900015	SR 28 R-0-W between Spooner Junction and Incline Village	Bunch 1987	None within North Demonstration Project APE
CRR-05-19-286 / R1988051900016	Lake Tahoe Shoreline Survey	Blanchard 1988	None within North Demonstration Project APE
No Number	Archaeological Investigations at Tunnel Creek Station (26Wa5831) and Marlette Lake Water System Box Flume Study	Harmon and Long 1998	None within North Demonstration Project APE
No Number	Nevada Department of Transportation Master Plan for Erosion Control and Storm Water Management, SR 28	Johnson and Joslin 1999	26Wa8314 (formerly FS-05-19-549); Historic SR 28
No Number	Cultural Resources Inventory Report State Route 28 Erosion Control-Storm Water Management Master Plan, Spooner Summit to Memorial Point	Johnson and Zeier 2000	26Wa8314 (formerly FS-05-19-549); Historic SR 28
No number	Nevada Stateline-to-Stateline Bikeway Project	EDAW/AECOM 2009	26Wa6933; Historic Tunnel Creek Road
Source: Lindström 2013 (Appendix F)			

Table 4.8-2 Summary of Documented Resources Within or Near Project APE		
Site Number	Description	NRHP Eligibility
No number	Marlette Lake Water System	*Eligible
26Wa6933	Historic Tunnel Creek Road	Not evaluated
26Wa8314	Historic SR 28	*Not eligible
* Final determination of eligibility made by FHWA with concurrence by the Nevada State Historic Preservation Officer (SHPO). Source: Lindström 2013 (Appendix F)		

PALEONTOLOGIC RESOURCES

A review of the Geologic Map of the Lake Tahoe Basin (Saucedo 2005) indicates that the project APE is located within an area of cretaceous age (145 to 66 million years old) granite. Small pockets of Pleistocene lacustrine and Holocene talus deposits exist near Sand Harbor and Ponderosa Ranch.

The value or importance of different fossil groups varies depending on the age and depositional environment of the rock unit that contains the fossils, their rarity, the extent to which they have already been identified and documented, and the ability to recover similar materials under more controlled conditions (such as for a research project). Marine invertebrates are generally common; the fossil record is well developed and well documented, and generally they would not be considered a unique paleontological resource. Identified vertebrate marine and terrestrial fossils are generally considered scientifically important because they are relatively rare. Some invertebrate fossils have been found on the south shore of Lake Tahoe; however there are no documented occurrences of vertebrate fossils within the Lake Tahoe Basin (U.C. Berkeley Museum of Paleontology [UCMP] 2013).

NATIVE AMERICAN CONSULTATION

An important element in National Historic Preservation Act, Section 106 compliance includes consultation with parties that might have an interest in or be affected by investigations of or effects on cultural resources. Prior ethnographic studies indicate that the Washoe Tribe is the applicable tribal authority for lands encompassing the project area. TTD consultants initiated consultation with the Washoe Tribe in a letter dated April 9, 2007 as part of early planning efforts for the Nevada Stateline-to-Stateline Bikeway Project, North and South Demonstration Projects. The Tribe responded with a letter (Barry 2007) stating concerns that the overall project area is considered to be sensitive for natural resources and cultural values, recommending that project construction activities be generally confined within previously disturbed areas. Additional consultation between TTD consultants and the Tribe occurred during August and September of 2008 (TRPA 2008). Following a letter dated August 19, 2008, TTD and consultants met with the Tribal Advisory Council on September 2, 2008. As an outcome of that meeting, Council members requested that they be consulted regarding any future heritage resource surveys and updated on the results of these investigations and any potential impacts to Native American sites.

As part of the current research effort, Darrel Cruz, Tribal Historic Preservation Officer for the Washoe Tribe, was contacted to again invite the opinions, knowledge, and sentiments regarding traditional Native American lands within the project area. As a follow-up, Ms. Susan Lindström, consulting archaeologist, sent Mr. Cruz project background information and location maps via email on July 2, 2011. This communication was supplemented by a telephone conversation and correspondence between Ms. Lindström and Mr. Cruz. A letter response was received from the Tribe on July 28, 2011 (Cruz 2011; Appendix F). The Tribe reiterated its concerns related to the avoidance of effects to Native American resources.

FHWA initiated formal government-to-government consultation with the Washoe Tribe of Nevada and California under Section 106 of the National Historic Preservation Act via letter to Chairman Darrel Kizer dated August 30, 2013 (Appendix F). This letter was cc'ed to Mr. Cruz. In the course of following up on the letter with Mr. Cruz, he verbally stated that he was satisfied with the informal consultation he had previously received for the project and did not wish to receive further consultation for this 3-mile segment of the project; however, he still wishes to be involved in the overall project planning and review and the Section 106 for the remainder of the larger project.

FIELD INVESTIGATIONS

The entire project APE was subject to an intensive surface survey by walking systematic transect intervals at no greater than 50 feet (15 meters) apart. Heritage resources inventoried within the project APE include 26Wa8314 (formerly FS-05-19-549, abandoned segment of SR 28), 26Wa9657 (logging grade), and 26Wa9658 (abandoned utility line). The Marlette Lake Water Site and site 26Wa6933, historic Tunnel Creek Road, identified in Table 3.8-2 are located near, but outside of the project APE.

The recorded segment of historic SR 28 within the project APE entails one abandoned curve (26Wa8314[1]), three ROW markers (26Wa8314[a-c]), one indeterminate wooden marker (26Wa8314[d]), and three artifacts (26Wa8314[e-g]). Modern debris and Nevada State Historical Marker #246 (26Wa8314[h]), although not older than 50 years, are also discussed as part of the historic SR 28 site documentation included in the standalone inventory and evaluation report prepared for the project.

26Wa9657 comprises a faint and eroded logging grade that may date from Comstock-era logging above Sand Harbor.

26Wa9658, the abandoned utility line, is marked by three flush-cut utility poles that may represent an earlier line (ca. 1940s) that once connected the community of Incline to Sand Harbor and possibly the Whittell Estate farther to the south.

4.8.2 ENVIRONMENTAL CONSEQUENCES AND RECOMMENDED MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The significance of a heritage resource is typically evaluated in terms of criteria established in the NRHP, as authorized under the NHPA, as amended. Federal criteria (A through D) focus on a heritage property's associations with significant ***events*** and ***personalities*** in the nation's history and cultural heritage; its ***distinctive*** technical, architectural or artistic ***characteristics***; and/or a property's ***information potential***. Resources are evaluated within a specific and important time frame or ***period of significance*** during which time the property was occupied or used. To be listed in the NRHP, a property must not only be shown to be significant under one or more of these criteria, but it must also have ***integrity***.

TRPA has adopted procedures for the identification, recognition, protection, and preservation of the region's significant cultural, historical, archaeological, and paleontological resources that are modeled after the NRHP guidelines. Chapter 67 of the TRPA Code requires a site survey by a qualified archaeologist, an inventory of any extant heritage resources, and consultation with the Washoe Tribe. The TRPA Initial Environmental Checklist was used to guide evaluation of the project's effects on archaeological and historical resources under TRPA regulations. The context and intensity of an alternative's potential to adversely affect archaeological and historical resources were evaluated based on the following:

- Would the project result in an alteration of or adverse physical or aesthetic effect to a significant archaeological or historical site, structure, object or building?
- Is the project located on a property with any known cultural, historical, and/or archaeological resources, including resources on TRPA or other regulatory official maps or records?
- Is the property associated with any historically significant events and/or sites or persons?
- Does the project have the potential to cause a physical change which would affect unique ethnic cultural values?
- Will the project restrict historic or pre-historic religious or sacred uses, or alter unique paleontological resources, within the potential impact area?

METHODS AND ASSUMPTIONS

Project-related actions undertaken by the USFS and the FHWA are subject to compliance with Section 106 of the NHPA and its implementing regulations (36 CFR Part 800), as amended. Section 106 constitutes the main

regulatory framework guiding heritage resource investigations for federal undertakings. The Section 106 review process involves a four-step procedure:

- Initiate the Section 106 process by establishing the APE for the undertaking, developing a plan for public involvement and identifying other consulting parties.
- Identify heritage properties (sites, districts, buildings, objects, traditional cultural properties, etc.) by inventorying cultural resources and evaluating their eligibility for inclusion in the NRHP.
- Assess any potential adverse effects on properties that are listed in or may be eligible for listing in the NRHP by applying the criteria of adverse effect (noted in 36 CFR Part 800).
- Resolve potential adverse effects by consulting with the SHPO and other consulting agencies, including the Advisory Council of Historic Preservation if necessary, to develop an agreement that addresses the proper treatment of historic properties.

As described above, the stand-alone inventory and evaluation report was prepared based on an APE that included all areas of potential disturbance associated with the North Demonstration Project action alternatives. The inventory of cultural resources was based on a thorough research of previous studies within the APE and a comprehensive field investigation by qualified archaeologists. Based on these efforts, Table 4.8-3 includes significance assessments of heritage resources inventoried within the North Demonstration Project APE (26Wa8314, 26Wa9657, and 26Wa9658). None of the recorded segments within the study area are found to be NRHP eligible, either individually or collectively.

DISTURBANCE TO POTENTIALLY SIGNIFICANT DOCUMENTED CULTURAL RESOURCES

ALTERNATIVES A AND B

Direct and Indirect Effects

Section 106 of the NHPA requires that federal agencies consider the effects of their actions on significant archaeological properties before implementing a project (i.e., undertaking). Federal regulatory impact thresholds are found in 36 CFR 800. Regulations require that the federal agency apply the criteria of adverse effect to heritage properties that would be affected by a proposed undertaking (36 CFR Part 800.9b). The criteria of adverse affect, defined at 36 CFR Part 800.5(a)(1), states that:

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

Section 67.7.3 of the TRPA Code also requires the protection of sites, objects, structures, or other resources designated as historic resources or for which designation is pending. Demolition, disturbance, removal, or significant alterations are prohibited unless TRPA has approved a resource protection plan to protect the historic resources.

If a heritage resource is not a unique archaeological or a historical resource and if it is determined not eligible to the National Register, the effects of a project on the resource are not considered to be a significant effect on the environment. It is sufficient that both the resource and the effect on it are noted in the environmental document, but they need not be considered further in the Section 106 process.

None of the heritage resources recorded within the APE (26Wa8314, 26Wa9657, and 26Wa9658) meet NRHP criteria of significance and all are not eligible resources. (Note: the Marlette Lake Water System and 26Wa6933

are located near but outside of the project APE; therefore, these resources are not discussed further herein.) All of their potentially significant information has been recovered with the completion of Intermountain Antiquities Computer System (IMACS) archaeological site record forms that accompany the standalone inventory and evaluation report (Lindström 2013) and their data potential has been exhausted. Therefore, neither of the action alternatives, Alternatives A and B and their optional components, would have an adverse effect on any significant properties potentially eligible for the NRHP and a determination of "No Historic Properties Affected" was recommended in the inventory and evaluation report (Table 4.8-3). Appendix F includes a letter from the Nevada State Historic Preservation Officer concurring with these findings and FHWA's determination that no historic properties would be affected.

Table 4.8-3 Summary of Heritage Resources, Potential Impacts and Significance

Resource Number	Description	Potential Impacts	NRHP Eligibility
26Wa8314(1) and (a-h)	Historic SR 28 abandoned curve and associated features and artifacts	Yes	*Not eligible
26Wa9657	Logging grade	Yes	Recommend not eligible
26Wa9658	Utility line	Yes	Recommend not eligible

* A final determination of eligibility has been made by the LTBMU with concurrence by the Nevada Office of Historic Preservation.
Source: Lindström 2013 (Appendix F)

Cumulative Effects

Research conducted for the North Demonstration Project indicates that the APE does not contain archaeological and historical resources that are considered significant according to Section 106 and TRPA criteria. Additionally, the related cumulative projects listed in Table 4.1-1 would include project design features or mitigation measures to protect cultural resources that may occur within the project vicinity. These measures would reduce or avoid potential construction-related disturbance to any documented resources that may exist within the vicinity, outside of the APE. Therefore, the North Demonstration Project and related projects in the North Lake Tahoe and Washoe County portions of the Tahoe Basin (as described in Table 4.1-1) would not result in adverse cumulative effects related to documented cultural resources.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no effect to the condition of documented cultural resources.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to documented cultural resources.

EFFECTS ON PREVIOUSLY UNDISCOVERED CULTURAL RESOURCES AND HUMAN REMAINS

ALTERNATIVES A AND B

Direct and Indirect Effects

Archival research, Native American consultation, and intensive field survey conducted within the APE indicate that the area is moderately sensitive to contain heritage resources that may be buried or otherwise not visible on the ground surface. Consequently, the potential exists that undocumented and concealed prehistoric or

historic-era sites, structures, features, artifacts, or human interments could be present and encountered during project-related ground-disturbing activities under Alternatives A and B. If previously undiscovered and significant (per NRHP/TRPA criteria) archaeological or historical resources or human remains were disturbed by construction, this would be an adverse effect. However, implementation of proposed Design Feature ARCH-1 would reduce or avoid potential construction-related disturbances to undocumented resources and human remains, such that the action alternatives would not result in an adverse effect to these resources.

Cumulative Effects

Research conducted for the North Demonstration project indicates that the project area does not contain cultural resources that are considered significant per Section 106 and TRPA criteria. However, Design Feature ARCH-1 provides protection for unknown cultural resources or undocumented human remains that may be discovered during ground-disturbing activities. Additionally, the related cumulative projects listed in Table 4.1-1 would include similar project design features or mitigation measures to protect unknown cultural resources that may be discovered within the project vicinity. These measures would include procedures to cease ground disturbing activities and to implement notification procedures in the event that previously unknown cultural resources or undocumented human remains are discovered during ground disturbing activities. These measures would reduce or avoid potential construction related disturbance to any undocumented cultural resources that may be found within the vicinity. Therefore, the North Demonstration Project and related projects in the North Lake Tahoe and Washoe County portions of the Lake Tahoe Basin (as described in Table 4.1-1) would not result in adverse cumulative effects related to unknown cultural resources or undocumented human remains.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would not result in a contribution to potential effects related to unknown cultural resources or undocumented human remains within the project area.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would not result in a contribution to potential cumulative effects related to unknown cultural resources or undocumented human remains.

EFFECTS ON PALEONTOLOGICAL RESOURCES

ALTERNATIVES A AND B

Direct and Indirect Effects

A review of the UCMP database indicates there are no recorded fossil sites in the vicinity of the project area (UCMP 2013). The majority of the project area has been heavily influenced by the Pleistocene era glaciations, which scoured the mountain slopes; mixing, and transported granitic and volcanic debris, and further minimizing the potential for fossils to be present in these locations. Isolated remnants of ancient, metamorphosed sedimentary seafloor deposits exist within the Lake Tahoe Basin but do not occur within the project area (Saucedo 2005). The metamorphosed remnant located closest to the project area is found approximately 4.5 miles to the south on the ridge north of Capitan Pomin Rock, near Spooner Summit. For these reasons, Alternatives A and B would not result in an adverse effect to unique paleontological resources.

Cumulative Effects

No unique paleontological resources are known to be present within the project area or vicinity and the existing predominant geologic deposits are not known to contain such resources. Therefore, the North Demonstration

project and related projects in the North Lake Tahoe and Washoe County portions of the Lake Tahoe Basin (as listed in Table4.1-1) would not result in adverse cumulative effects related to unique paleontological resources.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would not result in a contribution to potential effects related to paleontological resources within the project area.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would not result in a contribution to potential cumulative effects related to paleontological resources.

4.9 TRAFFIC, PARKING, AND TRANSIT

This section describes the existing roadway network, intersection conditions, pedestrian and bicycle facilities, parking and transit facilities, and traffic volumes on roadways in the project area and analysis of potential adverse effects resulting from implementation of Alternatives A, B, and C on traffic, parking, and transit. The analysis in this section relies on the following: the *Lake Tahoe Region Bicycle Pedestrian Use Model*, traffic engineering guidelines, supporting technical memorandums and supplemental analyses prepared by LSC Transportation Consultants, Inc. (LSC; LSC 2011, 2012, 2013a, 2013b), and bicycle facility and sight distance guidelines specified in American Association of State Highway and Transportation Officials' (AASHTO's) *A Policy on Geometric Design of Highways and Streets* (AASHTO 2001).

4.9.1 AFFECTED ENVIRONMENT

STUDY AREA ROADWAYS

This section identifies the existing transportation facilities and describes traffic conditions for the roadway network within the vicinity of the proposed project. These roadways are shown on Exhibits 3-2 through 3-5 in Chapter 3, "Alternatives."

- **Nevada State Route (SR) 28** connects Crystal Bay, Nevada with the intersection with U.S. 50 at Spooner Summit. This 16.1-mile long roadway consists of one travel lane in each direction. Portions of the roadway in Incline Village include a center turn lane and bicycle lanes. Speed limits are generally 45 miles per hour (mph), with sections of 35 and 25 mph in Incline Village and Crystal Bay. Grades are largely flat between Incline Village and Sand Harbor, with sustained grades on either end. This roadway is part of the state and federal highway system ringing Lake Tahoe.
- **Lakeshore Boulevard** is a Washoe County roadway that extends across the southern portion of Incline Village. Connecting to SR 28 at either end, this roadway consists of one travel lane in each direction with a speed limit of 25 mph.

INTERSECTION CONFIGURATION

The following is a description of the intersection included in the analysis herein:

- The **SR 28/Lakeshore Boulevard** intersection is an unsignalized intersection, with traffic control provided by a Stop sign on the west (Lakeshore Boulevard) approach. A northbound left turn and eastbound left turn lane is provided.

GROUND-TRANSIT SERVICES AND FACILITIES

The North Shore area of Lake Tahoe (including both California and Nevada portions) is served by the Tahoe Area Regional Transit (TART) program operated by Placer County. Services within Washoe County are partially funded by the Washoe Regional Transportation Commission.

The Incline Village area is served by a portion of the TART "Mainline Route," which extends from SR 89 in Tahoma within El Dorado County, California across the North Shore along SR 28 to Incline Village. Within Incline Village, the route consists of eastbound service on SR 28 from Crystal Bay to Southwood Boulevard (east intersection) and a one-way counter-clockwise loop along Southwood Boulevard, Village Boulevard, Lakeshore Boulevard and Country Club Drive, returning westbound on SR 28. The closest transit stop to the North Demonstration project is located at the intersection of Lakeshore Boulevard and Country Club Drive (Hyatt Resort). This stop is approximately 0.8 mile west of the North Demonstration Project shared-use path. An existing shared-use path that extends along the length of Lakeshore Boulevard would connect this stop to the

North Demonstration Project. Currently, bus service to this stop is provided every 0.5 hour, from 6:42 a.m. to 7:12 p.m., seven days per week. TART buses can accommodate up to three bicycles on a front rack.

The Hyatt Resort is also served by the Night Rider program, operated by the Truckee – North Tahoe Transportation Management Association. This service operates during both summer and winter peak periods, with service every 0.5 hour that connects the Hyatt with other portions of the North Shore. This service runs from 7:00 p.m. to midnight, when operating.

In addition to these services, the Tahoe Transportation District operates the East Shore Express transit service as a convenient and affordable means to access Sand Harbor. The East Shore Express runs daily every 20 minutes during the peak summer months (end of June through Labor Day) from 10:00 a.m. to 8:00 p.m., and includes low fares and free entry into Sand Harbor. Parking for the East Shore Express is provided at the Old Elementary School in Incline Village at 771 Southwood Boulevard. This shuttle was offered as a two-year pilot program which ran through summer 2013. The shuttle is scheduled to operate in 2014; however, the project is currently unfunded. Funding to continue the program is being sought by TTD and other partners.

PEDESTRIAN AND BICYCLE FACILITIES

The Lakeshore Trail parallels Lakeshore Boulevard along its entire length, from SR 28 on the east side of Incline Village to SR 28 on the west side of Incline Village. This consists of a paved, shared-use path. It is one of the most popular bicycle facilities in the Tahoe Region, with up to 253 users per hour observed at any one location, of which 80 percent are pedestrians and 20 percent are cyclists (TRPA/Tahoe Metropolitan Planning Organization [TMPO] 2010). Within Incline Village, SR 28 includes bicycle lanes on both sides of the highway.

Formal trails are at several locations along SR 28, as well as connecting the highway to Lake Tahoe beaches. There are also a series of informal use trails (i.e., unmarked, volunteer trails established by repeated use) connecting popular beaches with nearby shoulder parking locations.

The Flume Trail is a popular mountain biking route connecting the Spooner Lake Management Area of Lake Tahoe Nevada State Park with Tunnel Creek Road near Ponderosa Ranch via Marlette Lake in the backcountry of Lake Tahoe Nevada State Park (over 15 miles in length). Other trails along the corridor consist of Skunk Harbor Road, the Chimney Rock Access Road, and a trail connecting the USFS East Lot with Marlette Lake.

PARKING FACILITIES

Parking in the vicinity of the proposed North Demonstration Project is available at the following locations:

- Sand Harbor provides a total of 532 parking spaces, in addition to boat user parking.
- Memorial Point Overlook provides a total of 28 spaces. While 16 spaces are limited to 20 minutes only, 12 spaces allow longer stays.
- Parking along SR 28 between Memorial Point and Lakeshore Boulevard consists of 149 legal spaces along the road shoulders. Counts conducted in early August 2011 indicated a total of 59 vehicles in these shoulder areas at peak time on a Wednesday, and 110 at peak time on a Saturday.
- There is also shoulder areas used for parking along SR 28 north of Lakeshore Boulevard and south of Sweetwater Road, with a capacity of approximately 149 vehicles. A total of 47 vehicles were observed to park in this area at a peak time on a Wednesday in early August 2011, and 48 at peak time on a Saturday.
- Tunnel Creek Station consists of a café and outdoor shuttle service. A total of 36 spaces are provided in this private lot.
- In addition, there are large private parking lots previously used for the former Ponderosa Ranch, which are not currently available to the public.

ROADWAY TRAFFIC VOLUMES

The existing peak hour and Average Daily Traffic volumes for SR 28 and Lakeshore Boulevard are presented in Table 4.9-1. Table 4.9-2 shows peak-hour traffic volumes on SR 28 at Memorial Point on peak weekend days. Table 4.9-3 shows measured vehicle speeds on SR 28 at potential crossing locations for the North Demonstration Project.

Table 4.9-1 Existing Daily Traffic Volumes

Roadway	Summer Average Daily Traffic Volumes
SR 28, west of western end of Lakeshore Boulevard	12,000
SR 28, east of Village Boulevard	12,000
SR 28, north of eastern end of Lakeshore Boulevard	6,100
SR 28, south of east end of Lakeshore Boulevard	7,200
SR 28, north of U.S. 50	5,600
Lakeshore Boulevard, 0.1 mile west of SR 28	1,800

Source: NDOT 2012

Table 4.9-2 Peak-Hour Traffic Volumes on SR 28 at Memorial Point

Day	Southbound	Northbound	Total
Friday, August 12, 2011: 4:00 p.m. to 5:00 p.m.	454	531	985
Saturday, August 13, 2011: 4:00 p.m. to 5:00 p.m.	463	528	991
Sunday, August 14, 2012: 2:00 p.m. to 3:00 p.m.	433	514	947

Source: Counts conducted by LSC in 2011 and 2012.

Table 4.9-3 Vehicle Speeds on SR 28

Location	Direction	Posted	Average	85th Percentile
Lakeshore Boulevard	Southbound	45	40	46
	Northbound	45	34	44
Tunnel Creek	Southbound	45	39	44
	Northbound	45	36	41
Memorial Point	Southbound	45	37	41
	Northbound	45	37	41
Sand Harbor	Southbound	45	31	36
	Northbound	45	39	44

Source: Counts conducted by LSC on Sunday August 13, 2011 and Saturday, August 20, 2011.

INTERSECTION LEVEL OF SERVICE

Level of Service (LOS) is a measure of congestion used by traffic engineers to determine the effectiveness of elements of transportation infrastructure. LOS is most commonly used to analyze highways by categorizing traffic flow with corresponding delay and travel-time conditions. A LOS analysis is not relevant to existing conditions, because the proposed path crossing locations (which are the potential source of delay involved with the proposed project) do not presently exist. Because there are no existing SR 28 crossings within the project limits, vehicle travel would be as free-flowing as surrounding traffic conditions.

4.9.2 ENVIRONMENTAL CONSEQUENCES AND RECOMMENDED MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Based on TRPA's Initial Environmental Checklist, effects related to traffic, parking, and transit were evaluated based on whether an alternative would:

- generate an increase in Daily Vehicle Trip Ends and related Vehicle Miles Traveled (VMT) not contemplated in the Regional Transportation Plan;
- create an unmet demand for parking;
- cause a substantial adverse effect upon existing transportation systems, including highway, transit, bicycle or pedestrian facilities;
- alter present patterns of circulation or movement of people and/or goods; or
- increase traffic hazards to motor vehicles, bicyclists, or pedestrians.

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the TRPA criteria used for this analysis.

METHODS AND ASSUMPTIONS

FORECAST OF SHARED-USE PATH USE

LSC applied the *Lake Tahoe Region Bicycle and Pedestrian Corridor Use Model* (LSC 2009; LSC 2012) to estimate the user demand for the proposed North Demonstration Project. This model is based upon observed facility use levels in the Lake Tahoe Region, data regarding the characteristics of individual facility users, as well as demographic and travel data for the Lake Tahoe Region. The complete use analysis for the North Demonstration Project is provided in the *Nevada Stateline-to-Stateline Bikeway North Demonstration Project Use Forecasts Memorandum* (LSC 2012) incorporated by reference here. The analysis estimates the projected number of shared-use path users in the following categories:

- residents bicycling to the shared-use path from home,
- visitors bicycling to the shared-use path from lodging,
- residents or visitors driving to the shared-use path to bicycle,
- residents walking to the shared-use path from home,
- visitors walking to the shared-use path from lodging, and
- residents or visitors driving to the shared-use path to walk.

Shared-use path use estimates are provided for: daily, peak hour, and annual time periods; the location of peak use; and the North Demonstration Project shared-use path in its entirety.

Shared-use path use estimates are derived from a "maximum feasible demand" figure based on regional path use and demographic data, which is then refined based on site-specific path characteristics (e.g., steepness or grade, facility continuity, recreation value, and path congestion). Because some of these factors differ between Alternatives A and B, the use forecasts for each alternative also differ. The result of applying the reduction factors to the maximum feasible demand is the estimated daily usage at the location of peak demand along the North Demonstration Project. Table 4.9-4 summarizes the demand estimate calculations and projected use for Alternatives A and B.

Table 4.9-4 Total Projected North Demonstration Project Use by Alternative

Location	Daily One-Way Trips			Peak Hour One-Way Trips			Annual One-Way Trips		
	Bike	Ped.	Total	Bike	Ped.	Total	Bike	Ped.	Total
Alternative A									
Northern Terminus	546	224	770	84	34	118	80,000	33,000	113,000
Memorial Point	83	158	241	13	24	37	12,000	23,000	35,000
Sand Harbor	50	250	300	8	38	46	7,000	37,000	44,000
Total Use - Alternative A	**679**	**632**	**1,311**	**105**	**96**	**201**	**99,000**	**93,000**	**192,000**
Alternative B									
Northern Terminus	461	224	685	71	34	105	68,000	33,000	101,000
Memorial Point	83	53	136	13	8	21	12,000	8,000	20,000
Sand Harbor	50	100	150	8	15	23	7,000	15,000	22,000
Total Use - Alternative B	**594**	**377**	**971**	**92**	**57**	**149**	**87,000**	**56,000**	**143,000**

Source: LSC 2012

The point of the shared-use path with the highest forecast use for both alternatives is near the northern terminus of the path near the Lakeshore Boulevard/SR 28 intersection. The estimated daily path use at this location is 546 one-way bicycle trips and 224 pedestrian trips for Alternative A, and 461 one-way bicycle trips and 224 pedestrian trips for Alternative B. The estimated peak hour trail use at this location is 84 one-way bicycle trips and 34 pedestrian trips for Alternative A and 71 one-way bicycle trips and 34 pedestrian trips for Alternative B. The total estimated annual usage of the North Demonstration Project shared-use path is 113,000 one-way trips for Alternative A, and 101,000 one-way trips for Alternative B.

Not all shared-use path users would pass the location of peak use. For instance, persons starting from Sand Harbor or Memorial Point and making short trips that do not extend as far as Lakeshore Boulevard result in additional use not included in the figures above. Taking these users into consideration, Table 4.9-4 also presents the total number of trips for the facility as a whole. As indicated in Table 4.9-4, use projections for Alternative A include: 679 and 632 daily one-way bicycle and pedestrian trips, respectively; 105 peak hour one-way bicycle trips, and 96 peak hour one-way pedestrian trips. With Alternative B, these figures would be 594 daily one-way bicycle trips, 377 daily one-way pedestrian trips, 92 peak hour one-way bicycle trips, and 57 peak hour one-way pedestrian trips.

To evaluate potential cumulative traffic, parking, and transit effects, Table 4.1-1 was reviewed to determine those projects that could potentially affect path use numbers. Of the projects listed in Table 4.1-1, it is anticipated that only two of the foreseeable projects would alter the number of path users:

> While completing the Nevada Stateline-to-Stateline Bikeway project by constructing the segments of the Bikeway between the North and South Demonstration Projects would provide an attractive and comprehensive recreational facility, the marginal increase in use because of the construction of this middle segment would be limited. Beyond access trailheads to additional beaches (and upland trails), the additional facility would not provide non-motorized access to new activity centers such as residential areas or commercial areas. In addition, the substantial grades required to make the approximately 800-foot climb from lake level at the southern terminus of the North Demonstration Project to Spooner Summit would dissuade much of the potential ridership. As reflected in the *Lake Tahoe Region Bicycle Pedestrian Use Model*, the presence of sustained grades is one of the largest factors reducing potential use of a shared-use path. It should also be noted that, as there is not excess parking within the corridor on peak summer days, bicyclists of the additional section accessing from the north would need to ride the length of the North Demonstration Project (approximately 3 miles) before accessing the additional segments. Overall, extension of the path to complete the Nevada Stateline-to-Stateline Bikeway would increase use of the North Demonstration Project by no more than 7 percent, or 50 users per day.

- Currently, the East Shore Express transit service consists of summer bus service between an intercept parking lot in the western portion of Incline Village and Sand Harbor. The North Demonstration Project does not include any additional bus stops (such as at Tunnel Creek). To the degree that growth in ridership on this service delivers more visitors to Sand Harbor than at present, this service has the potential to generate a slight increase in the number of path users (particularly pedestrians) using the southern portion of the North Demonstration Project. Modifications to transit service could occur related to the East Shore Express alone, or as a result of implementation of the SR 28 Corridor Management Plan.

While there are no established criteria for determining whether the estimated bicycle and pedestrian use levels alone would result in adverse effects, the following discussions of traffic, parking, and transit effects are directly influenced by the demand and use levels associated with the proposed North Demonstration Project.

4.9.3 ENVIRONMENTAL CONSEQUENCES

CONSTRUCTION-RELATED INCREASE IN TRAFFIC HAZARDS

ALTERNATIVE A

Direct and Indirect Effects

Implementation of Alternative A would involve construction associated with two SR 28 crossings and construction within or immediately adjacent to SR 28 ROW that could affect highway traffic during construction. Construction associated with the SR 28 crossings, the IVGID sewer main relocation associated with the undercrossing option at Tunnel Creek, or related to installation of bridge structures south of Tunnel Creek would require some degree of highway closures (e.g., closure of one lane for periods, or full highway closure). This could create temporary traffic delays and roadway hazards and could also temporarily delay or reduce emergency access within and around construction zones. Increased risk to motorists, pedestrians, and bicyclists within the construction zone and interference with emergency responders (i.e., law enforcement, fire, and medical) as a result of construction would be a potential adverse effect under Alternative A. However, because a traffic control plan (Design Feature TRA-1) would be prepared and implemented that would include measures to provide notification to emergency service providers and adequate circulation around construction sites for emergency vehicle and existing public vehicular access, the potential increase in traffic hazards to motor vehicles, bicyclists, and pedestrians would be minimized such that there would not be a residual adverse effect.

ALTERNATIVE B

Direct and Indirect Effects

The Alternative B effect on traffic hazards and emergency access during construction would be similar to that described above for Alternative A, although the duration of lane closures would be substantially less. Alternative B includes up to four SR 28 crossings, including one crossing location at Tunnel Creek that includes an undercrossing option that would require relocation of the IVGID sewer main located within SR 28 that would likely have short-term effects on public and emergency access. Any SR 28 closures associated with construction of these highway crossings would be minor in duration relative to the extent of highway closures that could be required for bridge structure installation south of Tunnel Creek for Alternative A.

However, because a traffic control plan (Design Feature TRA-1) would be prepared and implemented that includes forethought into emergency notification procedures, and adequate circulation around construction sites for emergency vehicle and existing public vehicular access, the potential increase in traffic hazards to motor vehicles, bicyclists, and pedestrians would be minimized such that there would not be a residual adverse effect.

Cumulative Effects

Some of the projects listed in Table 4.1-1 (e.g., improvements proposed as part of the SR 28 Corridor Management Plan, or the Incline Village General Improvement District Sewer Export Line Upgrade Project) could occur concurrently with construction of the North Demonstration Project (either Alternative A or B) and could have a similar potential to create an increase in traffic hazards within the vicinity of the project related to highway closures or restricted access. However, the shared-use path and related projects would each be required to implement traffic control plans as part of the encroachment and occupancy permit process for portions of the projects that would involve construction within existing roadway rights-of-way to ensure sufficient public and emergency access is maintained. Therefore, the related projects (as listed in Table 4.1-1) as well as the North Demonstration Project would not result in adverse cumulative effects related to increased traffic hazards during construction.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C the shared-use path would not be constructed; therefore, there would be no direct or indirect effects on emergency access.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to emergency access.

GENERATION OF DAILY VEHICLE TRIP ENDS AND VMT

ALTERNATIVES A AND B

Direct and Indirect Effects

Alternatives A and B could influence daily vehicle trips and VMT in the following ways:

- VMT in the vicinity of the shared-use path would be beneficially reduced related to the mode shift of path users bicycling/walking to the path and on to their final destination instead of using a vehicle to make the trip.
- VMT associated with the North Demonstration Project would also be increased by path users driving to the project area to use the path. A portion of these drivers are expected to consist of persons making new trips for this purpose, while the remainder are drivers that otherwise would have driven to another similar path facility (e.g., Camp Richardson, South Demonstration Project, Truckee River Trail).
- In addition, VMT could be decreased by path users that otherwise would have driven to Sand Harbor and other beaches that instead shorten their auto trip by bicycling or walking along the path.

The Regional Transportation Plan (RTP) identifies the transportation projects planned for implementation in the Tahoe Region through 2035. Projects identified in the RTP range from water quality and traffic flow improvements on major highways to the installation of new bicycle paths and development of a regional public-transit, ferry system on the Lake. The RTP seeks to enhance public mobility and safety while at the same time delivering meaningful environmental improvements throughout the transportation network. The proposed North Demonstration Project is both an EIP project and a specific project identified in the RTP (TRPA and TMPO 2012a: p. 2-17; TRPA and TMPO 2012b: p. 2-7), and is a project that would help achieve RTP mobility, safety, and environmental goals, including environmental threshold carrying capacities related to recreation, air quality, and water quality.

The RTP's combined list of projects is expected to result in an overall reduction in region-wide VMT (3.1 percent reduction in per capita VMT) between 2010 and 2035 (TRPA and TMPO 2012a: p. 3.3-50). This reduction

percentage is based on an analysis conducted using the Lake Tahoe Bicycle and Pedestrian Use Model, which was used to develop VMT reduction/increase estimates for proposed trail corridors around the Lake Tahoe Region. The VMT analysis conducted in support of the RTP acknowledged that depending on the location and type of trail, some trails may generate trips, while others reduce trips. Even if a trail is sufficiently attractive that VMT increases from users accessing the facility by motor vehicle, it increases interest in non-motor vehicle mobility and creates a mode shift from the private automobile to walking and bicycling. In aggregate, the full network of the bicycle trails planned by the TRPA and TMPO as part of the RTP is estimated to result in an overall VMT reduction (TRPA and TMPO 2012b: p. 3-378 and 3-403). The North Demonstration Project is also identified in the Lake Tahoe Environmental Improvement Program as EIP Project 03.01.02.17 and is intended to achieve and maintain environmental thresholds related primarily to air quality and is considered an overall benefit to the environment.

Therefore, because the proposed project is consistent with the RTP and EIP, is projected to contribute to a reduction in region-wide VMT, and would not conflict with TRPA's VMT threshold (see also discussion in Section 4.10, "Air Quality"), the North Demonstration Project would not result in a substantial adverse effect related to VMT.

Cumulative Effects

Some of the projects listed in Table 4.1-1 (such as the Boulder Bay Project) could generate traffic trips that contribute to VMT in the Region. The Boulder Bay Project was already contemplated in the RTP's cumulative effects analysis that determined an overall reduction in region-wide VMT (TRPA and TMPO 2012a: p. 4-5). Like the North Demonstration Project, the subsequent phases of the Nevada Stateline-to-Stateline Bikeway would help achieve RTP mobility, safety, and environmental goals. It is anticipated that segments of the Bikeway located closer to communities or more specifically that would provide a transportation connection between communities (e.g., the segments between Crystal Bay and Incline Village, and Cave Rock and Stateline) would reduce VMT and that more distant segments (e.g., segments between Sand Harbor and Spooner Summit) may incrementally increase VMT. Collectively, the complete Nevada Stateline-to-Stateline Bikeway is anticipated to reduce overall VMT. Given that the proposed North Demonstration Project and subsequent phases of the Nevada Stateline-to-Stateline Bikeway are consistent with the RTP and EIP and other foreseeable projects that could generate trips were already contemplated in the RTP's cumulative effects analysis that determined an overall reduction in region-wide VMT, the project is expected to further the goal of reducing VMT and no cumulative adverse effect would occur.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C the shared-use path would not be constructed; therefore, there would be no direct or indirect effects on VMT.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to VMT.

TRAFFIC CONDITIONS – ROADWAY LEVEL OF SERVICE AND TRAFFIC SAFETY

ALTERNATIVES A AND B

Direct and Indirect Effects

For an intersection or roadway segment, the LOS is the delay to users and the volume/capacity (v/c) ratio. LOS is expressed by a series of letter grades from A (free flow: low v/c ratio and delay) through E (Unstable flow: high v/c ratio and delay) and F (forced or breakdown flow). An increase in the number of intersections or crossings could affect the LOS for a given roadway (AASHTO 2011). The following discussion focuses on LOS as an indicator

of potential effects to the existing transportation facilities, patterns of traffic circulation, and an increase in traffic hazards.

Preliminary engineering plans for the North Demonstration Project were reviewed for consistency with AASHTO guidance documents A Guide for the Development of Bicycle Facilities (AASHTO 2012) and A Policy on Geometric Design of Highways and Streets (AASHTO 2011). AASHTO's guidance related to at-grade crossings is incorporated by reference in NDOT's Roadway Design Guide (NDOT 2010). The proposed at-grade crossings (including driver sight distances given posted speed limits and curvature requirements) at the up to two at-grade crossings under Alternative A (Lakeshore Boulevard and Tunnel Creek) and the up to four at-grade crossings under Alternative B (Lakeshore Boulevard, Tunnel Creek, Memorial Point, and Sand Harbor) were evaluated for safety and consistency with these guidelines.

The preliminary engineering plans include the following crossing improvements:

- At the Lakeshore Boulevard crossing, a striped crosswalk would be provided on the north leg of the intersection. A raised center median island would allow a two-stage crossing, in which pedestrians can cross wait for a gap in one direction of travel, cross to the center, then wait for a gap in the other direction of travel.
- At the Tunnel Creek crossing, a HAWK signal or similar device is proposed. Also known as a hybrid pedestrian beacon, a HAWK signal consists of traffic signal heads suspended on a catenary arm over the travel lanes, which is dark (unlit) unless activated (Exhibit 3-10). An approaching pedestrian activates the signal (typically with a push button). The signal then displays a yellow indication, followed by a solid red indication, fully stopping motor vehicle traffic. Once adequate time has passed for pedestrians to cross at typical speeds, the signal changes to a flashing red for a few seconds before returning to a dark condition. This new signal type, recently included in the Manual on Uniform Traffic Control Devices, has the advantage of a very high rate of compliance by motorists, but no impact on traffic flow when not needed for pedestrian crossing.
- At the Memorial Point crossing (Alternative B only), a striped crosswalk would be provided.
- At the Sand Harbor crossing (Alternative B only), a striped crosswalk with a raised center median island would be provided.

Note that at both the Tunnel Creek and Sand Harbor locations an undercrossing below SR 28 is an option under consideration that would eliminate the need for an at-grade crossing at these locations. Additional specific details of crossings treatments would be developed further in the subsequent design phases, and would be designed to conform to applicable AASHTO, NDOT, TRPA, FHWA, and Washoe County design standards.

Sight Distance

One key indicator of traffic safety conditions is the availability of adequate stopping sight distance. This is the distance needed by an approaching motorist to perceive the presence of a pedestrian in the crosswalk, and to come to a safe stop. It also provides adequate distance for a pedestrian to judge the availability of an adequate gap in traffic. As shown in Table 4.9-5, all of the potential crossing locations, except the southbound travel direction at the proposed Memorial Point crosswalk location, have adequate stopping sight distance in both directions. This assumes that no vehicles are parked within the lines of sight. Implementation of Design Feature TRA-2 (described in the "List of Design Features" at the beginning of this document) would ensure that adequate stopping sight distance is incorporated into the final design plans for the Memorial Point crossing. This refinement in design would require that the crossing location be moved approximately 120 feet to the south.

Crossing Level of Service

As input to the LOS analysis, it is necessary to forecast path activity at each of the crossing locations. The total path use forecasts by origination location (as shown in Table 4.9-4) can be used to estimate the number of path users from each origination location that would cross at each of the crossing locations. Table 4.9-6 shows the projected daily and peak-hour total number of users (bicyclists and pedestrian) from each origination location at each SR 28 crossing location by alternative.

Table 4.9-5 Trail Crossing Location Sight Distances on SR 28					
Crossing Location	Posted Speed (mph)	Design Speed (mph)	Required Stopping Sight Distance (feet)[1]	Existing Sight Distance (feet) [2]	Adequate Stopping Sight Distance?
SR 28/Lakeshore Boulevard					
Southbound	45	50	425	2,000+	Yes
Northbound	45	50	425	490	Yes
Tunnel Creek					
Southbound	45	50	425	850	Yes
Northbound	45	50	425	470	Yes
Memorial Point Scenic Overlook					
Southbound	45	50	425	340	No
Northbound	45	50	425	690	Yes
Sand Harbor					
Southbound	45	50	425	900+	Yes
Northbound	45	50	425	550	Yes

[1] Derived from AASHTO's *A Policy on Geometric Design of Highways and Streets* (AASHTO 2011).
[2] Determined by LSC.
Source: Adapted by LSC in 2013.

Table 4.9-6 Projected Daily and Peak Hour SR 28 Crossing Activity					
		Total Persons at Crossing Location			
		Tunnel Creek	Memorial Point	Sand Harbor	Lakeshore Boulevard
Daily Volume					
Trip Origin	**Alternative A**				
	Northern Terminus	732	--	--	326
	Memorial Point	32	--	--	25
	Sand Harbor	23	--	--	23
	TOTAL	**786**	**--**	**--**	**373**
	Alternative B				
	Northern Terminus	295	57	356	296
	Memorial Point	25	136	109	19
	Sand Harbor	15	10	150	23
	TOTAL	**335**	**203**	**615**	**338**
Peak Hour Volume					
Trip Origin	**Alternative A**				
	Northern Terminus	112	--	--	50
	Memorial Point	5	--	--	4
	Sand Harbor	4	--	--	4
	TOTAL	**121**	**--**	**--**	**57**
	Alternative B				
	Northern Terminus	45	9	55	45
	Memorial Point	4	21	17	3
	Sand Harbor	2	2	23	4
	TOTAL	**51**	**31**	**95**	**52**

Source: LSC 2013a

Traffic LOS

Traffic conditions at the HAWK signal or similar device location at Tunnel Creek were evaluated using the Synchro software package. The peak hourly number of crossing groups was used to identify the average time between the activation of the signal (assuming that more than one group does not cross at a time). As shown in Table 4.9-7, average delay per vehicle is less than 5 seconds under either action alternative, which indicates a LOS A or free flowing condition on SR 28.

Table 4.9-7 Evaluation of Path Crossings on Peak Hour Auto Level of Service on SR 28

	Alternative A		Alternative B			
Crossing Location:	Tunnel Creek	Lakeshore Boulevard	Tunnel Creek	Lakeshore Boulevard	Memorial Point	Sand Harbor
Crossing Control:	HAWK Signal	Crosswalk, Raised Median	HAWK Signal	Crosswalk, Raised Median	Crosswalk	Crosswalk, Raised Median
Number of Path Users per Hour	121	57	51	52	31	95
Average Path Users per Crossing Group	2.5	2.5	2.5	2.5	2.5	2.5
Crossing Groups per Hour	48	23	20	21	12	38
Crossing Distance - 1/2 of Roadway Width + 4 feet	--	35	--	35	18	34
Crossing Speed (feet per second)	--	4.0	--	4.0	4.0	4.0
Time Required per Crossing (seconds)	--	8.75	--	8.75	4.5	8.5
Total Time per Hour Auto Traffic Blocked (seconds)	--	200	--	181	56	322
Percent of Hour that Auto Traffic is Blocked	--	6%	--	5%	2%	9%
Base Roadway Capacity (vehicles per hour per direction)	--	1,600	--	1,600	1,600	1,600
Roadway Capacity with Crossings (vehicles per hour)	--	1,504	--	1,520	1,568	1,456
Hourly Peak Direction Traffic Volume	--	480	--	565	565	565
Volume/Capacity (v/c) Ratio	--	32%	--	37%	36%	39%
Average Delay on Worst Approach (seconds)	4.4	--	2.3	--	--	--
SR 28 Crossing LOS	A	A	A	A	A	A

Source: Adapted by LSC in 2013.

LOS at the other at-grade roadway crossing locations was evaluated by considering the effect that shared-use path users blocking traffic movements would have on the capacity of the travel lanes, and comparing it with the traffic volumes to identify the v/c ratio and associated LOS. This analysis is presented in Table 4.9-7 and consists of the following steps:

- The forecast number of path users in the peak hour is divided by an estimated average number of persons crossing at the same time (2.5 persons) to identify the number of crossing events per hour that would require drivers to stop.
- Section 484B.283 of the Nevada Revised Statutes states that "When official traffic-control devices are not in place or not in operation the driver of a vehicle shall yield the right-of-way, slowing down or stopping if need be so to yield, to a pedestrian crossing the highway within a crosswalk when the pedestrian is upon the half of the highway upon which the vehicle is traveling, or when the pedestrian is approaching so closely from the opposite half of the highway as to be in danger." Based on this, it is assumed that drivers would need to

stop for the time required for a path user to cross half of the roadway plus 4 feet. This distance was divided by a typical walking speed of 4 feet per second to identify the time that each crossing event stops traffic.

- The stop time per crossing event is multiplied by the number of crossing events per hour to identify the total time in the peak hour that traffic is stopped. Dividing by the total number of seconds per hour (3,600) yields the proportion of the total hour in which traffic is stopped.
- The capacity of a travel lane under ideal low-speed conditions is 1,600 vehicles per hour. Multiplying by the proportion of the total hour that traffic is *not* stopped yields the roadway capacity reflecting path crossing activity.
- The peak-direction volume is divided by the capacity to identify the v/c ratio. A capacity v/c ratio less than 0.5 indicates a LOS of A.

Table 4.9-7 presents a summary of traffic LOS at all potential shared-use path crossing locations on SR 28. The roadway LOS at all path crossing locations would be LOS A (free flow) for both action alternatives. Because the proposed North Demonstration Project would not cause roadway LOS on SR 28 to degrade to levels below LOS standards established by TRPA and Washoe County for the area, there would not be an adverse effect on roadway LOS.

Pedestrian/Bicyclist LOS

LOS can also be evaluated for pedestrians (and cyclists crossing as pedestrians) at the various crossing locations. The LOS criteria for these users are based on the average delay experienced by the pedestrian, as shown in Table 4.9-8. At the Tunnel Creek crossing location (with the at-grade crossing option), the delay would be equal to the time needed to activate the signal and wait for the signal to cycle through a yellow indication to a solid red indication, which would take 5 to 10 seconds (LOS B). At the other crossing locations, it is necessary to calculate the average delay that would be experienced as the pedestrian waits for an adequate gap in traffic to cross the traffic stream. Note that this conservatively assumes no yielding on the part of approaching motorists. For locations with a raised center island (e.g., the Lakeshore Boulevard crossing), gaps only need to be available in one direction at a time, rather than in both directions simultaneously. This yields an LOS for each direction at these locations.

Table 4.9-8 Pedestrian LOS Criteria[1]

LOS	Delay (seconds)	Comments
A	0-5	Usually no conflicting traffic
B	5-10	Occasionally some delay due to conflicting traffic
C	10-20	Delay noticeable to pedestrians, but not inconveniencing
D	20-30	Delay noticeable and irritating, increased likelihood of risk taking
E	30-45	Delay approaches tolerance level, risk-taking behavior likely
F	>45	Delay exceeds tolerance level, high likelihood of pedestrian risk taking

[1] From Exhibit 19-2.
Source: Transportation Research Board 2010

As shown in Table 4.9-9, LOS would be LOS B at the Sand Harbor crossing location (with the option that includes an at-grade crossing) in both directions and at the Lakeshore Boulevard crossing in the northbound direction, and LOS C at the Memorial Point crossing location and at the Lakeshore Boulevard crossing in the southbound direction. Referring to the comments in Table 4.9-8, these LOS results indicate that delays would be noticeable but do not generate a potential for risk-taking behavior on the part of pedestrians.

Table 4.9-9 Pedestrian LOS at Crossing Locations						
For Both Alternatives A and B						
Crossing Location:	Tunnel Creek	Lakeshore Boulevard		Memorial Point	Sand Harbor	
Crossing Control:	HAWK Signal	Crosswalk, Raised Median		Crosswalk	Crosswalk, Raised Median	
	Both	Southbound	Northbound	Both	Southbound	Northbound
Minimum Gap for Crossing (seconds)	--	12	8	11	7	7
# of Adequate Gaps Per Hour	--	79	110	103	120	93
Average Time Between Adequate Gaps (seconds)	--	46	33	35	30	39
Average Path User Wait Time for Adequate Gap (seconds)	--	20	13	15	11	14
Pedestrian LOS	B	C	B	C	B	B
Source: Adapted by LSC in 2013.						

Conclusion

With implementation of Design Feature TRA-2 adequate sight and stopping distance and a traffic LOS of A would be maintained on SR 28 for all at-grade crossings for Alternatives A and B. Additionally, bicycle and pedestrian LOS at these crossings would acceptable in that it would not encourage shared-use path users to engage in risk-taking behavior. The options that include undercrossings at Tunnel Creek (Alternatives A and B) and Sand Harbor (Alternative B only) would avoid any auto delays or user crossing delays associated with at-grade crossings. For these reasons, implementation of Alternatives A and B would not cause an adverse effect to the existing transportation facilities, patterns of traffic circulation, and an increase in traffic hazards.

Cumulative Effects

As described earlier in this section, two of the reasonably foreseeable projects (the subsequent phases of the Nevada Stateline-to-Stateline Bikeway, and transit modifications to the East Shore Express either made alone or in combination with other improvements called for in the SR 28 Corridor Management Plan) could incrementally increase the number of path users beyond that projected for the North Demonstration Project alone. The increase in users is expected to be minor. Adequate site and stopping distance and a traffic LOS of A would be maintained on SR 28 for all at-grade crossings for Alternatives A and B. Additionally, bicycle and pedestrian LOS at these crossings would not encourage shared-use path users to engage in risk-taking behavior at crossings. The options that include undercrossings at Tunnel Creek (Alternatives A and B) and Sand Harbor (Alternative B only) would avoid any auto delays or user crossing delays associated with at-grade crossings; however, undercrossings would add substantial cost when compared to the at-grade crossings. For these reasons, implementation of Alternatives A and B would not cause an adverse effect to the existing transportation facilities, patterns of traffic circulation, and an increase in traffic hazards.

TRAILHEAD PARKING DEMAND

ALTERNATIVES A AND B

Direct and Indirect Effects

Parking demand at points along the North Demonstration Project was estimated by LSC based on the calculated demand for drive-to-trail users (LSC 2013b). The analysis resulted in a total of 137 vehicles parking at a shared-use path access location over the course of a typical day for Alternative A and 118 vehicles for Alternative B.

The daily demand for parking would not occur all at one time. Parking demand at a given time would reflect turnover in shared-use path use over the course of the day. A review of the ratio of peak parking to total daily

parking activity for the drive-to-trail users was calculated as the weighted average of the ratio observed for vehicles at Hidden Beach and that observed at other Tahoe shared-use path trailheads. This ratio was calculated to be 50 percent for the North Demonstration Project, resulting in a peak hour parking demand of 69 vehicles for Alternative A and 59 vehicles for Alternative B. It is estimated that 96 percent of the parking demand would occur at the northern trail terminus near Lakeshore Boulevard and the remaining 4 percent would occur at Memorial Point. Because of traffic congestion, limited parking, and the entrance fee, it is expected that no net increase in parking associated with the shared-use path would occur at Sand Harbor. Taking these figures into account, the peak parking demand at the northern trail terminus generated by the proposed shared-use path would equal 66 parked vehicles under Alternative A and 56 under Alternative B.

The proposed shared-use path (under either Alternative A or B) would also eliminate some highway shoulder area currently used for parking, in the area on the east side of SR 28 from Ponderosa Ranch Road south to the point where the path leaves the highway. Counts conducted by LSC in the summer of 2011 in these areas indicates that a maximum of 22 cars were observed to be parked in this area, consisting of 15 parked along the east side of SR 28 between Ponderosa Ranch Road and Lakeshore Boulevard, plus seven parked along the east side between Lakeshore Boulevard and where the shared-use path starts to climb away from the roadway shoulder. Adding this figure to the parking demand, a total of 88 new parking spaces would be required under Alternative A and 78 under Alternative B, to address projected peak parking demands of the project.

In an effort to promote non-automobile access to the shared-use path but also acknowledging that some users may drive to the trailhead via auto, TTD is proposing a combination of trailhead parking and transit services to meet the projected parking demand. Current plans would construct a total of 31 parking spaces in the existing NDOT ROW along the east side of SR 28 from the Tunnel Creek Station area north to Ponderosa Ranch Road. The remaining parking demand would be met through an extension of TART service to the site or through the East Shore Express shuttle service which currently provides access to Sand Harbor. Additionally, users would have access to legal shoulder parking on adjacent public roads. The closest available legal shoulder parking is located along SR 28 north of Lakeshore Boulevard and south of Sweetwater Road, with capacity of approximately 149 vehicles. A total of 47 vehicles were observed to park in this area at a peak time on a Wednesday in early August 2011, and 48 at peak time on a Saturday, leaving approximately 100 parking spaces available. The proposed trailhead parking would eliminate approximately 385 feet of legal shoulder parking (approximately 15 spaces) and replace it with parking for 31 vehicles. This would result in an increase of 16 parking spaces within the area between Sweetwater Road and Lakeshore Boulevard, for a new total of 165 spaces. Therefore, the available parking (165 spaces) is more than sufficient to meet the demand of 88 (Alternative A) or 78 (Alternative B) new or relocated vehicles.

Because the existing and projected parking demand would be fully met through proposed trailhead parking, potential transit service enhancements, and existing legal shoulder parking, implementation of Alternatives A and B would have no adverse effect on existing parking facilities and would not create unmet parking demand.

Additionally, as discussed in Section 4.2.1, the option exists for an extension of the formalized parking area to include the ROW on the eastern side of SR 28 between Ponderosa Ranch Road and Sweetwater Road. This extension would add an additional 70 spaces and would provide sufficient formalized parking to meet the existing and projected demand without reliance on legally available shoulder parking or transit.

Cumulative Effects

The additional trail use associated with the completion of the Nevada Stateline-to-Stateline trail (specifically, the construction of the segments between the North Demonstration and South Demonstration Projects) would increase potential parking demand at the northern end of the North Demonstration Project by up to five cars. This would result in a total parking demand (new plus relocated vehicles) of 93 vehicles under Alternative A and 83 vehicles under Alternative B. This additional demand would be fully accommodated through transit service or

legal shoulder parking and would have no cumulative adverse effect to parking facilities and would not create unmet demand.

The SR 28 Corridor Management Plan could eliminate shoulder parking along SR 28 and provide access to recreation sites serviced by the eliminated parking via a public transit system or shuttle service. Any existing parking would be re-directed to one or more transit intercept lots. Implementation of projects envisioned in the SR 28 Corridor Management Plan would be subject to subsequent project-level environmental review and permitting, at which time, they too would be required to demonstrate that they are not creating an unmet demand for parking. Therefore, the potential changes to parking facilities resulting from this cumulative project would be resolved at a project level and would not result in an adverse cumulative effect.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed and there would be no change to existing parking facilities or increased demand for parking facilities.

Cumulative Effects

Completion of the other portions of the Nevada Stateline-to-Stateline Bikeway and implementation of the SR 28 Corridor Management Plan could result in increased demand for parking facilities within the study area. However, as no new bicycle/pedestrian facilities would be constructed under this alternative, Alternative C would have no cumulative effect on parking demand.

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4.10 AIR QUALITY

This section describes the existing air quality conditions within the project area and evaluates potential impacts to air quality related to implementation of the North Demonstration Project, including Alternatives A, B, and C. A summary of applicable regulations under which the action alternatives would be implemented is provided in Appendix C. The following analysis focuses on the potential for project construction and operations to violate any air quality standard or contribute substantially to an existing or projected air quality violation; result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard; expose sensitive receptors to substantial pollutant concentrations; or create objectionable odors affecting a substantial number of people. Operation of the project would not result in the introduction of new emission sources of odors or hazardous air pollutants (HAPs). Thus, potential effects related to emissions of odors and HAPs during project construction are examined, but long-term operational emissions of odors and HAPs are not discussed further. The proposed project would not introduce any new stationary sources of emissions.

As described in Section 4.1, “Approach to Environmental Analysis,” relevant federal laws and executive orders are discussed at the beginning of each resource section. General conformity requirements were adopted by Congress as part of the federal Clean Air Act Amendments of 1990 (Public Law 84-159). General conformity requires that all federal actions conform to the state air quality control plan referred to as a State Implementation Plan (SIP). Areas that do not meet or previously have not met national ambient air quality standards are required to prepare, submit, and implement a SIP or Federal Transportation Improvement Program (FTIP) demonstrating how attainment and maintenance of these standards will be achieved. An analysis that determines whether an individual project complies with the SIP or FTIP is called a conformity analysis. The Transportation Conformity Rule appears in 40 CFR, Parts 51 and 93.

The proposed project is located in Washoe County, Nevada, and within the Lake Tahoe Air Basin (LTAB). For the LTAB, the 2013 Federal Transportation Improvement Program (2013 FTIP), a four-year program of surface transportation projects, was approved by TMPO on January 23, 2103 (TMPO 2013). The 2013 FTIP was found to conform to the SIPs in California and Nevada. The 2013 FTIP is consistent with the transportation system and financial plan described in the most recent amendment to the Lake Tahoe Regional Transportation Plan (RTP), referred to as “Mobility 2035,” adopted on December 12, 2012 (TRPA and TMPO 2012). The 2013 FTIP met all air quality conformity requirements when approved. EPA has confirmed the conformity determination for the RTP.

TMPO is responsible for conducting conformity determinations for both the California and Nevada portions of the LTAB where conformity requirements apply. The purpose of the general conformity program is to ensure that actions taken by the federal government do not undermine state or local efforts to achieve and maintain national ambient air quality standards. Before a federal action is taken, it must be evaluated for conformity with the applicable SIP or FTIP. All reasonably foreseeable emissions, both direct and indirect, that are predicted to result from the action must be taken into consideration.

The proposed North Demonstration Project is included in both the 2013 FTIP and RTP. As a non-motorized transportation facility the North Demonstration Project supports the 2013 FTIP and RTP goals of expanding alternative (non-auto) modes of transportation in the LTAB. Because the North Demonstration Project action alternatives are consistent with the RTP for which an air quality conformity analysis has already been conducted, an independent conformity determination for the project is not required. Furthermore, the proposed project, which supports both bicycle and pedestrian use, is a type of project that is exempt from the requirements to determine conformity on an individual project basis (40 CFR Section 93.126; CFR 2008). For these reasons, an independent conformity determination for the project is not required.

4.10.1 AFFECTED ENVIRONMENT

Air quality within the Washoe County portion of the LTAB is regulated by EPA, TRPA, the NDEP Bureau of Air Pollution Control (BAPC) and Bureau of Air Quality Planning (BAQP), and Washoe County. Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. The Washoe County Health District Air Quality Management Division (AQMD) is responsible for controlling sources of air pollution and assuring compliance with federal and state environmental laws governing air quality (AQMD [no date]).

ATTAINMENT DESIGNATIONS FOR AMBIENT AIR QUALITY STANDARDS

EPA and BAQP have established ambient air quality standards for principal ambient air pollutants, referred to as criteria air pollutants, based on public health concerns. Criteria air pollutants include ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead. EPA and AQMD use monitoring data to designate whether areas are in attainment with their respective ambient air quality standards. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are “nonattainment,” “attainment,” and “unclassified.” “Unclassified” is used in areas that cannot be classified on the basis of available information as meeting or not meeting the standards. The LTAB has been designated as attainment or unclassified with respect to the national ambient air quality standards for ozone, NO_2, CO, PM_{10}, and $PM_{2.5}$, and there is not an attainment designation for SO_2 and lead (EPA 2011). According to BAQP, instead of issuing its own attainment designations for the state ambient air quality standards, BAQP relies on national area designations, as described in its air quality trend report (BAQP 2010).

ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

TRPA adopted Environmental Threshold Carrying Capacities (ETCCs) related to air quality and other resource topics for the Lake Tahoe Region (TRPA 2007). Some ETCCs consist of a numerical standard (e.g., pollutant concentrations) and other ETCCs consist of management standards. TRPA’s air quality-related ETCCs are listed in Table 4.10-1 along with the most recent TRPA designation.

Table 4.10-1 TRPA Designations for the Lake Tahoe Air Basin

Pollutant	Threshold Indicator Reporting Category	TRPA Designation
Ozone	Highest 1-hour Average Concentration	At or somewhat better than target
	Highest 8-hour Average Concentration	At or somewhat better than target
	3-year Average of 4th Highest 8-hour Average Concentration	At or somewhat better than target
	Oxides of Nitrogen Emissions (Average tons/day)	At or somewhat better than target
Respirable Particulate Matter (PM_{10})	Highest 24-hour Average PM_{10} Concentration	Somewhat worse than target
	Annual Average PM_{10} Concentration	Unknown
Fine Particulate Matter ($PM_{2.5}$)	3-year Average of 98th Percentile 24-hour $PM_{2.5}$ Concentration	Considerably better than target
	Annual Average $PM_{2.5}$ Concentration	Considerably better than target
Visibility Reducing Particles	Regional Visibility 50th Percentile	At or somewhat better than target
	Regional Visibility 90th Percentile	At or somewhat better than target
	Sub-regional Visibility 50th Percentile	Unknown

Table 4.10-1 TRPA Designations for the Lake Tahoe Air Basin

Pollutant	Threshold Indicator Reporting Category	TRPA Designation
	Sub-regional Visibility 90th Percentile	Unknown
	Vehicle Miles Traveled	At or somewhat better than target
Carbon Monoxide	Highest and 2nd Highest 1-hour Carbon Monoxide Standard	Considerably better than target
	Highest and 2nd Highest 8-hour Carbon Monoxide Standard	Considerably better than target
	Average Daily Winter Traffic Volumes	At or somewhat better than target
Nitrogen Dioxide	Nitrate Deposition	Implemented[1]
Sulfur Dioxide	No Standard	No Designation
Odor	Non-numerical Standard	Implemented[1]

Notes: CO = carbon monoxide; NO_2 = nitrogen dioxide; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter; SO_2 = sulfur dioxide; TRPA = Tahoe Regional Planning Agency
[1] "Implemented" refers to implementation of a management standard rather than monitoring the achievement of a numerical standard.
Source: TRPA 2012

HAZARDOUS AIR POLLUTANTS

Concentrations of HAPs are also used to indicate the quality of ambient air. HAPs are air pollutants that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. HAPs are usually present in trace quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

Sources of HAPs in the vicinity of the North Demonstration Project include SR 28 and local roadways, associated with the presence of diesel PM emissions from vehicle exhaust. The proposed shared-use path would generally run parallel to SR 28. The project site is not located in close proximity to stationary sources of HAPs.

4.10.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

For the purpose of this analysis, the following significance criteria are used to determine whether implementation of the proposed project would result in significant air quality impacts. The proposed project would result in significant adverse air quality effects if implementation would:

- conflict with or obstruct implementation of an applicable air quality plan (such as a SIP or FTIP), violate any air quality standard or contribute substantially to an existing or projected air quality violation (Table 1 of Appendix C),
- expose sensitive receptors to substantial pollutant concentrations (including criteria air pollutants and HAPs),
- result in the exposure of sensitive receptors to an objectionable odor source,
- result in construction-generated emissions that exceed Nevada Administrative Code (NAC) Sections 445B.7665 (Heavy-duty Equipment Opacity) or 445B.22037 (PM Emissions-Fugitive Dust) standards (NAC 2008). These standards are discussed in the Air Quality Regulatory Setting in Appendix C,
- result in construction-generated or long-term operational (regional) emissions of reactive organic gases (ROG), nitrogen oxide (NO_X), or PM_{10} that exceed mass emissions of 82 pounds per day (lb/day), or

- result in long-term operational (e.g., regional and local) emissions that exceed TRPA's numerical ETCC thresholds (e.g., CO concentrations of 6.0 parts per million [ppm] averaged over 8 hours, ozone concentrations of 0.08 ppm averaged over 1 hour).

Although mass emissions significance criteria have not been adopted by BAQP or the Washoe County AQMD, a criterion of 82 lb/day of construction-generated or long-term operational (regional) emissions of ROG, NO_X, or PM_{10} is used by other jurisdictions in the LTAB (i.e., the Placer County Air Pollution Control District [PCAPCD] and El Dorado County Air Quality Management District [EDCAQMD]) to determine whether an individual project would cause or contribute substantially to a violation of applicable ambient air quality standards, a violation of visibility standards, or atmospheric deposition that would cause or contribute to a violation of Lake Tahoe clarity standards. The application of these mass emissions thresholds is considered appropriate because they are consistent with the recommendations of other air districts with jurisdiction in the LTAB (EDCAQMD 2002) and have been used by TRPA to evaluate the significance of project-generated emissions for other projects in Nevada.

METHODS AND ASSUMPTIONS

This analysis is based on the net increase in emissions of criteria air pollutants associated with Alternatives A and B. Emissions generated by the construction of the shared-use path and the related trailhead parking were estimated using the Sacramento Air Quality Management District's (SMAQMD's) Roadway Construction Emissions Model, Version 7.1.1, which is designed to estimate emissions of linear construction projects (SMAQMD 2012) and recommended by many local air districts. The emissions factors and equipment specifications in the model are representative of the types of equipment used for roadway construction.

Operational emissions, including emissions from associated on-road motor vehicle trips, were estimated using the California Emissions Estimator Model (CalEEMod) Version 2011.1.1 computer program (South Coast Air Quality Management District 2011), as recommended by two other local air districts with jurisdictions that include the LTAB (i.e., PCAPCD and EDCAQMD) and used on other projects subject to TRPA review. CalEEMod is widely-used to model land use-related emissions. The emission factors in the model are representative of conditions affecting the project site (such as vehicle fleet and meteorological conditions). Where applicable, FHWA guidance is used to determine whether project-related emissions would conform with the applicable SIP or FTIP, which demonstrate how attainment and maintenance of national ambient air quality standards will be achieved.

Both construction-and operation-related inputs to the models are based on information contained in Chapter 3, "Alternatives," and Section 4.9, "Traffic, Parking, and Transit," or model defaults representative of the LTAB where detailed project-specific information was not available.

SHORT-TERM CONSTRUCTION-GENERATED CRITERIA AIR POLLUTANT AND PRECURSOR EMISSIONS

ALTERNATIVES A AND B

Direct and Indirect Effects

Construction-generated emissions associated with both action alternatives would be short-term and temporary in nature. The duration and type of construction activities would generally be the same under both action alternatives. Construction activities that would generate emissions of criteria air pollutants generally include: vegetation clearing; shared-use path and trailhead parking construction and BMP installation; paving; and striping and sign installation. These activities would temporarily generate emissions of several criteria air pollutants and precursors: ROG, NO_X, CO, PM_{10} and $PM_{2.5}$. Exhaust emissions would be generated by

construction equipment, worker commute trips, and trucks delivering materials. Evaporative emissions would be generated by asphalt paving and striping. Fugitive dust emissions, including PM_{10} and $PM_{2.5}$, would also be generated during site preparation, grading, and other ground-disturbance activities.

As discussed above, short-term construction emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ for Alternatives A and B were modeled using the widely-accepted Roadway Construction Emissions Model (SMAQMD 2012) and the modeled maximum daily construction emissions are summarized in Table 4.10-2. Detailed modeling parameters are provided in Appendix G.

Table 4.10-2 Summary of Estimated Daily Construction Emissions (Exhaust and Dust) under Alternatives A and B (lb/day)[1]

Construction Phase	ROG	NO_X	PM_{10}	$PM_{2.5}$
Grubbing/Land Clearing	2.8	9.1	20.7	4.8
Grading/Excavation	2.8	9.4	20.8	4.8
Drainage/Sub-Grade	2.8	9.0	20.7	4.8
Paving	2.8	8.0	0.7	0.6
Maximum Daily Total, Unmitigated	2.8	9.4	20.8	4.8
Thresholds Used to Determine Adverse Effects (Maximum Daily)	**82**	**82**	**82**	**—[2]**

Notes:
1 SMAQMD's Roadway Construction Emissions Model, Version 7.1.1, was used to estimate all construction-related emissions. Emissions estimates assume that up to 1 acre of land could be disturbed on a given day.
2 Emissions of $PM_{2.5}$ are shown for disclosure purposes only. No regulatory agencies with jurisdiction in the LTAB have a mass emission threshold for construction-generated $PM_{2.5}$.
See Appendix G for detailed modeling input parameters and results.
Source: Modeling performed by Ascent Environmental 2013.

As shown in Table 4.10-2 neither action alternative would result in construction-generated emissions of ROG, NO_X, or PM_{10} that exceed specified criteria. Furthermore, implementation of Design Feature AQ-1 (as described in the "List of Design Features" at the beginning of this document) would include implementing TRPA, NDEP, and NAC requirements with respect to best management practices, heavy-duty equipment opacity, and fugitive dust control, to prevent adverse effects related to short-term construction-related emissions. Thus, construction-related emissions of criteria air pollutants and precursors would not conflict with or obstruct implementation of an applicable air quality plan, violate any air quality standard or contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. Therefore, construction activities under Alternatives A and B would not result in a significant adverse effect related to pollutant emissions.

Cumulative Effects

As identified in Table 4.10-2 neither action alternative would result in construction-generated emissions of ROG, NO_X, or PM_{10} that exceed specified criteria. However, related projects listed in Table 4.1-1 could violate or contribute to an existing or projected air quality violation due to construction-related emissions. However, in accordance with TRPA Code and NDEP requirements, the related projects as well as the North Demonstration Project would be required to follow all regulations with respect to BMPs, grading, and excavation, construction season limits, and air quality controls, which would reduce emissions of ROG, NO_X, or PM_{10} to levels that do not exceed specified criteria. Therefore, the North Demonstration Project and related projects listed in Table 4.1-1 would not result in significant adverse cumulative effects related to short-term construction-related emissions of ROG, NO_X, or PM_{10}.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no construction-related emissions of air pollutants.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would not result in construction-related emissions that would contribute to potential cumulative effects related to ambient concentrations of criteria air pollutants.

LONG-TERM OPERATIONAL (REGIONAL) CRITERIA AIR POLLUTANT AND PRECURSOR EMISSIONS

ALTERNATIVES A AND B

Direct and Indirect Effects

Long-term operational emission sources associated with both action alternatives would include vehicle trips by visitors and maintenance staff, as well as occasional operation of maintenance equipment (see discussion of VMT benefits related to the larger Nevada Stateline-to-Stateline Bikeway and mobility, safety, and environmental benefits of the proposed shared-use path in Section 4.9, "Traffic, Parking, and Transit"). As discussed above, long-term operational emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ for Alternatives A and B were modeled using CalEEMod and based on technical memorandums developed in support of Section 4.9, "Traffic, Parking, and Transit." Modeling results are summarized in Table 4.10-3. Detailed modeling input parameters are provided in Appendix G.

Table 4.10-3 Summary of Maximum Daily Operational Emissions under Alternatives A and B (lb/day)[1]

Alternative	ROG	NO_X	PM_{10}	$PM_{2.5}$
Alternative A	0.8	1.1	0.8	<0.1
Alternative B	0.6	0.9	0.7	<0.1
Thresholds Used to Determine Adverse Effects (Maximum Daily)	**82**	**82**	**82**	**—[2]**

Notes:
1 CalEEMod was used to estimate all operation-related emissions.
2 Emissions of $PM_{2.5}$ are shown for disclosure purposes only. No regulatory agencies with jurisdiction in the LTAB have a mass emission threshold for operational emissions of $PM_{2.5}$.
See Appendix G for detailed modeling input parameters and results.
Source: Modeling performed by Ascent Environmental 2013.

As shown in Table 4.10-3 neither action alternative would result in operation-related emissions of ROG, NO_X, or PM_{10} that exceed specified criteria. Thus, operational emissions of criteria air pollutants and precursors would not conflict with or obstruct implementation of an applicable air quality plan, violate any air quality standard or contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. Therefore, operation of the shared-use path under Alternatives A and B would not result in a significant adverse effect related to pollutant emissions.

Cumulative Effects

As described above, emissions associated with the operation of any of the project development alternatives would be long-term and have associated regional emissions. However, the increase in emissions would be small

compared with applicable significance thresholds that are tied to attainment planning efforts, and would not contribute substantially to a cumulative long-term regional air quality impact, nor would it affect TRPA's attainment designations. Additionally, the North Demonstration Project is included in both the 2013 FTIP and RTP. In aggregate, the full shared-use path network included in the RTP is estimated to result in an overall VMT reduction and related emissions (TRPA and TMPO 2012b: p. 3-378 and 3-403). Therefore, the proposed project would not make a considerable contribution such that a cumulative adverse effect related to criteria air pollutant and precursor emissions would occur.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no operation-related emissions of air pollutants.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed and operated and there would be no increase in emissions of criteria air pollutants and precursors; therefore, Alternative C would result in no contribution to a cumulative long-term regional air quality effect, nor would it affect TRPA's attainment designations. Thus, Alternative C would make not contribution such that a cumulative impact related to criteria air pollutant and precursor emissions would occur.

LOCALIZED MOBILE-SOURCE CARBON MONOXIDE EMISSIONS

ALTERNATIVES A AND B

Direct and Indirect Effects

The LTAB is designated as a maintenance area for the national ambient air quality standards for CO. Thus, pursuant to the procedures for a hot-spot analysis in the CFR (40 CFR Section 93.123; CFR 2008) the potential for the proposed project to result in localized concentrations of CO that exceed the national ambient air quality standards can be assessed qualitatively.

Implementation of either action alternative (Alternatives A or B) would increase vehicle trips to and from the shared-use path. CO emissions are a direct function of vehicle idling time and, thus, traffic flow conditions. Under specific meteorological conditions, the concentration of CO emissions near congested roadways and/or intersections may reach unhealthy levels with respect to local sensitive land uses such as residential areas. The Transportation Project-Level Carbon Monoxide Protocol (Garza et al. 1997) states that signalized intersections at level of service (LOS) E or F represent a potential for a CO violation, also known as a "hot spot," and should undergo quantitative screening-level analysis. Thus, modeling of CO concentrations is typically recommended for receptors located near signalized roadway intersections that are projected to operate at LOS E or F. The traffic analysis prepared for this EA (Section 4.9, "Traffic, Parking, and Transit") focuses on an evaluation of effects on roadway LOS at at-grade crossing locations for the action alternatives. Because shared-use path users and project-related traffic would not adversely affect the LOS at nearby intersections, the action alternatives would not result in or contribute to CO concentrations that exceed applicable 1-hour and 8-hour CO ambient air quality standards. As a result, no adverse effect on localized CO concentrations would occur with implementation of Alternatives A and B.

The LTAB has been designated as attainment with respect to the national ambient air quality standards for PM_{10} and $PM_{2.5}$. Therefore, no analysis of PM_{10} and $PM_{2.5}$ hot spots is needed (FHWA and EPA 2006).

Also, the proposed project is not anticipated to have any meaningful effects with respect to mobile-source air toxics (MSATs), which are the subset of EPA-recognized HAPs that are generated by mobile sources, because the

proposed project would not have any meaningful effect on traffic volumes or the mix of vehicles that travel on the affected roadways. This determination is based on the most recent interim guidance regarding MSATs from EPA (FHWA 2012).

Cumulative Effects

The additional traffic and additional path usage generated by the related projects in Table 4.1-1 at the path crossing locations is not expected to be substantial and as such would not degrade LOS at the at-grade roadway crossing locations. The LOS at all locations where the shared-use path would cross SR 28 would not be substantially diminished when considered with these other projects, and there would not be an adverse cumulative effect on roadway LOS.

Construction of the North Demonstration Project Alternative A or B would not cause or contribute to CO concentrations that exceed applicable 1-hour and 8-hour standards at signalized intersections or at at-grade roadway crossing locations. Further, because the LOS would not be substantially affected at the potential road crossing locations, under cumulative conditions, the North Demonstration Project and related projects in the vicinity would not result in an adverse cumulative effect related to localized CO concentrations.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no potential effects related localized CO concentrations.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to localized CO concentrations.

ODOR EMISSIONS

ALTERNATIVES A AND B

Direct and Indirect Effects

Construction activities that would take place under either action alternative (Alternatives A or B) could result in temporary generation of objectionable odors associated with diesel exhaust, asphalt paving that may be considered offensive to some individuals. Objectionable odors may also be associated with striping installation. However, these odors would be temporary and would generally not be produced in the same locations during the entire construction period. Furthermore, such odorous emissions generally disperse rapidly with distance from the source and construction equipment would be staged as distant as possible from any nearby residences or other sensitive receptors (Design Feature NOI-3). Also, individuals using the shared-path would not pass in close proximity to existing sources of odors. Therefore, these activities would not result in the frequent exposure of receptors to objectionable odorous emissions.

Cumulative Effects

None of the related projects in Table 4.1-1 would include the operation of odors sources that would expose individuals using the proposed shared-use path to objectionable odors. Therefore, the related projects as well as the North Demonstration Project would not result in adverse cumulative effects related to odors.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C the shared-use path would not be constructed; therefore, there would be no new sources of odors or new receptors (i.e., recreational users) introduced to the area. Thus, there would be no direct or indirect effects related to odors.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to odors.

HAZARDOUS AIR POLLUTANT EMISSIONS

ALTERNATIVES A AND B

Direct and Indirect Effects

Construction-related activities that would take place under either of the action alternatives (Alternatives A or B) would result in temporary, short-term emissions of diesel PM from the exhaust of off-road heavy-duty diesel equipment used for site preparation (e.g., excavation, grading, and clearing); paving; trucks hauling materials to and from construction staging areas; and other miscellaneous activities. The potential cancer risk from the inhalation of diesel PM is a more serious risk than the potential non-cancer health impacts (California Air Resources Board 2003). Consequently, for the purposes of this analysis, this discussion focuses on cancer rather than non-cancer risks.

The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to HAP emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. It is positively correlated with time, meaning that a longer exposure period would result in a higher level of exposure to the exposed individual. In other words, the risks estimated for an exposed individual are higher if a fixed exposure occurs over a longer period. According to the Office of Environmental Health Hazard Assessment (OEHHA), Health Risk Assessments, which determine the exposure of sensitive receptors to HAP emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the duration of exposure (OEHHA 2001). Due to the linear nature of the project, the use of mobilized equipment for construction activities would be temporary at any one location, and would dissipate with increasing distance from the source. In addition, all construction equipment would not operate at the same time or location and, therefore, not expose the same nearby receptors to increased levels of diesel PM during the entire construction period. In addition, construction equipment would be staged as distant as possible from any nearby residences and other sensitive receptors (Design Feature NOI-3).

On-going maintenance of the shared-use path would consist of occasional maintenance vehicles and repair equipment operating along the corridor. However, no new stationary sources or continuously operating area sources of HAPs would be introduced to the project area. For these reasons, and because of the highly dispersive properties of diesel PM (Zhu et. al. 2002) short-term construction-generated and long-term operational HAP emissions would not expose sensitive receptors to an incremental increase in cancer risk that exceeds of 10 in one million or a Hazard Index greater than 1.0 at the maximally exposed individual. Therefore, the project would not have an adverse effect on the environment related to exposure to HAPs.

Cumulative Effects

Implementation of some of the related projects listed in Table 4.1-1 that would generate emissions of HAPs could expose the public to incremental increases in health risk. However, the proposed project and related

projects are subject to similar government regulations. Transportation of hazardous materials on area roadways is regulated by the Nevada Highway Patrol, while use, storage, and disposal of hazardous materials are regulated by NEV-OSHA and Nevada's Hazardous Waste Management Program. Compliance with these regulations would minimize the combined effect related to hazardous materials use. Therefore, the related projects in Washoe County portions of the Tahoe Basin (as listed in Table 4.1-1) as well as the North Demonstration Project would not result in adverse cumulative effects related to the use or transport of hazardous materials.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path would not be constructed and there would be no additional sources of HAP emissions such as diesel-powered construction equipment or maintenance equipment. Therefore, Alternative C would result in no increase to health risk associated with exposure to HAPs.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed and there would be no additional sources of HAP emissions such as diesel-powered construction equipment or maintenance equipment; therefore, Alternative C would result in no contribution to potential cumulative effects related to health risk exposure.

4.10.3 CONSEQUENCES FOR TRPA ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

This section summarizes the effects of implementing the action alternatives on the thresholds established by TRPA for air quality. The following Indicator Reporting Categories for air quality have been established by TRPA:

- Carbon Monoxide and Traffic Volumes;
- Ozone, Particulate Matter, Wood Smoke, Regional Visibility, and Sub-Regional Visibility;
- Vehicle Miles Traveled and Atmospheric Deposition; and
- Odors.

CARBON MONOXIDE AND TRAFFIC VOLUMES

According to the most recent threshold evaluation, TRPA's ETCC for carbon monoxide is "considerably better than target" (TRPA 2012). The potential for CO hot spots is greater in winter because motor vehicles generate higher emissions of CO when ambient temperature is low (ARB 2013). Trips generated by the project are not anticipated to occur between the hours of 4:00 p.m. and midnight in the U.S. 50 corridor during the months of November through February, as the project is located along SR 28 (not U.S. 50) and this is not the time of year or time of day when project-related trips would likely occur. Long-term operational (local) mobile-source CO emissions under either of the action alternatives, would not violate an air quality standard (i.e., 8-hour TRPA standard of 6 ppm), contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations. Therefore, operation of either action alternative would not exceed the applicable significance criteria, and it would not be expected that the project would affect attainment of relevant TRPA thresholds for CO.

OZONE, PARTICULATE MATTER, WOOD SMOKE, REGIONAL VISIBILITY, AND SUB-REGIONAL VISIBILITY

As discussed in the analyses above, short-term construction-related emissions and long-term operational emissions of ozone precursors, ROG and NO_X, and particulate matter, including PM_{10} and $PM_{2.5}$, would not

exceed the mass emission thresholds established by air districts with jurisdiction in the LTAB (i.e., EDCAQMD and PCAPCD) and used by TRPA for analysis purposes under either action alternative. Construction-related emissions associated with the action alternatives are summarized in Table 4.10-2 and operation-related emissions are summarized in Table 4.10-3 above. Because construction and operation of the action alternatives would not exceed the local significance criteria, the net increase in long-term daily emissions of PM_{10} and ozone precursors would be nominal, and the proposed project is a component of the 2013 FTIP and RTP that include a suite of programs that will result in a region-wide decrease in criteria pollutant emissions, the action alternatives would not affect attainment of relevant TRPA thresholds for ozone or particulate matter. In addition, because the project would not result in open burning or the introduction of new wood-burning fireplaces or other wood-burning devices in the LTAB, the proposed project would not affect attainment of the TRPA thresholds for wood smoke, regional visibility, or sub-regional visibility.

VEHICLE MILES TRAVELED AND ATMOSPHERIC DEPOSITION

TRPA adopted its Vehicle Miles Travelled (VMT) threshold in 1982 as both a water quality and air quality threshold. The TRPA thresholds for air quality, under both visibility and nitrate deposition, include the following management standard: “reduce vehicle miles of travel by 10 percent of the 1981 base values.” The indicator for TRPA’s VMT threshold states that there shall be a 10 percent reduction in VMT below the 1981 peak summer day levels. Using its newer, more sophisticated and more accurate transportation model (TransCAD), TRPA has back-calculated the target peak summer daily VMT to be 2,067,600 VMT/day (TRPA 2012). The Tahoe Region has been in compliance with this standard since 2007 and the most recent peak estimate, in 2010, was 1,987,794 VMT/day. Considering that traffic volumes have not increased since 2008, it can be concluded that the region is currently in attainment of the VMT threshold. If traffic volumes do not “rebound” as a result of an improving economy, this indicates that VMT for the Tahoe Basin as a whole could increase by 79,806 while still being in attainment of this regional threshold standard. In general, gaseous emissions of nitrogen compounds are associated with combustion processes from automobiles and other sources.

Because the proposed project is consistent with the RTP and is projected to contribute to a reduction in region-wide VMT, it would not conflict with TRPA’s VMT threshold.

ODOR

As discussed in Section 4.10.2, operation of either action alternative is not expected to result in any new permanent odor sources and odors associated with project construction (e.g., diesel exhaust from equipment and the application of architectural coatings) would be temporary and would generally not be produced in the same locations during the entire construction period. Furthermore, such odorous emissions generally disperse rapidly with distance from the source and construction equipment would be staged as distant as possible from any nearby residences, schools, or other sensitive receptors (Design Feature NOI-3). Therefore, the proposed project would not result in the introduction of new odor sources or new odor exposure problems in the LTAB.

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4.11 GREENHOUSE GASES AND CLIMATE CHANGE

Greenhouse gas (GHG) emissions have the potential to adversely affect the environment because they contribute, on a cumulative basis, to global climate change. In turn, global climate change has the potential to affect rain and snow fall, leading to changes in alpine hydrology and water supply; to affect habitat, leading to adverse effects on biological and other resources; and to change the frequency and duration of droughts, which can affect wildfire hazards and forest health. This section describes existing conditions with respect to GHGs and climate change and evaluates whether project-related GHGs would be cumulatively considerable under Alternatives A, B, and C. A summary of applicable regulations under which the action alternatives would be implemented is provided in Appendix C.

4.11.1 AFFECTED ENVIRONMENT

EXISTING CLIMATE

Climate is the accumulation of daily and seasonal weather events over a long period of time, whereas weather is defined as the condition of the atmosphere at any particular time and place (Ahrens 2003). Lake Tahoe lies in a depression between the crests of the Sierra Nevada and Carson ranges on the California-Nevada border at a surface elevation of approximately 6,260 feet above sea level. The LTAB is defined by the 7,000-foot contour, which is continuous around the lake, except near Tahoe City. The mountains surrounding the lake are approximately 8,000–9,000 feet in height on average, with some reaching 10,000 feet.

The constant water temperature of Lake Tahoe at 600 feet below the surface is approximately 39 degrees Fahrenheit (°F). This characteristic and the lake's topographic location combine to define one of the LTAB's most important atmospheric regimes—in the absence of strong synoptic weather systems (large-scale system, 620 miles or more), the LTAB develops shallow subsidence and radiation inversions throughout the year (air temperature variations unique to the Tahoe Basin relative to surrounding areas). In addition, rapid radiation cooling at night regularly generates gentle downslope nocturnal winds that blow from the mountain ridges down to the shore, then fan across the lake (Cahill and Cliff 2000, p. 1).

ATTRIBUTING CLIMATE CHANGE—THE PHYSICAL SCIENTIFIC BASIS

Certain gases in the earth's atmosphere, collectively classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth as low-frequency infrared radiation.
The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate on Earth. Without the greenhouse effect, Earth would not be able to support life as we know it.

Prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is *extremely unlikely* that global climate change of the past 50 years can be explained without the contribution from human activities (IPCC 2007).

Climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants (TACs), which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 54 percent is sequestered through ocean uptake, uptake by forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46 percent of human-caused CO_2 emissions remains stored in the atmosphere (Seinfeld and Pandis 1998).

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and TACs. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; suffice it to say, the quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climate. From the standpoint of NEPA, GHG impacts to global climate change are inherently cumulative.

ATTRIBUTING CLIMATE CHANGE—GREENHOUSE GAS EMISSION SOURCES

NEVADA

In Nevada, the electrical generation sector is the largest emitter of GHGs, followed by transportation (NDEP 2008, p. 12). Nevada produced 56 gross million metric tons carbon dioxide equivalent per year (MMT CO_2e) in 2005 (NDEP 2008, p. 12). Nevada's GHG emissions inventory and projections are summarized in Table 4.11-1 below.

Table 4.11-1 Nevada Greenhouse Gas Emissions Inventory and Projections

Emissions Sector	MMT CO_2e/yr				
	1990	2000	2005	2010	2020
Electrical Generation[1]	16.9	24.8	26.2	22.5	36.0
Residential/Commercial/Industrial	4.4	6.0	6.8	6.9	6.9
Transportation	9.7	14.9	16.9	19.3	26.0
Industrial Process	0.2	2.1	2.5	3.1	4.6
Fossil Fuel Industry	0.4	0.6	0.8	0.9	0.9
Agriculture	1.6	1.8	1.6	1.7	1.8
Waste Management	0.8	1.4	1.4	1.5	2.2
Gross Total Emissions[2]	**34.1**	**51.5**	**56.3**	**55.8**	**78.4**
Carbon Sequestration	-5.0	-5.0	-5.0	-5.0	-5.0
Net Emissions[2]	**29.1**	**46.5**	**51.3**	**50.8**	**73.4**

Notes: MMT CO_2e/yr = million metric tons carbon dioxide equivalent per year.
[1] Includes in-state-generated electricity production.
[2] Totals may not sum exactly because of rounding.
Source: NDEP 2008, 12.

LAKE TAHOE BASIN-WIDE GREENHOUSE GAS EMISSIONS INVENTORY

In 2010, the basin-wide daily VMT for purposes of estimating GHG emissions was 1,459,299 miles and 198,340 trips (TRPA and TMPO 2012). The results of baseline GHG emissions modeling (for mobile-source emissions) are summarized in Table 4.11-2 below.

Table 4.11-2 TMPO Mobile-Source Activity Data and Greenhouse Gas Emissions in the Tahoe Region in 2010[1]	
Daily VMT	1,459,299
Daily Vehicle Trips	198,340
Population	54,473
GHG Emissions (tons/day)	918
GHG Emissions (MT/year)	303,877
GHG Emissions/Capita (MT/person/year)	5.58
GHG Emissions/Capita (pounds/person/day)	33.70

Notes: GHG = greenhouse gas; MT = metric tons; TMPO = Tahoe Metropolitan Planning Organization; VMT = vehicle miles traveled.
[1] VMT and vehicle trips were attributed to TMPO using the Regional Targets Advisory Committee (RTAC) method, which includes 100 percent of internal-internal (i.e., trips that originate and terminate in the applicable MPO), includes 50 percent of internal-external and external-internal (i.e., trips that originate or terminate in the Basin), and excludes VMT from through-trips.
Source: TRPA and TMPO 2012

In addition, a local, community-wide GHG emissions inventory is being prepared as part of the Tahoe Regional Sustainability Plan. The GHG inventory will include emissions and projections for sources such as transportation, energy consumption, solid waste, water consumption, and forestry.

WASHOE COUNTY GREENHOUSE GAS EMISSIONS INVENTORY

A 2008 baseline GHG inventory for Washoe County was developed by the International Council for Local Environmental Initiatives (Washoe County 2010). According to the inventory, a combined total of 6,093,401 MT CO_2e/year were generated by the residential, commercial/industrial, transportation, and waste sectors. The transportation sector accounted for most emissions at 2,605,371 MT CO_2e/year, or 43percent of the county-wide inventory.

4.11.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Neither TRPA, NDEP, nor the Washoe County Health District Air Quality Management Division has identified a significance threshold standard for analyzing GHG emissions generated by a proposed project, or a methodology for analyzing impacts related to GHG emissions or global climate change.

For the purpose of this analysis, the following significance criteria have been used to determine whether project-related GHG emissions would be cumulatively considerable. The proposed project would result in a cumulatively considerable contribution to climate change if the project would:

- generate greenhouse gas emissions, either directly or indirectly, that may have a significant adverse effect on the environment; or
- conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

The White House Council on Environmental Quality (CEQ), a division of the Executive Office of the President, that coordinates federal environmental efforts in the United States, has provided draft guidance for federal lead agencies to address impacts of GHG emissions. The draft guidelines state:

> If a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2 equivalent GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual direct emissions of less than 25,000 metric tons of CO_2 equivalent, CEQ encourages federal agencies to consider whether the action's long-term emissions should receive similar analysis. CEQ does not propose this as an indicator of a threshold standard of significant effects, but rather as an indicator of a minimum level of GHG emissions that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs (CEQ 2010: pp. 1-2).

METHODS AND ASSUMPTIONS

For the purposes of this analysis, total operational GHG emissions from the project alternatives are quantified to determine whether the net increase in GHG emissions compared to existing conditions would be substantial.

Emissions generated by the construction of the shared-use path and related trailhead parking were estimated using SMAQMD's Roadway Construction Emissions Model, Version 7.1.1, which is designed to estimate emissions of linear construction projects (SMAQMD 2012) and is recommended as a analysis tool by many local air districts. The emissions factors and equipment specifications in the model are representative of the types of equipment used for roadway construction.

Operational emissions, including emissions from project-related motor vehicle trips, were estimated using the CalEEMod Version 2011.1.1 computer program (SCAQMD 2011), used by TRPA to evaluate other projects in the Basin and recommended by two other local air districts with jurisdictions within the LTAB (i.e., PCAPCD and EDCAQMD). CalEEMod is widely-used to model land use-related emissions. The emission factors in the model are representative of conditions affecting the project site (such as vehicle fleet and meteorological conditions). For the sake of this analysis, it is assumed that the emission rates of vehicles operation on the Nevada side of the Lake Tahoe Region are not substantially different than the vehicles on the California side.

Both construction- and operation-related inputs to the models are based on information contained in Chapter 3, "Alternatives," Section 4.9, "Traffic, Parking, and Transit," or model defaults representative of the LTAB where detailed project-specific information was not available.

GREENHOUSE GAS EMISSIONS

ALTERNATIVES A AND B

Cumulative Effects

The effects of GHGs are borne globally, as opposed to localized air quality effects of criteria air pollutants and TACs. The quantity of GHGs that ultimately result in climate change is not precisely known; suffice it to say, the quantity is enormous, and no single project alone would measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climate. Therefore, GHG impacts to global climate change are considered to be inherently cumulative. Therefore, they are analyzed here as a cumulative effect.

Construction activities that would generate GHG emissions include the use of off-road construction equipment, trucks hauling materials to and from the construction site, and commute trips by workers. The duration and type of construction activities would generally be the same under both action alternatives. Construction-related emissions of CO_2e were modeled using the Roadway Construction Emissions Model (SMAQMD 2012) and detailed modeling parameters are provided in Appendix H. CO_2e is a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential of a GHG, is dependent on the

lifetime, or persistence, of the gas molecule in the atmosphere. For example, as described in Appendix C, "Calculation References," of the General Reporting Protocol of the California Climate Action Registry (2009), 1 ton of CH_4 has the same contribution to the greenhouse effect as approximately 21 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2. Expressing emissions in CO_2e takes the contributions of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Based on the modeling, construction activities would generate an approximate total of 70.2 MT CO_2e under both action alternatives. This value amortized over an approximate 20-year life of the project would be approximately 3.5 MT CO_2e/year. There are currently no federal or State of Nevada measures to determine what level of GHG emissions from construction projects would be considered to have an adverse effect.

Both Alternatives A and B would increase mobile-source emissions of GHGs associated with path users who drive to and from the shared-use path. The same model runs in CalEEMod used to calculate maximum daily emissions of criteria air pollutants, discussed in Section 4.10, "Air Quality," estimated that project-related vehicle trips would generate up to 696 lb of CO_2e on a summer weekend day under Alternative A and up to 572 lb on a summer weekend day under Alternative B. Conservatively assuming that peak daily shared-use path use would occur approximately 40 percent of the year (or approximately 146.5 days per year), and converting to metric units, annual emissions would be 46.3 MT CO_2e /year under Alternative A and 38.0 MT CO_2e /year under Alternative B. In combination with the amortized level of construction–related GHG emissions, implementation of Alternative A would result in a net increase of 49.8 MT CO_2e /year under Alternative A and 41.5 MT CO_2e/year under Alternative B.

GHG emissions associated with implementation of Alternatives A or B would be less than one percent of 25,000 MT CO_2e/year, which is the level suggested in draft guidance from CEQ for determining whether a project's GHG emissions should be quantified (CEQ 2010: p.1-2). A quantitative analysis was provided here for informational purposes, though not required. Although it is not the intent of CEQ or TRPA to adopt 25,000 MT CO_2e/year as a significance criterion, it is relevant that CEQ identifies 25,000 MT CO_2e/year as the level above which quantitative analysis is warranted, because this quantity of emission is recognized as substantial. EPA also uses 25,000 MT CO_2e/year as the level above which facilities are subject to mandatory GHG reporting. The project's GHG emissions and associated contribution to cumulative climate change impacts would be well below this level and, therefore, would constitute a less-than-considerable contribution to the cumulative adverse effect of climate change. Moreover, VMT (and resultant GHG emissions) associated with the proposed project was fully contemplated in the RTP's cumulative effects analysis that determined an overall reduction in region-wide VMT (TRPA and TMPO 2012). Project-related VMT is discussed in further detail in Section 4.9, "Traffic, Parking, and Transit," and supporting technical memorandums.

ALTERNATIVE C

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no construction- or operation-related GHG emissions.

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4.12 NOISE

This section includes a description of acoustic fundamentals, existing ambient noise conditions, and an analysis of potential short- and long-term noise effects associated with implementation of the North Demonstration Project, including Alternatives A, B, and C. A summary of applicable regulations under which the action alternatives would be implemented is provided in Appendix C. Mitigation measures are recommended, as necessary, to reduce potentially significant adverse noise effects. The information contained in this section is based, in part, on data contained in Section 4.9, "Traffic, Parking, and Transit."

4.12.1 ACOUSTIC FUNDAMENTALS

Acoustics is the scientific study that evaluates perception and properties of sound waves. Sound that is loud, disagreeable, unexpected, or unwanted is generally defined as noise. Common sources of environmental noise and associated noise levels are presented in Table 4.12-1.

Table 4.12-1 Typical Noise Levels

Common Outdoor Activities	Noise Level (dB)	Common Indoor Activities
	110	Rock band
Jet flyover at 1,000 feet	100	
Gas lawnmower at 3 feet	90	
Diesel truck moving at 50 mph at 50 feet	80	Food blender at 3 feet, Garbage disposal at 3 feet
Noisy urban area, Gas lawnmower at 100 feet	70	Vacuum cleaner at 10 feet, Normal speech at 3 feet
Commercial area, Heavy traffic at 300 feet	60	
Quiet urban daytime	50	Large business office, Dishwasher in next room
Quiet urban nighttime	40	Theater, Large conference room (background)
Quiet suburban nighttime	30	Library, Bedroom at night, Concert hall (background)
Quiet rural nighttime	20	Broadcast/Recording Studio
	10	
Threshold of Human Hearing	0	Threshold of Human Hearing

Notes: dB=A-weighted decibels; mph=miles per hour
Source: Federal Transit Administration (FTA) 2006: p. 2-16

SOUND PROPERTIES

Sound levels are measured using the decibel (dB) scale, developed to relate to the range of human hearing. A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly summed. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a 100 fold increase in acoustical energy.

The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed, identified as A through E. There is a strong correlation between the way humans perceive sound and A-weighted sound levels. For this reason the A-weighted sound levels are used to predict community response

to noise from the environment, including noise from transportation and stationary sources, and are expressed as A-weighted decibels (dBA). All sound levels discussed in this section are A-weighted decibels unless otherwise noted.

Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks, and airplanes and stationary sources such as activity at construction sites, machinery, and commercial and industrial operations. As sounds travels through the atmosphere from the source to the receiver, noise levels attenuate (i.e., decrease) depending on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers. Noise generated from mobile sources generally attenuate at a rate of 4.5 dB per doubling of distance from the source. Noise from stationary sources spread with more spherical dispersion patterns that attenuate at a rate of 6 to 7.5 dB per doubling of distance from the source.

Atmospheric conditions such as wind speed, wind direction, turbulence, temperature gradients, and humidity also alter the propagation of noise and affect levels at a receiver. Furthermore, the presence of a barrier (e.g., topographic feature, intervening building, and dense vegetation) between the source and the receptor can provide substantial attenuation of noise levels at the receiver. Both natural (e.g., berms, hills, and dense vegetation) and human-made features (e.g., buildings and walls) may function as noise barriers.

All buildings provide some exterior-to-interior noise reduction. A building constructed with a wood frame and a stucco or wood sheathing exterior typically provides a minimum exterior-to-interior noise reduction of 25 dB with its windows closed, whereas a building constructed of a steel or concrete frame, a curtain wall or masonry exterior wall, and fixed plate glass windows of one-quarter-inch thickness typically provides an exterior-to-interior noise reduction of 30–40 dB with its windows closed (California Department of Transportation 2002: p. 7-37).

COMMON NOISE DESCRIPTORS

The intensity of environmental noise fluctuates over time, and several different descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often used to characterize environmental noise are defined below (FTA 2006: p. 2-25).

- Equivalent Noise Level (L_{eq}): The average noise level during a specified time period; that is, the equivalent steady-state noise level in a stated period of time that would contain the same acoustic energy as the time-varying noise level during the same period (i.e., average noise level).
- Maximum Noise Level (L_{max}): The highest instantaneous noise level during a specified time period.
- Minimum Noise Level (L_{min}): The lowest instantaneous noise level during a specified time period.
- Day-Night Noise Level (L_{dn}): The 24-hour L_{eq} with a 10-dB penalty applied during the noise-sensitive hours from 10:00 p.m. to 7:00 a.m., which are typically reserved for sleeping.
- Community Noise Equivalent Level (CNEL): Similar to the L_{dn} described above with an additional 5-dB penalty applied during the noise-sensitive hours from 7:00 p.m. to 10:00 p.m., which are typically reserved for evening relaxation activities.
- Single Event Noise Levels (SEL): Sounds that occur in an irregular or non-repetitive manner, which makes them difficult to anticipate; these are usually measured by L_{max} noise levels.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. The L_{eq}, or average noise level over a given period of time, is the foundation of composite noise descriptors such as L_{dn} and CNEL, which effectively indicate community response to ambient noise levels.

EFFECTS OF NOISE ON HUMANS

Excessive and chronic (long-term) exposure to elevated noise levels can result in auditory and non-auditory effects on humans. Auditory effects of noise on people are those related to temporary or permanent hearing loss caused by loud noises. Non-auditory effects of exposure to elevated noise levels are those related to behavior and physiology. The non-auditory behavioral effects of noise on humans are primarily subjective effects such as annoyance, nuisance, and dissatisfaction, which lead to interference with activities such as communications, sleep, and learning. The non-auditory physiological health effects of noise on humans have been the subject of considerable research into possible correlations between exposure to elevated noise levels and health problems, such as hypertension and cardiovascular disease. The mass of research implies that noise-related health issues are predominantly the result of behavioral stressors and not a direct noise-induced response. The extent to which noise contributes to non-auditory health effects remains a subject of considerable research, with no definitive conclusions.

Negative effects of noise exposure include physical damage to the human auditory system, interference with daily activities, sleep disturbance, and disease. Exposure to noise may result in physical damage to the auditory system, which may lead to gradual or traumatic hearing loss. Gradual hearing loss is caused by sustained exposure to moderately high noise levels over a period of time; traumatic hearing loss is caused by sudden exposure to extremely high noise levels over a short period. Gradual and traumatic hearing loss both may be permanent. In addition, noise may interfere with or interrupt sleep, relaxation, recreation, and communication. Although most interference may be classified as annoying, the inability to hear a warning signal (for example) may be considered dangerous. Noise may also be a contributor to diseases associated with stress, such as hypertension, anxiety, and heart disease. The degree to which noise contributes to such diseases depends on the frequency, bandwidth, and level of the noise and the exposure time (EPA 1974).

GROUND VIBRATION

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of ground vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, and landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, and construction equipment). Vibration sources may be continuous, (e.g., operating factory machinery) or transient in nature (e.g., explosions). Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, or acceleration.

Vibration amplitudes are commonly expressed in peak particle velocity (PPV) or root mean square (RMS) vibration velocity. Peak particle velocity is defined as the maximum instantaneous positive or negative peak of a vibration signal. Peak particle velocity is typically used in the monitoring of transient and impact vibration and has been found to correlate well with the stresses experienced by buildings (FTA 2006: p.7-3). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. It takes some time for the human body to respond to vibration signals. In a sense, the human body responds to average vibration amplitude. The RMS of a signal is the average of the squared amplitude of the signal, typically calculated over a 1-second period. As with airborne sound, the RMS velocity is often expressed in decibel notation as vibration decibels (VdB), which serves to compress the range of numbers required to describe vibration (FTA 2006: p.7-3). This is based on a reference value of 1 micro (µ) in/sec.

The typical background vibration-velocity level in residential areas is approximately 50 VdB. Ground vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA 2006).

Table 4.12-2 describes the general human response to different levels of ground vibration-velocity levels.

Table 4.12-2 Human Response to Different Levels of Ground Noise and Vibration	
Vibration-Velocity Level	**Human Reaction**
65 VdB	Approximate threshold of perception.
75 VdB	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find that transportation-related vibration at this level is unacceptable.
85 VdB	Vibration acceptable only if there are an infrequent number of events per day.

Notes: VdB = vibration decibels referenced to 1 μ inch/second and based on the root mean square (RMS) velocity amplitude.
Source: FTA 2006: p.7-8

4.12.2 AFFECTED ENVIRONMENT

SENSITIVE LAND USES

Noise-sensitive land uses generally include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern due to the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Parks, schools, historic sites, cemeteries, and recreation areas are also generally considered sensitive to increases in exterior noise levels. Places of worship, and other similar places where low interior noise levels are of great importance, are also considered noise-sensitive. Noise-sensitive land uses are also considered to be vibration sensitive. Specifically, commercial and industrial buildings where ground vibration (including vibration levels that may be well below those associated with human annoyance) could interfere with operations within the building would be most sensitive to ground vibration (e.g., hospitals, laboratories).

SOURCES AND AMBIENT LEVELS

Although noise is produced from various sources throughout the project vicinity, vehicle traffic on SR 28 is the dominant noise source. During the winter months, tire chains on vehicles generate higher noise levels than non-chain equipped vehicles. Other noise sources include aircraft, motorized watercraft, construction, and machinery associated with refuse collection and snow removal. Less pronounced noise sources in the area include landscaping activities (e.g., grass cutting, leaf blowing, and snow blowing), people talking, and dogs barking.

Existing traffic noise levels were modeled for major roadway segments in the project vicinity in accordance with the FHWA Traffic Noise Model (2006), along with project-specific traffic data (LSC 2012). Traffic noise modeling results are based on existing average daily traffic (ADT) volumes and speeds from NDOT (NDOT 2011). Modeling assumes no natural or human-made shielding. The extent to which existing land uses are affected by existing traffic noise depends on their respective proximity to the roadways and sensitivity to noise.

Table 4.12-3 summarizes the modeled existing traffic noise levels at 100 feet from the centerline of SR 28 and identifies the distances from the roadway centerline to the 70-dB, 65-dB, 60-dB, and 55-dB CNEL/L_{dn} traffic noise contours.

Table 4.12-3 Summary of Modeled Existing Traffic Noise Levels							
Roadway	Segment		CNEL/L_{dn} (dB) at 100 feet from Road Centerline	Distance (feet) from Roadway Centerline to CNEL/L_{dn}(dB)			
	From	To		70	65	60	55
SR 28	Sand Harbor	Lakeshore Boulevard	62	31	66	142	306

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{dn} = day-night average noise level.
Refer to Appendix H for detailed modeling input data and output results.
Source: Data modeled by Ascent Environmental in 2012.

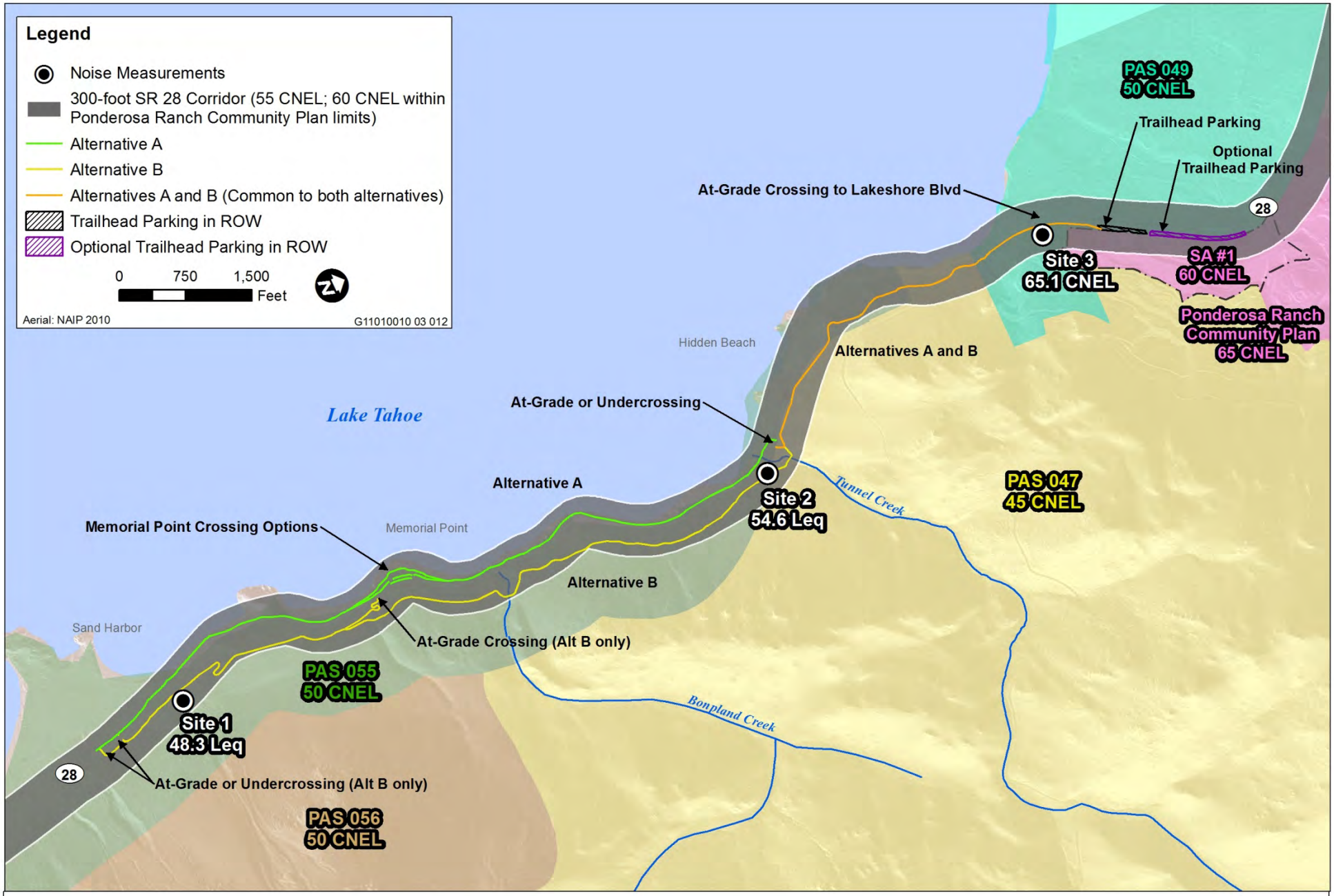
To supplement the noise modeling described above, two short-term noise measurements were taken on Tuesday, August 23, 2011, and one long-term (24-hour) noise measurement was taken between August 23, 2011 and August 24, 2011. Locations along the proposed North Demonstration Project shared-use path were chosen to capture the noise levels from various noise sources (e.g., traffic on SR 28, watercraft, pedestrian traffic, and nearby parking areas) and to characterize the noise levels at locations along the entire 3-mile path. Sound level measurement locations and the applicable noise standards are shown on Exhibit 4.12-1. Tables 4.12-4 and 4.12-5 and Exhibit 4.12-2 below, summarize the existing ambient noise levels in the project vicinity.

Table 4.12-4 Summary of Short-Term Existing Ambient Noise Level Measurements					
Location	Start (Date/Time)	Stop (Date/Time)	dB		
			L_{eq}	L_{max}	L_{min}
Site 1	August 23, 2011/1:20 p.m.	August 23, 2011/1:40 p.m.	48.3	58.8	38.4
Site 2	August 23, 2011/2:00 p.m.	August 23, 2011/2:20 p.m.	54.6	67.6	34.6

Notes: dB = A-weighted decibels; L_{eq} = energy-equivalent noise level; L_{max} = maximum noise level; L_{min} = minimum noise level.
Site numbers correspond to locations shown on Exhibit 4.12-1.
Source: Monitoring performed by Ascent Environmental in August 2011.

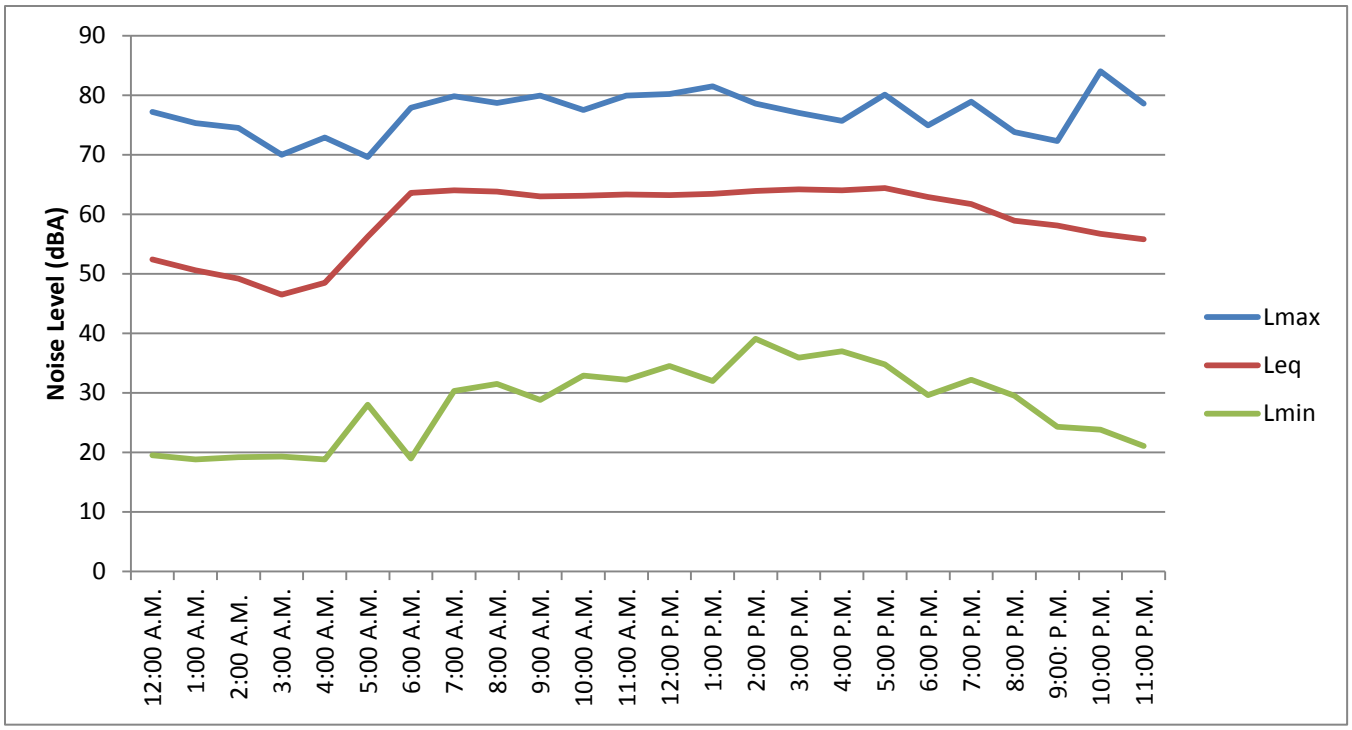
Table 4.12-5 Summary of Long-Term Existing Ambient Noise Level Measurements							
Location	Start (Date/Time)	Stop (Date/Time)	dB				
			CNEL/L_{dn}	Daytime		Nighttime	
				L_{max}	L_{min}	L_{max}	L_{min}
Site 3	August 23, 2011/ 5:00 p.m.	August 24, 2011/5:00 p.m.	65.1/64.7	74.9-81.5	19.0-39.1	69.6-78.6	18.8-29.5

Notes: dB = A-weighted decibels; CNEL = community noise equivalent level; L_{dn} = day-night noise level; L_{eq} = energy-equivalent noise level; L_{max} = maximum noise level; L_{min} = minimum noise level.
Site 3 corresponds to the location shown on Exhibit 4.12-1.
Source: Monitoring performed by Ascent Environmental in August 2011.



Source: Ascent Environmental 2012

Exhibit 4.12-1 Noise Measurement Location and Applicable Standards



Source: Monitoring performed by Ascent Environmental in August 2011.

Exhibit 4.12-2 Existing Ambient Noise Levels: Summary of Long-Term Noise Measurement

The long-term measurement taken at Site 3 was measured at 100 feet from the centerline of SR 28. Accounting for typical attenuation rates, the measured existing sound level of 65 dB CNEL would result in a sound level of 58 dB CNEL at 300 feet from the edge of SR 28. Therefore, existing traffic noise from SR 28 is in compliance with the SR 28 highway corridor CNEL standards of 60 dB CNEL within the Ponderosa Ranch Community Plan. However, existing noise levels at this location would exceed the 55 dB CNEL SR 28 highway corridor standard and the CNEL standards of 50 dB and 45 dB CNEL that apply elsewhere within PASs 049 and 047, respectively.

4.12.3 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

The project would result in a significant adverse noise effect if implementation of the project would result in any of the following:

- Short-term construction-related noise levels that
  - exceed applicable noise standards established by TRPA during the more noise-sensitive early morning, evening, and nighttime periods of the day that are not exempt by TRPA (i.e., 8:00 a.m. to 6:30 p.m., daily [Section 68.9 of the TRPA Code]); and/or
  - expose noise-sensitive receptors to noise levels that exceed applicable noise standards established by Washoe County during the more noise-sensitive periods of the day that are not exempt by Washoe County.
- Vibration levels that exceed FTA's recommended standard of 0.25 in/sec PPV with respect to the prevention of damage to historic/old buildings and older residential structures, or FTA's maximum acceptable vibration standard of 80 VdB with respect to human response for residential uses (e.g., annoyance, sleep disturbance) (FTA 2006: p. 8-3) at nearby vibration-sensitive land uses;

- New stationary or area sources that would generate long-term operational noise levels that exceed TRPA noise standards; or,
- Long-term traffic noise levels that
  - exceed an Environmental Threshold Carrying Capacity noise standard established by TRPA for different land use categories and highway corridors (including the CNEL standards in relevant Community Plans and Plan Area Statements), or FHWA Noise Abatement Criteria defined in 23 CFR, Part 772 (Appendix C);
  - result in a long-term perceptible increase in the ambient noise level (i.e., 3-dBA or greater) in an area where the applicable TRPA Environmental Threshold Carrying Capacity noise standard is not exceeded;
  - result in a long-term noise level increase, of any magnitude, in an area where the applicable TRPA Environmental Threshold Carrying Capacity noise standard is already exceeded.

METHODS AND ASSUMPTIONS

To assess potential short-term (construction-related) noise and vibration effects, sensitive receptors and their relative exposure were identified. Project-generated construction source noise and vibration levels were determined based on methodologies, reference noise levels, and usage factors from the FTA *Guide on Transit Noise and Vibration Impact Assessment Methodology* (FTA 2006). Reference levels are noise and vibration emissions for specific equipment or activity types that are well documented and the usage thereof common practice in the field of acoustics.

Long-term operational noise associated with proposed trailhead parking, and optional parking extending to Sweetwater Road, was assessed based on methodologies and reference noise levels from FTA's *Guide on Transit Noise and Vibration Impact Assessment* (FTA 2006). Long-term operational noise associated with actual shared-use path use was discussed and evaluated qualitatively.

To assess potential long-term (operation-related) noise effects due to project-related traffic, modeling was conducted for affected roadway segments using the FHWA Traffic Noise Model (FHWA 2006) and project-specific traffic data (LSC 2012). Generally, a doubling of a traffic noise source is required to result in an increase of 3 decibels, which is perceived as barely noticeable by humans (Egan 2007: p. 21). Thus, in regard to traffic noise, a noticeable increase in traffic noise could occur with a doubling in the volume of traffic on a roadway. The analysis is based on the reference noise emission levels for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and ground attenuation factors. Truck usage and vehicle speeds on study area roadways were estimated from field observations and data developed in support of Section 4.9, "Traffic, Parking, and Transit." Please note that the modeling conducted does not account for any natural or human-made shielding (e.g., the presence of vegetation, berms, walls, or buildings) and consequently, represents worst-case noise levels.

To evaluate relative significance, noise and vibration effects were determined based on comparisons to applicable regulations and guidance provided by federal, state, and local agencies. With regards to traffic-related noise impacts, TRPA noise standards are more stringent than applicable FHWA Noise Abatement Criteria. Therefore, TRPA noise standards are used as the basis for significance determinations herein.

SHORT-TERM CONSTRUCTION NOISE LEVELS

ALTERNATIVES A AND B

Direct and Indirect Effects

Construction activities for both alternatives would generally require use of similar types of noise-generating construction equipment. No blasting would be required and therefore noise impacts associated with rock blasting is not discussed further.

Construction equipment can be considered to operate in two modes; mobile and stationary. Mobile equipment sources move around a construction site performing tasks in a recurring manner (e.g., excavators, dozers, pavers), while stationary equipment operates in a given location for an extended period of time (e.g., portable generators, portable pumps, rock sorters). Construction activities associated with both alternatives could include site preparation (e.g., excavation, grading, boulder removal, and vegetation clearing), path construction (e.g., compacting, paving, etc.), structure erection (e.g., retaining walls, undercrossings, bridge structures), and trailhead parking. These activities may involve the use of heavy-duty construction equipment that would generate substantial noise levels.

The site preparation phase typically generates the most substantial noise levels because of on-site equipment associated with excavating, earth moving, and vegetation removal. To perform these activities, a combination of heavy equipment and smaller path construction equipment (e.g., compactors, chainsaws, rock drills) could be used. Pile driving could be required for bridge pier column construction.

The general alignment of the proposed shared-use path is depicted on Exhibit 3-2. However, the exact location would be determined based on various factors, such as land easements and landscape conditions; details that would be determined later in subsequent phases of design. Therefore, depending on the final alignment and whether the path would follow the alignment depicted on Exhibit 3-3 or would be located within the 4th Street ROW as described in Chapter 3, "Alternatives," the shared-use path could be within 75 to 110 feet of existing Rocky Point residential structures on the east side of SR 28. If pile driving were required, it would occur at the elevated pier structures between Tunnel Creek crossing and Sand Harbor State Park along the alignment of Alternative A. The nearest sensitive receptor is a Sand Harbor employee residence located approximately 760 feet south east of the southernmost pier structure.

Noise from pile driving and site preparation activities would generate the loudest noise levels. These activities would take place at difference distances from sensitive receptors (e.g., pile driving 760 feet and site preparation as close as 75 feet) and would not occur simultaneously, and therefore are discussed separately below. Noise emission levels from construction equipment associated with these activities are shown in Table 4.12-6 below.

Table 4.12-6 Typical Equipment Noise Levels

Type of Equipment	Noise Level (L_{max}) at 50 feet
Impact Pile Driver	101
Vibratory Pile Driver	101
Blasting	94
Crane	85
Excavator	85
Dozer	85
Grader	85
Dump Truck	84
Generator	82
Backhoe	80
Compactor	80
Front End Loader	80
Chain Saw	84
Wood Chipper	75[1]

Notes: [1] The reference sound level for a wood chipper is based on sound levels provided in Berger, Neitzel, and Kladden 2010.
Source: All noise levels are from FHWA 2006: p.3, unless otherwise noted.

Based on the information provided in Table 4.12-6 and accounting for typical usage factors of pile driving equipment along with typical attenuation rates, on-site pile driving activities could result in hourly average noise levels of approximately 94 dB L_{eq} at 50 feet and 101 dB L_{max} at 50 feet. Pile driving could occur near bridge column installation, located approximately 760 feet to the northwest from the nearest sensitive receptor (i.e., Sand Harbor residence located 760 feet to the south east). Therefore accounting for typical attenuation rates, these noise levels could reach 70 dB L_{eq} and 77 dB L_{max} at the nearest existing sensitive receptor.

As indicated above, activities associated with site preparation are typically the loudest phase of construction and therefore based on the information provided in Table 4.12-6 and accounting for typical usage factors of equipment associated with site preparation (i.e., compactors, rock drills, dozers, and loaders) along with typical attenuation rates, site preparation activities could result in hourly average noise levels of approximately 80 dB L_{eq} at 50 feet and 87 dB L_{max} at 50 feet.

Nearby sensitive receptors to these construction activities are residences within Segment 1, including those within and north of the Rocky Point Subdivision, and the State Park ranger residence on the east side of SR 28 in Segment 3, north of Sand Harbor. The proposed shared-use path would be located as close as 75 feet from existing Rocky Point residential structures on the east side of SR 28. Therefore accounting for typical attenuation rates, these noise levels could reach 77 dB L_{eq} and 84 dB L_{max} at the nearest existing sensitive receptor.

However, design features have been incorporated into the project for both action alternatives that would be implemented to minimize noise effects related to construction (Design Features NOI-1 through NOI-4, as described in the "List of Design Features" at the beginning of this document). These measures include placing noise controls on construction equipment, locating construction equipment and staging areas in a manner that minimizes noise effects, restricting construction vehicle idling during periods of non-use, and restricting noise-generating construction activities to the hours between 8:00 a.m. and 6:30 p.m., during which time period such activities are exempt from the TRPA noise standards (Section 68.9 of the TRPA Code [TRPA 2012a]). If construction activities must run past exempted hours (which is likely the case for bridge structure installation related to Alternative A), any nearby sensitive receptors (less than 200 feet from those activities) would be given at least one week notice of such activities. A plan would be prepared to demonstrate how appropriate noise-reducing measures (such as erecting temporary sound barriers) would be implemented to maintain the applicable PAS's maximum CNEL standards. The plan would be submitted to TRPA and Washoe County for review and approval, and would be implemented during all construction activities occurring outside of TRPA's exempted hours. All emergency work to protect life or property is exempt from applicable noise standards.

With implementation of Design Features NOI-1 through NOI-4, construction of Alternatives A and B would not cause noise levels to exceed the maximum CNELs for the applicable PASs and Community Plan, annoy and/or disrupt the sleep of occupants of existing noise-sensitive land uses in the project vicinity, nor create a substantial temporary increase in ambient noise levels. Therefore, Alternatives A and B would not result in direct or indirect adverse construction noise effects.

Cumulative Effects

Noise effects are localized occurrences; as such, they decrease rapidly in magnitude as the distance from the source to the receptor increases. Therefore, only those related projects that are in the direct vicinity of the project site and those that are considered influential in regards to noise and vibration would have the potential to be considered in a cumulative context with the project's incremental contribution. The closest related projects to the project site are the Sewer Export Pump Station Upgrade Project (construction completed in 2012), the Incline Fuels Reduction and Healthy Forest Restoration Project that would occur on the single NFS land parcel crossed by the proposed path, and elements of the SR 28 Corridor Management Plan. The subsequent phases of the Nevada Stateline-to-Stateline Bikeway are not expected to occur for at least several years (because they still require design and environmental review). The later phases would, therefore, be

separated in time and would be sufficiently distant from residences affected by construction noise associated with the North Demonstration Project that there would not be a combined effect.

The related projects described above and those listed in Table 4.1-1 as well as the North Demonstration Project, either Alternative A or B, would result in short-term noise effects from on-site construction equipment and vehicles and off-site construction vehicle traffic. However, all related projects as well as the North Demonstration Project would be required to include noise-reduction project design features or mitigation measures, such as noise controls on construction equipment, locating construction equipment and staging areas to minimize noise effects, restriction construction vehicle idling during periods of non-use, and restricting noise-generating construction activities to between the hours of 8:00 a.m. and 6:30 p.m. For these reasons, the North Demonstration Project and related projects in the immediate vicinity would not result in adverse cumulative effects related to construction noise.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no potential effects related to short-term construction noise.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to short-term construction noise.

GROUND VIBRATION

ALTERNATIVES A AND B

Direct and Indirect Effects

Construction activities generate varying degrees of temporary ground vibration, depending on the specific construction equipment used and activities involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. The effects of ground vibration may be imperceptible at the lowest levels, result in low rumbling sounds and detectable vibrations at moderate levels, and high levels of vibration can cause sleep disturbance in places where people normally sleep or annoyance in buildings that are primarily used for daytime functions and sleeping.

The North Demonstration Project would not include the development of any new permanent stationary sources of ground vibration. As described above under the heading Short-Term Construction Noise Levels, implementation of either action alternative could result in construction activities. Depending on the specific construction equipment used and activities involved, such activities may result in varying degrees of temporary ground vibration and noise.

As described previously in this section, pile driving may be required for bridge pier column installation. In addition, other heavy-duty equipment (i.e., small dozers) would be used for construction activities. Therefore, is assumed that pile driving may occur approximately 760 feet from a sensitive receptor and other vibration-inducing construction activities may occur 75 feet from an existing structure. Maximum ground vibration levels would be associated with pile driving and the use of dozers. Ground vibration and noise levels associated with various types of construction equipment and activities are summarized in Table 4.12-7.

Table 4.12-7 Representative Ground Vibration and Noise Levels for Construction Equipment		
Equipment	PPV at 25 feet (in/sec)[1]	Approximate L_v (VdB) at 25 feet[2]
Impact Pile Driver	1.518	112
Blasting	1.13	109
Sonic Pile Driver	0.734	104
Large Dozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Rock Breaker	0.059	83
Jackhammer	0.035	79
Small Dozer	0.003	58

PPV = peak particle velocity; L_V = the root mean square velocity expressed in vibration decibels (VdB), assuming a crest factor of 4
Source: FTA 2006:p.12-6,12-8

With regards to FTA's maximum-acceptable vibration standard of 80 Vdb, and based on FTA's recommended procedure for applying a propagation adjustment to these reference levels, this standard would be exceeded if pile driving were to occur within 300 feet of a sensitive receptor or other construction activities were to occur within 5 feet of an existing sensitive receptor. With regards structural damage from vibration, FTA recommends that ground vibration not exceed 0.25 in/sec PPV. This recommended threshold would be exceeded if pile driving were to occur within 80 feet of an existing structure or if other construction activities were to occur within 5 feet of an existing structure. As described above, pile driving would occur over 700 feet away from an existing structure and other construction activities could occur as close as 75 feet from an existing structure. All vibration-inducing construction activities would occur well beyond the distances described above that would result in an exceedance of FTA's recommended threshold for human disturbance (i.e., 80 VdB) and structural damage (i.e., 0.25 in/sec PPV). Therefore, construction activities would not result in vibration levels that exceeded recommended thresholds for human disturbance or structural damage, and therefore Alternative A or B would not result in direct or indirect ground vibration effects.

Cumulative Effects

As described above, noise and vibration are localized occurrences and therefore, only those related projects that are in the direct vicinity of the project and those that are considered influential in regards to noise and vibration would have the potential to be considered in a cumulative context with the project's incremental contribution.

Construction equipment ground vibration from the related projects listed in Table 4.1-1 would generally be similar in nature and magnitude to those discussed for the action alternatives above. Construction activities would not result in vibration levels at nearby sensitive receptors that exceed FTA recommendations for preventing structural damage to off-site buildings or result in human annoyance. In addition, implementation of Design Features NOI-1 through NOI-4 would ensure construction activities with the potential to disrupt sleep would take place during the less-sensitive time of the day when people are less likely to be disturbed. Therefore, construction activities would be temporary in nature, and vibration-generating construction activities would not occur during the more noise-sensitive hours (i.e., before 8:00 a.m. and after 6:30 p.m.). Similarly, all related projects would be required to consider and include measures to address potential vibration effects that could result in structural damage or disturbance. For these reasons, the North Demonstration Project and related projects in the immediate vicinity would not result in adverse cumulative vibration effects related to construction.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no potential effects related to ground vibration from construction activities.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to ground vibration from construction activities.

LONG-TERM OPERATIONAL NOISE LEVELS

ALTERNATIVES A AND B

Direct and Indirect Effects

Implementation of the proposed project would not result in any new stationary noise sources. The proposed North Demonstration Project would involve the development of a new shared-use path, trailhead parking, and access points that could result in up to 1,311 daily one-way user trips for Alternative A and 971 daily one-way user trips for Alternative B on the shared-use path. Users of the proposed shared-use path could lead to incremental increases in ambient noise associated with vehicles in trailhead parking areas and increases in human activity on the shared-use path and surrounding areas.

Noise generated from the proposed trailhead parking area would be typical of a small parking area used by cars and light trucks. Common motor vehicle-related noise include horns honking, engines starting, doors closing, engines idling, infrequent car alarms sounding, and various other sounds associated with moving vehicles. These noise sources are typically short in duration, intermittent throughout the day, and vary as a function of the number of vehicles present throughout the day (i.e., peak hours would result in more noise).

The proposed trailhead parking area is located adjacent to and on the east side of SR 28 (across the highway from residential areas). This shoulder area is currently used for parking, and as such these types of noises occur under existing conditions. Further, because no lighting is proposed as part of the project, path use would be limited to less-noise sensitive daylight hours in an area dominated by traffic noise from SR 28. For these reasons, noise associated with proposed trailhead parking would not be expected to result in a perceptible increase in ambient noise levels above those existing without the project.

Recreational uses allowed on the proposed shared-use path would include walking, jogging, and bicycle riding. These uses are not major sources of noise or new types of noise sources to the project area, because recreational activities (e.g., hiking, bicycle riding, site seeing) are typical in the Lake Tahoe Basin and exist throughout the project vicinity. Typical noise sources associated with recreational trails include people talking, dogs barking, and the occasional use of maintenance vehicles. In addition, the existing ambient noise levels are dominated by traffic noise on SR 28 and considering the relatively low level of noise generated from shared-use path usage, traffic noise along SR 28 would effectively mask the noise generated on the path and would continue to be the dominant noise source in the project vicinity. For these reasons, the proposed project would not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

Cumulative Effects

The proposed project would result in the development of a shared-use path and trailhead parking that could increase human activity in the project area. However, the types of noise generated from these project elements are not new noise sources to the project vicinity and are not considered substantial noise sources with respect to the existing ambient noise environment, which is dominated by traffic on SR 28. Additionally, because noise

levels associated with the proposed shared-use path would be minimal, they would not contribute to the cumulative noise environment and would not be noticeable noise sources in comparison to the existing or future noise environment. For these reasons, long-term operational noise would not make a considerable contribution such that a significant adverse cumulative noise effect would occur.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no potential effects related to long-term operational noise from trailhead parking or shared-use path use.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to long-term operational noise.

LONG-TERM TRAFFIC NOISE EFFECTS

ALTERNATIVES A AND B

Direct and Indirect Effects

Traffic noise was modeled for existing conditions, with and without implementation of Alternatives A and B, based on the predicted ADT volumes and their distribution over the roadway network. The project's contribution to the existing traffic noise levels along area roadways was determined by comparing predicted existing roadside noise levels with and without project (Alternatives A and B) traffic. Table 4.12-8 summarizes the net change in modeled traffic noise levels from existing-no-project to existing-plus-project conditions (Appendix H). As shown, project-generated traffic associated with the long-term operation of Alternatives A or B would not result in a perceptible (e.g., 3 dB or greater) increase in noise levels along affected local roadways or highways. Therefore, the project would not have an adverse effect on the environment related to increases in traffic-related noise.

Table 4.12-8 Summary of Modeled Traffic Noise Levels under Existing-No-Project and Existing-Plus-Project Conditions

Alternative	Road Segment	CNEL/L_{dn} (dB) at 100 feet from Roadway Centerline		Net Change (dB)
		Existing (No Project) Conditions	Existing (Plus Project) Conditions[1]	
Alternative A	SR 28, between Lakeshore Boulevard and Sand Harbor	62	62	0
Alternative B	SR 28, between Lakeshore Boulevard and Sand Harbor	62	62	0

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{dn} = day-night average noise level
[1] Modeling results showed a traffic noise increase of 0.1 dB. However, the model is not accurate to one tenth of a decibel and therefore results are rounded to the nearest whole number.
Refer to Appendix H for detailed modeling input data and output results.
Source: Data modeled by Ascent Environmental in 2013.

Cumulative Effects

Implementation of the aforementioned related projects could result in an increase in ADT volumes on affected roadway segments and, consequently, an increase in traffic source noise. Additionally, existing traffic-noise exceeds applicable PAS noise standards in certain areas along SR 28 (i.e., sound level measurement Site 3).

Traffic noise was modeled for future conditions, with and without implementation of the proposed project and development alternatives, based on 2035 predicted ADT volumes for SR 28 in the project vicinity (TMPO and TRPA 2012).

With respect to the related projects, the net change from existing to future with related projects would be less than 3 dB. Therefore, the related projects would not result in significant cumulative adverse effects with respect to long-term exposure of sensitive receptors to increased traffic noise. Table 4.12-9 summarizes the net change in modeled traffic noise levels from future no project to plus project conditions for each alternative. As shown, generated traffic source noise would not result in a perceptible (e.g., 3 dB or greater) increase in noise levels along affected local roadways. Therefore, the project would not make a considerable contribution such that a significant cumulative adverse noise effect would occur.

Table 4.12-9 Summary of Modeled Future 2035 Traffic Noise Levels under No Project and Plus Project Conditions

Alternative	Road Segment	CNEL/L_{dn} (dB) at 100 feet from Roadway Centerline		Net Change (dB)
		Future No Project Conditions[1]	Future Plus Project Conditions[1]	
Alternative A	SR 28, between Lakeshore Boulevard and Sand Harbor	63	63	0
Alternative B	SR 28, between Lakeshore Boulevard and Sand Harbor	63	63	0

Notes: CNEL = Community Noise Equivalent Level; dB = A-weighted decibels; L_{dn} = day-night average noise level
1. Modeling results showed a traffic noise increase of 0.1 dB. However, the model is not accurate to one tenth of a decibel and therefore results are rounded to the nearest whole number.
Refer to Appendix H for detailed modeling input data and output results.
Source: Data modeled by Ascent Environmental in 2013.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no potential effects related to increases in traffic-related noise.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to increases in traffic-related noise.

4.12.4 CONSEQUENCES FOR TRPA ENVIRONMENTAL THRESHOLD CARRYING CAPACITIES

This section describes the effects of implementing the proposed project and alternatives on the thresholds established for noise by TRPA. Two Indicator Reporting Categories for noise have been established by TRPA:

- Single Noise Events, and
- Cumulative Noise Events.

The Lake Tahoe Basin's status in 2011 was nonattainment for single noise events and for cumulative noise. However TRPA's 2011 *Threshold Evaluation Report* indicates that noise standards and approaches within the TRPA jurisdiction need to be re-evaluated. The majority of standards were determined to be out of attainment as a result of a 'no exceedance' interpretation of the standards and TRPA has little enforcement authority to address many noise issues—in particular, single event noise.

SINGLE NOISE EVENTS

Single noise events may result from the use of aircraft, watercraft, on-road vehicles (e.g., automobiles, motorcycles), and off-road vehicles (e.g., snowmobiles, all-terrain vehicles).

Implementation of Alternatives A, B, or C would not affect aircraft noise because none of the alternatives would have an effect on aircraft operations or be located within the area of influence of an existing airport.

Implementation of Alternatives A, B, or C would not affect attainment of the Single Event Noise Threshold, as defined in the TRPA Environmental Threshold Carrying Capacity Noise Standards, because single-event noise from project related increases in traffic would not result in a noticeable change in the traffic noise contours of area roadways (i.e., less than 3 dBA) based on existing traffic volumes. No other single-event noise sources would be created or modified due to construction or operation of the proposed shared-use path. The use of watercraft or off-road vehicles would not increase or otherwise be affected by any of the proposed alternatives.

CUMULATIVE NOISE EVENTS

As described in Section 4.12.3, implementation of Alternatives A, B, or C would not result in any short-term or long-term adverse noise effects. Implementing Alternatives A, B, or C would not affect attainment of the CNEL Threshold. Implementation of the project would increase short-term noise levels due to construction equipment and activities involved in constructing the shared-use path and associated facilities. Implementation of Design Features NOI-1 through NOI-4 would ensure that construction of Alternatives A and B would not exceed CNEL standards or vibration standards, disturb and/or disrupt the sleep of occupants of existing vibration-sensitive land uses in the project vicinity, nor create a substantial temporary increase in ambient noise or vibration levels.

Operational noise from use of and access to the shared-use path under both action alternatives would not cause perceptible noise increases at nearby sensitive receptors and thus would not increase CNELs sufficiently to adversely affect or interfere with attainment of community noise thresholds established by TRPA.

For Alternative C, noise levels would not change because no action would occur. For these reasons, changes to the existing attainment status of the CNEL Threshold would not occur under any of the alternatives.

4.13 PUBLIC SERVICES AND UTILITIES

This section describes existing public services and utilities and evaluates potential effects to such services and utilities related to implementation of the North Demonstration Project, including Alternatives A, B, and C. A summary of applicable regulations under which the action alternatives would be implemented is provided in Appendix C. The public services discussed in this section include solid waste disposal, law enforcement, and fire and emergency services. The only potential effects of the project on existing utility infrastructure (i.e., power lines, water supply lines, and wastewater lines) would be possible conflicts during construction and the incremental increase in demand for wastewater associated with the increased use of existing facilities.

The potential for adverse effects on the capacity of existing recreational facilities to occur as a result of the action alternatives is addressed in Section 4.7, "Recreation." Stormwater management and potential adverse effects on drainage, surface water, source water, and groundwater are addressed in Section 4.3, "Hydrology and Water Quality." Potential adverse effects related to exposure to wildfire hazards are discussed in Section 4.14, "Hazards and Hazardous Materials."

As described in Chapter 3, "Alternatives," the North Demonstration Project would not include new buildings, structures, or lighting that would require water supply, wastewater, natural gas, or telecommunications services. The proposed shared-use path would require electrical service to power the pedestrian activated crossing signal for the option that includes an at-grade crossing on SR 28 just north of Tunnel Creek. The signal would either be solar powered or require an approximately 50-foot connection to the overhead power line that runs parallel to and on the mountain side of SR 28. Public access to the proposed shared-use path is intended to occur between sunrise and sunset and no additional lighting would be provided.

Water and wastewater infrastructure at Memorial Point and Sand Harbor are constrained by the capacity of the sites wastewater system infrastructure, not the overall water supply system (NDSP 2011). NDSP has a Water Conservation Plan in place that would guide water use at both sites during the event of severe drought. As such, the incremental increase in water use associated with the action alternatives would not result in the need for new infrastructure or altered utilities. Furthermore, no permanent irrigation system would be installed for the shared-use path corridor landscaping. However, temporary irrigation to support establishment of the vegetation for slope and soil stabilization would be needed for approximately 2 years per standard permit conditions. In most cases, irrigation would be provided by truck operating under a temporary water permit; the two exceptions would be at Sand Harbor and Memorial Point, where the existing water systems may be used. The temporary irrigation would not diminish the existing water service at these locations, cause substantial service delivery limitations, or require the need for new or physically altered water supply facilities. In the event that irrigation water is not available at Sand Harbor and Memorial Point, these areas would be serviced by truck. Therefore, the increased demand for water supply, electricity, natural gas, and telecommunications is not discussed further herein. Similarly, according to the preliminary design plans, there are no telecommunication or natural gas lines that would be affected by the action alternatives and as such the potential for disruption of these utilities is not discussed further herein.

Construction and operation of a shared-use path would not increase population, nor subsequently increase the number of students in the Incline Village area, because it does not provide new dwelling units and new employment would be limited to temporary construction jobs. Therefore, without a potential for population change, school services do not need to be discussed further.

4.13.1 AFFECTED ENVIRONMENT

UTILITIES

An existing overhead power line parallels SR 28 within the project area, typically remaining on the mountain side of SR 28. The power line is owned and maintained by NV Energy.

Existing wastewater utilities located under SR 28 include a 4-inch sewer force main and a 16-inch effluent force main operated by IVGID. The 4-inch line is used to convey wastewater from restroom facilities at Memorial Point (four fixtures) and Sand Harbor (54 fixtures) to the IVGID wastewater facility in Incline Village, and the 16-inch line extends from the facility in Incline Village along SR 28 up to U.S. 50 to export wastewater effluent out of the Tahoe Basin. Hidden Beach is served by a vault toilet and does not have any wastewater infrastructure.

Water is supplied to Memorial Point and Sand Harbor via independent water systems fed by wells. Hidden Beach does not have water service at this time. The Memorial Point water system includes a groundwater well with a single service connection that supplies the restroom facility, limited drip irrigation in front of the restroom, and a drinking fountain. The Sand Harbor water system includes a groundwater well and 16 service connections that supply multiple public service and operational facilities at the park such as restrooms, water fountains, the visitor center, shop facilities, employee residences, and concessions (NDSP 2009). At Sand Harbor, the well is located on the lake side of SR 28 near the boat launch entrance. A water supply line extends from the well and across SR 28 to serve the park residential duplex on the east side of the highway.

SOLID WASTE SERVICE

Solid waste services in the project area are provided by the Incline Sanitation Department (ISD), a division of Waste Management. All materials collected by ISD, including trash and recyclables, are hauled to the Incline Transfer Station located in Incline Village, where they are sorted. Material that is not recyclable is treated as solid waste and delivered by truck to the Lockwood Regional Landfill near Sparks in Storey County, Nevada.

The Lockwood Regional Landfill is a Class I municipal solid waste landfill that handles organic material but does not accept hazardous waste. The average quantity of waste presently received at the landfill is on the order of 2,200 tons per working day (tpd). The permitted disposal area is approximately 350 acres with a capacity of 64.8 million cubic yards (NDEP 2012). Based on projected volumes, Lockwood Regional Landfill has a remaining capacity of 32 million cubic yards (approximately 22 million tons). In December 2011, a modification request was submitted to increase the capacity of the landfill. The proposed expansion would increase of the total capacity of the Lockwood Landfill from 64.8 to 302.5 million cubic yards (approximately 204 million tons) and increase the disposal area from 350 to 856.5 acres (NDEP 2012).

LAW ENFORCEMENT

The Washoe County Sheriff's Department (WCSO) provides law enforcement services for the unincorporated areas of Washoe County and is responsible for operating the only adult detention facility for pretrial detainees and sentenced misdemeanants within Washoe County. The County Sheriff's Office has 420 commissioned, 151 civilian, and 36 intermittent hourly employees as well as 22 active reserve deputy sheriffs and a volunteer corps of 966 persons.

The closest sheriff's station to the project corridor is the Incline Village substation located at 625 Mt. Rose Highway. This substation is a full-service satellite station. Primary responsibilities of the substation include providing law enforcement, search and rescue, dispatch, and civil process services for the Tahoe area of Washoe County. The substation serves the area from Crystal Bay to Incline Village and east along SR 28, as well as to the top of Mt. Rose summit. The WCSO headquarters are in Reno. Current response times by officers to incidents in

the Tahoe area portion of Washoe County are low (Washoe County 2010a). According to the Washoe County Master Plan Public Services and Facilities Element (Washoe County 2010b) no additional constable staffs are currently needed to service the Tahoe area portion of WCSO's jurisdiction.

The Nevada Highway Patrol Department (NHPD) is primarily responsible for providing law enforcement services along the roads and highways maintained or funded by the State of Nevada and the federal-aid primary and secondary road system (these are the federally funded interstate and intrastate roads and highways). In addition, the NHPD is the primary motor vehicle accident investigation agency in the state. In Washoe County, the NHPD operates from its main station at 305 Galetti Way in Reno (Washoe County 2010b).

In addition to law enforcement services provided by WCSO and NHPD, both the NDSP and LTBMU provide law enforcement services for the management of their land and recreation facilities. Both the WCSO and NHPD provide enforcement of no parking areas along SR 28.

FIRE AND EMERGENCY SERVICES

Emergency response within the project area is provided by North Lake Tahoe Fire Protection District (NLTFPD). NLTFPD is an "all risk" fire district; they respond to all types of emergency and public service situations including structural fires, wildland fires, automobile and all-terrain vehicle accidents, emergency medical needs, avalanche extrications, and boats and/or swimmers in distress. NLTFPD has three fire stations and one administrative office. The headquarters fire station (Station 11), which is the closest station to the project area, is located at 875 Tanager Street in Incline Village. Station 11 has one engine, one ladder truck, one heavy rescue squad, two paramedic ambulances, a minimum of seven members at a time, and a shift supervisor. Station 12 is located in Crystal Bay and houses a minimum of three members, one paramedic engine, a brush engine, and a reserve ambulance. Station 13 is located on the Mt. Rose Highway and houses three members, one paramedic engine, and an ambulance. Ambulance service is provided to the Incline Village area by the NLTFPD with hospital transport to the Incline Village Community Hospital, Tahoe Forest Hospital, Renown Regional Medical Center, and Saint Mary's Hospital. In addition to the traditional fire and emergency medical equipment, NLTFPD has a heavy rescue squad, a rescue boat, two snowmobiles, and two all-wheel drive squads. NLTFPD operates with a full-time staff of 50, of which 46 are line personnel (i.e., fire and/or medical first responders).

NLTFPD is mandated to provide advanced life support (NRS Section 450.B) and to respond to such calls within 4 minutes, 90 percent of the time (based on a local bond ballot measure). NLTFPD's response time goal for fire response is 5 minutes after the processing of alarm to the arrival of the first unit. Based on a population estimate of 7,700 for the NLTFPD service area, there are approximately six firefighters for every 1,000 residents in the service area (Washoe County 2010a).

NLTFPD also provides fire prevention and control services and responds to backcountry emergencies, boats and/or swimmers in distress, avalanche extrications, all terrain vehicle accidents, and rope rescues (NLTFPD 2005).

In addition to the services provided by NLTFPD, LTBMU and the Nevada Division of Forestry (NDF) provide fire prevention and control services on NFS and state-owned lands, respectively (NDF 2011).

HOSPITAL FACILITIES

Two medical facilities are located in close proximity to the project area. Incline Urgent Care is located approximately 1 mile from the project area at 995 Lake Tahoe Boulevard and Incline Community Hospital is approximately 2.5 miles from the project area at 880 Alder Avenue in Incline Village. The hospital was recently remodeled to be a 4-bed critical access hospital and 24-hour emergency room with lab and diagnostic capability.

4.13.2 ENVIRONMENTAL CONSEQUENCES AND RECOMMENDED MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Based on TRPA's Initial Environmental Checklist, the proposed action would result in an adverse public services and utilities effect if it would result in:

- an unplanned effect upon, or result in a need for altered governmental services related to fire protection, emergency medical response, or law enforcement;
- substantial alterations to the following:
  - power lines;
  - solid waste disposal; or
  - water and wastewater systems.

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the TRPA criteria used for this analysis.

METHODS AND ASSUMPTIONS

Evaluation of potential public service and utilities impacts were based on a review of documents and regulations pertaining to the project area, including TRPA's Code, the Sand Harbor Recreational Capacity Study, and the Washoe County Master Plan. Additional background information on current services, staffing, and equipment was obtained through consultation with the applicable service providers.

DEMAND FOR AND ALTERATIONS TO UTILITIES

ALTERNATIVES A AND B

Direct and Indirect Effects

Both action alternatives could involve the relocation of existing utilities and would incrementally increase the demand for restroom facilities related to increased use in this portion of the SR 28 corridor.

With respect to use, both action alternatives would result in increased use of facilities at Hidden Beach, Memorial Point, and Sand Harbor. Increased use of recreational facilities is addressed in Section 4.7, "Public Access and Recreation." The annual level of use at these facilities is projected in Section 4.7 to increase by up to 34 percent at Hidden Beach, up to 4 percent at Memorial Point, and up to 8 percent at Sand Harbor.

Hidden Beach is served by a vault toilet. Increased use associated with the shared-use path could require a greater service frequency for the vault at Hidden Beach (currently serviced by NDSP about once every 2 years) or an additional vault; however, this would not be considered an adverse effect on the IVGID wastewater system. Servicing of the existing vault requires that the south bound lane of SR 28 be closed while the vault is pumped out and transferred to a truck. The proposed shared-use path would allow the pump truck to pull off the highway onto the ramp on the west side of the highway (Sheets C15.1 and C16.0 in Appendix B) thereby eliminating the need for highway lane closure.

NDSP considers the current restroom maintenance frequency at Memorial Point to be inadequate due to budget constraints (NDSP 2011). The Sand Harbor Recreational Capacity Study reported an average of 20 to 30 users at the site at one time, with up to 44 users at a time during the peak season (NDSP 2011). The Sand Harbor Recreation Capacity Study reported that the required fixture standard for Memorial Point was one to two toilets per 40 users of similar recreational facilities (NDSP 2011; National Standard Plumbing Code [NSPC] 2003). The restroom at Memorial Point contains four toilets, which meets the required number of fixtures. Implementation of the action alternatives is projected to result in a 2 to 5 percent increase (Table 4.7-3) in daily use of the site at Memorial Point with Alternatives B and A, respectively. This would result in 49 to 55 users at the site at one time (existing plus project) during peak season. Because the increased restroom use associated with the action alternatives would remain well within the relevant plumbing code requirements, the action alternatives would not necessitate the construction of additional restroom facilities or alterations to existing wastewater infrastructure at Memorial Point. The adaptive management elements of the Operations and Maintenance Plan described in Chapter 3, "Alternatives," addresses maintenance of existing restroom facilities.

According to NDSP the appropriate restroom standards for Sand Harbor are contained in the 2012 International Building Code (IBC). The 2012 IBC sets standards for the minimum number of required plumbing fixtures for a variety of uses, including outdoor assembly areas. The IBC sets forth the following fixture standards that apply to Sand Harbor (IBC 2012):

- male fixtures: 1 fixture per 75 persons for the first 1,500 persons and 1 fixture per 120 persons for the remainder exceeding 1,500 persons
- female fixtures: 1fixture per 40 persons for the first 1,520 persons and 1 fixture per 60 persons for the remainder exceeding 1,520 persons

Sand Harbor has 54 restroom fixtures located in nine restroom buildings (including the Visitor Center)—27 of the fixtures are for men and 27 are for women. Lines often form at the restrooms closest to beach areas during peak hours, while the restrooms farther from the beach are underutilized (NDSP 2011). Based on existing peak-hour use levels (Table 3.7-4; NDSP 2011: p. 43), the existing restroom facilities are approaching and/or do not meet the number of fixtures required by the IBC (Mullen 2013). This condition exists on peak days during peak hours—weekends and holidays during July and August between 10:00 a.m. and 4:00 p.m. On the average peak day (NDSP 2011: p. 40) and during early summer and the shoulder seasons, the restrooms meet the IBC standards (Mullen 2013). To address the existing restroom capacity challenges at Sand Harbor during peak periods, NDSP is considering either converting some of the underutilized showers with toilets or increasing the number of fixtures (NDSP 2011: p. 166).

Implementation of the North Demonstration Project action alternatives is projected to result in a 4 to 5 percent increase (Table 4.7-3) in daily use at Sand Harbor with Alternatives B and A, respectively. The incremental increase in peak-hour use (Alternative A = 43 users, Alternative B = 32 users) alone would not trigger the need for new restroom fixtures at Sand Harbor, but it would exacerbate existing capacity challenges and the issue of lines forming at popular restrooms during peak hours. The Operation and Maintenance Plan would provide an adaptive management strategy for development of additional restroom fixtures and funding if they become needed following construction of the shared-use path (potentially through conversion of existing shower facilities as suggested by the Sand Harbor Recreational Capacity Study).

Additionally, the capacity of the outgoing 4-inch sewer force main is 43,000 gallons per day and the highest load to date has been 38,000 gallons per day during the peak season; outgoing wastewater from Sand Harbor is typically between 8,000 to 15,000 gallons per day (NDSP 2011). Any increase in restroom fixtures at Sand Harbor resulting from actions taken by NDSP or related to implementation of the Operation and Maintenance Plan would not add the volume of wastewater that could cause an exceedance of the available capacity of the existing sewer force main. For these reasons, the incremental increase in use at Memorial Point and Sand

Harbor is not likely to create additional wastewater demands that would exceed the maximum capacity of the existing wastewater system.

According to the project design engineers, existing water supply lines at Memorial Point and Sand Harbor would not be affected by construction of either action alternative. The lines at Memorial Point are limited to areas west of SR 28 and are below grade. The underground water line that provides water supply to the park residence on the east side of SR 28 at Sand Harbor is located north of the optional undercrossing at Sand Harbor and, as such, would not be affected by the action alternatives.

Only Alternative B would affect existing overhead power lines. The shared-use path associated with Alternative A would be crossed six times by the existing power line in Segment 1, but none of the lines, poles, or guy wires would be altered with this alternative. With Alternative B, overhead power lines would cross the path 17 times. Alternative B would avoid all the power lines and poles, but would require the relocation of one guy wire (a tensioned cable design to add stability to a free-standing power pole) near station 11+00 (see Appendix B).

The optional SR 28 at-grade crossings associated with Alternative A (two total) and B (four total) would not affect either wastewater main located in SR 28. As described in Chapter 3, “Alternatives,” the optional SR 28 undercrossings at Tunnel Creek and Sand Harbor would require relocation (lowering) of the 16-inch effluent force main and the 4-inch sewer force main operated by IVGID. An estimated 60 linear feet of each line would have to be lowered to a depth that maintains minimum separation distances between the undercrossing tunnel (8.5 feet tall) and the highway surface and the tunnel and the relocated line. The lines would be relocated to a point below the undercrossing tunnels. Total excavations depths for construction of the undercrossings are expected to be 16 to 18 feet. In addition to the line relocations, new air release valves would be required for both of the mains. These valves would be located within the NDOT ROW. The actual depth and length of the relocated mains, and location of new air release valves, would be determined in latter phases of design if the optional undercrossing were to be selected for implementation.

The restroom facilities at Sand Harbor and Memorial Point are the only facilities with connections to the 4-inch sewer force main. Pipeline relocations would be scheduled during low-flow periods, when Sand Harbor visitation is near its minimum. Temporary restroom facilities would be supplied at Sand Harbor and Memorial Point during pipeline relocation. Relocation of the pipeline could involve a risk of spill of treated effluent and untreated raw sewage. However, standard out-of-service procedures would be followed to manage flows during service interruption. Design Features PS&U-1 and PS&U-2, as described in the “List of Design Features” at the beginning of this document, are incorporated into both action alternatives which would ensure that proper design and construction management procedures are implemented to ensure that the pipelines are properly isolated and drained (pumped out and hauled away by truck); that the pumps and restroom facilities at Sand Harbor and Memorial Point are temporarily shut down for construction and that temporary restroom facilities are provided; and that pipes are monitored and crews are on stand-by to pump down pipes if necessary. Because design features incorporated into the project would minimize or avoid effects related to sewer service interruption as well as a potential effluent or sewage spill, the potential effects of implementing Alternative A or B on wastewater mains would not be adverse.

Cumulative Effects

There are no existing IVGID wastewater pipeline or treatment system deficiencies. In addition, IVGID recently completed upgrades at the sewer export pump station south of Sand Harbor. Implementation of related projects listed in Table 4.1-1 could require service interruptions or involve a risk of effluent or sewage spill, and could increase demand for wastewater facilities. However, the design features incorporated into the project (PS&U-1 and PS&U-2) ensure that implementation of Alternatives A or B would not contribute to sewer service deficiencies or adverse physical impacts associated with the relocation of sewer system infrastructure. Furthermore, the IVGID is restricted by law to not serve any new use unless it has the capacity to do so. There is sufficient capacity to serve the existing restrooms at Sand Harbor and Memorial Point and no additional

restrooms would be constructed as part of the North Demonstration Project. Any restrooms constructed at Sand Harbor by NDSP and/or in response to the Operations and Maintenance Plan would not create a volume of wastewater that would cause an exceedance of the available capacity of the existing sewer force main. Implementation of some projects listed in Table 4.1-1 could result in increased demand for water supply or electrical service; however implementation of the project alternatives would create minimal or temporary demand for water and electricity. Therefore, neither of the alternatives would substantially contribute to an existing cumulative effect nor cause a cumulative adverse effect to occur related to the sewer, water or electrical supply system.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C no shared-use path would be constructed and no effluent or sewage pipeline relocation would be necessary. Therefore, there would be no direct or indirect effects on wastewater treatment.

Cumulative Effects

Under Alternative C no shared-use path would be constructed and no effluent or sewage pipeline relocation would be necessary. Therefore, Alternative C would result in no contribution to potential cumulative effects related to wastewater treatment.

CREATE A NEED FOR NEW SYSTEMS OR SUBSTANTIAL ALTERATION OF SOLID WASTE SERVICES

ALTERNATIVES A AND B

Direct and Indirect Effects

The action alternatives would increase the demand for solid waste services. The location and service schedule for new bear-proof trash containers would be defined in the Operations and Maintenance Plan, which would be developed prior to construction of the project. Garbage and recyclables would be collected and hauled to the Incline Transfer Station, in Incline Village, where recyclable materials would be salvaged and recycled. Material that is not recyclable would treated as solid waste and hauled to the Class I Lockwood Regional Landfill near Sparks, Nevada, which has capacity for approximately 100 years (Hildago 2012). The primary bulk of trash expected from people using the shared-use path would be recyclable, such as beverage containers. The amount of recyclables that would be processed at the Incline Transfer Station and the amount of non-recyclables that would be sent to Lockwood Landfill would not be substantial relative to the amount of solid waste that the Incline Sanitation District currently processes (Hidalgo 2012). Therefore, the increased demand for solid waste services would not cause an adverse effect on the current level of solid waste services nor generate the need for additional solid waste servicing facilities.

Cumulative Effects

There is sufficient capacity at Lockwood Landfill for approximately 100 years. Given the current capacity and long life expectancy of the landfill, there is not an existing cumulatively adverse condition with respect to solid waste services. Trash generated under either action alternative (Alternative A or B) would be added to trash generated by the various related projects and other projects in the region (Table 4.1-1). The amount generated by the proposed project would be a minimal contribution compared with the amount of solid waste currently handled. Therefore, neither of the alternatives would substantially contribute to an existing cumulative effect nor cause a cumulatively adverse effect to occur.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C the shared-use path would not be constructed; therefore, there would be no direct or indirect effects on existing solid waste disposal services.

Cumulative Effects

Under Alternative C, the shared-use path would not be constructed; therefore, Alternative C would result in no contribution to potential increased demand for solid waste services or facilities.

UNPLANNED EFFECT UPON OR ALTERATION TO POLICE, FIRE, AND EMERGENCY SERVICES

ALTERNATIVES A AND B

Direct and Indirect Effects

The proposed shared-use path associated with both action alternatives would attract additional visitors to the area to access the interconnected bicycle and pedestrian trails, established recreation areas adjacent to Lake Tahoe, and viewpoints. The proposed shared-use path would be similar to existing uses within the SR 28 corridor that include formal and informal trails to view points and beaches. Section 4.7, "Recreation," provides peak-hour, daily, and annual use estimates for each of the action alternatives. Because the shared-use path design under both action alternatives would accommodate emergency vehicle loads and both alternatives would increase visitor access, the effects on governmental services related to law enforcement, fire protection, and emergency medical services would be the same.

Multiple studies have demonstrated that construction of public shared-use paths does not result in an increase in crime associated with the path area provided the paths are maintained and well used (Racca and Dhanju 2006). Because the project is expected to have a high level of use and visibility, it is not expected to result in an increase in illegal behavior requiring additional law enforcement response. According to the Washoe County Master Plan and the WCSO, adequate law enforcement staff is available to serve the Tahoe area of Washoe County. Therefore, the shared-use path would not require the construction of new law enforcement facilities or the addition of law enforcement personnel. In addition to the services provided by WCSO, NDSP has two commissioned Park Rangers that provide law enforcement within the Lake Tahoe Nevada State Park, which are assisted by three seasonal Park Ranger Technicians (NDSP 2011). Reductions in staffing and mandatory furlough days have reduced the visibility of park personnel and a 2010 survey of park staff indicated concern that the number of personnel was not sufficient to provide quality service and safety for visitors (NDSP 2011). However, the Operations and Maintenance Plan that would be developed for the project (described in Section 3.4 of Chapter 3, "Alternatives") would include an adaptive management strategy to resolve any issues related to law enforcement on the shared-use path. Furthermore, the shared-use path would run near or directly adjacent to the existing highway; therefore, response times to any incidents on or near the shared-use path should remain equivalent to the response times along the SR 28 corridor in the project area.

The shared-use would increase visitor activity in and through the forested project area that could affect fire protection services. However, as described in Section 4.14, "Hazards and Hazardous Materials," the proposed action would include removal/relocation of vegetation for construction of the shared-use path, measures to maintain vegetation that would minimize the extent of fire fuels in the immediate shared-use path corridor, and the path itself would create a fire break. Additionally, the TRPA permit process requires fire protection agency pre-approval demonstrating that adequate fire protection department access and defensible space has been provided before permit acknowledgement. NLTFPD was contacted by project engineers during the design process, and the preliminary plans reflect input received related to access needs. The NLTFPD does not anticipate that providing service to the path would require additional staffing or new facilities. Additionally, fire

ignition risk would be minimized through required fuels reduction practices and signage during fire season (Regan, pers. comm., 2013). Therefore, because the proposed action would not result in an unplanned effect on fire protection services or the need for additional staff or new or altered facilities, the proposed action would not have an adverse effect on fire protection services.

Construction of the proposed shared-use path is not expected to result in an increased demand for emergency medical services. A beneficial effect of the project would be the reduced risk of pedestrian/vehicle collisions that would occur by creating a separate shared-use path that would provide safe access to existing popular recreation areas along SR 28, thereby reducing pedestrian traffic along SR 28. The current conditions place pedestrians, parked vehicles, and vehicles moving at highway speeds on SR 28 within the same area. Pedestrians account for 13 percent of all traffic fatalities nationwide (NHTSA 2010), and 14 percent in Nevada (NDOT 2010). Nationally, 75 percent of pedestrian fatalities were at non-intersection areas. In addition, fatalities were disproportionately high in rural areas and areas without sidewalks (FHWA 2010). Comparatively, a 1 year study of pedestrian and bicyclist injuries from emergency departments in California, New York, and North Carolina reported that only 0.8 percent of injuries occurred from pedestrian-bicycle collisions, and only 2.4 percent of all pedestrian injuries occurred on trails (Stutts and Hunter 1999). These studies indicate that the re-direction of pedestrians from the road shoulder to the shared-use path would result in an improvement in pedestrian safety within the project area vicinity.

While the implementation of either action alternative would result in an increase in visitors to the area, this increased use would not result in an unplanned effect upon, or alteration to, existing law enforcement, fire, and emergency medical services. Therefore, the proposed action would not cause an adverse effect on governmental services.

Cumulative Effects

Some of the projects listed in Table 4.1-1 have the potential to increase demand for fire protection, emergency medical, and law enforcement services. However, there are currently sufficient fire protection, law enforcement, and emergency medical facilities and staff for the Washoe County portion of the Lake Tahoe Basin (Washoe County 2010b) and therefore, no existing cumulatively adverse condition would occur. Neither of the proposed shared-use path alignments would contribute to an increase in the need for these services nor reduce levels of service. Therefore, the North Demonstration Project would not substantially contribute to an adverse cumulative effect related to law enforcement, fire protection, and emergency medical services nor cause a cumulatively adverse effect to occur.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C the shared-use path would not be constructed; therefore, there would be no direct or indirect effects on existing law enforcement, fire protection, and emergency medical services.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed; therefore, Alternative C would result in no contribution to potential cumulative effects related to law enforcement, fire protection, and emergency medical services.

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4.14 HAZARDS AND HAZARDOUS MATERIALS

This section describes the existing environmental conditions related to hazards and hazardous materials within the project area and evaluates potential public health hazards related to implementation of the North Demonstration Project, including Alternatives A, B, and C. A summary of applicable regulations under which the action alternatives would be implemented is provided in Appendix C. The following analysis focuses on the potential for project construction activities to expose the public and the environment to hazardous materials and related effects, and the project's potential to increase the exposure of persons to wildfire hazards. The potential for conflicts at roadway crossing locations is discussed in Section 4.9, "Traffic, Parking, and Transit." Section 4.13, "Public Services and Utilities," addresses the project's effect on demand and response times for fire protection, law enforcement, and emergency services.

As described in Chapter 3, "Alternatives," it is a goal of the project to construct a separated, shared-use path designed to meet the ADA and the AASHTO standards. AASHTO and ADA standards consider safety issues such as facility width, surface, slope, shoulders, and crossing design. As a result, user safety is incorporated into the shared-use path design and the long-term effects related to user safety are not discussed further in this section. Additionally, the project would not result in long-term effects to humans or the environment related to hazards or hazardous materials because operation of the shared-use path would not require the use, storage, transport, or disposal of hazardous materials.

Furthermore, long-term operations of the shared-use path would not interfere with emergency evacuation plans; rather, the path would be beneficial to emergency evacuation planning, because portions of the path itself could serve as an additional access route for fire and emergency response, as well as egress from Sand Harbor in the event of an emergency evacuation. Therefore, potential effects related to emergency access are focused on the construction period, and emergency access over the long-term is not discussed further.

4.14.1 AFFECTED ENVIRONMENT

HAZARDOUS MATERIALS IN THE PROJECT VICINITY

A search of the EPA EnviroMapper Database (2012) indicated the presence of nine hazardous waste generating facilities reporting to the EPA within 1 mile of the project boundaries. However, none of the facilities have a record of a significant violation or informal enforcement action related to hazardous materials within the last 5 years.

LAKE TAHOE GEOGRAPHIC RESPONSE PLAN

The Lake Tahoe Geographic Response Plan establishes the policies, responsibilities, and procedures required to protect life, environment, and property from the effects of hazardous materials incidents occurring within the Lake Tahoe watershed. The plan is generally intended to be used for oil spills or chemical releases that impact or could potentially impact drainages entering Lake Tahoe, Lake Tahoe itself, and its outflow at the Truckee River. It is both an operational plan as well as a reference document. The plan is consistent with federal, state, and local laws and is intended to facilitate multi-agency and multi-jurisdictional coordination in hazardous materials emergencies, particularly among local, state, and federal agencies (Lake Tahoe Response Plan Area Committee [LTRPAC] 2007).

WILDLAND FIRE HAZARDS

Because of excessive fire suppression activities in the 1900s, the forests of the Tahoe Basin are overstocked and at high risk for catastrophic wildfire, with the probability of such an event increasing every year (State of California 2008). In the 1990s, fire protection districts and agencies within the Basin began prescribed burning and fuel reduction projects. In 2006 the fire protection agencies within the basin developed a 10 year Multi-Jurisdictional Fuels Reduction and Fire Prevention Strategy (Nevada Division of Forestry [NDF] 2011). This plan comprehensively combined existing wildfire hazard reduction plans (prepared by federal, state and local government agencies), and Community Fire Protection Plans (developed by fire protection districts) and provided a framework for collaborative work. The devastating 2007 Angora fire on the south shore of the Basin reinforced the importance of these efforts.

Currently, all fire protection districts in the basin have prepared Community Wildfire Prevention Plans (CWPPs). In 2010 the Lake Tahoe Basin Fuel Reduction and Wildfire Prevention Strategy (FRWPS) was released. Both the CWPPs and the FRWPS stress the high risk of wildfire, particularly high intensity wildfire, in the Tahoe Basin and identify fuel reduction treatments as an important action for reducing the fire risk. As of 2009, all land within the project area managed by state and local governments had been treated for fuel reduction, with treatment of NFS lands planned for 2014 (NDF 2011). Fire suppression for the private and local jurisdiction land within the project area is provided by NLTFPD. NDF and NDSL are responsible for fuels management on state lands within the project area. LTBMU provides forest management and fire suppression for NFS lands within the project area (NDF 2011).

4.14.2 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

SIGNIFICANCE CRITERIA

Based on TRPA's Initial Environmental Checklist, the proposed action would result in an adverse hazards and hazardous materials effect if it would:

- involve a risk of explosion or the release of hazardous substances,
- create a health hazard or potential health hazard, or
- expose people to potential health hazards.

An environmental document prepared to comply with NEPA must consider the context and intensity of the environmental effects that would be caused by or result from the proposed action. The factors that are taken into account under NEPA to determine the significance of an action in terms of the context and the intensity of its effects are encompassed by the TRPA criteria used for this analysis.

METHODS AND ASSUMPTIONS

The following sources documenting potential hazardous conditions in the project area were reviewed for this analysis:

- preliminary plans for the North Demonstration Project alternatives;
- applicable elements and guidance from the Washoe County Master Plan (Washoe County 2010); TRPA Plan Area Statements 047, 049 and 055; and the Ponderosa Ranch Community Plan;
- Lake Tahoe Bicycle and Pedestrian Plan (TRPA 2010);
- North Lake Tahoe Fire Plan (NLTFPD 2004);
- EPA's EnviroMapper Database (EPA 2012); and
- Lake Tahoe Geographic Response Plan (LTRPAC 2007).

Impacts related to hazardous conditions as a result of implementation of the action alternatives were identified by comparing existing conditions and services in the project area against future hazards associated with project implementation.

EXPOSURE TO HAZARDOUS MATERIALS

ALTERNATIVES A AND B

Direct and Indirect Effects

Construction of the North Demonstration Project would involve the short-term use and storage of hazardous materials typical of a roadway or shared-use path construction project. If waste is generated from these materials, characterization will be done as needed to evaluate disposal options. All materials would be used, stored, and disposed of in accordance with applicable federal, state, and local laws including State of Nevada Occupational Safety and Health Administration (NEV-OSHA), and Nevada's Hazardous Waste Management Program regulations, as well as manufacturer's instructions. Transportation of hazardous materials on area roadways is regulated by the Nevada Highway Patrol. As described in the "List of Design Features" at the beginning of this document, a design feature has been incorporated into the project that includes preparation of a site-specific spill prevention plan that addresses hazardous materials use, storage, transport, and disposal and management and containment of hazardous materials in the event of a spill (Design Feature BMP-1). These protective regulations and measures incorporated into the project are sufficient to minimize risks associated with hazardous materials use such that a risk of explosion or the release of hazardous substances would be avoided. Therefore, Alternatives A and B would not create a health hazard to the public or the environment related to hazardous materials use.

Cumulative Effects

Like the proposed action, implementation of related projects listed in Table 4.1-1 could expose the public or the environment to risks associated with the use, storage, disposal, or transport of hazardous materials. However, the proposed project and related projects are subject to similar government regulations. Transportation of hazardous materials on area roadways is regulated by the Nevada Highway Patrol, while use, storage, and disposal of hazardous materials are regulated by NEV-OSHA and Nevada's Hazardous Waste Management Program. Compliance with these regulations would minimize the combined effect related to hazardous materials use. Therefore, the related projects in Washoe County portions of the Tahoe Basin (as listed in Table 4.1-1) as well as the North Demonstration Project would not result in adverse cumulative effects related to the use or transport of hazardous materials.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path would not be constructed and there would be no use, storage, or transport of hazardous materials associated with the project. Therefore, Alternative C would have no effects related to the spill or accidental release of hazardous materials.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed and there would be no use, storage, or transport of hazardous materials; therefore, Alternative C would not contribute to potential cumulative effects related to the spill of hazardous materials.

INCREASED EXPOSURE TO WILDFIRE HAZARD

ALTERNATIVES A AND B

Direct and Indirect Effects

Incline Village has a "high" potential ignition risk and has an "extreme" fire hazard rating. These ratings are primarily attributed to inadequate defensible space, combustible building materials, heavy fuels, and steep southwest facing slopes (NLTFPD 2004). While the risk of fire within the broader area is high, the majority of the project area has already received fuel reduction treatments (NDF 2011).

The creation of a new shared-use path would bring more people to the project area, which could increase sources of ignition (e.g., improperly extinguished cigarettes). However, implementation of Alternatives A and B would include removal/relocation of vegetation for construction of the shared-use path. In addition, once construction is complete, the agency responsible for operations and maintenance (see Chapter 3, "Alternatives," for a description of the O&M Plan) would oversee maintenance of the shared-use path, such as vegetation clearing, pavement sweeping, and removal of fallen. Vegetation removal for construction as well as maintenance of the shared-used path would minimize the extent of fire fuels in the immediate shared-use path corridor. Furthermore, areas where the proposed shared-use path would create new disturbance, would widen an existing trail, or otherwise improve an existing trail, could act as a fire break, which would reduce opportunities for a fire to spread. The study area is also sufficiently served with fire protection and emergency services by the NLTFPD (see Section 4.13, "Public Services and Utilities"). Thus, the proposed action would not result in an adverse effect related to the exposure of people to wildfires.

Cumulative Effects

The related projects listed in Table 4.1-1, as well as the North Demonstration Project, either Alternative A or B, have the potential to increase the exposure of people or structures to wildfire. However, projects in the Basin are required to be reviewed and approved by the appropriate fire protection district to ensure sufficient emergency response and fire protection measures (such as fire resistant roofs, defensible space, and adequate fire protection services) are included in the projects. Further, the vegetation removal for construction and maintenance of the proposed shared-use path, the potential for the path to act as a fire break, and the fire protection services provided by NLTFPD, NDF, and LTBMU reduce the project's potential to contribute to a cumulative increase in risks in the project area. Therefore, the related projects in the Washoe County portions of the Tahoe Basin (as listed in Table 4.1-1) as well as the North Demonstration Project would not result in adverse cumulative effects related to the risk of exposure to wildfires.

ALTERNATIVE C

Direct and Indirect Effects

Under Alternative C, the shared-use path would not be constructed and there would be no increased exposure of people or structures to wildland fires. Therefore, Alternative C would have no effects related to wildland fires.

Cumulative Effects

Under Alternative C, no shared-use path would be constructed and there would be no increased exposure of people or structures to wildland fires; therefore, Alternative C would result in no contribution to potential cumulative effects related to increased exposure to wildland fires.

5 SECTION 4(f) OF THE U.S. DEPARTMENT OF TRANSPORTATION ACT OF 1966

5.1 BACKGROUND

Section 4(f) of the Department of Transportation Act of 1966, a law applying only to agencies within the U.S. Department of Transportation (USDOT), states it is the policy of the federal government "that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites" (49 USC 303). Section 4(f) specifies that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site of national, State, or local significance located on public or private land, only if (USDOT 2013):

- There is no prudent and feasible alternative to using that land; and
- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use; or
- The FHWA determines that the use of the property, including measures to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant, will have a de minimis impact, as defined in 23 CFR 774.17, on the property.

The Section 4(f) "use" of a resource is defined and addressed in the FHWA Regulations at 23 CFR 774.17. "Use" is defined as:

> "Except as set forth in Sections 774.11 and 774.13, a 'use' of Section 4(f) property occurs: (1) when land is permanently incorporated into a transportation facility; (2) when there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose as determined by the criteria in Section 774.13(d); or (3) when there is a constructive use of a Section 4(f) property as determined by the criteria in Section 774.15."

In addition to Section 4(f), the Land and Water Conservation Fund Act (LWCFA) of 1965 established a funding source for federal acquisition of parks and recreational land, as well as matching grants for state and local governments for recreation planning, acquisition, and development. This Act is administered nationally by the National Park Service (NPS) and locally by NDSP. Section 6(f) of the LWCFA prohibits the conversion of land purchased with LWCFA funds to a use other than public recreation without NPS approval. All portions of the proposed shared-use path (under Alternatives A and B) south of the Rocky Point Subdivision are located on state-owned parcels (APNs 130-340-01 and 130-350-01) purchased with LWCFA funds and managed by NDSP. NDSP has been extensively consulted throughout the planning process and through the development of this document. Because the proposed shared-use path is consistent with public outdoor recreational use, the project would not conflict with the LWCFA, as confirmed by NDSP (see Appendix K).

5.2 PROGRAMMATIC APPROACH

Programmatic Section 4(f) evaluations are a time-saving procedural option for preparing individual Section 4(f) evaluations for certain uses of Section 4(f) property. Programmatic Section 4(f) evaluations are developed by the FHWA based on experience with many projects that have common design characteristics and circumstances related to Section 4(f). By applying a specific set of criteria, that include project type, degree of use, and impact, the evaluation of avoidance alternatives is standardized and simplified. An approved programmatic Section 4(f)

evaluation may be relied upon to cover a particular project only if the specific conditions in that programmatic evaluation are met.

FHWA has issued a programmatic ***Section 4(f) Statement and Determination for Independent Bikeway or Walkway Construction Projects***.

Before being adopted, all of the nationwide programmatic Section 4(f) evaluations were published in draft form in the *Federal Register* for public review and comment. They were also provided to appropriate federal agencies, including the U.S. Department of the Interior (USDOI), for review. Each programmatic Section 4(f) evaluation was reviewed by FHWA's Office of Chief Counsel for legal sufficiency.

5.2.1 CRITERIA FOR THE APPLICATION OF THE PROGRAMMATIC SECTION 4(F) STATEMENT AND DETERMINATION FOR INDEPENDENT BIKEWAY OR WALKWAY CONSTRUCTION PROJECTS

The North Demonstration Project qualifies as an independent bikeway or walkway project. The project's qualification, in accordance with FHWA criteria, is explained below.

- *This programmatic Section 4(f) determination is only applicable for independent bikeway or walkway construction projects, which require the use of recreation and park areas established and maintained primarily for active recreation, open space, and similar purposes.*

The North Demonstration Project is an independent, shared-use path that would affect public land owned by the State of Nevada, which is administered by NDSL and managed by NDOT and NDSP; federal land managed by the USFS, LTBMU; and land owned by Washoe County (i.e., ROW in the Rocky Point Subdivision). Depending on the final alignment and design of the path through the Rocky Point Subdivision, the project may also affect additional state-owned land managed by NDSL. Of the public land affected by the project, only the land south of the Rocky Point Subdivision within the Lake Tahoe Nevada State Park and managed by NDSP is established and maintained for recreation purposes. Lake Tahoe Nevada State Park meets the definition of a Section 4(f) resource. Because of the size and location of the affected NDSP parcels, there are no feasible alternatives that could avoid use of these parklands.

- *This programmatic determination is applicable only when the official having specific jurisdiction over the Section 4(f) property has given approval in writing that the project is acceptable and consistent with the designated use of the property and that all possible planning to minimize harm has been accomplished in the location and design of the bikeway or walkway facility.*

FHWA has consulted with officials from NDSP on the use of this programmatic determination and has submitted a letter to NDSP requesting concurrence. NDSP representatives have been regularly involved in the planning process for the North Demonstration Project. A written concurrence letter from NDSP is required before a Finding of No Significant Impact (FONSI) can be adopted by FHWA.

- *This programmatic determination does not apply if the project would require the use of critical habitat of endangered species.*
- *This programmatic determination does not cover the use of any land from a publicly owned wildlife or waterfowl refuge or any land from a historic site of national, State, or local significance.*
- *It also does not cover those projects where there are unusual circumstances (major impacts, adverse effects, or controversy).*
- *It is also required that a public agency be responsible for maintenance of the federally funded bikeway or walkway.*

The project would not require the use of critical habitat of endangered species or any land from a publicly-owned wildlife or waterfowl refuge; critical habitat is not present in the project vicinity (see Section 4.4, "Biological Resources"). The project would not require the use of land from a historic site of national, state, or local significance; cultural resources investigations have determined that no such resources are present in the project's Area of Potential Effect (see Section 4.8, "Archaeological and Historical Resources"). There are no unusual, adverse circumstances associated with any of the alternatives considered (see Sections 4.2 through 4.14). Finally, a public agency would be responsible for operations and maintenance of the shared-use path (see Section 3.4, "Long-Term Operations and Maintenance," in Chapter 3, "Alternatives").

- *This document does not cover bicycle or pedestrian facilities that are incidental items of construction in conjunction with highway improvements having the primary purpose of serving motor vehicular traffic.*

Because the North Demonstration Project is a separated, shared-use path that is not associated with a highway construction project and is outside the existing highway facility, the proposed project is consistent with this definition. The North Demonstration Project is generally consistent with the AASHTO, NDOT, TRPA, and Washoe County standards related to alignment and profile, surface material, drainage, and width for a two-way shared-use facility. Variances from these standards are necessary at a limited number of specific locations, as described in Chapter 3, "Alternatives." The North Demonstration Project would be accessible from controlled access points at several locations along its length, thereby connecting residential areas with developed and undeveloped recreation sites, such as public beaches, day-use state park facilities, and other recreational trails.

5.3 SECTION 4(f) FINDING

Having met the conditions established for its use, and pending receipt of written concurrence from NDSP, FHWA will apply the use of the ***Section 4(f) Statement and Determination for Independent Bikeway or Walkway Construction Projects*** for the North Demonstration Project.

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6 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

6.1 PUBLIC INVOLVEMENT

NEPA regulations and TRPA rules require public notification and scoping to determine the scope of the environmental analysis. The public scoping began with issuance of a Notice of Preparation and request for comments on September 21, 2011. The scoping period extended for 30 days, concluding on October 21, 2011. Public scoping included two public meetings; one meeting was held on October 5, 2011 at The Chateau Incline Village, 955 Fairway Boulevard, Incline Village, Nevada and a second meeting was held before TTD's Board on October 12, 2011 at the North Tahoe Conference Center, 8318 North Lake Boulevard, Kings Beach, California. Scoping notices were mailed to interested parties. The notices requested that comments and issues for consideration in the North Demonstration Project joint EA be submitted by October 21, 2011. Parties contacted in the scoping process included property owners within 500 feet of the proposed shared-use path alternatives, individuals requesting to be included on the distribution list for all things project related, and an extensive list of government, public, and community organizations maintained by the proponent and lead agencies. Additionally, a public notice was placed in the Tahoe Daily Tribune and North Lake Tahoe Bonanza. The Notice of Preparation was also filed with the Nevada and California State Clearinghouses on September 21, 2011. Additionally, some property owners within the Rocky Point Subdivision area were also contacted by TTD representatives to solicit input on the project. A copy of the Notice of Preparation is included in Appendix A of this EA.

Information on the Nevada Stateline-to-Stateline Bikeway may also be obtained at http://tahoetransportation.org. The link on TTD's website is a public outreach tool developed for the Nevada Stateline-to-Stateline Bikeway Project, providing information on how the public can get involved, when and where meetings and presentations will be scheduled, availability of documents, and answers to frequently asked questions. Components of the Nevada Stateline-to-Stateline Bikeway preliminary planning efforts (including documents such as the design principles, desired design parameters, opportunities and constraints evaluation, and feasibility study for the whole of the shared-use path) were also subject to their own public meetings and input.

A scoping report was prepared for the initial scoping process (Appendix A). The report summarizes comments received during the public scoping process and includes, in some cases, brief responses to those comments and cross-references the appropriate EA resource chapter/section where the comment was considered. The report identifies issues associated with the alternatives and was used by the FHWA and TRPA to determine areas in the EA where additional assessment, information, or clarification would be necessary.

6.2 EA PREPARERS

The following agency and non-agency persons contributed to the preparation of this EA.

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The following agency persons have contributed information that informed the EA process and/or the preliminary design plans used as the basis for the analysis in this EA.

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NEVADA STATELINE-TO-STATELINE BIKEWAY – WORKING GROUP

The following entities are indirectly involved with the project through sponsorship of the Nevada Stateline-to-Stateline Bikeway planning process and are participants in the Working Group.

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Bill Story ..... NDOT
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