

Appendix E

Noise Technical Report



Noise Study Report
State Route 89/Fanny Bridge Community Revitalization Project

Tahoe City, California

District 3-Marysville-State Route 89-Bridge #19-0033

California Department of Transportation, District 3

April 2014



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April 2014

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Summary of Findings

The Tahoe Transportation District, in coordination with Placer County, U.S. Forest Service –Lake Tahoe Basin Management Unit, Tahoe City Public Utility District, California Department of Transportation (Caltrans), and Federal Highway Administration is proposing improvements at and around the existing Fanny Bridge (Bridge #19-0033) across the Truckee River as part of a community revitalization effort.

The purpose of this noise study report (NSR) is to describe the existing noise environment in the project area and identify potential future traffic noise impacts associated with implementation of the State Route 89 (SR 89)/Fanny Bridge Community Revitalization Project (proposed project). The project area is located in the vicinity of Tahoe City, Placer County, California. In the Tahoe City area, SR 89 is primarily a two-lane roadway built to rural design standards. At the southwest end of the Tahoe City commercial area, SR 89 intersects with SR 28 at a signalized intersection locally referred to as the North Tahoe “wye.” The elevation of the project area ranges from approximately 6,235 to 6,250 feet above mean sea level. In general, the topography in the project area slopes moderately downward, from 2 to 9 percent from the outer perimeter of the influence area to the shoreline of Lake Tahoe.

This NSR, under the requirements of the Caltrans *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol), evaluates where traffic noise impacts may occur within the project area of the proposed project, potential noise abatement, and whether that abatement would be feasible. Specifically, for each receiver in the project area, this NSR describes existing and future predicted traffic noise levels for four new bridge alternatives along with two alternatives that replace and widen the existing bridge, and a no-build alternative. The four new bridge alternatives involve either reconstruction or rehabilitation of Fanny Bridge, construction of a new bridge across the Truckee River approximately 1,800 feet to the southwest, and construction on State Route (SR) 89 north of Granlibakken Road to the northwest of Fairway Drive and on SR 28 from just to the east of the SR 89 and SR 28 intersection to the SR 89 and SR 28 intersection. This NSR also addresses potential construction noise impacts associated with the proposed project.

The proposed project is scheduled to start in 2015.

The primary goal of the proposed project is to reduce congestion and improve the safety and operations of the SR 89/SR 28 intersection in Tahoe City, by addressing present and

future automobile travel demand, pedestrian and bicycle mobility, public transit needs, the structural integrity of Fanny Bridge, and emergency access to West Shore communities.

Alternative 1 would involve constructing a new alignment for SR 89 with a new wye at the east end of the Caltrans Maintenance Facility, and existing SR 89 would be open to local traffic only. Alternative 2 would involve constructing a new alignment for SR 89, to be located at the east end of the Caltrans Maintenance Facility, and would provide a roundabout at a new wye, closing existing SR 89 to vehicle traffic. Alternative 3 would involve constructing a new alignment for SR 89, to be located at the east end of the Caltrans Maintenance Facility, and would provide a roundabout at a new wye; existing SR 89 would be closed to vehicle traffic between the existing recreational parking access, and the Tavern Shores driveway would be turned into a cul-de-sac on the south side of the bridge. Alternative 4 is the same as Alternative 3, except that instead of a roundabout at a new wye, the intersection would be controlled with a traffic signal, and instead of a roundabout at the southern end of the 64-Acre Tract, a sweeping curve would be constructed. Alternative 6 would replace the existing Fanny Bridge with a wider structure with three northbound and two southbound travel lanes. The widened portion of the bridge would be constructed downstream of the existing structure, to comply with U.S. Bureau of Reclamation distance restrictions related to the dam. Under Alternative 6A, the existing Fanny Bridge would be replaced at its current location with a new, wider four-lane structure built to current Caltrans design and safety standards. Similar to Alternative 6, the additional 49 feet of width would be downstream of the existing structure. Under Alternative 5, the No-Build Alternative, the existing alignments would remain in place, and structural improvements would be addressed separately.

Existing land uses in the project area include residential, commercial, and open space areas including single-family residences, condominiums, tennis courts, swimming pools, a golf course, hotels, motels, restaurants, and U.S. Forest Service, California Tahoe Conservancy, and State Parks lands. Potential noise impacts were assessed by investigating the existing traffic noise conditions in the project area, identifying noise-sensitive locations, and predicting future traffic noise levels with and without the build alternatives. The noise receivers that were analyzed are located throughout the project area; 67 receiver points were evaluated, 30 representing hotels and motels within the project area, seven representing single-family residential units, 27 for commercial/governmental units, two for recreational areas, and one driveway.

Noise levels were measured at select receivers in the project area to identify existing background noise levels and validate the noise model. Loudest hour noise levels were modeled from the 67 modeled receiver locations; none of the receivers approached or exceeded the relevant equivalent continuous sound level (L_{eq}) of noise abatement criteria used by Caltrans and the Federal Highway Administration (FHWA). Tahoe Regional Planning Agency (TRPA) noise criteria are addressed in Appendix C. Existing noise sources in the project area include traffic on SR 89 and SR 28. In addition, commercial and recreational activities also contribute substantially to the existing noise environment. Existing peak-hour traffic noise levels at the identified receivers ranged between 38.2 dBA L_{eq} and 65.4 dBA L_{eq} . Existing peak-hour traffic noise levels at the Category B (Residential) receivers range between 39.2 dBA L_{eq} and 58.6 dBA L_{eq} .

Future predicted peak-hour traffic noise levels under the No-Build Alternative (2018) at identified receivers ranged between 39.9 dBA L_{eq} and 66.9 dBA L_{eq} . The future predicted peak-hour traffic noise levels for the year 2018 ranged between 37.7 dBA L_{eq} and 64.1 dBA L_{eq} under Alternative 1, between 36.7 dBA L_{eq} and 64.1 dBA L_{eq} under Alternative 2, between 38.6 dBA L_{eq} and 64.1 dBA L_{eq} under Alternative 3, and between 36.6 dBA L_{eq} and 64.2 dBA L_{eq} under Alternative 4. The future 2018 predicted peak-hour traffic noise levels under Alternatives 6 and 6A range from 39.4 dBA L_{eq} to 64.2 dBA L_{eq} and 39.1 dBA L_{eq} to 64.2 dBA L_{eq} , respectively.

Under the 2038 No-Build Alternative, future predicted peak-hour traffic noise levels at identified receivers ranged between 40.6 dBA L_{eq} and 67.2 dBA L_{eq} . The future predicted peak-hour traffic noise levels for 2038 ranged between 38.2 dBA L_{eq} and 64.4 dBA L_{eq} under Alternative 1, between 37.0 dBA L_{eq} and 64.4 dBA L_{eq} under Alternative 2, between 39.3 dBA L_{eq} and 64.1 dBA L_{eq} under Alternative 3, and between 37.1 dBA L_{eq} and 64.6 dBA L_{eq} under Alternative 4. The future 2038 predicted peak-hour traffic noise levels under Alternatives 6 and 6A range from 39.8 dBA L_{eq} to 64.6 dBA L_{eq} and 39.5 dBA L_{eq} to 64.6 dBA L_{eq} , respectively.

The build alternatives would create some noise level changes over No Build Alternative. The maximum increase associated with build alternatives would be 4.2 dB and 4.4 dB under Alternative 4 (2018), and Alternative 4 (2038), respectively, which is below the Caltrans definition of a substantial increase (12 dB).

Based on the Protocol and relevant noise abatement criteria used by Caltrans and the Federal Highway Administration, no noise abatement measures were proposed at any locations in the project area. The proposed project would not expose any locations to a

higher noise level under any of the build alternatives in 2018 and 2038, over the existing and the No-Build Alternative conditions. No noise abatement measures are evaluated in this report; therefore, preparation of a noise abatement decision report is not required.

Construction noise related to implementing the proposed project is anticipated to be typical of that for road construction. Some pavement breaking would be required; however, these activities would be temporary. Construction equipment noise may be audible at local receivers above the normal traffic noise. Night work would be required to maintain roadway operation for activities that would cross travel lanes. Nighttime construction noise would result in noise levels approximately 2 A-weighted decibels above the lowest measured ambient hourly noise level; however, these noise level increases would be temporary and would not represent a substantial increase in noise levels at local receivers. To minimize construction-related noise to the extent practical, Caltrans would implement the noise control measures described under construction noise abatement in Chapter 8, as part of standard contract requirements.

TRPA has adopted standards for noise, including single-event standards for aircraft and other motorized vehicles and standards for cumulative noise events measured in terms of the 24-hour average noise metric CNEL for various land use categories and transportation corridors. The changes associated with build alternatives over the No-Build Alternative would range between -21.5 and 8.5 dB. As with the 2018 No-Build Alternative, the primary cause of the noise level change would be the forecasted increases in traffic volumes. However, unlike with the No-Build Alternative, some noise level changes would be a result of the proposed SR 89 alignment under each build alternative. Impacts have been identified under all 2018 build alternatives. However, all the impacted receivers would exceed the TRPA “CNEL Standard” of 55 dBA CNEL under existing and the No-Build Alternative. Locations that would be impacted as a result of future improvements within the project area represent commercial/governmental land uses along SR 89, trails on the west side of SR 89, and an exterior hotel location on the east side of SR 89 south of the project area.

Because these receivers represent commercial/governmental areas, trails, and exterior hotel locations, use of barriers for mitigation of traffic noise impacts at these locations would not be feasible or reasonable because barriers would require substantial gaps to access numerous driveways and recreation areas along SR 89. Gaps or openings in a sound wall would compromise the barrier effectiveness. In addition, there would likely be aesthetic effects of constructing barriers along the SR 89 corridor as well as further limiting access to public lands. Therefore, no noise barriers were modeled for the

impacted receivers and it is determined that a barrier would not be feasible or reasonable. The use of noise-reducing paving materials along the project site appears to be a feasible means of achieving a 4 to 5 dB decrease in traffic noise and would reduce the potential for adverse public reaction to future traffic noise levels along the roadway.

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List of Abbreviated Terms

ADT	Average Daily Traffic
AADT	Annual Average Daily Traffic
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
dB	Decibel(S)
dBA	A-weighted Decibel(S)
FHWA	Federal Highway Administration
Hz	Hertz
IRRS	Interregional Road System Routes
LD820	Larson Davis Laboratories Model 820
L _{dn}	Day-Night Level
L _{den}	Day-Evening-Night Level
L _{eq}	Equivalent Continuous Sound Level
L _{eq(h)}	Equivalent Continuous Sound Level over 1 Hour
L _{max}	Maximum Sound Level
LOS	Level Of Service
LT	Long Term
L _{xx}	Percentile-Exceeded Sound Level
mPa	Micro-Pascal(S)
mph	Miles Per Hour
NAC	Noise Abatement Criteria
NADR	Noise Abatement Decision Report
NEPA	National Environmental Policy Act
NHS	National Highway System
NSR	Noise Study Report
Protocol	Caltrans's 2011 <i>Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects</i>
SEL	Sound Exposure Level
SN	Serial Number
SPL	Sound Pressure Level
SR	State Route
ST	Short Term
TCPUD	Tahoe City Public Utility District
TeNS	Caltrans's 2009 Technical Noise Supplement

TNM 2.5	FHWA Traffic Noise Model, version 2.5
TRPA	Tahoe Regional Planning Agency
USGS	U.S. Geological Survey

Chapter 1. Introduction

1.1. Purpose of the Noise Study Report

The purpose of this noise study report (NSR) is to evaluate noise impacts and abatement under the requirements of Title 23, Part 772 of the Code of Federal Regulations (23 CFR 772), “Procedures for Abatement of Highway Traffic Noise.” The NSR, however, also supports the noise impact analyses under CEQA, NEPA and the applicable TRPA ordinances. 23 CFR 772 provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. According to 23 CFR 772.3, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with Federal Highway Administration (FHWA) noise standards.

The Caltrans *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects* (Protocol) (Caltrans 2011) provides the California Department of Transportation’s (Caltrans’s) policy for implementing 23 CFR 772 in California. The Protocol outlines the requirements for preparing NSRs.

1.2. Project Purpose and Need

The purpose of the proposed project is to reduce congestion and improve the safety and operations of the SR 89/SR 28 intersection in Tahoe City, by addressing present and future automobile travel demand, pedestrian and bicycle mobility, public transit needs, the structural integrity of Fanny Bridge, and emergency access to west shore communities.

Degraded traffic operations along SR 89 within the project area during summer peak periods currently create an unacceptable Level of Service (LOS) “F” for northbound traffic. Some or all concepts developed by the proposed project may not improve LOS to levels normally considered acceptable to one or more agencies’ criteria. The project innately has physical and environmental constraints that limit LOS improvement; that is, roadway lane additions on SR 28 or SR 89 would not be feasible or advisable because the existing roadways around the north and west shorelines of Lake Tahoe are predominantly two-lane highways, and Caltrans’s plans do not envision adding vehicular lanes.

Also, connectivity of bike/pedestrian/transit facilities is lacking in the project area and across the Truckee River. Bike/pedestrian/vehicle conflicts occur at Fanny Bridge because of the proximity of bicycles and pedestrians to traffic lanes and pedestrians

crossing the highway. This adversely affects pedestrian and bicyclist safety, and causes vehicle operations to operate at an unacceptable LOS during peak summer hours. SR 89 bisects land managed by the U.S. Forest Service, limiting access to public land that fronts the lake adjacent to the project area.

Furthermore, intermodal connectivity is lacking between vehicles, transit, bicycles, and pedestrians. Insufficient parking and access exists for recreational activities and transit. The new bus transit center is expected to accommodate existing bicycle and pedestrian paths, but those paths have limited connections east across SR 89 to access Lake Tahoe and Tahoe City. Those path connections are limited as a result of SR 89 being the primary vehicular roadway circling the west side of the lake.

The seismic and structural rating of Fanny Bridge also has degraded. The structure has a bridge sufficiency rating of 52.7 and is classified as “structurally deficient.” Furthermore, the structure does not meet current seismic design standards and is vulnerable to failure in an earthquake. Structural improvements would be necessary even under the No-Build Alternative, as a separate project.

The proposed project is needed to eliminate typical summer northbound traffic queues on SR 89, formed by volumes exceeding roadway capacity at Fanny Bridge, which have been observed to result in queues exceeding 2 miles in length and delays exceeding 1 hour, typically occurring for 4–6 hours per day. Existing capacity is reduced by the presence of pedestrians and bicyclists, both along SR 89 and crossing Fanny Bridge.

Recent studies of the bridge have established that it is in need of replacement or retrofit. Opportunities to reduce dependence on automobiles, enhance the experience of pedestrians and bicyclists, improve public health and safety, achieve community plan goals, and benefit environmental conditions exists as well and could help achieve the thresholds envisioned by the TRPA.

The proposed action is intended to achieve the following objectives:

- Relieve existing congestion on SR 89 and improve vehicle mobility for commercial needs and a better resident and visitor experience.
- Improve traffic safety, traffic operations, and emergency access on SR 89 and SR 28, including the river crossing (Fanny Bridge) and associated intersections.

- Improve the connectivity, reliability, travel times, and operations of public transportation modal concepts, including the mobility and safety of bicyclists and pedestrians.
- Improve highway freight mobility and commercial access.
- Improve the structural integrity of the river crossing (Fanny Bridge), and resolve safety and community concerns about the cultural values related to the historic Fanny Bridge.
- Make public transportation more effective with better connectivity, reliability, and travel times.
- Provide two viable emergency evacuation routes from the Lake Tahoe west shore communities.
- Reduce vehicle emissions and improve stormwater treatment.
- Comply with Caltrans design standards.

Chapter 2. Project Description

2.1. Project Overview and Location

The project area is located in the immediate vicinity of Truckee River Bridge #19-0033 (locally known as the “Fanny Bridge”) in Tahoe City, on the North Shore of Lake Tahoe in Placer County. Fanny Bridge is currently the only vehicular bridge crossing over the Truckee River that provides access to the West Shore from the north. This bridge has one 12-foot vehicular travel lane in each direction, with a 5-foot shoulder on the west side, and a 3-foot shoulder and a 5-foot sidewalk on the east side. Figures 2-1 and 2-2 show the project area boundary and regional location.

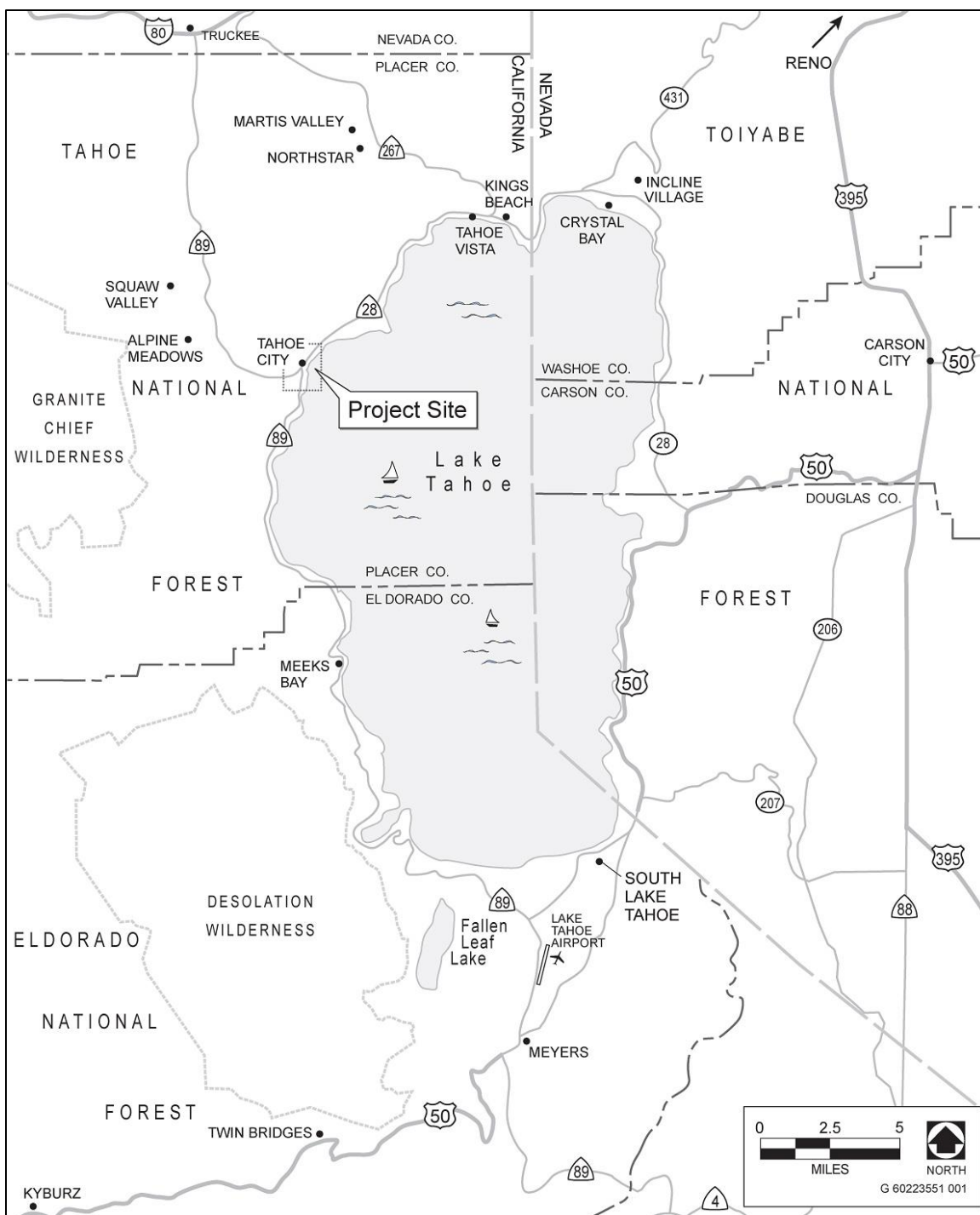
Pedestrians, cyclists, and drivers are put at risk by the existing conditions of Fanny Bridge, as well as traffic congestion heading into Tahoe City along State Route (SR) 89 and at the southwest end of town. Seasonal traffic volumes cause periodic gridlock and delays in both directions, discourage transit ridership, and inconvenience residents, visitors, and businesses. The SR 89/Fanny Bridge Community Revitalization Project (proposed project) would address these deficits.

There are seven project alternatives are being considered for implementation, consisting of six build and one no-build alternative (Alternative 5).

Four build alternatives (Alternatives 1 through 4) would result in the construction of a new bridge over the Truckee River and realignment of SR 89. Two build alternatives (Alternatives 6 and 6A) would replace and widen the existing Fanny Bridge and would maintain the existing SR 89/ SR 28 intersection location. The build alternatives address the project needs of improving seasonal traffic congestion and air quality, providing bike/pedestrian connectivity, improving transit operations, improving bicycle and pedestrian safety, and addressing the structural integrity of Fanny Bridge. By relieving congestion on SR 89, the project would improve vehicle mobility for commerce needs and for resident and visitor experiences. Alternatives 1 through 4 would also provide a second crossing over the Truckee River that would aid emergency evacuation from the west shore of Lake Tahoe.

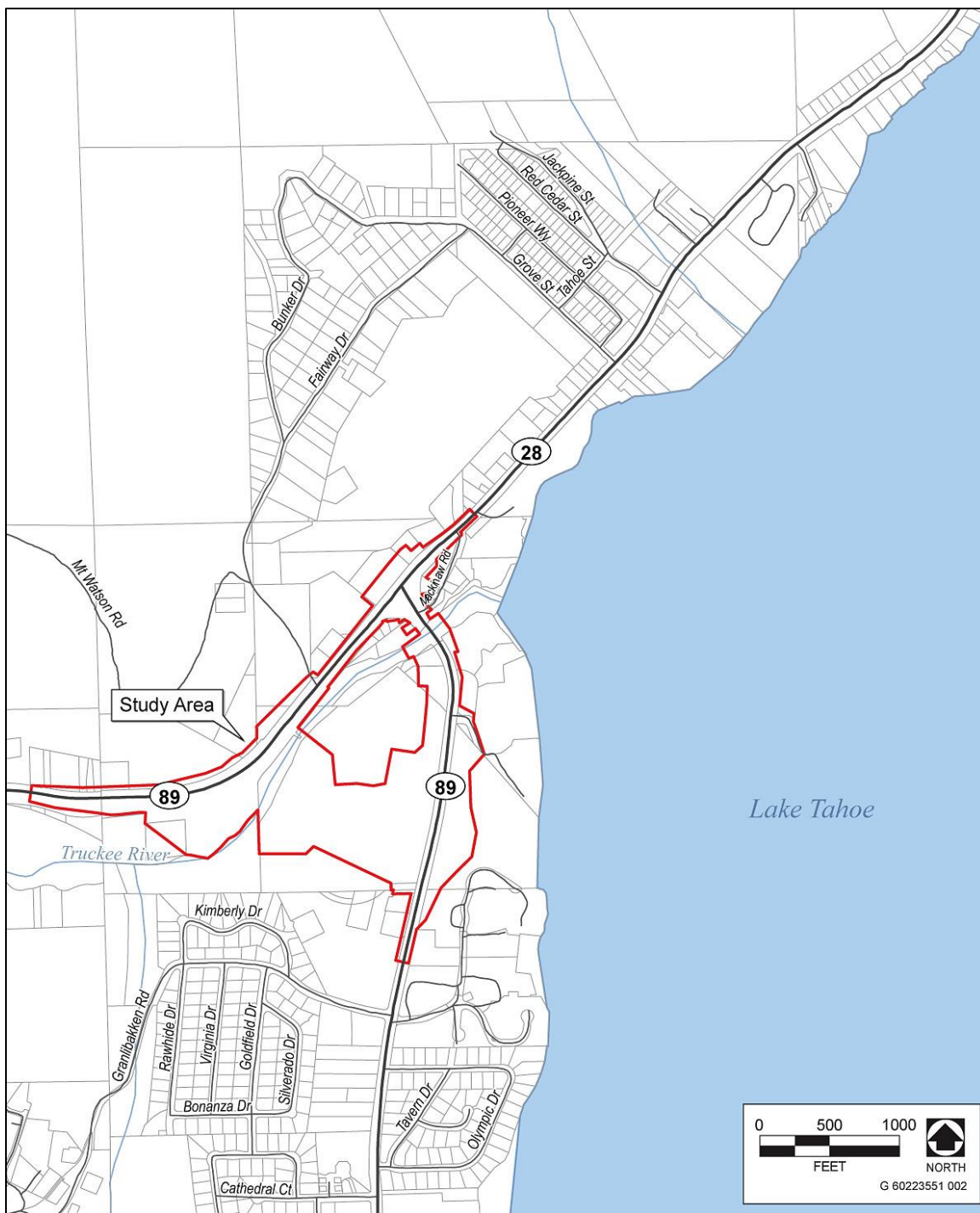
2.1.1. Project Elements Common to Alternatives 1 through 4

The four new bridge alternatives would include the realignment of SR 89 to a point approximately 1,800 feet southwest of the existing SR 89/SR 28 intersection (known as the “wye”). SR 89 would be realigned from the Caltrans Maintenance Facility, over the



Source: Data adapted by AECOM in 2014

Figure 2-1: Regional Location



Source: Data adapted by AECOM in 2014

Figure 2-2: Project Area Location

Truckee River and east through the U.S. Forest Service (USFS) 64-Acre Tract, to reconnect to existing SR 89 near the existing changeable message sign and sled hill. SR 28 would be extended from the existing wye to the new SR89/SR 28 intersection. A portion of the existing SR 89 would become a local road for approximately 2,000 feet south of SR 28, or would be re-constructed as a cul-de-sac. Alternatives 1 through 4 would include either reconstruction or rehabilitation of the existing Fanny Bridge and the potential removal of the free right-turn lanes at the existing wye.

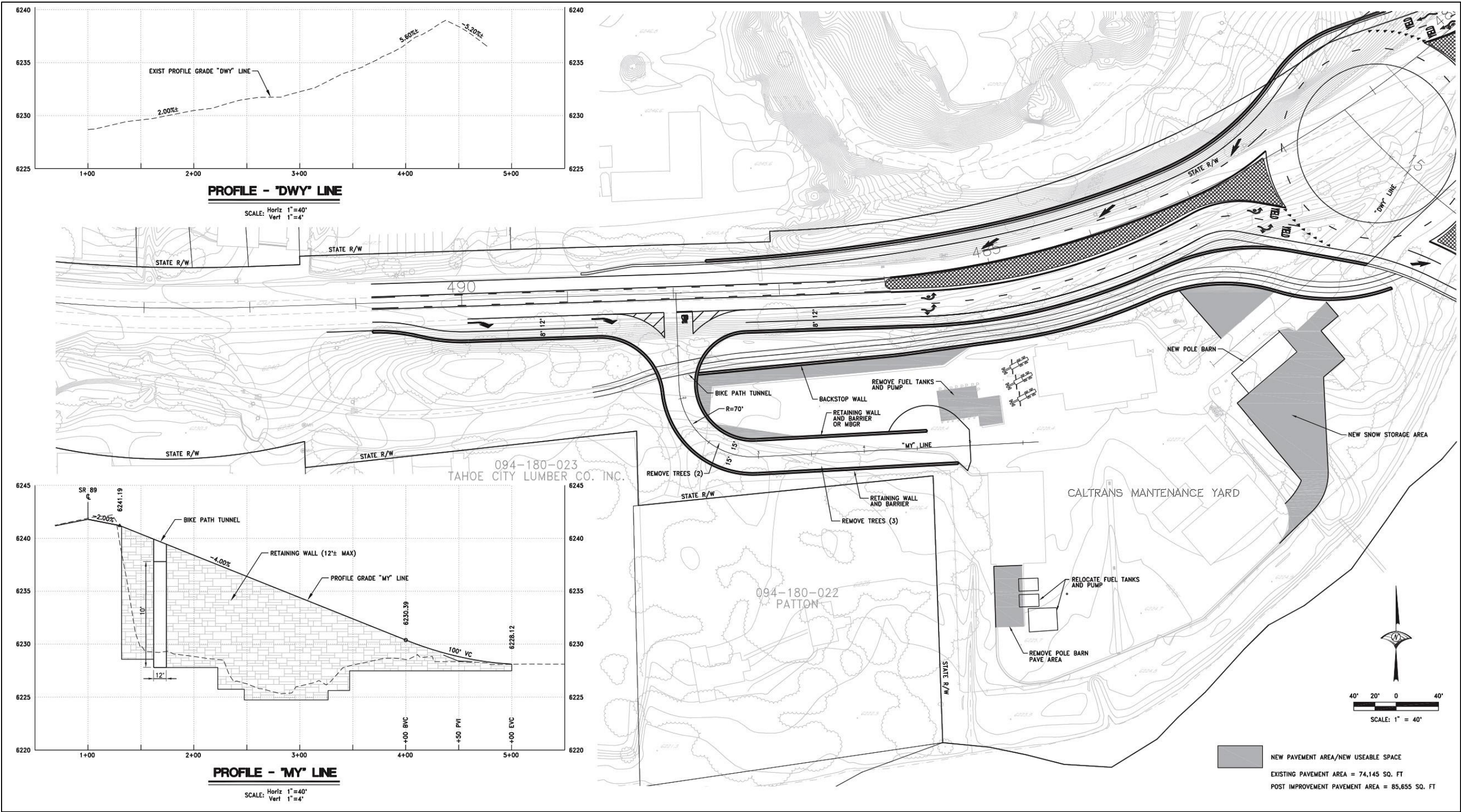
In addition to the roadway realignment, all of the new bridge alternatives would also include modification to the Caltrans Maintenance Facility; relocation of the Tahoe-Truckee Sanitation Agency (TTSA) sewer line beneath SR 89 near the Caltrans Maintenance Facility; and realignment of portions of the existing Class I bike paths on both sides of the Truckee River. The existing bike path would be rerouted over the new bridge and reconnected with existing bike paths in the 64-Acre Tract.

These common elements are described in more detail below.

NEW BRIDGE OVER THE TRUCKEE RIVER

A new bridge over the Truckee River would be located approximately 1,800 feet southwest of the existing Fanny Bridge. The bridge would have three 12-foot through-traffic lanes (one eastbound and two westbound) and 8-foot shoulders on each side. The bridge would include a separated Class I bike path on the west side for the Truckee River bike trail. The bike path would be separated from vehicular traffic with a concrete barrier and would be 10-feet wide with a 3-foot eastern shoulder and a 4-foot western shoulder. The width of the proposed bridge would range from 80 feet at the eastern abutment to 100 feet at the western abutment. The structure would widen on the western abutment, under Alternatives 1, 2, and 3, to accommodate the approach to the proposed western roundabout. The structure would use precast concrete girders and context sensitive railings would be constructed along each edge of the bridge. Aesthetic treatments would be included in the design and construction of the bridge to be compatible with the surrounding natural and human environments. A minimum 10 feet of clearance for non-motorized watercraft would be below the bridge under normal water level conditions, and 10 feet of clearance over the Tahoe Rim Trail on the eastern shore of the Truckee River.

Slope retaining structures with appropriate drainage would be constructed, as required, along the portions of SR 89 that would be widened.



Source: Wood Rodgers; Adapted by AECOM in 2014

Figure 2-3: Caltrans Maintenance Facility Configuration



Source: Data provided by Wood Rodgers and adapted by AECOM in 2014

Figure 2-4: Alternative 1—New Alignment – Existing SR 89 Open to Local Traffic Only



Source: Data provided by Wood Rodgers and adapted by AECOM in 2014

Figure 2-5: Alternative 2—New Alignment – Close Existing SR 89 to Vehicle Traffic



Figure 2-6: Alternative 3—New Alignment – Existing SR 89 Becomes a Cul-de-sac on the South Side of the Bridge



Source: Data provided by Wood Rodgers and adapted by AECOM in 2014

Figure 2-7: Alternative 4—New Alignment, No Roundabouts – Existing SR 89 Becomes a Cul-de-sac on the South Side of the Bridge

FANNY BRIDGE

Following construction of the new bridge, Fanny Bridge would either be rehabilitated or replaced with a new structure to address structural and seismic deficiencies. A replaced Fanny Bridge would be the same width as the existing bridge and have similar architecture. With the bridge no longer serving as a state highway, a replaced bridge would allow for reduced 11-foot lanes, and 3-foot shoulders. This would allow for a sidewalk to be added to the west (downstream) side of the bridge. Rock slope protection may be required to provide scour protection.

FREE RIGHT-TURN LANE MODIFICATIONS

Alternatives 1 through 4 would include three options for the existing free right-turn lanes at the existing SR 89/SR 28 intersection.

Option 1 – Parking Spaces

Under Option 1, the existing free right-turn lanes would be replaced with approximately 55 parking spaces. The landscaped median at the southeast corner of the intersection would be removed and replaced with a parking lot, and the existing free right-turn lanes would be restriped with parking spaces. The free right turns would be closed to through traffic, and all right turns would be directed through the signalized intersection.

Option 2 – Landscaping

Under Option 2, the free right-turn lanes would be replaced with expanded landscaping. The landscaped medians at the southeast and southwest corners of the intersection would be expanded to include the existing free right turns. All right turns would be directed through the signalized intersection.

Option 3 – Minor Modifications

Under Option 3, minor modifications would be made to the existing free-right-turn lanes. The lanes would be reduced to 13 feet. The existing landscaped medians would be expanded and pedestrian facilities in the area would be enhanced.

MODIFICATIONS TO THE CALTRANS MAINTENANCE FACILITY

Under Alternatives 1 through 4, the primary ingress and egress to the Caltrans Maintenance Facility (the Caltrans Tahoe City Maintenance Station) would be relocated from its current location at the northeastern end of the maintenance yard to a modified entrance at the western end (Figure 1-3). The profile of the new western entrance would be raised 10 feet higher than the existing conditions, and a wall would be constructed at the existing entrance to prohibit access. Fuel tanks, pumping facilities, and a pole barn would be demolished and relocated within the maintenance yard. In addition, the entire

area between the new driveway and SR 89 would be used as storage for snow or other materials.

The existing bike path would be realigned and a short tunnel would be constructed beneath the new entrance to accommodate bicycle traffic (i.e., through the embankment of the new entrance).

RELOCATION OF THE TAHOE TRUCKEE SANITATION AGENCY SEWER LINE

The Truckee River Interceptor (TRI) pipeline is a trunk sewer line that serves the North Tahoe Public Utility District, the Tahoe City Public Utility District (TCPUD), the Alpine Springs County Water District, the Squaw Valley Public Service District, and the Truckee Sanitary District. It is owned and operated by the TTSA. A portion of the TRI sewer line is located beneath the area of the proposed roundabout or intersection near the Caltrans Maintenance Facility and would require relocation.

Alternatives 1 through 4 would include installation of new manholes and relocation of the TRI sewer line, either beneath or around the western roundabout (or signalized intersection) at the western end of the new SR 89 alignment. Flow monitoring equipment would also be relocated to one of the new manhole locations. This relocation would be completed within existing disturbed areas (e.g., within roadway) and would be sized to maintain the existing flow capacity.

BIKE PATH REALIGNMENT

Portions of the existing Class I bike paths in the project area would be realigned as part of implementation of any of the new bridge alternatives, as described below.

SOUTH SIDE OF RIVER

Beginning at the “McClintock Building” on SR 89, north of Granlibakken Road, the existing bike path would turn west onto a new alignment for 580 feet. It would then rejoin the existing path and would continue toward the Truckee River. At the river, the path would shift closer to the river and would go underneath the new Truckee River Bridge before rejoining the existing path, near the existing recreational parking lot. The existing bike path, which runs parallel to SR 89 between the McClintock Building and the Tahoe City Transit Center (Transit Center), would remain. The segment of bike path along SR 89, between the Transit Center and Fanny Bridge, would be converted to sidewalk. Bicycles would be directed to use a new Class II bike lane on the existing SR 89, which would be relinquished by Caltrans and would be designated as a local Placer County road with implementation of the proposed project.

NORTH SIDE OF RIVER

Beginning east of the Tahoe City Lumber/Ace Hardware entrance on SR 89, the existing Truckee River Class I bike path would be shifted south towards the Caltrans Maintenance Facility and would go underneath the new Maintenance Facility driveway in a short tunnel through the driveway embankment. At the new Truckee River Bridge, the bike path would go over the new bridge and join the trail on the south side of the Truckee River near the Tahoe Rim Trail. The bike trail would be separated from vehicle traffic over the bridge to improve safety. The existing segment of trail between the new Truckee River Bridge and the existing pedestrian bridge would be demolished.

CONSTRUCTION TECHNIQUES

Alternatives 1 through 4 would incorporate the following construction techniques and practices.

In-Water Construction and Groundwater

Construction of any new bridges across the Truckee River would require dewatering for construction activities that would encounter groundwater, including: installation of the bridge footings and utility demolition, replacement, and protection. As necessary during construction, water-tight coffer dams would be installed temporarily to prevent scour and to maintain soil- and water-free footings, to allow for pile driving. After the footings were constructed, the coffer dams would be removed and the remaining portion of the bridge would be constructed from outside the Truckee River. The river bottom would be restored to its original condition and elevation when work within the river is completed.

Water pumped from excavation activities would contain suspended sediments and other solids, as measured by total dissolved solids. The suspended sediments would not be discharged directly into the Truckee River, stream environment zones (as defined by Tahoe Regional Planning Agency [TRPA]), wetlands (as defined by the U.S. Army Corps of Engineers [USACE]), or municipal storm drains. Filtration devices and systems would be provided to remove suspended sediments that were generated during dewatering activities. Pumped water would be discharged in compliance with all applicable laws and permit requirements. If any groundwater to be dewatered or any accumulated stormwater runoff contained elevated levels of regulated constituents, the contaminated water would be pumped and disposed at a permitted waste disposal facility meeting all applicable laws and regulations.

Utility work is expected to take several weeks to complete. Bridge footing work within the Truckee River is anticipated to take approximately 2 to 3 months and would be completed during the summer months.

Construction best management practices (BMPs) would be implemented, in compliance with all permits and Caltrans requirements.

Traffic Control Measures

Traffic control would be required during project construction, to minimize lane closure requirements, preserve access to businesses, and minimize travel delays. These strategies would be implemented in conformance with Caltrans and County standards as they would apply to each stage of construction. Rehabilitation or replacement of Fanny Bridge would require periods of reduced lane widths and lane closures on the existing bridge, and a short period of full bridge closure. Bridge closure would affect traffic and accessibility to and from the West Shore. The new Truckee River Bridge would be constructed prior to the construction on Fanny Bridge to allow for detour of traffic and to maintain a crossing over the Truckee River at all times. Closures could potentially be scheduled in late spring or early fall to reduce impacts on businesses, residents, and visitors during the summer peak season. However, this may not be feasible due to the short construction season within the Tahoe Basin (May 1 through October 15). As with Alternatives 1–4, emergency service providers would be notified about any planned lane closures and reduced lane widths, and a traffic management plan would be prepared to specify how emergency services would be provided during temporary closures. Traffic control measures would include: temporary signage, lane width reductions, reduced speeds, and detours over the new bridge.

2.1.2. Alternatives 1-4: New Bridge Alternatives Descriptions

While the components described above would be the same under each new bridge alternative, the configurations of the roadways and associated features would differ as described below.

ALTERNATIVE 1 – NEW ALIGNMENT – EXISTING SR 89 OPEN TO LOCAL TRAFFIC ONLY

Under Alternative 1, SR 89 would be realigned as a new two-lane segment of roadway that would cross through USFS's 64-Acre Tract. The western end of the new segment would begin at a new single-lane roundabout, which would serve as the new SR 89/SR 28 intersection. A new bridge over the Truckee River would be constructed immediately southeast of the roundabout on the new roadway segment. The new alignment would continue east and would reconnect to existing SR 89 at a single-lane roundabout near the existing changeable message sign and sled hill (see Figure 1-4). Retaining walls, 10 to 15 feet in height, would be required around the western roundabout because the roadway would need to be raised approximately 10 feet at the roundabout to provide sufficient clearance for the new bridge over the river. To implement Alternative 1, 4.117 acres

would have to be acquired for right-of-way (ROW); however, no businesses or residences would need to be relocated as a result of these acquisitions, and access would be maintained to all parcels affected by the alternative.

Fanny Bridge would be rehabilitated or replaced to address the existing structural deficiencies and resolve safety and community concerns related to the project objectives. The existing section of SR 89 between Fanny Bridge and the eastern roundabout would be relinquished to Placer County and would become a local street. Traffic calming and aesthetic features would be installed within this section of roadway (e.g., a reduced speed limit, bulb-outs, landscaped areas, raised landscaped median, on-street parking, sidewalks, street lighting, and benches). New parking or landscaping may replace the existing free right turns.

Alternative 1 would include signage to indicate to drivers the direction to Truckee, Tahoe City, and South Lake Tahoe. Signs would be placed near all entry points to the roundabouts. Signs for gas, food, lodging, public transportation, hiking trails, and other tourist amenities would direct travelers toward Tahoe City attractions and businesses. In addition, the entrance into the Transit Center would be realigned to allow for bus and vehicle access approximately 240 feet north of the eastern roundabout.

ALTERNATIVE 2 – NEW ALIGNMENT – CLOSE EXISTING SR 89 TO VEHICLE TRAFFIC

Under Alternative 2, the SR 89 realignment and signage would be the same as described under Alternative 1. Fanny Bridge would be rehabilitated or replaced to address the existing structural deficiencies and resolve safety and community concerns related to the project objectives. The existing section of SR 89 between Fanny Bridge and the new eastern roundabout would be relinquished to Placer County and would become a local street (see Figure 1-5). Similar to Alternative 1, under Alternative 2, 4.117 acres would have to be acquired for ROW; however, no businesses or residences would need to be relocated as a result of these acquisitions, and access would be maintained to all parcels affected by the alternative.

A new bridge, which would serve as the primary river crossing, would be constructed over the Truckee River near the east end of the Caltrans Maintenance Facility. Bollards would be placed to the north and south of Fanny Bridge to prohibit vehicular traffic. Access on this portion of the former SR 89 would be provided only for pedestrians, bicyclists, and emergency vehicles. New parking or landscaping may replace the existing free-right turns. Entry into the Transit Center would be allowed from the south only, at a point access approximately 240 feet north of the single-lane roundabout. Traffic calming

improvements similar to those described for Alternative 1 would be constructed on the street south of Fanny Bridge.

ALTERNATIVE 3 – NEW ALIGNMENT – EXISTING SR 89 BECOMES A CUL-DE-SAC ON THE SOUTH SIDE OF THE BRIDGE

Under Alternative 3, the SR 89 realignment and signage would be the same as described under Alternatives 1 and 2. Fanny Bridge would be rehabilitated or replaced to improve the existing structural integrity and resolve safety and community concerns related to the project objectives. The existing section of SR 89 between Fanny Bridge and the eastern roundabout would be relinquished to Placer County and would become a local street (see Figure 1-6). To implement Alternative 3, 4.6111 acres would have to be acquired for ROW; however, no businesses or residences would need to be relocated as a result of these acquisitions. Unlike Alternatives 1 and 2, Alternative 3 would affect access to several parcels, including the Tahoe Tavern Properties and the Bank of the West parcel.

A new bridge, which would serve as the primary river crossing, would be constructed over the Truckee River near the east end of the Caltrans Maintenance Facility. Access to Fanny Bridge would be available only from the north, via SR 28. A cul-de-sac would be constructed on the southern side of Fanny Bridge. The existing SR 89 would no longer allow access to Fanny Bridge from the south. It would provide access only to the Transit Center and would offer a secondary Truckee River crossing for emergency vehicles, if necessary. Buses would be allowed to enter the Transit center either from the cul-de-sac or the single-lane roundabout; vehicle entry to the Transit Center would be limited to the eastern roundabout.

New parking or landscaping may replace the existing free-right turns. The SR 89/28 intersection modifications and signage would be the same under Alternative 3 as described for Alternative 1 and 2.

ALTERNATIVE 4 – NEW ALIGNMENT, NO ROUNDABOUTS – EXISTING SR 89 BECOMES A CUL-DE-SAC ON THE SOUTH SIDE OF THE BRIDGE

Under Alternative 4, the SR 89 realignment would follow a similar alignment as described above under Alternative 1. However, the two-lane roundabout at the SR 89/SR 28 junction would be replaced with a traditional signalized intersection and a sweeping curve, diverting vehicles onto realigned SR 89, would replace the eastern roundabout (see Figure 1-7). To implement Alternative 4, 4.3756 acres would have to be acquired for ROW; however, no businesses or residences would need to be relocated as a result of these acquisitions. As under Alternative 3, access to several parcels from the south would be affected. Although

the changes in access would reduce traffic congestion adjacent to these parcels, access to and from the south would be much longer and less direct.

A new bridge, which would serve as the primary river crossing, would be constructed over the Truckee River near the east end of the Caltrans Maintenance Facility. Fanny Bridge would be rehabilitated or replaced to improve the existing structural integrity and resolve safety and community concerns related to the project objectives. Fanny Bridge and the existing section of SR 89 south of Fanny Bridge would undergo the same rehabilitation as described under Alternative 3.

The SR 89/SR 28 intersection modifications and signage would be the same under Alternative 4 as described under Alternatives 1, 2, and 3. Buses would be allowed to enter the Transit Center, either from the cul-de-sac or the single-lane roundabout; car entry to the Transit Center would be limited to the new entrance off of the realigned segment.

2.1.3. Alternative 5: No-Build Alternative

Alternative 5 is the No-Build Alternative. Under this alternative, no improvements would be made to SR 89, the SR 89/SR 28 intersection, or Fanny Bridge. Any actions required to address the bridge's structural deficiencies would not be completed by the Tahoe Transportation District (TTD). Another agency (such as Caltrans or Placer County) could pursue a separate bridge rehabilitation or replacement project, or gradual upgrades may be implemented through routine maintenance by Caltrans. Alternatively, Caltrans could declare a more stringent vehicle weight restriction. At this time, no specific improvements to the bridge are planned by Caltrans or another agency. Because no roadway improvements to improve traffic circulation or safety would be made under Alternative 5, no land acquisitions for ROW would occur under this alternative.

ALTERNATIVE 6 AND 6A: REPLACE AND WIDEN EXISTING BRIDGE

Under Alternatives 6 and 6A, the existing Fanny Bridge structure would be replaced with a wider structure and changes to the profile may be required. These alternatives would not include the project components described in Section 1.1.1, "Project Elements Common to Alternatives 1 through 4." Although construction of Alternative 6 or Alternative 6A would not affect the existing bicycle paths or other facilities in the 64-Acre Tract, access to the 64-Acre Tract on either side of SR 89 could be blocked temporarily during construction. If Fanny Bridge was closed during construction, as would be likely to occur at times, access to the 64-Acre Tract by vehicle would not be possible from the north. Access to bicycle paths would still be possible by using the existing pedestrian/bicycle bridge.

The following provides specifics related to Alternatives 6 and 6A.

ALTERNATIVE 6 – REPLACE AND WIDEN EXISTING BRIDGE, MODIFY LANE GEOMETRICS AT EXISTING WYE INTERSECTION

Alternative 6 would replace the existing Fanny Bridge with a wider structure having three northbound and two southbound travel lanes. The widened portion of the bridge would be constructed downstream from the existing structure, to comply with U.S. Bureau of Reclamation (Reclamation) distance restrictions related to the dam. Therefore, the new bridge would be 60 feet wider, and the centerline would be 28 feet downstream, as compared to the existing structure. The new Fanny Bridge would have 12-foot travel lanes, 8-foot shoulders, and 10-foot sidewalks on both sides. Under this alternative, the wye would remain in its existing location and configuration; however, the free right-turn lanes at the wye would be removed and would be replaced with right-turn lanes that would direct vehicles through the signalized intersection (Figure 2-8).

To implement Alternative 6, 0.4452 acre of ROW would be acquired; three of these acquisitions could require full take of property. Should full take be needed for the acquisitions, the total ROW acquired would be 1.879 acres. In addition, an existing structure on the Liberty Power parcel would have to be relocated within that parcel. Access would be maintained to all parcels affected by this alternative.

ALTERNATIVE 6A – REPLACE AND WIDEN EXISTING BRIDGE, INSTALL ROUNDABOUT AT EXISTING WYE INTERSECTION

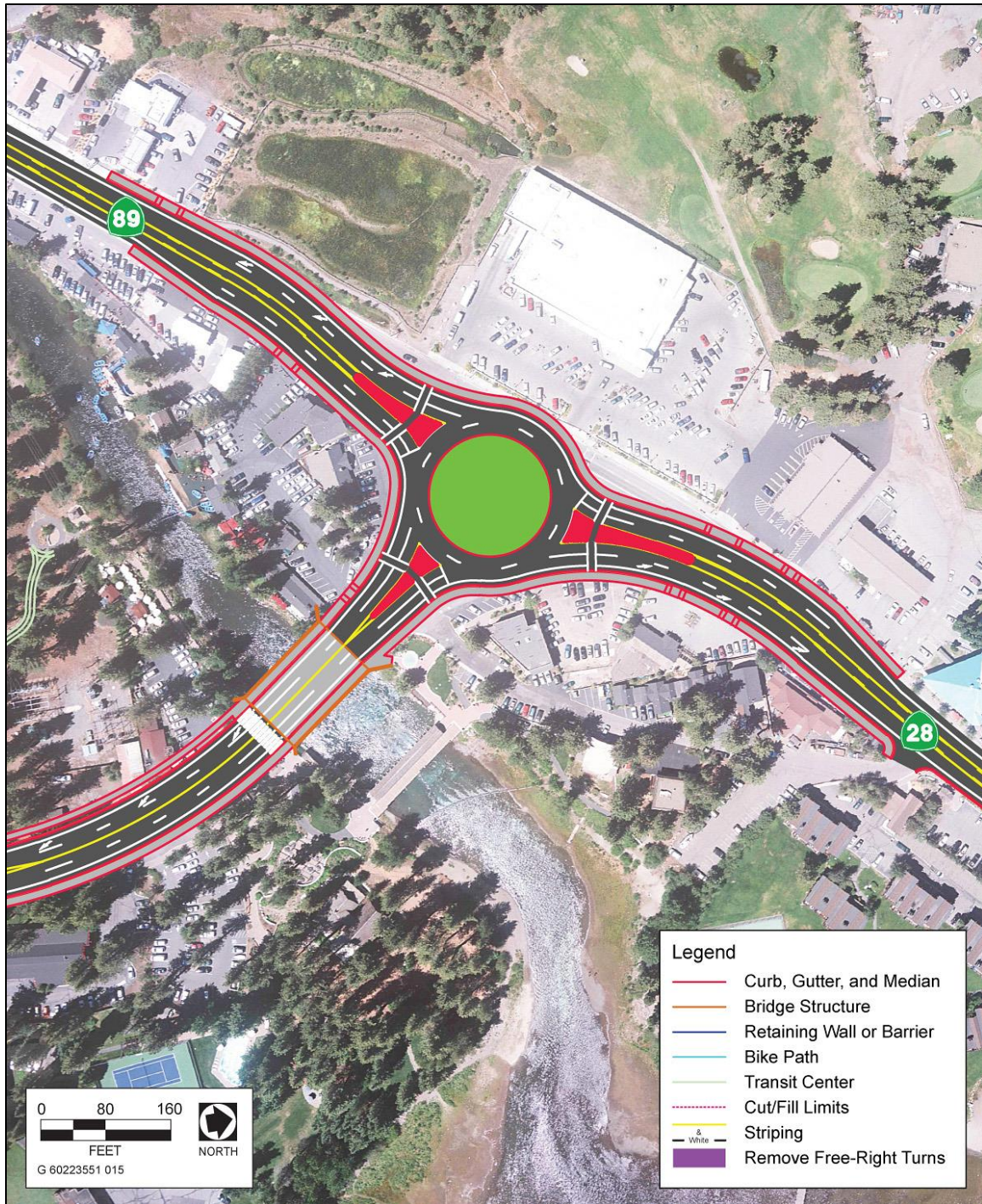
Under Alternative 6A, the existing Fanny Bridge would be replaced at its current location with a new, wider four-lane structure built to current Caltrans design and safety standards. Similar to Alternative 6, the additional 49 feet in width would be downstream from the existing structure. The centerline of the new bridge would be 22 feet downstream from the centerline of the existing bridge. The new Fanny Bridge would have 12-foot travel lanes, 8-foot shoulders, and 10-foot sidewalks on both sides. The existing signalized “wye” intersection would be replaced with a two-lane roundabout (Figure 1-9).

To implement Alternative 6A, 0.3645 acre of ROW would be acquired; two of these acquisitions could require full take of the property. Should full take be needed for the acquisitions, the total ROW acquired would be 1.0037 acres. In addition, as under Alternative 6, an existing structure on the Liberty Power parcel would have to be relocated within that parcel. Access would be maintained to all parcels affected by this alternative.



Source: Data provided by Wood Rodgers and adapted by AECOM in 2014

Figure 2-8: Alternative 6— Replace and Widen Existing Bridge, Modify Lane Geometrics at Existing Wye Intersection



Source: Data provided by Wood Rodgers and adapted by AECOM in 2014

Figure 2-9: Alternative 6A—Replace and Widen Existing Bridge, Install Roundabout at Existing Wye Intersection

Chapter 3. Fundamentals of Traffic Noise

This section discusses fundamental traffic noise concepts. For a more detailed discussion, please refer to Caltrans's Technical Noise Supplement (TeNS) (Caltrans 2009), a technical supplement to the Protocol that is available on the Caltrans Web site (http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf).

3.1. Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

3.2. Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High frequencies are sometimes more conveniently expressed in kilohertz, or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

3.3. Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.0000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of decibels (dB). The threshold of hearing for young people is about 0 dB, which corresponds to 20 mPa.

3.4. Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB; rather, they would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

3.5. A-Weighted Decibels

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Although the intensity (energy per unit area) of the sound is a purely physical quantity, the loudness or human response is determined by the characteristics of the human ear.

Human hearing is limited in the range of audible frequencies as well as in the way it perceives the SPL in that range. In general, people are most sensitive to the frequency range of 1,000–8,000 Hz, and perceive sounds within that range better than sounds of the same amplitude in higher or lower frequencies. To approximate the response of the human ear, sound levels of individual frequency bands are weighted, depending on the human sensitivity to those frequencies. Then, an “A-weighted” sound level (expressed in units of A-weighted decibels [dBA]) can be computed based on this information.

The A-weighting network approximates the frequency response of the average young ear when listening to most ordinary sounds. When people make judgments of the relative loudness or annoyance of a sound, their judgment correlates well with the A-scale sound levels of those sounds. Other weighting networks have been devised to address high noise levels or other special problems (e.g., B-, C-, and D-scales), but these scales are rarely used in conjunction with highway-traffic noise. Noise levels for traffic noise reports are typically reported in terms of A-weighted decibels or dBA. Table 3-1 describes typical A-weighted noise levels for various noise sources.

Table 3-1: Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

Source: Caltrans 2009

3.6. Human Response to Changes in Noise Levels

As discussed above, the doubling of sound energy results in a 3-dB increase in sound. However, given a sound level change measured with precise instrumentation, the subjective human perception of a doubling of loudness will usually be different from what is measured.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels when exposed to steady, single-frequency

(“pure-tone”) signals in the mid-frequency (1,000–8,000 Hz) range. In typical noisy environments, changes in noise of 1–2 dB are generally not perceptible. However, it is widely accepted that people are able to begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness. Therefore, a doubling of sound energy (e.g., doubling the volume of traffic on a highway) that would result in a 3-dB increase in sound would generally be perceived as barely detectable.

3.7. Noise Descriptors

Noise in our daily environment fluctuates over time. Some fluctuations are minor, but some are substantial. Some noise levels occur in regular patterns, but others are random. Some noise levels fluctuate rapidly, but others fluctuate slowly. Some noise levels vary widely, but others are relatively constant. Various noise descriptors have been developed to describe time-varying noise levels. The following are the noise descriptors most commonly used in traffic noise analysis.

Equivalent Continuous Sound Level (L_{eq}): L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level ($L_{eq[h]}$) is the energy average of A-weighted sound levels occurring during a 1-hour period and is the basis for noise abatement criteria (NAC) used by Caltrans and FHWA.

Percentile-Exceeded Sound Level (L_{xx}): L_{xx} represents the sound level exceeded for a given percentage of a specified period (e.g., L_{10} is the sound level exceeded 10 percent of the time, and L_{90} is the sound level exceeded 90 percent of the time).

Maximum Sound Level (L_{max}): L_{max} is the highest instantaneous sound level measured during a specified period.

Day-Night Level (L_{dn}): L_{dn} is the energy average of A-weighted sound levels occurring over a 24-hour period, with a 10-dB “penalty” applied to A-weighted sound levels occurring during nighttime hours between 10 p.m. and 7 a.m.

Community Noise Equivalent Level (CNEL) or Day-Evening-Night Level (L_{den}): Similar to L_{dn} , CNEL or L_{den} is the energy average of the A-weighted sound levels occurring over a 24-hour period, with a 10-dB penalty applied to A-weighted sound

levels occurring during the nighttime hours between 10 p.m. and 7 a.m. and a 5-dB penalty applied to the A-weighted sound levels occurring during evening hours between 7 p.m. and 10 p.m.

3.8. Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The manner in which noise reduces with distance depends on the following factors.

3.8.1. Geometric Spreading

Sound from a localized source (i.e., a point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source.

3.8.2. Ground Absorption

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective-wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 feet. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance.

3.8.3. Atmospheric Effects

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) from the highway because of atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects.

3.8.4. Shielding by Natural or Human-Made Features

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Natural terrain features (e.g., hills and dense woods) and human-made features (e.g., buildings and walls) can substantially reduce noise levels. Walls are often constructed between a source and a receiver specifically to reduce noise. A barrier that breaks the line of sight between a source and a receiver will typically result in at least 5 dB of noise reduction. Taller barriers provide increased noise reduction. Vegetation between the highway and receiver is rarely effective in reducing noise because it does not create a solid barrier.

Chapter 4. Regulatory Setting

This report focuses on the requirements of 23 CFR 772, as described below.

4.1. Federal Regulations

4.1.1. 23 CFR 772

This regulation provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. Under 23 CFR 772.7, projects are categorized as Type 1, Type 2, or Type 3 projects. FHWA defines a Type 1 project as a proposed federal or federal-aid highway project for the construction of a highway on a new location, or the physical alteration of an existing highway where there is either substantial horizontal or substantial vertical alteration, or increases the number of through-traffic lanes. A Type 2 project is a noise barrier retrofit project that involves no changes to highway capacity or alignment. A Type 3 project is a project that does not meet the classifications of a Type 1 or Type 2 project. Type 3 projects do not require a noise analysis.

Type 1 projects include the addition of through traffic lanes that function as high-occupancy vehicle lanes, high-occupancy toll lanes, bus lanes, or truck climbing lanes. Type 1 projects include the addition of an auxiliary lane (except when an auxiliary lane is a turn lane); addition or relocation of interchange lanes or ramps; restriping existing pavement for the purpose of adding a through-traffic lane or auxiliary lane; and the addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot, or toll plaza. Projects unrelated to increased noise levels, such as striping, lighting, signing, and landscaping projects, are not considered Type 1 projects. The proposed Project includes construction of highway in a new location, substantial horizontal alteration, and addition of traffic lanes as described under Alternatives 1 – 6A. Therefore, the proposed Project is categorized as a Type 1 Project according to 23 CFR 772.

Under 23 CFR 772.11, noise abatement must be considered for Type 1 projects if the project is predicted to result in a traffic noise impact. In such cases, 23 CFR 772 requires that the project sponsor “consider” noise abatement before adoption of the final NEPA document. This process involves identification of noise abatement measures that are reasonable, feasible, and likely to be incorporated into the project, and of noise impacts for which no apparent solution is available.

Traffic noise impacts, as defined in 23 CFR 772.5, occur when the predicted noise level in the design year approaches or exceeds the NAC specified in 23 CFR 772, or a

predicted noise level substantially exceeds the existing noise level (i.e., a “substantial” noise increase). 23 CFR 772 does not specifically define the terms “substantial increase” or “approach”; these criteria are defined in the Protocol (see Section 4.2.1 below)..

The NAC shown in Table 4-1 correspond to various land use activity categories. Activity categories and related traffic noise impacts are determined based on the actual land use in a given area.

Table 4-1: Activity Categories and Noise Abatement Criteria

Activity Category	Activity $L_{eq(h)}$, dBA	Evaluation Location	Description of Activities
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B ²	67	Exterior	Residential.
C ²	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F			Agriculture, airports, bus Facilities, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail facilities, retail facilities, ship facilities, utilities (water resources, water treatment, electrical), and warehousing.
G			Undeveloped lands that are not permitted.

Notes:

$L_{eq(h)}$, dBA = 1-hour equivalent continuous sound level, in A-weighted decibels

¹ The $L_{eq(h)}$ activity criteria values are for impact determination only and are not design standards for noise abatement measures.

² Includes undeveloped lands permitted for this activity category.

Source: Federal Highway Administration 23 CFR 772.

In identifying noise impacts, primary consideration is given to exterior areas of frequent human use. In situations where there are no exterior activities, or where the exterior activities are far from the roadway or physically shielded in a manner that prevents an impact on exterior activities, the interior criterion (Activity Category D) is used as the basis for determining a noise impact.

4.2. State Regulations and Policies

4.2.1. Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects

The Protocol specifies the policies, procedures, and practices to be used by agencies that sponsor new construction or reconstruction of federal or federal-aid highway projects. The NAC specified in the Protocol are the same as those specified in 23 CFR 772. The Protocol defines a noise increase as substantial when the predicted noise levels with project implementation exceed existing noise levels by 12 dB. The Protocol also states that a sound level is considered to approach an NAC level when the sound level is within 1 dB of the NAC identified in 23 CFR 772 (e.g., 66 dBA is considered to approach the NAC of 67 dBA, but 65 dBA is not) (Caltrans 2011).

The TeNS to the Protocol provides detailed technical guidance for the evaluation of highway traffic noise. This includes field measurement methods, noise modeling methods, and report preparation guidance (Caltrans 2009).

4.2.2. Section 216 of the California Streets and Highways Code

Section 216 of the California Streets and Highways Code relates to the noise effects of a proposed freeway project on public and private elementary and secondary schools. Under this code, a noise impact occurs if, as a result of a proposed freeway project, noise levels exceed 52 dBA 1-hour A-weighted equivalent continuous sound level ($L_{eq(h)}$) in the interior of public or private elementary or secondary classrooms, libraries, multipurpose rooms, or spaces. This requirement does not replace the “approach or exceed” NAC criterion for FHWA Activity Category D for classroom interiors, but it is a requirement that must be addressed in addition to the requirements of 23 CFR 772.

If implementing a project results in a noise impact under this code, noise abatement must be provided to reduce classroom noise to a level that is at or below 52 dBA $L_{eq(h)}$. If the noise levels generated from freeway and nonfreeway sources exceed 52 dBA $L_{eq(h)}$ prior to the construction of the proposed freeway project, then noise abatement must be provided to reduce the noise to the level that existed prior to construction of the project.

4.3. Local Regulations and Policies

4.3.1. Placer County Noise Element

The General Plan for Placer County (1994) contains policies governing noise related to development within Placer County, as identified below. The maximum allowable noise

exposure limits for transportation noise sources in Placer County are summarized in Table 4-2.

Table 4-2: Placer County Maximum Allowable Noise Exposure for Transportation Noise Sources

Land Use	Outdoor Activity Areas ¹	Interior Spaces	
	L _{dn} /CNEL	L _{dn} /CNEL	L _{eq} , dBA ²
Residential	60 ³	45	
Transient Lodging	60 ³	45	
Hospitals, Nursing Homes	60 ³	45	
Theaters, Auditoriums, Music Halls			35
Churches, Meeting Halls	60 ³		40
Office Buildings			45
Schools, Libraries, Museums			45
Playgrounds, Neighborhood Parks	70		

Notes:

CNEL = community noise equivalent level

¹ Where the location of outdoor activity areas is unknown, the exterior noise level standard shall be applied to the property line of the receiving land use.

² As determined for a typical worst-case hour during periods of use.

³ Where it is not possible to reduce noise in outdoor activity areas to 60 L_{dn}/CNEL or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dBA L_{dn}/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.

Source: Placer County General Plan, 1994.

4.3.2. Tahoe Regional Planning Agency

CODE OF ORDINANCES

Noise generated from construction activities is limited to between the hours of 8:00 a.m. and 6:30 p.m. on Monday through Saturday, based on Section 68.9 of the TRPA Code of Ordinances. Also, construction activities are prohibited on Sundays and federal holidays.

TRPA has adopted standards for noise, including single-event standards for aircraft and other motorized vehicles and standards for cumulative noise events measured in terms of the 24-hour average noise metric CNEL for various land use categories and transportation corridors. CNEL is the time varying noise over a 24-hour period, with a 5-dB weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10-dB weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). The standards, established in the Goals and Policies, apply to the entire Lake Tahoe Region. Table 4-3 summarizes thresholds for single events (L_{max}) and threshold for community noise events.

Table 4-3: TRPA Regional Plan Cumulative Noise Levels

Single Noise Events	Noise Measurement
Boats (not to exceed any of 3 tests)	82 dBA measured at 50 feet with engine at 3,000 rpm
	SAE test J1970 or SAEJ1970, Shoreline Test, 75 dBA (standard adopted 7/03)
	SAE Test J2005, Stationary Test, 88 dBA if watercraft manufactured on or after 1/1/93 and 90 dBA if watercraft manufactured before 1/1/93 (standard adopted 7/03)
Motor Vehicles (less than 6,000 pounds GVW)	76 dBA running at <35/mph (82 dBA running at >35/mph) measured at 50 feet
Motor Vehicles (greater than 6,000 pounds GVW)	82 dBA running at <35/mph (86 dBA running at >35/mph) measured at 50 feet
Motorcycles	77 dBA running at <35/mph (86 dBA running at >35/mph) measured at 50 feet
Off-road Vehicles	72 dBA running at <35/mph (86 dBA running at >35/mph) measured at 50 feet
Snowmobiles	82 dBA running at <35/mph measured at 50 feet
Community Noise Equivalent Levels: Background levels shall not exceed the following:	
Land Use Category	CNEL, dBA
High Density Residential	55
Low Density Residential	50
Hotel/motel facilities	55
Commercial area	65
Industrial	65
Urban Outdoor Recreation	55
Rural Outdoor Recreation	50
Wilderness and Roadless Areas	45
Critical Wildlife Areas	45
Policy Statement: It shall be a policy of the TRPA Governing Board in the development of the Regional Plan to define, locate, and establish CNEL levels for transportation corridors.	
Transportation¹	
U.S. 50	65 ⁽²⁾ dBA CNEL
State Routes 89 , 207, 28 , 267 and 431	55 ⁽²⁾ dBA CNEL
South Lake Tahoe Airport	60 ⁽³⁾ dBA CNEL

Notes:

CNEL = community noise equivalent level measurements are weighted average of sound level gathered throughout a 24-hour period; dB = decibels; dBA = A-weighted decibels; mph = miles per hour; rpm = revolutions per minute

¹ CNEL values for transportation corridor.

² This transportation corridor threshold overrides the land use CNEL thresholds and is limited to an area within 300 feet from the edge of the road.

³ This threshold applies to those areas impacted by the approved flight paths.

Source: Tahoe Regional Planning Agency Code of Ordinances 2012

CNEL levels are addressed in Appendix C.

GOALS AND POLICIES

The Goals and Policies document of the 1987 Regional Plan establishes an overall framework for development and environmental conservation in the Lake Tahoe region. Chapter II (Land Use Element) of the Goals and Policies document considers seven subelements, including the Noise subelement.

The Goals and Policies document presents the overall approach to meeting TRPA's environmental carrying capacity thresholds (thresholds) (see "Thresholds" below). The following goals and policies in the Noise subelement of the Goals and Policies are relevant to the project:

- **Goal 1. Single Event Noise Standards shall be attained and maintained.** People can be annoyed by a specific noise source. Thresholds were adopted that apply to aircraft, boats, motor vehicles, off-road vehicles, and snowmobiles to reduce impacts associated with single noise events.
 - **Policy 3:** Motor vehicles and motorcycles shall comply with the appropriate noise thresholds.
 - **Policy 6:** The plan will permit uses only if they are consistent with the noise standards. Sound proofing practices may be required on all structures containing uses that would otherwise adversely impact the prescribed noise levels.
- **Goal 2. Community noise equivalent levels shall be attained and maintained.** CNEL thresholds were adopted to reduce the annoyance associated with cumulative noise events on people and wildlife. In the Lake Tahoe Basin, the main sources of noise are attributed to the major transportation corridors and the airport. Therefore, the policies are directed towards reducing the transmission of noise from those sources. The CNEL thresholds will be attained upon implementation of the following policies.
 - **Policy 1:** Transmission of noise from transportation corridors shall be reduced. The noise associated with the transportation corridors can be decreased by reducing the number of trips and by installing mitigation measures. Trip reduction will be accomplished by the transit improvements identified in the Transportation Element. Ordinances will establish specific site design criteria for projects to help reduce the transmission of noise from the transportation

corridors. The design criteria will also be incorporated into the water quality and transportation improvement programs. The mitigation measures may include setbacks, earth berms, and barriers.

As a form of zoning, TRPA has divided the Lake Tahoe Region into more than 175 separate Plan Areas. For each Plan Area, a “Statement” is made as to how that particular area should be regulated to achieve regional environmental and land uses objectives. As part of each Statement, an outdoor CNEL standard is established based on the “Thresholds”.

TRPA has established noise standards in community noise equivalent levels (CNEL) measured in dBA over a 24 hour period. TRPA thresholds establish different limits for different uses. The noise limitations of Chapter 23 of the TRPA Code apply; however, the Community Plan Area Statement establishes equal or superior standards pursuant to the noise thresholds. Placer County will use the TRPA and CP rules for noise.

TRPA Thresholds are 65 CNEL for commercial areas, 55 CNEL for residential and urban recreation, and 55 CNEL for highway corridors. Based on CNEL values for transportation corridors, 55 dBA CNEL would be applied for SR 28 and SR 89, as also shown in Table 4-3. TRPA thresholds establish different limits for different uses. The noise limitations of Chapter 23 of the TRPA Code apply; however, the Community Plan Area Statement establishes equal or superior standards pursuant to the noise thresholds. Placer County will use the TRPA and CP rules for noise. The maximum cumulative noise equivalent levels for Tahoe City Community Plan area are as follows:

- Where applicable, a maximum 55 CNEL override for the Highway 28 and Highway 89 corridors is permissible.
- The maximum CNEL for Special Areas #3 and #4 and #5 is 55 CNEL.
- The maximum CNEL for all areas of the Community Plan except as noted in 1 and 2 above is 65 CNEL.

The maximum CNEL for Shorezone Tolerance Districts 4, 6 and 7 is 55 CNEL and the maximum for the lakezone is 50 CNEL.

Figure 3 of the Tahoe City Community Plan (attached in Appendix C of this report) shows Specials areas within the Community Plan Area Boundary. All the receivers studied under this project are located within Special areas 1 through 5. Therefore, based

on the CNEL standards of the Tahoe City Community Plan area, the threshold for all receivers would be considered as 55 dB CNEL.

Chapter 5. Study Methods and Procedures

5.1. Selection of Receivers and Measurement Sites

Preliminary selection of receivers for modeling and measurement was made based on the distance from roadway rights of way within the project area, aerial photographs of the project area, and an initial field visit. As stated in the Protocol, noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. Although all developed land uses are evaluated in this analysis, the focus is on locations of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common use areas at hotels/motels in the project vicinity. The geographical features of the project area relative to nearby existing land uses also were identified.

Five short-term (ST) noise measurement locations were selected to represent the major developed area within the project area along the existing portion of the project roadway segments. Two long-term (LT) measurement sites were selected to capture the diurnal traffic noise level pattern in the project area. The short-term measurement locations were selected to serve as representative modeling locations at noise sensitive areas. An additional 61 non-measurement locations were selected as modeling locations. In total, 67 receiver locations were modeled to represent the noise sensitive land uses in the project vicinity. The monitoring and modeled receiver locations are shown in Figure 5-1.

Receiver locations were then refined, based on the results of a field visit, maps, and photographic data. Modeled receiver placement focused on areas of frequent human use associated with residential units or recreational areas. Measurement points are identified as ST-01 through ST-05. ST-01 and ST-03 were used to calibrate the FHWA Traffic Noise Model, version 2.5 (TNM 2.5) relative to the distribution of traffic noise. The traffic counts were expanded to hourly volumes (multiplied by 4 to normalize the results to hourly values) and entered into TNM 2.5 for the monitoring site. All measurement points represented areas of frequent human use.

5.2. Field Measurement Procedures

A field noise study was conducted in accordance with recommended procedures in the Caltrans TeNS document (Caltrans 2009). The following is a summary of the procedures used to collect short-term and long-term sound level data.

5.2.1. Long-Term (LT) Measurement

Long-term (24-hour) noise measurements were taken to determine the loudest hour or period within the Project area. Two long term noise measurements were conducted; during the summer time and winter time, from Thursday July 5 through Friday July 6, 2012, and from Friday January 10 to Saturday January 11, 2014, respectively. The LT noise measurements were captured in 1-hour intervals to determine the loudest hour or hours. During the LT measurements, the sound level meter was unattended, and no traffic data were collected. The LT measurement was taken near the intersection of SR 89 and SR 28 at Tahoe Marina Lodge at 270 North Lake Boulevard (SR 28), 85 feet from the SR 28 centerline and at 55 West Lake Boulevard (South SR 89), 90 feet from the South SR 89 centerline. The locations of the long term noise measurements are shown in Figure 5-1.

5.2.2. Short-Term (ST) Measurements

Five short term (15-minute) noise measurements were conducted at representative receiver sites, classified as Activity Categories B, C, and E within the project area, on Thursday and Friday, July 5 and July 6, 2012, between 7:00 a.m. and 6:30 p.m. when traffic was free-flowing. The ST measurement locations are shown in Figure 5-1.

The following measurement procedures were utilized:

- calibrating the sound level meter;
- setting up the sound level meter at a height of 5 feet;
- commencing the noise monitoring;
- collecting site-specific data, such as date, time, direction of traffic, and distance from the sound level meter to the right-of-way;
- counting passing vehicles for a period of 15 minutes (vehicles were split into three categories: heavy trucks, medium trucks, and automobiles);
- stopping measurement after 15 minutes; and



Source: AECOM 2014

Figure 5-1: Noise Measurement and Receiver Locations

- calibrating the sound level meter.

Traffic on SR 28, SR 89 West, and SR 89 South was counted during the ST (15-minute) noise measurement. Traffic counts for the monitoring site are provided in Appendix A. Vehicles were classified as automobiles, medium-duty trucks, motorcycles, and buses. An automobile was defined as a vehicle with two axles and four tires, primarily designed to carry passengers. Small vans and light trucks were included in this category. Medium-duty trucks were defined as all cargo vehicles with two axles and six tires. Heavy-duty trucks were defined as all vehicles with three or more axles. The posted speed limit on the observed portions of SR 89 and SR 28 is 25 miles per hour (mph).

Because of the constant traffic flow on SR 89, the ST measurement intervals were sufficient to characterize hourly traffic noise levels. ST noise level measurements taken outside the loudest period were adjusted up to normalize the data to the loudest period, as defined by the 24-hour measurements. Detailed measurement data, including noise levels, observations, weather conditions, and field measurement logs, are provided in Appendix F. The results of the measurements are discussed in Section 6.2. Sound level meter setup and instrumentation are discussed below.

5.2.3. Instrumentation and Setup

Two sound level meters were used to measure existing noise in the project area. Larson-Davis Laboratories Model 820 (LD820) Type 1 sound level meters (serial number [SN] 820A1176 and SN 820A1298) were used, with the following parameters:

Filter:	A-weighted
Response:	Slow
Time History Period:	1 Second

Sound level meter calibration was checked with Larson-Davis CAL200 (SN 2876 and SN 1176) calibrators before and after use. Pre-measurement and post-measurement calibration results were within 0.1 dB, and no corrections were made to the results. For all noise measurements, the sound level meters were placed 5 feet above the existing ground level.

5.2.4. Meteorology

Wind and temperature measurements were made at the time of existing noise measurements because atmospheric conditions can cause noise levels to fluctuate by 10 dB or more at locations distant from the freeway. The fluctuations generally are less at closer distances. Wind and vertical temperature differentials cause the greatest

meteorological effects on noise levels and propagation. A vertical gradient of temperature or wind velocity can produce a vertical gradient of sound velocity, which can cause sound waves to refract or bend. Wind speeds averaged less than 4 mph during all measurements. The results of meteorological measurements are discussed further in Section 6.2.2.

5.2.5. Data Reduction

Noise-level data were captured in the sound level meters and then electronically transferred to a desktop computer using the Larson-Davis UTIL and the Larson-Davis 820 Utility programs. Average noise levels for each measurement were calculated, summing the time-energy products for each interval of measurement and converting them to the L_{eq} metric.

5.3. Methods of Predicting Traffic Noise Levels

Traffic noise levels were predicted using FHWA TNM 2.5. TNM 2.5 is a computer model based on two FHWA reports: FHWA-PD-96-009 and FHWA-PD-96-010 (FHWA 2004). Key inputs to the traffic noise model were the locations of roadways and vehicle volumes and speeds, by type of vehicle, shielding features (e.g., topography and buildings), existing walls, ground type, and receivers. Three-dimensional representations of these inputs were developed, using computer-aided design drawings, aerials, and topographic contours provided by Wood Rodgers, Inc.

Traffic calming and aesthetic features (e.g., reduced speed limit, bulb-outs, landscaped areas, raised landscaped median, on-street parking, sidewalks, street lighting, benches, etc.), would be installed within the roadways under study. However, the highest posted speeds along the studied segments of the roads were used to predict the loudest noise from these roadways traffic.

Traffic noise was evaluated under existing conditions, the 2018 and 2038 No-Build alternatives, and the 2018 and 2038 build alternatives. Summer peak traffic volumes under existing and 2018 and 2038 conditions were provided by Wood Rodgers, Inc. (2013) for input into the traffic noise model. The highest average traffic volumes on SR 89 and SR 28 were predicted to occur during the summer; therefore, summer peak-traffic volumes were used in the model. The model outputs were noise levels at the selected receiver points. Receivers at exterior locations and ground-floor windows were modeled 5 feet above the ground elevation.

5.4. Traffic Parameters

The TNM 2.5 model is sensitive to the volume of trucks on the roadway because trucks are louder than automobiles and therefore contribute disproportionately to traffic noise. Truck percentages on SR 89 and SR 28 were obtained from the *Caltrans Annual Average Daily Trucks on the California State Highway System* (Caltrans 2010). The vehicle distributions, speeds, and assumptions used to calculate noise levels for existing conditions, the future No-Build Alternative, and future build alternative (Alternatives 1–4, 6 and 6A) are presented in Table 5-1.

Table 5-1: Vehicle Distribution and Vehicle Speed

Roadway	Vehicle (percent)			Vehicle Speed (mph)		
	Automobiles	Medium Trucks	Heavy Trucks	Automobiles	Medium Trucks	Heavy Trucks
State Route 89	93	5	2	35	30	25
State Route 28	97	2	1	25	20	15

mph = miles per hour

Source: Caltrans 2010

Existing and future traffic volumes on all project area roadways were taken from the proposed project traffic report (Wood Rodgers 2013). Speeds were developed from posted speed limits, and measured using a speed radar during the field visit as well as by driving along the existing roads. Vehicle mixes for SR 89 and SR 28 were taken from the *Annual Average Daily Truck Traffic on the California State Highway System* (Caltrans 2012). Future traffic speeds and vehicle mixes on all project area roadways were assumed to be the same as those used for existing conditions. Traffic volumes used in the noise modeling for each scenario are provided in Appendix B.

5.5. Methods of Identifying Traffic Noise Impacts and Consideration of Abatement

Traffic noise impacts would occur at receiver locations where predicted 2018 and 2038 noise levels were at least 12 dB greater than existing noise levels, or where predicted 2018 and 2038 noise levels approached or exceeded the NAC for the applicable activity category. Where traffic noise impacts are identified, noise abatement would be considered for reasonableness and feasibility, as required by 23 CFR 772 and the Protocol.

Traffic noise impacts were also evaluated based TRPA and CEQA requirements as discussed in Appendix C. Traffic noise impacts were considered to occur at receiver locations where predicted 2018 and 2038 noise levels increases were at least +5 dB relative to ambient (no project) traffic noise levels of less than 60 dBA CNEL, a +3 dB increase relative to ambient levels of 60-65 dBA CNEL, and a 1.5+ dB increase relative to ambient levels above 65 dBA CNEL. These criteria are consistent with the Federal Interagency Committee on Noise (FICON) criteria established in 1992 (*Federal Agency Review of Selected Airport Noise Analysis Issues, FICON*, August 1992).

According to the Protocol, abatement measures are considered acoustically feasible if a minimum noise reduction of 5 dB at impacted receiver locations is predicted with implementation of the abatement measure. In addition, barriers should be designed to intercept the line of sight from the exhaust stack of a truck to the first tier of receivers, as required by the *Highway Design Manual*, Chapter 1100 (Caltrans 2007). Other factors that affect feasibility include topography, access requirements for driveways and ramps, presence of local cross streets, utility conflicts, other noise sources in the area, and safety considerations. The overall reasonableness of noise abatement is determined by considering factors such as the construction cost of the barrier, noise reduction design goal (a noise level reduction of 7 dB or more at one or more benefited receivers), and the viewpoints of benefited receivers (including property owners and residents of the benefited receivers).

The Protocol defines the procedure for assessing the reasonableness of sound barriers from a cost perspective. A cost-per-residence allowance is calculated for each benefited residence (i.e., residences that receive at least 5 dB of noise reduction from a sound barrier). The 2011 allowance is \$55,000 per benefited residence. Total allowances are calculated by multiplying the cost allowance per residence by the number of benefited residences.

Chapter 6. Existing Noise Environment

6.1. Existing Land Uses

SR 89 is a state highway that traverses north-south through the project area. Caltrans District 3's *SR-89 Transportation Concept Report* (TCR) (Caltrans 2001) categorizes SR 89 as a "two-lane conventional highway" from the El Dorado/Placer county line to Tahoe City. The SR 89 study corridor segment is functionally classified as a "Minor Arterial." The corridor is not a National Highway System (NHS) route, or a lifeline route. However, the corridor is officially designated as a "scenic route" and as an Interregional Road System Route (IRRS) (FHWA 2012; Caltrans 2012; California Highways 2004). Regionally, SR 89 begins in Mono County, north of the town of Topaz, and continues predominantly northward until reaching Interstate 5, near Mt. Shasta in Siskiyou County. To the north, SR 89 is the most direct all-weather road connecting the north Tahoe area to the Interstate 80 corridor and the Sacramento and San Francisco Bay areas; therefore, the route carries large traffic volumes through the Tahoe Basin. SR 89 also serves as a critical roadway for traffic circulation within the Tahoe Basin.

Within the project area, SR 89 generally is a two-lane arterial with left-turn pockets at major intersections. SR 89 has a traffic signal-controlled intersection with SR 28 and side-street stop-controlled intersections with Fairway Drive, Tahoe Tavern Road, 64-Acre Tract recreational access, and Granlibakken Road. Per Caltrans 2012 traffic count data, the SR 89 segment west of the wye intersection experiences an annual average daily traffic (AADT) of 11,700 vehicles and a peak-month average daily traffic (ADT) of 14,800 vehicles. SR 89, just south of Fanny Bridge, carries an AADT of 13,200 and a summer peak-month ADT of 22,300. The summer peak-month ADT on Fanny Bridge is approximately 70 percent higher than AADT demands.

SR 28 serves as a critical roadway for traffic circulation to and within the Tahoe Basin. Within the project area, SR 28 generally operates as a two-lane arterial with a continuous left-turn median lane. SR 28 intersects SR 89 at the signalized wye intersection, and intersects with Grove Street at a side-street stop-controlled intersection. The signalized wye intersection has dual through lanes on eastbound and westbound approaches and dual left-turn lanes on the westbound and northbound approaches. Per Caltrans 2012 traffic count data, the SR 28 segment east of the wye intersection experiences an AADT of 12,400 vehicles and a peak-month ADT of 17,000 vehicles.

The project area is bordered to the north and northwest by commercial properties, commercial strip malls, and a Save Mart grocery store (100 River Road). Beyond these properties are the Tahoe City Golf Course to the north and northeast and the TCPUD property to the northwest. To the east is the downtown area of Tahoe City, which is primarily commercial with intermixed residential properties, and also by Lake Tahoe. The project area is bordered to the south by storage spaces and an open park/wooded area. Mixed commercial and residential properties are located to the east of SR 89, and SR 89 is bounded to the west by an open park/wooded area. Further south, beyond the open park/wooded area, are mixed commercial and residential properties.

Downstream of Fanny Bridge is a pedestrian/bicycle bridge that is part of an overall trail system. However, it does not have the attraction of fish viewing, nor does it have any adjacent commercial activity, so it would not serve as a replacement for Fanny Bridge.

Developed and undeveloped land uses in the project area were identified through land use maps, aerial photography, and site inspection. Within each land use category, sensitive receivers were identified. Existing land uses in the project area include residential, commercial, and open space areas including single-family residences, condominiums, tennis courts, swimming pools, a golf course, hotels, motels, restaurants, and U.S. Forest Service, California Tahoe Conservancy, and State Parks lands.

6.2. Noise Level Measurements Results

The existing noise environment in the project area is based on ST and LT 24-hour traffic noise level measurements. Site visits and noise measurements were conducted on Thursday and Friday, July 5 and July 6, 2012 and Saturday January 10 to Sunday January 11 (see Appendix F for details). For each measurement location, the sound level meter was placed 5 feet above the existing ground elevation.

6.2.1. Long-Term Monitoring

Long term traffic noise level measurements were conducted to document the peak traffic noise hour. Long-term ambient noise measurements were conducted using a Larson Davis Model 820 Type 1 sound level meter (SN 1298) at two locations. Two LT noise level measurements were performed along the east and west sides of the wye, at Tahoe Marina Lodge at 270 North Lake Boulevard (SR 28), 85 feet from the SR 28 centerline and at 55 West Lake Boulevard (South SR 89), 90 feet from the South SR 89 centerline, respectively. The LT measurements were recorded from 3:30 p.m. on Thursday, July 5, 2012, to 3:30 p.m. on Friday, July 6, 2012, and from 4:00 p.m. on Friday, January 10, 2014 to 4:00 p.m. on Saturday, January 11, 2014. The LT noise monitoring locations are

shown in Figure 5-1. Long term noise measurements at location LT-01 show that traffic noise peaks during the 4:30 p.m. to 5:30 p.m. hour in summer time. Noise levels for LT-01 are consistent for most of the afternoon through evening hours, fluctuating by no more than 3 dB between 4:30 p.m. and 10:30 p.m., but a marked drop in noise levels occurs after 11:30 p.m. that continues over the early morning hours. Also, long term noise measurements at location LT-02 show that traffic noise peaks during morning between the hours of 8:00 a.m. to 9:00 a.m. in winter time. Noise levels for LT-02 are fluctuating from 3 dB to 8 dB during the day and evening hours of a winter weekend between 6:00 a.m. and 11:00 p.m., but a marked drop in noise levels occurs after 11:00 p.m. that continues to the early morning hour of 5:00 a.m. Summary of the continuous long term measurements are shown in Table 6-1 and Table 6-2 for summer time and winter time, respectively.

Table 6-1: Summary of LT-01, July 5 to July 6, 2012 (Summer)

Time	L _{eq} (dBA)	Difference from Loudest Hour (dB)
04:33 p.m.	58.9	4
05:33 p.m.	62.9	0
06:33 p.m.	58.7	4.2
07:33 p.m.	59.2	3.7
08:33 p.m.	58.9	4
09:33 p.m.	58.8	4.1
10:33 p.m.	57.0	5.9
11:33 p.m.	53.9	9
12:33 p.m.	52.4	10.5
01:33 a.m.	48.6	14.3
02:33 a.m.	49.2	13.7
03:33 a.m.	43.5	19.4
04:33 a.m.	43.0	4

Notes:

L_{eq} = energy-equivalent noise level; L_{max} = maximum noise level; SEL = sound exposure level

Bolded number indicates the loudest hour.

The anticipated 24 hour data were not recorded at LT-01 due to a memory shortage in the sound meter. However, the 13 hours of data gathered were deemed sufficient to capture the highest noise level in the project area. Because the measurement results are consistent with the project traffic report, which indicates that during the summer peak period from 11 a.m. to 5 p.m., the pedestrian and bicycle traffic activities in the project area are at their peak. Because of the presence of a large amount of pedestrian and bicycle traffic, vehicular traffic reacts by slowing down substantially; which results in lower sound levels. Also, since the project is in a recreational area, the traffic volume before 11a.m. is lower than the traffic volume in the afternoon to evening hours from 4:30pm to 10:30pm.

Source: Data compiled by AECOM in 2012

The LT noise measurement results presented in Table 6-1 are consistent with the project traffic report (Wood Rodgers 2012), which indicates that during the summer peak period from 11 a.m. to 5 p.m., the pedestrian and bicycle traffic activities in the project area are at their peak. The sidewalk adjacent to the northbound lane on Fanny Bridge is the most popular spot for pedestrians to watch fish. Because of the presence of a large amount of pedestrian and bicycle traffic adjacent to northbound SR 89, vehicular traffic on northbound SR 89 reacts by slowing down substantially. Substantial slowing down of vehicle traffic consequently results in lower sound levels.

Table 6-2: Summary of LT-02, January 10 to January 11, 2014 (Winter)

Time	L _{eq} (dBA)	Difference from Loudest Hour (dB)
16:00 p.m.	64.3	3.0
17:00 p.m.	63.1	4.2
18:00 p.m.	60.9	6.4
19:00 p.m.	58.8	8.5
20:00 p.m.	61.1	6.2
21:00 p.m.	59.0	8.3
22:00 p.m.	59.8	7.5
23:00 p.m.	59.1	8.2
0:00 a.m.	55.3	12.0
1:00 a.m.	54.2	13.1
2:00 a.m.	56.4	10.9
3:00 a.m.	46.8	20.5
4:00 a.m.	48.4	18.9
5:00 a.m.	54.8	12.5
6:00 a.m.	59.5	7.8
7:00 a.m.	62.6	4.7
8:00 a.m.	67.3	0.0
9:00 a.m.	62.3	5.0
10:00 a.m.	64.0	3.3
11:00 a.m.	66.4	0.9
12:00 a.m.	66.4	0.9
13:00 a.m.	67.1	0.2
14:00 a.m.	66.4	0.9
15:00 a.m.	66.1	1.2

Notes:

L_{eq} = energy-equivalent noise level; L_{max} = maximum noise level; SEL = sound exposure level

Bolded number indicates the loudest hour Noise Level.

Source: Data compiled by AECOM in 2014

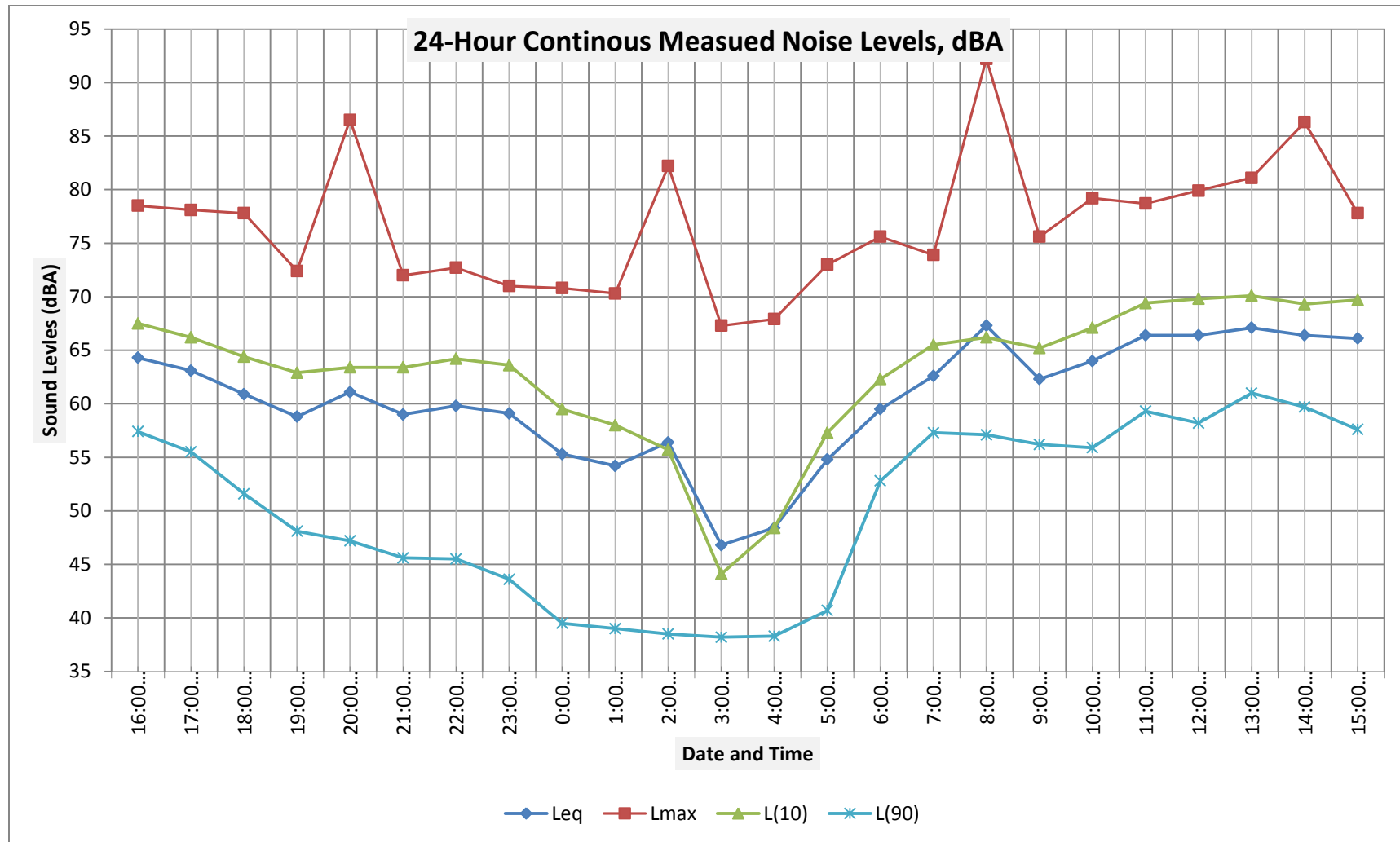
The peak noise levels at locations LT-01 and LT-02 are 62.9 dBA L_{eq} and 67.3 dBA L_{eq} , respectively. The LT-02 noise measurement results presented in Table 6-2 are representing noise levels at a noise sensitive land use closest to the intersection of SR 89 and SR 28, and during a weekend period in winter. This measurement was started in the afternoon of Friday (no rain) and continued to the afternoon of Saturday (snowing). The noise results at LT-02 show an increase of up to 3 dB during the rainy hours of morning and afternoon on Saturday comparing to afternoon hours of Friday. This increase could potentially be due to tire and wet pavement contact, which include splashing noise over the surface of the wet roads. The 3 dB increase during the Saturday hours could also be for increase in vehicular traffic flow due to winter recreation activities in the area. The graph for LT-02 noise measurement results are shown in Figure 5-2.

6.2.1. Short-Term Monitoring

The primary sources of noise in the project area are traffic on SR 89, SR 28, and local roadways. ST (15-minute) noise measurements were conducted to document existing noise levels at five representative receiver locations. Noise level measurements were conducted using Larson Davis Model 820 Type 1 sound level meter (SN 1176). Table 6-2 shows the results of the ST noise level measurements. ST noise measurements were taken between 1:00 p.m. and 6:30 p.m. at selected receivers and other points of interest in the project area (Figure 5-1). Weather conditions were clear and warm, 72 degrees Fahrenheit (°F) to 87°F, with a slight breeze of less than 10 mph each day. Table 6-3 shows summary of the noise monitoring results.

Because SR 89 is a continuous noise source, background noise (i.e., noise without the traffic noise from SR 89 or other local roadways) is not easily measured. However, based on a review of the detailed noise measurement data (provided in Appendix F), the background noise level may be estimated at less than 51 dBA L_{eq} , based on the L_{90} measurement (which represents the noise level exceeded 90 percent of the time during the measurement) at measurement sites ST-04 and ST-05. ST-04 would also represent the noise in the woods where currently there are not any roads, and, the new SR 89 alignment would pass through, under the proposed project. The ST noise measurements and the adjusted loudest hour for each location also are summarized in Table 6-3.

The dominant noise sources in the project area—traffic on major local roadways, such as SR 89 and SR 28—represented the main noise sources with a noticeable effect on the ambient noise levels. Smaller local roadways, including Fairway Drive, Tahoe Tavern



Source: Data compiled by AECOM in 2014

Figure 5-2: Long-Term Monitoring at Location LT-02, January 10–11, 2014

Table 6-3: Summary of Short-Term Measurements

Site ID ¹	Location or Address	Land Use	Distance	Day	Start Time	Duration	Measured (L _{eq(h)} , dBA)
ST-01	(Golf Course) 251 North Lake Boulevard, Tahoe City, CA 96145	Golf course	240 feet from SR28	7/6/2012	2:19 p.m.	15 minutes	53.6
ST-02	132 Mackinaw Rd, Tahoe City, CA 96145	Hotel/motel	180 feet from SR 28	7/5/2012	4:21 p.m.	15 minutes	53.4
ST-03	180 W Lake Blvd, Tahoe City, CA 96145	Pool	250 feet from SR 89 South	7/6/2012	1:09 p.m.	15 minutes	52.5
ST-04	411 Kimberly Dr, Tahoe City, CA 96145	Single-family residential	90 feet from Kimberly Drive	7/5/2012	6:13 p.m.	15 minutes	52.5
ST-05	264 W Lake Blvd, Tahoe City, CA 96145	Tennis court	100 feet from SR 89 South	7/5/2012	2:08 p.m.	15 minutes	53.8

Notes:

L_{eq(h)}, dBA = 1-hour equivalent continuous sound level, measured in A-weighted decibels¹ See Figure 5-1.

Source: Data compiled by AECOM in 2012

Road, 64-Acre Tract recreation area access, and Granlibakken Road, had limited traffic volumes and low speeds, which had a minor effect on ambient noise levels in the project area.

6.3. Noise Model Calibration

The purpose of model calibration is to “fine-tune” the prediction model to actual site conditions that are not adequately accounted for by the model. Calibration is performed by algebraically adding a constant, or K-factor, to the noise level calculated in TNM 2.5. The magnitude of K-factors initially is determined by the difference between measured and modeled noise levels at specific points. Calibration factors may be positive or negative. Additional factors may be applied, based on the experience and judgment of the noise engineer performing the analysis. Short-term sites ST-01 and ST-03 were used for model calibration of the two existing major roads; SR 28 and SR 89, respectively. ST-01 represents a noise sensitive land use that is directly exposed to SR 28, and ST-03 represents a noise sensitive land use that is exposed to SR 89. Other short term

measurements were not used for model calibration because of the existing of the intervening structures between the measurement location and the roadways. The result of the model run was compared to the measured ambient noise level to ensure the accuracy of TNM 2.5.

Section N-5400 of the TeNS, “Calibrating the Prediction Model,” provides guidance on the application of calibrations. Subsection N-5420 states, “highway reconstruction projects which significantly alter alignments and profiles of an existing highway are also poor candidates for model calibration.” Additionally, FHWA’s policy for TNM 2.5 states, “[n]o adjustments should be made for differences of less than 3 dB” (FHWA 2004). As shown in Table 6-4, the K-factors for ST-01 and ST-03 are 0.9 dB and 1.4 dB, respectively, therefore, no calibration factor was applied to the model results.

Table 6-4: Model Calibration

Monitor Number	Measured Noise Level (dBA L_{eq})	Modeled Noise Level (dBA L_{eq})	Measured minus Predicted (dB) (K-Factor)
ST-01	53.6	54.5	0.9
ST-03	52.5	51.1	1.4

Notes:

dBA = A-weighted decibels; L_{eq} = energy-equivalent noise level

Source: Data compiled by AECOM in 2012

6.4. Estimated Noise Levels for Existing Conditions

Existing summer peak traffic volumes obtained from the traffic study (Wood Rodgers 2013) were coded into TNM 2.5 with existing roadway conditions. The model input and output data for the existing conditions is provided in Appendix B. Noise levels were predicted at all receivers, including at ST measurement locations, using TNM 2.5 and various input parameters, as previously discussed. The results of the existing traffic noise modeling are shown in Table 6-5.

Existing noise sources in the project area include traffic on SR 89 and SR 28. In addition, commercial and recreational activities also contribute significantly to the existing noise environment. Existing peak-hour traffic noise levels at the identified receivers ranged between 38.2 dBA L_{eq} and 65.4 dB L_{eq} . Existing peak-hour traffic noise levels at the Category B (residential uses) receivers ranged between 39.2 dBA L_{eq} and 58.6 dBA L_{eq} . Among the 67 modeled receiver locations, none of the receivers approached or exceeded

Table 6-5: Existing Traffic Noise Levels, dBA L_{eq}

Receiver ID	Location	Type of Land Use	Activity Category NAC	Existing Conditions Estimated Noise Level (dBA L _{eq})
LT-01	Tahoe Marina Lodge, Mackinaw Rd	Driveway	--	59.7
R-01	255 N Lake Blvd	Hotel/Yard	E (72)	45
R-02	N Lake Blvd	Commercial	E (72)	49.5
R-03	Undeveloped/West of Save Mart	Commercial	E (72)	60.3
R-04	Fairway Dr	Commercial	E (72)	55.5
R-05	Fairway Dr	Commercial	E (72)	54.1
R-06	W River Rd	Governmental	E (72)	52.6
R-07	W River Rd	Commercial	E (72)	53.4
R-08	W River Rd	Commercial	E (72)	46.9
R-09	W River Rd	Residential	B (67)	58.6
R-10	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	47
R-11	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	41.4
R-12	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	42.1
R-13	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	38.2
R-14	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	43.5
R-15	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	43.2
R-16	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	49.9
R-17	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	48.2
R-18	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	50.3
R-19	Tahoe Marina Lodge, Mackinaw Rd	Hotel/Pool	E (72)	50
R-20	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	45.3
R-21	Mackinaw Rd	Commercial	E (72)	53.1
R-22	Mackinaw Rd	Commercial	E (72)	55.5
R-23	Mackinaw Rd	Commercial	E (72)	60.3
R-24	W Lake Blvd	Commercial	E (72)	62.6
R-25	W River Rd	Commercial	E (72)	59.6
R-26	W Lake Blvd	Commercial	E (72)	63.7
R-27	W River Rd	Commercial	E (72)	57.2
R-28	W River Rd	Commercial	E (72)	56.5
R-29	W River Rd	Commercial	E (72)	55.7
R-30	W River Rd	Commercial	E (72)	56.1
R-31	Tahoe Rim Trails	Commercial	E (72)	57.3
R-32	Tahoe Rim Trails	Trail	C (67)	53.4
R-33	Tahoe Rim Trails	Trail	C (67)	57.1
R-34	Tahoe Rim Trails	Trail	C (67)	49.1

Table 6-5: Existing Traffic Noise Levels, dBA L_{eq}

Receiver ID	Location	Type of Land Use	Activity Category NAC	Existing Conditions Estimated Noise Level (dBA L _{eq})
R-35	176 W Lake Blvd	Commercial	E (72)	65.4
R-36	Tahoe Tavern Rd	Commercial	E (72)	54
R-37	217 Tahoe Tavern Rd	Hotel	E (72)	46.3
R-38	217 Tahoe Tavern Rd	Hotel	E (72)	42.1
R-39	217 Tahoe Tavern Rd	Hotel	E (72)	46.3
R-40	217 Tahoe Tavern Rd	Hotel	E (72)	59.5
R-41	217 Tahoe Tavern Rd	Hotel	E (72)	47
R-42	217 Tahoe Tavern Rd	Hotel	E (72)	49.3
R-43	217 Tahoe Tavern Rd	Hotel	E (72)	54
R-44	217 Tahoe Tavern Rd	Hotel	E (72)	47.1
R-45	W River Rd	Governmental	E (72)	51.1
R-46	W River Rd	Governmental	E (72)	54.2
R-47	W River Rd	Governmental	E (72)	50.2
R-48	W River Rd	Residential	B (67)	49.7
R-49	W River Rd	Residential	B (67)	45
R-50	217 Tahoe Tavern Rd	Hotel	E (72)	40.3
R-51	217 Tahoe Tavern Rd	Hotel	E (72)	59.5
R-52	217 Tahoe Tavern Rd	Hotel	E (72)	41.7
R-53	217 Tahoe Tavern Rd	Hotel	E (72)	59.2
R-54	217 Tahoe Tavern Rd	Hotel	E (72)	56.8
R-55	217 Tahoe Tavern Rd	Hotel	E (72)	41.6
R-56	401 W Lake Blvd/Tahoe Tree Company	Commercial	E (72)	54.3
R-57	Kimberly Dr	Residential	B (67)	51.3
R-58	Kimberly Dr	Residential	B (67)	50.2
R-59	Kimberly Dr	Residential	B (67)	48.9
R-60	Kimberly Dr	Residential	B (67)	49.4
R-61	Kimberly Dr	Residential	B (67)	39.2
ST-01	N Lake Blvd	Golf Course	C (67)	58.2
ST-02	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	51.2
ST-03	217 Tahoe Tavern Rd	Hotel/Pool	C (67)	58.5
ST-04	411 Kimberly Dr	Residential	B (67)	49.7
ST-05	217 Tahoe Tavern Rd	Hotel/Tennis Court	C (67)	62.1

Notes:

dBA L_{eq} = equivalent continuous sound level, measured in A-weighted decibels; NAC = noise abatement criteria

Source: Data compiled by AECOM in 2012

the relevant equivalent continuous sound level (L_{eq}) NAC. Figure 5-1 shows the locations of the modeled receivers. Input and output data from the noise model run for existing conditions are provided in Appendix B.

Chapter 7. Future Noise Environment, Impacts, and Considered Abatement

7.1. Site Geometry and Traffic

Potential long-term noise impacts associated with project operations are solely from traffic noise. Traffic noise was evaluated for 2018 and 2038 traffic noise impacts. The proposed project was modeled using TNM 2.5. Using coordinates obtained from topographic maps, 67 receiver locations associated with existing single-family residences, pools, a golf course, hotels, motels, trails, commercial areas, governmental units, and vacant land were evaluated in the model.

Traffic noise levels were predicted for five 2018 and five 2038 alternatives: the No-Build Alternative, Alternative 1 (Figure 2-4), Alternative 2 (Figure 2-5), Alternative 3 (Figure 2-6), Alternative 4 (Figure 2-7), Alternative 6 (Figure 2-8), and Alternative 6A (Figure 2-9). Existing and future traffic volumes on all roadways within the project area were taken from the project traffic report (Wood Rodgers 2013). Speeds were developed from posted speed limits. Vehicle mixes for SR 89 and SR 28 were taken from the *Annual Average Daily Truck Traffic on the California State Highway System* (Caltrans 2013). The traffic mix used for West SR 89 was 94 percent automobile, 4 percent medium trucks, and 2 percent heavy trucks. The traffic mix used for South SR 89 was 93 percent automobile, 5 percent medium trucks, and 2 percent heavy trucks. Also, the traffic mix used for SR 28 was 96 percent automobile, 3 percent medium trucks, and 1 percent heavy trucks.

Future traffic speeds and vehicle mixes on all project area roadways were assumed to be the same as those used under existing conditions. The traffic parameters used for the modeling are discussed in detail in Section 5.4, and peak-hour traffic volumes developed from the project traffic report are provided in Appendix A.

Receiver and building locations and elevations were taken from topographic survey data provided by the noise analyst (AECOM 2012). Existing and future roadway geometric data were developed from project design drawings provided by the traffic engineer (Wood Rodgers 2013). Appendix B provides the model input and output sheets for both the No-Build alternatives and the 2018 and 2038 build alternatives.

7.2. Predicted Noise Levels (2018)

The predicted 2018 noise levels at the representative receiver locations within the project area were determined using 2018 summer peak-hour traffic volumes. The model input and output data for the 2018 No-Build Alternative (Alternative 5) and Alternatives 1- 4, 6 and 6A are provided in Appendix B. TRPA CNEL results are provided in Appendix C. Table 7-1 shows the 2018 traffic noise level results. The modeled future noise levels with the proposed project were compared to the modeled existing noise levels from TNM 2.5 to determine whether a substantial noise increase would occur. The modeled future noise levels with the project also were compared to the NAC under Activity Categories B, C, and E to determine whether a traffic noise impact would occur.

Table 7-1: Predicted Peak Noise Levels in 2018 under the No-Build and Build Alternatives

Receiver ID	Location or Address	Land Use ¹	NAC	No-Build	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 6	Alt. 6A
				(dBA L _{eq})						
LT-01	Tahoe Marina Lodge, Mackinaw Rd	Driveway	--	61.4	61.1	61.0	61.0	61.0	65.0	63.5
R-01	255 N Lake Blvd	Hotel/Yard	E (72)	46.7	46.0	45.8	45.9	45.8	48.1	48.1
R-02	N Lake Blvd	Commercial	E (72)	51.1	50.5	50.3	50.3	50.1	51.1	50.4
R-03	Undeveloped/ West of Save Mart	Commercial	E (72)	61.7	61.1	61.5	61.3	59.5	61.5	59.0
R-04	Fairway Dr	Commercial	E (72)	56.6	55.9	56.5	56.5	56.4	56.3	56.0
R-05	Fairway Dr	Commercial	E (72)	55.4	55.4	56.0	55.9	56.4	55.2	54.6
R-06	W River Rd	Governmental	E (72)	53.6	54.5	55.2	55.3	59.5	53.5	53.4
R-07	W River Rd	Commercial	E (72)	54.4	54.6	54.9	54.8	56.8	54.2	54.1
R-08	W River Rd	Commercial	E (72)	47.9	48.1	48.3	48.2	49.9	47.8	47.8
R-09	W River Rd	Residential	B (67)	59.6	59.6	59.7	59.6	59.8	59.6	59.6
R-10	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	48.7	48.3	48.3	48.3	48.3	49.9	49.6
R-11	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	43.0	42.3	42.1	42.2	42.1	43.3	43.3
R-12	Tahoe Marina Lodge,	Hotel	E (72)	43.6	40.6	40.0	40.4	40.9	41.5	40.7

Table 7-1: Predicted Peak Noise Levels in 2018 under the No-Build and Build Alternatives

Receiver ID	Location or Address	Land Use ¹	NAC	No-Build	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 6	Alt. 6A
				(dBA L _{eq})						
	Mackinaw Rd									
R-13	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	39.9	39.5	39.4	39.4	39.4	40.3	40.9
R-14	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	45.1	43.8	43.4	43.6	43.9	44.7	44.0
R-15	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	44.9	44.5	44.4	44.4	44.4	45.5	45.7
R-16	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	51.4	47.6	44.8	46.1	45.9	47.6	45.9
R-17	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	49.8	46.6	44.0	45.2	45.4	46.4	44.8
R-18	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	51.8	47.3	45.8	47.1	46.9	48.8	48.2
R-19	Tahoe Marina Lodge, Mackinaw Rd	Hotel/Pool	E (72)	51.6	48.6	46.1	47.2	47.4	48.4	47.1
R-20	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	46.9	44.9	44.1	44.5	44.5	45.7	45.4
R-21	Mackinaw Rd	Commercial	E (72)	54.7	52.7	50.6	51.4	51.2	53.3	52.3
R-22	Mackinaw Rd	Commercial	E (72)	57.0	53.6	50.5	52.1	51.9	53.4	52.3
R-23	Mackinaw Rd	Commercial	E (72)	62.0	60.8	59.7	59.9	59.4	61.6	58.6
R-24	W Lake Blvd	Commercial	E (72)	64.2	62.7	60.2	60.1	59.1	63.2	59.8
R-25	W River Rd	Commercial	E (72)	60.9	60.0	60.7	60.6	59.5	60.6	58.6
R-26	W Lake Blvd	Commercial	E (72)	65.3	62.4	57.9	59.8	59.9	63.2	61.6
R-27	W River Rd	Commercial	E (72)	58.7	55.7	52.6	54.5	54.7	56.1	54.0
R-28	W River Rd	Commercial	E (72)	58.0	55.1	53.1	54.1	54.4	55.9	52.7
R-29	W River Rd	Commercial	E (72)	57.2	55.0	54.7	55.0	55.4	55.6	53.6
R-30	W River Rd	Commercial	E (72)	57.5	55.7	56.0	56.1	56.2	56.6	55.4
R-31	Tahoe Rim	Commercial	E (72)	58.9	56.6	54.4	55.3	55.2	57.0	55.0

Table 7-1: Predicted Peak Noise Levels in 2018 under the No-Build and Build Alternatives

Receiver ID	Location or Address	Land Use ¹	NAC	No-Build	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 6	Alt. 6A
				(dBA L _{eq})						
	Trails									
R-32	Tahoe Rim Trails	Trail	C (67)	54.7	53.4	53.6	54.3	55.0	53.7	52.9
R-33	Tahoe Rim Trails	Trail	C (67)	58.0	58.4	59.3	59.2	62.0	58.1	57.4
R-34	Tahoe Rim Trails	Trail	C (67)	50.3	57.1	58.3	58.2	58.0	49.9	49.5
R-35	176 W Lake Blvd	Commercial	E (72)	66.9	62.9	58.7	61.5	61.4	61.4	60.9
R-36	Tahoe Tavern Rd	Commercial	E (72)	55.4	51.0	49.6	53.5	53.4	54.3	54.2
R-37	217 Tahoe Tavern Rd	Hotel	E (72)	47.7	44.2	43.6	42.8	42.7	47.1	47.0
R-38	217 Tahoe Tavern Rd	Hotel	E (72)	43.8	40.4	39.9	40.0	39.5	43.0	42.8
R-39	217 Tahoe Tavern Rd	Hotel	E (72)	47.7	44.5	43.8	43.6	43.5	46.5	46.2
R-40	217 Tahoe Tavern Rd	Hotel	E (72)	61.0	56.1	54.4	57.2	57.2	59.2	58.9
R-41	217 Tahoe Tavern Rd	Hotel	E (72)	48.4	45.4	44.5	43.8	43.6	48.0	47.9
R-42	217 Tahoe Tavern Rd	Hotel	E (72)	50.8	48.4	45.5	46.6	46.9	47.6	45.9
R-43	217 Tahoe Tavern Rd	Hotel	E (72)	55.3	50.4	48.8	55.3	55.4	54.0	53.8
R-44	217 Tahoe Tavern Rd	Hotel	E (72)	48.3	46.5	45.9	44.2	44.7	48.1	48.1
R-45	W River Rd	Governmental	E (72)	52.1	52.9	53.3	53.1	55.8	52.1	52.0
R-46	W River Rd	Governmental	E (72)	55.2	55.2	55.4	55.3	56.1	55.2	55.2
R-47	W River Rd	Governmental	E (72)	51.2	51.3	51.5	51.3	51.6	51.2	51.1
R-48	W River Rd	Residential	B (67)	50.7	50.9	51.2	51.1	52.8	50.7	50.6
R-49	W River Rd	Residential	B (67)	46.0	46.1	46.6	46.5	48.8	45.9	45.7
R-50	217 Tahoe Tavern Rd	Hotel	E (72)	41.7	37.7	36.7	41.0	41.0	39.4	39.8
R-51	217 Tahoe Tavern Rd	Hotel	E (72)	61.1	61.0	61.0	61.0	61.2	62.0	62.0
R-52	217 Tahoe Tavern Rd	Hotel	E (72)	43.2	43.5	43.6	43.6	43.8	43.2	43.2

Table 7-1: Predicted Peak Noise Levels in 2018 under the No-Build and Build Alternatives

Receiver ID	Location or Address	Land Use ¹	NAC	No-Build	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 6	Alt. 6A
				(dBA L _{eq})						
R-53	217 Tahoe Tavern Rd	Hotel	E (72)	60.8	60.7	60.7	60.7	61.2	61.7	61.7
R-54	217 Tahoe Tavern Rd	Hotel	E (72)	58.5	58.7	58.7	58.7	59.4	59.0	59.0
R-55	217 Tahoe Tavern Rd	Hotel	E (72)	43.1	40.7	40.1	38.8	36.6	42.5	42.2
R-56	401 W Lake Blvd/Tahoe Tree Company	Commercial	E (72)	55.9	55.9	55.9	56.0	56.2	55.8	55.8
R-57	Kimberly Dr	Residential	B (67)	52.3	52.7	53.2	53.1	55.1	52.3	51.7
R-58	Kimberly Dr	Residential	B (67)	51.3	51.9	52.4	52.3	54.6	51.1	50.6
R-59	Kimberly Dr	Residential	B (67)	50.0	50.7	51.2	51.1	53.9	50.0	49.8
R-60	Kimberly Dr	Residential	B (67)	50.5	51.8	52.4	52.4	54.6	50.2	50.1
R-61	Kimberly Dr	Residential	B (67)	40.3	40.2	40.5	40.4	41.8	40.1	39.1
ST-01	N Lake Blvd	Golf Course	C (67)	59.8	58.9	58.2	58.2	57.5	59.3	56.3
ST-02	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	52.8	51.6	51.5	51.6	51.6	53.8	53.1
ST-03	217 Tahoe Tavern Rd	Hotel/Pool	C (67)	60.0	55.9	52.4	54.6	54.5	55.4	54.7
ST-04	411 Kimberly Dr	Residential	B (67)	50.7	51.8	52.4	52.4	55.2	50.5	50.2
ST-05	217 Tahoe Tavern Rd	Hotel/Tennis Court	C (67)	63.8	64.1	64.1	64.1	64.2	64.2	64.2

Notes:

dBA = A-weighted decibels; L_{eq} = equivalent continuous sound level; NAC = noise abatement criteria.

¹ Noise levels reported for Hotel receivers are reduced by 20 dBA to represent interior noise levels.

Source: Data compiled by AECOM in 2012

Maximum and minimum noise levels for all future No-Build and build alternatives at each activity category, and also noise level changes in all build alternatives over existing and No-Build Alternative conditions are summarized in Table 7-2, for 2018.

Table 7-2: Maximum, Minimum, and Noise Level Changes in 2018 under the No-Build and Build Alternatives

Year 2018 Noise Level (dBA L _{eq})					
Activity Category (NAC)			B (67)	C (67)	E (72)
No-Build Alternative	Predicted	Min	40.3	50.3	39.9
		Max	59.6	63.8	66.9
	Change from Existing	Min	1.1	1.2	1.7
		Max	1.0	1.7	1.5
Alternative 1	Predicted	Min	40.2	53.4	37.7
		Max	59.6	64.1	62.9
	Change from Existing	Min	1.0	4.3	-0.5
		Max	1.0	2.0	-2.5
	Change from No-Build Alternative	Min	-0.1	3.1	-2.2
		Max	0.0	0.3	-4.0
Alternative 2	Predicted	Min	40.5	52.4	36.7
		Max	59.7	64.1	61.5
	Change from Existing	Min	1.3	3.3	-1.5
		Max	1.1	2.0	-3.9
	Change from No-Build Alternative	Min	0.2	2.1	-3.2
		Max	0.1	0.3	-5.4
Alternative 3	Predicted	Min	40.4	54.3	38.8
		Max	59.6	64.1	61.5
	Change from Existing	Min	1.2	5.2	0.6
		Max	1.0	2.0	-3.9
	Change from No-Build Alternative	Min	0.1	4.0	-1.1
		Max	0.0	0.3	-5.4
Alternative 4	Predicted	Min	41.7	54.5	36.6
		Max	60.4	64.2	61.4
	Change from Existing	Min	2.5	5.4	-1.6
		Max	1.8	2.1	-4.0
	Change from No-Build Alternative	Min	1.4	4.2	-3.3
		Max	0.8	0.4	-5.5
Alternative 6	Predicted	Min	40.1	49.9	39.4
		Max	59.6	64.2	63.2
	Change from Existing	Min	0.9	0.8	1.2
		Max	1.0	2.1	-2.2
	Change from No-Build Alternative	Min	-0.2	-0.4	-0.5
		Max	0.0	0.4	-3.7

Table 7-2: Maximum, Minimum, and Noise Level Changes in 2018 under the No-Build and Build Alternatives

Year 2018 Noise Level (dBA L _{eq})					
Activity Category (NAC)			B (67)	C (67)	E (72)
Alternative 6A	Predicted	Min	39.1	49.5	39.8
		Max	59.6	64.2	62.0
	Change from Existing	Min	-0.1	0.4	1.6
		Max	1.0	2.1	-3.4
	Change from No-Build Alternative	Min	-1.2	-0.8	-0.1
		Max	0.0	0.4	-4.9

Notes:

dBA = A-weighted decibels; L_{eq} = equivalent continuous sound level; NAC = noise abatement criteria

Source: Data compiled by AECOM in 2012

7.2.1. Traffic Noise Impacts (2018)

Traffic noise impacts occur when either of the following occurs: (1) the traffic noise level at a sensitive receiver location is predicted to “approach or exceed” the NAC, or (2) the predicted traffic noise level is 12 dB or more over the corresponding modeled existing peak noise level at the sensitive receiver locations analyzed. When traffic noise impacts occur, noise abatement measures must be considered. Of the 67 modeled receivers, none of the receivers approach or exceed the NAC, under any future build alternatives.

Predicted 2018 noise levels for the future build alternatives are shown in Table 7-1. The maximum and minimum noise levels for future No-Build and all build alternatives at each activity category, and also noise level changes in all build alternatives over existing and No-Build Alternative conditions are summarized in Table 7-2, for 2018. Future predicted peak-hour traffic noise levels at identified receivers under the 2018 No-Build Alternative ranged between 39.9 dBA L_{eq} and 66.9 dBA L_{eq}, under Alternative 1 between 37.7 dBA L_{eq} and 64.1 dBA L_{eq}, under Alternative 2 between 36.7 dBA L_{eq} and 64.1 dBA L_{eq}, under Alternative 3 between 38.6 dBA L_{eq} and 64.1 dBA L_{eq}, and under Alternative 4 between 36.6 dBA L_{eq} and 64.2 dBA L_{eq}. The future 2018 predicted peak-hour traffic noise levels under Alternatives 6 and 6A range from 39.4 dBA L_{eq} to 64.2 dBA L_{eq} and 39.1 dBA L_{eq} to 64.2 dBA L_{eq}, respectively.

Under the 2018 No-Build Alternative, none of the 67 modeled receiver locations would approach or exceed the relevant equivalent continuous sound level (L_{eq}) NAC, and would not substantially (by 12 dB or more) increase over existing condition as shown in Table 7-1. Under 2018 No-Build Alternative, predicted noise levels at Activity Category B

receivers would range from 40.3 to 59.6 dBA L_{eq} . Noise levels at Activity Category C receivers under the No-Build Alternative would range from 50.3 to 63.8 dBA L_{eq} . Predicted noise levels at Activity Category E receivers under the No-Build Alternative would range from 39.9 to 66.9 dBA L_{eq} . The changes in traffic noise levels from existing conditions to the 2018 No-Build Alternative condition would range from 1 to 2 dB. The increases in noise levels associated with the 2018 No-Build Alternative would be caused by forecasted increases in traffic volumes (Wood Rodgers 2013).

Noise level changes under 2018 build Alternatives would range from -4.0 to 5.4 dB over the existing condition and from -5.5 to 4.2 dB over noise levels under the No-Build Alternative, as shown in Table 7-2. Furthermore, predicted noise levels at Activity Category B receivers under 2018 Alternative 1 would range from 40.2 to 59.6 dBA L_{eq} , at Activity Category C receivers from 53.4 to 64.1 dBA L_{eq} , and at Activity Category E receivers from 37.7 to 62.9 dBA L_{eq} . Predicted noise levels at Activity Category B receivers under 2018 Alternative 2 would range from 40.5 to 59.7 dBA L_{eq} , at Activity Category C receivers from 52.4 to 64.1 dBA L_{eq} , and at Activity Category E receivers from 36.7 to 61.5 dBA L_{eq} .

Predicted noise levels at Activity Category B receivers under 2018 Alternative 3 would range from 40.4 to 59.6 dBA L_{eq} , at Activity Category C receivers from 54.3 to 64.1 dBA L_{eq} , and at Activity Category E receivers from 38.8 to 61.5 dBA L_{eq} . Predicted noise levels at Activity Category B receivers under 2018 Alternative 4 would range from 41.7 to 60.4 dBA L_{eq} , at Activity Category C receivers from 54.5 to 64.2 dBA L_{eq} , and at Activity Category E receivers from 36.6 to 61.4 dBA L_{eq} . Predicted noise levels at Activity Category B receivers under 2018 Alternative 6 would range from 40.1 to 59.6 dBA L_{eq} , at Activity Category C receivers from 49.9 to 64.2 dBA L_{eq} , and at Activity Category E receivers from 39.4 to 63.2 dBA L_{eq} . And predicted noise levels at Activity Category B receivers under 2018 Alternative 6A would range from 39.1 to 59.6 dBA L_{eq} , at Activity Category C receivers from 49.5 to 64.2 dBA L_{eq} , and at Activity Category E receivers from 39.8 to 62.0 dBA L_{eq} .

The increases and decreases in noise levels associated with the build alternatives over noise levels in existing and the No-Build Alternative would be caused by the difference in future alignment of SR 89 under the proposed project, from the existing alignment of SR 89; and also by forecasted increases in traffic volumes (Wood Rodgers 2013). As with the 2018 No-Build Alternative, the primary cause of the noise level change would be the forecasted increases in traffic volumes. However, unlike under the No-Build Alternative, some noise level changes would also result from the proposed new alignment

of SR 89 under each build alternative. As shown in Table 7-2, the maximum increase associated with the build alternatives would be 5.4 dBA L_{eq} , which is below the Caltrans definition of a substantial increase (12 dB). Therefore, noise levels associated with implementing the proposed project under 2018 Alternatives would not approach or exceed the NAC and would not substantially (by 12 dB or more) increase over the existing condition, at any of the receivers and activity categories.

7.3. Predicted Noise Levels (2038)

The predicted 2038 noise levels at the representative receiver locations within the project area were determined using 2038 summer peak-hour traffic volumes. The model input and output data for the 2038 No-Build Alternative and Alternatives 1-6A are provided in Appendix B. Table 7-3 shows the 2038 traffic noise level results. The modeled future noise levels with the project were compared to the modeled existing noise levels from TNM 2.5 to determine whether a substantial noise increase would occur. The modeled future noise levels with the project also were compared to the NAC under Activity Categories B, C, and E to determine whether a traffic noise impact would occur.

Table 7-3: Predicted Peak Noise Levels in 2038 under the No-Build and Build Alternatives

Receiver I.D.	Location or Address	Type of Development ¹	NAC	No Build	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 6	Alt. 6A
			(dBA L_{eq})							
LT-01	Tahoe Marina Lodge, Mackinaw Rd	Driveway	--	61.6	61.5	61.5	61.5	61.5	65.2	63.5
R-01	255 N Lake Blvd	Hotel/Yard	E (72)	46.9	46.5	46.3	46.4	46.2	48.3	48.1
R-02	N Lake Blvd	Commercial	E (72)	51.3	50.9	50.8	50.8	50.6	51.3	50.4
R-03	Undeveloped/West of Save Mart	Commercial	E (72)	62.0	61.4	61.9	62.1	60.0	61.7	59.3
R-04	Fairway Dr	Commercial	E (72)	57.0	56.2	56.9	57.1	56.9	56.7	56.3
R-05	Fairway Dr	Commercial	E (72)	55.7	55.7	56.4	56.5	56.9	55.6	54.9
R-06	W River Rd	Governmental	E (72)	54.0	54.6	55.5	55.6	59.8	53.9	53.8
R-07	W River Rd	Commercial	E (72)	54.8	54.9	55.2	55.2	57.2	54.6	54.5
R-08	W River Rd	Commercial	E (72)	48.2	48.4	48.6	48.6	50.2	48.1	48.1
R-09	W River Rd	Residential	B (67)	59.9	59.9	60.0	60.0	60.2	59.9	59.9
R-10	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	48.9	48.8	48.8	48.8	48.8	50.1	49.7
R-11	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	43.3	42.7	42.6	42.7	42.6	43.6	43.3
R-12	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	43.9	41.0	40.4	41.0	41.4	41.8	41.0
R-13	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	40.1	39.9	39.9	39.9	39.9	40.5	40.9

Table 7-3: Predicted Peak Noise Levels in 2038 under the No-Build and Build Alternatives

Receiver I.D.	Location or Address	Type of Development ¹	NAC	No Build	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 6	Alt. 6A
			(dBA L _{eq})							
R-14	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	45.3	44.2	43.8	44.1	44.3	44.9	44.1
R-15	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	45.1	44.9	44.9	44.9	44.9	45.7	45.7
R-16	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	51.7	47.9	44.9	46.8	46.6	48.0	46.3
R-17	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	50.1	46.9	44.2	45.8	46.0	46.7	45.2
R-18	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	52.2	47.7	46.1	47.7	47.4	49.2	48.6
R-19	Tahoe Marina Lodge, Mackinaw Rd	Hotel/Pool	E (72)	51.9	48.9	46.4	47.8	48.0	48.7	47.4
R-20	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	47.2	45.3	44.5	45.0	45.1	46.0	45.5
R-21	Mackinaw Rd	Commercial	E (72)	55.0	53.0	50.9	51.9	51.8	53.6	52.4
R-22	Mackinaw Rd	Commercial	E (72)	57.4	53.9	50.7	52.7	52.5	53.7	52.7
R-23	Mackinaw Rd	Commercial	E (72)	62.3	61.2	60.1	60.5	60.0	61.9	58.8
R-24	W Lake Blvd	Commercial	E (72)	64.4	63.1	60.5	61.0	59.7	63.5	60.1
R-25	W River Rd	Commercial	E (72)	61.3	60.4	61.1	61.3	60.0	60.9	59.0
R-26	W Lake Blvd	Commercial	E (72)	65.6	62.7	57.9	60.5	60.5	63.5	61.9
R-27	W River Rd	Commercial	E (72)	59.1	56.0	52.8	55.2	55.2	56.4	54.4
R-28	W River Rd	Commercial	E (72)	58.4	55.4	53.3	54.7	54.9	56.2	53.1
R-29	W River Rd	Commercial	E (72)	57.5	55.3	55.1	55.6	55.9	56.0	54.0
R-30	W River Rd	Commercial	E (72)	57.8	56.0	56.5	56.7	56.7	57.0	55.8
R-31	Tahoe Rim Trails	Commercial	E (72)	59.2	56.9	54.7	56.0	55.8	57.4	55.4
R-32	Tahoe Rim Trails	Trail	C (67)	55.1	53.6	54.0	54.9	55.4	54.1	53.3
R-33	Tahoe Rim Trails	Trail	C (67)	58.5	58.5	59.7	59.6	62.3	58.5	57.8
R-34	Tahoe Rim Trails	Trail	C (67)	50.7	57.2	58.8	58.6	58.4	50.4	49.9
R-35	176 W Lake Blvd	Commercial	E (72)	67.2	63.2	58.8	62.1	62.0	61.8	61.3
R-36	Tahoe Tavern Rd	Commercial	E (72)	55.8	51.4	49.8	54.0	54.0	54.7	54.6
R-37	217 Tahoe Tavern Rd	Hotel	E (72)	48.1	44.6	43.9	43.3	43.3	47.5	47.3
R-38	217 Tahoe Tavern Rd	Hotel	E (72)	44.1	40.7	40.2	40.4	40.0	43.3	43.2
R-39	217 Tahoe Tavern Rd	Hotel	E (72)	48.1	44.9	44.1	44.1	44.1	46.9	46.6
R-40	217 Tahoe Tavern Rd	Hotel	E (72)	61.3	56.5	54.5	57.8	57.8	59.6	59.3
R-41	217 Tahoe Tavern Rd	Hotel	E (72)	48.7	45.7	44.7	44.2	44.2	48.4	48.2
R-42	217 Tahoe Tavern Rd	Hotel	E (72)	51.1	48.7	45.8	47.1	47.4	47.9	46.2
R-43	217 Tahoe Tavern Rd	Hotel	E (72)	55.7	50.9	49.0	55.9	56.0	54.4	54.2
R-44	217 Tahoe Tavern Rd	Hotel	E (72)	48.7	46.7	46.2	44.5	45.2	48.5	48.5
R-45	W River Rd	Governmental	E (72)	52.5	53.3	53.6	53.6	56.3	52.5	52.4

Table 7-3: Predicted Peak Noise Levels in 2038 under the No-Build and Build Alternatives

Receiver I.D.	Location or Address	Type of Development ¹	NAC	No Build	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 6	Alt. 6A
			(dBA L _{eq})							
R-46	W River Rd	Governmental	E (72)	55.6	55.6	55.7	55.7	56.5	55.6	55.6
R-47	W River Rd	Governmental	E (72)	51.6	51.6	51.7	51.7	52.0	51.6	51.5
R-48	W River Rd	Residential	B (67)	51.1	51.3	51.5	51.5	53.3	51.1	51.0
R-49	W River Rd	Residential	B (67)	46.4	46.3	46.9	46.8	49.2	46.2	46.1
R-50	217 Tahoe Tavern Rd	Hotel	E (72)	42.1	38.2	37.0	41.5	41.5	39.8	40.2
R-51	217 Tahoe Tavern Rd	Hotel	E (72)	61.5	61.3	61.4	61.2	61.6	62.4	62.4
R-52	217 Tahoe Tavern Rd	Hotel	E (72)	43.6	43.7	43.9	43.6	44.2	43.5	43.5
R-53	217 Tahoe Tavern Rd	Hotel	E (72)	61.2	61.0	61.1	60.8	61.5	62.0	62.0
R-54	217 Tahoe Tavern Rd	Hotel	E (72)	58.8	58.9	59.0	58.7	59.8	59.4	59.4
R-55	217 Tahoe Tavern Rd	Hotel	E (72)	43.5	41.1	40.4	39.3	37.1	42.9	42.5
R-56	401 W Lake Blvd/Tahoe Tree Company	Commercial	E (72)	56.3	56.2	56.3	56.1	56.6	56.2	56.2
R-57	Kimberly Dr	Residential	B (67)	52.7	53.0	53.5	53.5	55.5	52.7	52.1
R-58	Kimberly Dr	Residential	B (67)	51.7	52.2	52.7	52.7	55.0	51.5	51.1
R-59	Kimberly Dr	Residential	B (67)	50.4	51.0	51.6	51.5	54.3	50.3	50.2
R-60	Kimberly Dr	Residential	B (67)	50.9	52.0	52.8	52.7	55.0	50.6	50.5
R-61	Kimberly Dr	Residential	B (67)	40.6	40.6	40.8	40.8	42.2	40.5	39.5
ST-01	N Lake Blvd	Golf Course	C (67)	60.1	59.3	58.6	58.8	58.0	59.5	56.5
ST-02	Tahoe Marina Lodge, Mackinaw Rd	Hotel	E (72)	53.1	52.1	51.9	52.1	52.1	54.1	53.2
ST-03	217 Tahoe Tavern Rd	Hotel/Pool	C (67)	60.3	56.3	52.6	55.2	55.1	55.8	55.0
ST-04	411 Kimberly Dr	Residential	B (67)	51.1	52.1	52.8	52.8	55.6	50.9	50.6
ST-05	217 Tahoe Tavern Rd	Hotel/Tennis Court	C (67)	64.1	64.4	64.4	64.1	64.6	64.6	64.6

Notes:

dBA = A-weighted decibels; L_{eq} = equivalent continuous sound level; NAC = noise abatement criteria.

¹ Noise levels reported for Hotel receivers are reduced by 20 dBA to represent interior noise levels.

Source: Data compiled by AECOM in 2012

Maximum and minimum noise levels for all future build alternatives at each activity category, and also noise level changes in all four build alternatives over existing and No-Build Alternative conditions are summarized in Table 7-4, for 2038.

Table 7-4: Future 2038 No-Build and Build Alternatives, Maximum, Minimum, and Noise Level Changes

Year			2038 Noise Level (dBA L _{eq})		
Activity Category (NAC)			B (67)	C (67)	E (72)
No-Build Alternative	Predicted	Min	40.6	50.7	40.1
		Max	59.9	64.1	67.2
	Change from Existing	Min	1.4	1.6	1.9
		Max	1.3	2.0	1.8
Alternative 1	Predicted	Min	40.6	53.6	38.2
		Max	59.9	64.4	63.2
	Change from Existing	Min	1.4	4.5	0.0
		Max	1.3	2.3	-2.2
	Change from No-Build Alternative	Min	0.0	2.9	-1.9
		Max	0.0	0.3	-4.0
Alternative 2	Predicted	Min	40.8	52.6	37.0
		Max	60.0	64.4	61.9
	Change from Existing	Min	1.6	3.5	-1.2
		Max	1.4	2.3	-3.5
	Change from No-Build Alternative	Min	0.2	1.9	-3.1
		Max	0.1	0.3	-5.3
Alternative 3	Predicted	Min	40.8	54.9	39.3
		Max	60.0	64.1	62.1
	Change from Existing	Min	1.6	5.8	1.1
		Max	1.4	2.0	-3.3
	Change from No-Build Alternative	Min	0.2	4.2	-0.8
		Max	0.1	0.0	-5.1
Alternative 4	Predicted	Min	41.9	55.1	37.1
		Max	60.4	64.6	62.0
	Change from Existing	Min	2.7	6.0	-1.1
		Max	1.8	2.5	-3.4
	Change from No-Build Alternative	Min	1.3	4.4	-3.0
		Max	0.5	0.5	-5.2
Alternative 6	Predicted	Min	40.5	50.4	39.8
		Max	59.9	64.6	63.5
	Change from Existing	Min	1.3	1.3	1.6
		Max	1.3	2.5	-1.9

Table 7-4: Future 2038 No-Build and Build Alternatives, Maximum, Minimum, and Noise Level Changes

Year			2038 Noise Level (dBA L _{eq})		
Activity Category (NAC)			B (67)	C (67)	E (72)
	Change from No-Build Alternative	Min	-0.1	-0.3	-0.3
		Max	0.0	0.5	-3.7
Alternative 6A	Predicted	Min	39.5	49.9	40.2
		Max	59.9	64.6	62.4
	Change from Existing	Min	0.3	0.8	2.0
		Max	1.3	2.5	-3.0
	Change from No-Build Alternative	Min	-1.1	-0.8	0.1
		Max	0.0	0.5	-4.8

Notes: dBA = A-weighted decibels; L_{eq} = equivalent continuous sound level; NAC = noise abatement criteria.

Source: Data compiled by AECOM in 2012

7.3.1. Traffic Noise Impacts (2038)

Traffic noise impacts occur when either of the following occurs: (1) the traffic noise level at a sensitive receiver location is predicted to “approach or exceed” the NAC, or (2) the predicted traffic noise level is 12 dB or more over the corresponding modeled existing peak noise level at the sensitive receiver locations analyzed. When traffic noise impacts occur, noise abatement measures must be considered. Of the 67 modeled receivers, none of the receivers approach or exceed the NAC, under any future build alternatives.

Predicted 2038 noise levels for the build alternatives are shown in Table 7-3. Under the 2038 No-Build Alternative, future predicted peak-hour traffic noise levels at identified receivers ranged between 40.6 dBA L_{eq} and 67.2 dBA L_{eq}. The future predicted peak-hour traffic noise levels for 2038 ranged between 38.2 dBA L_{eq} and 64.4 dBA L_{eq} under Alternative 1, between 37.0 dBA L_{eq} and 64.4 dBA L_{eq} under Alternative 2, between 39.3 dBA L_{eq} and 64.1 dBA L_{eq} under Alternative 3, and between 37.1 dBA L_{eq} and 64.6 dBA L_{eq} under Alternative 4. The future 2038 predicted peak-hour traffic noise levels under Alternatives 6 and 6A range from 39.8 dBA L_{eq} to 64.6 dBA L_{eq} and 39.5 dBA L_{eq} to 64.6 dBA L_{eq}, respectively.

Under the 2038 No-Build Alternative, none of the 67 modeled receiver locations would approach or exceed the relevant equivalent continuous sound level (L_{eq}) NAC, and would not substantially (by 12 dB or more) increase over existing condition as shown in Table

7-3. Under the 2038 No-Build Alternative, predicted noise levels at Activity Category B receivers would range from 40.6 to 59.9 dBA L_{eq} . Noise levels at Activity Category C receivers under the No-Build Alternative would range from 50.7 to 64.1 dBA L_{eq} . Predicted noise levels at Activity Category E receivers under the No-Build Alternative would range from 40.1 to 67.2 dBA L_{eq} . The changes in traffic noise levels from existing conditions to the 2018 No-Build Alternative condition would range from 1 to 2 dB. The increases in noise levels associated with the 2038 No-Build Alternative would be caused by forecasted increases in traffic volumes (Wood Rodgers 2013).

Noise level changes under 2038 build Alternatives would range from -3.5 to 6.0 dB over the existing condition and from -5.3 to 4.4 dB over noise levels under the No-Build Alternative, as shown in Table 7-4. Furthermore, predicted noise levels at Activity Category B receivers under 2038 Alternative 1 would range from 40.6 to 59.9 dBA L_{eq} , at Activity Category C receivers from 53.6 to 64.4 dBA L_{eq} , and at Activity Category E receivers from 38.2 to 63.2 dBA L_{eq} . Predicted noise levels at Activity Category B receivers under 2038 Alternative 2 would range from 40.8 to 60.0 dBA L_{eq} , at Activity Category C receivers from 52.6 to 64.4 dBA L_{eq} , and at Activity Category E receivers from 37.0 to 61.9 dBA L_{eq} .

Predicted noise levels at Activity Category B receivers under 2018 Alternative 3 would range from 40.8 to 60.0 dBA L_{eq} , at Activity Category C receivers from 54.9 to 64.1 dBA L_{eq} , and at Activity Category E receivers from 39.3 to 62.1 dBA L_{eq} . Predicted noise levels at Activity Category B receivers under 2038 Alternative 4 would range from 41.9 to 60.4 dBA L_{eq} , at Activity Category C receivers from 55.1 to 64.6 dBA L_{eq} , and at Activity Category E receivers from 37.1 to 62.0 dBA L_{eq} . Predicted noise levels at Activity Category B receivers under 2038 Alternative 6 would range from 40.5 to 59.9 dBA L_{eq} , at Activity Category C receivers from 50.4 to 64.6 dBA L_{eq} , and at Activity Category E receivers from 39.8 to 63.5 dBA L_{eq} . And predicted noise levels at Activity Category B receivers under 2038 Alternative 6A would range from 39.5 to 59.9 dBA L_{eq} , at Activity Category C receivers from 49.9 to 64.6 dBA L_{eq} , and at Activity Category E receivers from 40.2 to 62.4 dBA L_{eq} .

The increases and decreases in noise levels associated with the build alternatives over noise levels in existing and the No-Build Alternative would be caused by the difference in future alignment of SR 89 under the proposed project, from the existing alignment of SR 89; and also by forecasted increases in traffic volumes (Wood Rodgers 2013). As with the 2038 No-Build Alternative, the primary cause of the noise level change would be the forecasted increases in traffic volumes. However, unlike under the No-Build

Alternative, some noise level changes would also result from the proposed new alignment of SR 89 under each build alternative. As shown in Table 7-4, the maximum increase associated with the build alternatives would be 6.0 dBA L_{eq} , which is below the Caltrans definition of a substantial increase (12 dB). Therefore, noise levels associated with implementing the proposed project under 2038 Alternatives would not approach or exceed the NAC and would not substantially (12 dB or more) increase over the existing condition, at any of the receivers and activity categories.

7.4. Noise Abatement

Noise abatement must be considered where traffic noise impacts are identified. According to FHWA/Caltrans criteria, noise abatement must be considered at affected receivers where an exposed area of frequent human use (such as a yard, patio, or deck) exists and a lowered noise level would be beneficial. Frequent human use is defined as any activity that would result in frequent human exposure to traffic noise over the course of a year in a specific location. Impacts have not been identified at any receivers under all four build alternatives for 2018 and 2038. As per the Protocol, abatement needs to be considered only in locations of frequent human use and where a lowered noise level (minimum of 5 dB) would be beneficial. Because the proposed project would not expose any locations within the project area to approach or exceed the NAC and nor to a substantial increase in noise level over the existing and No-Build Alternative conditions, abatement is not considered further.

7.5. Conclusion

Based on the Protocol, no noise abatement measures were identified at any locations within the project area. Therefore, a noise abatement decision report (NADR) is not required for the proposed project. A NADR typically is prepared when an NSR identifies receiver locations that would be exposed to noise levels that would approach or exceed NAC or substantially increase in noise level over the existing and No-Build Alternative conditions, and those receivers would be areas of frequent human use and abatement would be beneficial. The proposed project would not expose any locations to approach or exceed the NAC or to a substantially higher noise level under any of the 2018 and 2038 build alternatives, over the existing and No-Build Alternative conditions. As no noise abatement measures are evaluated in this report, the preparation of an NADR is not required. Noise abatement measures to address exceedances per TRPA are discussed in Appendix C.

7.6. Feasibility of Noise Abatement

No soundwalls would be required. Thus, a feasibility analysis is not required and has not been conducted.

7.7. Reasonable Noise Abatement

No soundwalls would be required. Thus, a reasonable allowance analysis is not required.

7.8. Areas Where Abatement Is Not Feasible

No soundwalls would be required. Thus, none have been found not feasible.

Chapter 8. Construction Noise

8.1. Applicable Standards—California Department of Transportation

The Protocol requires that a noise assessment of potential adverse construction noise impacts on local receivers and activities be performed, using a reasonable analysis method (Caltrans 2011). Construction noise based on TRPA’s applicable CNEL is evaluated in Appendix C.

As part of the specifications for construction contracts, the Caltrans requirements relative to the allowable noise emission of equipment must be used on the proposed project. Sound control must conform to the provisions in Section 14-8.02, “Noise Control,” of the Standard Specifications and the following special provisions:

1. The noise level requirement shall apply to the equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.
2. Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefore.

During project construction, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Construction noise would be regulated by Caltrans Standard Specifications Section 14-8.02, “Noise Control.”

Caltrans’s Standard Specification Section 14-8.02, “Noise Control,” states the following:

- Noise levels generated during construction shall comply with applicable local, state, and federal regulations, and that all equipment shall be fitted with adequate mufflers according to the manufacturers’ specifications.
- The noise level from operations, between the hours of 9:00 p.m. and 6:00 a.m., shall not exceed 86 dBA at a distance of 50 feet.

- Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without said muffler.

Table 8-1 summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. For the proposed project, construction equipment is expected to generate noise levels ranging from 70 to 90 dBA at a distance of 50 feet, and noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance.

Table 8-1: Construction Equipment Noise

Equipment	Maximum Noise Level (dBA at 50 feet)
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Backhoe	80
Backhoe	80

Note: dBA = A-weighted decibels

Source: Federal Transit Administration 1995

8.2. Impacts

No adverse noise impacts from project construction are anticipated because construction would be conducted in accordance with Caltrans Standard Specifications Section 7-1.01I and applicable local noise standards. Construction related traffic noise would be overshadowed by the existing trips along the SR 28 and SR 89. As doubling the source strength increases the sound pressure only by 3 dB, the total daily vehicle trips due to the construction of the proposed project, and by workers to and from the construction site would be even less than one percent of the existing daily traffic volumes, therefore it would be nominal when added to existing traffic volumes and thus it would not be considered an impact.

The proposed project's construction noise would be short term, intermittent, and overshadowed by local traffic noise. Furthermore, implementing the construction noise abatement measures listed in Section 7.3 would minimize the temporary noise impacts from project construction.

8.3. Construction Noise Abatement

The following measures are recommended to avoid or minimize construction noise impacts:

- All equipment will have sound-control devices that are no less effective than those provided on the original equipment. No equipment will have an unmuffled exhaust.
- As directed by Caltrans, the contractor will implement appropriate additional noise mitigation measures, including changing the location of stationary construction equipment, turning off idling equipment, rescheduling construction activity, notifying adjacent residents in advance of construction work, and installing acoustic barriers around stationary construction noise sources.
- One study shows that a two-story building can reduce noise levels on the side of the building away from the noise source by about 13dB.
- Reductions of 10 dB or more can be achieved with optimal muffler systems.
- Noise reductions of up to 5 dB can be achieved using dampening materials.
- Shields such as sound skins may achieve reductions of 20 dB at high frequencies and 10 dB in the middle frequency range.
- Sound aprons may achieve noise reductions up to 10 dB.

Implementation of the above measures would reduce the construction noise level substantially, particularly at receivers located more than 50 feet from the construction site.

- Construction noise limitations are exempted under Article 23.8 of TRPA Code of Ordinances, Chapter 23 - Noise Limitations:
 - The standards of this chapter shall not apply to noise from TRPA-approved construction or maintenance projects, or the demolition of structures, provided such activities are limited to the hours between 8 a.m. and 6:30 p.m. The standards of this chapter shall not apply to safety signals, warning devices, or emergency pressure relief valves and other similar devices. Emergency work to protect life or property is exempt from noise standards, as are fireworks used in accordance with a state or local permit.

Chapter 9. References

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Chapter 10. List of Preparers

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Appendix A Traffic Data

CALIBRATION RUN

EXISTING CONDITION

FUTURE (2018) NO-BUILD ALTERNATIVE CONDITION

ALTERNATIVE 1 CONDITION (2018)

ALTERNATIVE 2 CONDITION (2018)

ALTERNATIVE 3 CONDITION (2018)

ALTERNATIVE 4 CONDITION (2018)

ALTERNATIVE 6 CONDITION (2018)

ALTERNATIVE 6A CONDITION (2018)

FUTURE (2038) NO-BUILD ALTERNATIVE CONDITION

ALTERNATIVE 1 CONDITION (2038)

ALTERNATIVE 2 CONDITION (2038)

ALTERNATIVE 3 CONDITION (2038)

ALTERNATIVE 4 CONDITION (2038)

ALTERNATIVE 6 CONDITION (2038)

ALTERNATIVE 6A CONDITION (2038)

Table A-1: Field-Counted Traffic Volumes – Model Calibration

Lane(s)	Traffic Volume				
	Automobile	Medium Truck (MT)	Heavy Truck (HT)	Motorcycle	Bus
SM NBN	19	0	0	0	0
SM SBN	29	0	0	0	0
89 NBS	113	4	0	3	2
89 SBS	89	5	0	0	1
89 NBR	61	1	0	0	0
89 SBR	106	4	0	0	4
28 EBE	98	3	0	3	1
28WBE	192	11	0	2	1
28 EBW	111	3	0	0	0
28 WBW	168	7	0	5	2

Notes:

EBE = Eastbound, East of Intersection; EBW = Eastbound, West of Intersection; NBN = Northbound, North of Intersection; NBR = Northbound, Ramp; NBS = Northbound, South of Intersection; SBN = Southbound, North of Intersection; SBR = Southbound, Ramp; SBS = Southbound, South of Intersection; SM = SaveMart;

WBE = Westbound, East of Intersection; WBW = Westbound, West of Intersection

Source: Data compiled by AECOM in 2012

Table A-2: PM Peak Hour Traffic Volumes – Existing (2013)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	112	35	57	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	760	35	625	35
			West of Intersection	MT	36	30	30	30
				HT	15	25	12	25
				Auto	785	35	599	35
				MT	37	30	28	30
				HT	15	25	12	25
2	SR 89 / SR 28 ("Wye")	Save Mart Access	North of Intersection	Auto	141	35	132	35
			MT	0	30	0	30	
			HT	0	25	0	25	
		SR 89	South of Intersection	Auto	645	35	804	35
			MT	36	30	45	30	
			HT	15	25	19	25	
		SR 28	East of Intersection	Auto	654	25	680	25
			West of Intersection	MT	15	20	16	20
				HT	9	15	10	15
		SR 89	West of Intersection	Auto	756	35	613	35
			MT	36	30	29	30	
			HT	15	25	12	25	
4	SR 89 / Tavern Shores Access	SR 89	North of Intersection	Auto	670	35	784	35
			South of Intersection	MT	38	30	44	30
				HT	16	25	18	25
				Auto	662	35	774	35
				MT	37	30	44	30
				HT	15	25	18	25
		Tavern Shores Access	East of Intersection	Auto	17	35	15	35
			West of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	30	0	30

				HT	0	25	0	25
5	SR 89 / 64 Acres Access	SR 89	North of Intersection	Auto	685	35	742	35
				MT	39	30	42	30
				HT	16	25	17	25
			South of Intersection	Auto	626	35	739	35
				MT	35	30	42	30
				HT	15	25	17	25
		64 Acres Access	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	96	35	35	35
				MT	0	30	0	30
				HT	0	25	0	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	627	35	740	35
				MT	35	30	42	30
				HT	15	25	17	25
			South of Intersection	Auto	494	35	691	35
				MT	28	30	39	30
				HT	12	25	16	25
		Granlibakken Rd	East of Intersection	Auto	27	35	22	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	201	35	105	35
				MT	0	30	0	30
				HT	0	25	0	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-3: PM Peak Hour Traffic Volumes – No Build Alternative (2018)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	20	35	36	35
				MT	0	30	0	30
				HT	0	25	0	25
			South of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	982	35	743	35
				MT	47	30	35	30
				HT	19	25	15	25
			West of Intersection	Auto	965	35	741	35
				MT	46	30	35	30
				HT	19	25	15	25
2	SR 89 / SR 28 ("Wye")	Save Mart Access	North of Intersection	Auto	186	35	200	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	South of Intersection	Auto	962	35	1147	35
				MT	54	30	65	30
				HT	22	25	27	25
		SR 28	East of Intersection	Auto	1029	25	936	25
				MT	24	20	22	20
				HT	15	15	13	15
		SR 89	West of Intersection	Auto	1104	35	839	35
				MT	52	30	40	30
				HT	22	25	16	25
4	SR 89 / Tavern Shores Access	SR 89	North of Intersection	Auto	900	35	1091	35
				MT	51	30	62	30
				HT	21	25	25	25
			South of Intersection	Auto	901	35	1092	35
				MT	51	30	62	30
				HT	21	25	25	25
		Tavern Shores Access	East of Intersection	Auto	14	35	14	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	30	0	30

				HT	0	25	0	25
5	SR 89 / 64 Acres Access	SR 89	North of Intersection	Auto	895	35	1087	35
				MT	51	30	61	30
				HT	21	25	25	25
			South of Intersection	Auto	884	35	1089	35
				MT	50	30	61	30
				HT	21	25	25	25
		64 Acres Access	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	54	35	41	35
				MT	0	30	0	30
				HT	0	25	0	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	864	35	1110	35
				MT	49	30	63	30
				HT	20	25	26	25
			South of Intersection	Auto	821	35	1017	35
				MT	46	30	57	30
				HT	19	25	24	25
		Granlibakken Rd	East of Intersection	Auto	80	35	50	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	143	35	167	35
				MT	0	30	0	30
				HT	0	25	0	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-4: PM Peak Hour Traffic Volumes – Alternative 1 (2018)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	20	35	36	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	832	35	676	35
			West of Intersection	MT	40	30	32	30
				HT	16	25	13	25
				Auto	835	35	693	35
				MT	40	30	33	30
				HT	16	25	14	25
2	Old SR 89 / SR 28 ("Old Wye")	Save Mart Access	North of Intersection	Auto	193	35	199	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
		SR 89	South of Intersection	Auto	413	35	440	35
				MT	23	30	25	30
				HT	10	25	10	25
		SR 28	East of Intersection	Auto	975	25	880	25
				MT	23	20	21	20
				HT	14	15	12	15
		SR 89	West of Intersection	Auto	878	35	764	35
				MT	42	30	36	30
				HT	17	25	15	25
4	Old SR 89 / Tavern Shores Access	SR 89	North of Intersection	Auto	356	35	388	35
			South of Intersection	MT	20	30	22	30
				HT	8	25	9	25
				Auto	357	35	382	35
				MT	20	30	22	30
				HT	8	25	9	25
		Tavern Shores Access	East of Intersection	Auto	21	35	14	35
			West of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30

				HT	0	25	0	25
5	Old SR 89 / 64 Acres Access	SR 89	North of Intersection	Auto	357	35	382	35
				MT	20	30	22	30
				HT	8	25	9	25
			South of Intersection	Auto	344	35	401	35
				MT	19	30	23	30
				HT	8	25	9	25
		64 Acres Access	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	87	35	53	35
				MT	0	30	0	30
				HT	0	25	0	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	864	35	1110	35
				MT	49	30	63	30
				HT	20	25	26	25
			South of Intersection	Auto	821	35	1017	35
				MT	46	30	57	30
				HT	19	25	24	25
		Granlibakken Rd	East of Intersection	Auto	80	35	50	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	143	35	167	35
				MT	0	30	0	30
				HT	0	25	0	25
7	New SR 89 / SR 89 (New "WYE")	New SR 89	North of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			South of Intersection	Auto	667	35	751	35
				MT	32	30	36	30
				HT	13	25	15	25
		SR 89	East of Intersection	Auto	835	35	693	35
				MT	35	30	29	30
				HT	21	25	18	25
		Old SR 89	West of Intersection	Auto	966	35	741	35
				MT	46	30	35	30
				HT	19	25	15	25
8	SR 89 / New SR 89 / Old SR 89	SR 89	North of Intersection	Auto	348	35	406	35
				MT	16	30	19	30
				HT	7	25	8	25
		Old SR 89	South of Intersection	Auto	933	35	1075	35
				MT	44	30	51	30
				HT	18	25	21	25

		New SR 89	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	751	35	667	35
				MT	36	30	32	30
				HT	15	25	13	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-5: PM Peak Hour Traffic Volumes – Alternative 2 (2018)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	20	35	36	35
				MT	0	30	0	30
				HT	0	25	0	25
			South of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	1063	35	840	35
				MT	50	30	40	30
				HT	21	25	16	25
			West of Intersection	Auto	1065	35	857	35
				MT	51	30	41	30
				HT	21	25	17	25
2	Old SR 89 / SR 28 ("Old Wye")	Save Mart Access	North of Intersection	Auto	143	35	139	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	South of Intersection	Auto	144	35	152	35
				MT	8	30	9	30
				HT	3	25	4	25
		SR 28	East of Intersection	Auto	975	25	875	25
				MT	23	20	20	20
				HT	14	15	12	15
		SR 89	West of Intersection	Auto	1042	35	933	35
				MT	50	30	44	30
				HT	20	25	18	25
5	Old SR 89 / 64 Acres Access	Old SR 89	North of Intersection	Auto	207	35	269	35
				MT	12	30	15	30
				HT	5	25	6	25
			South of Intersection	Auto	276	35	353	35
				MT	16	30	20	30
				HT	6	25	8	25
		64 Acres Access	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	101	35	84	35
				MT	0	30	0	30

				HT	0	25	0	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	864	35	1110	35
			South of Intersection	MT	49	30	63	30
				HT	20	25	26	25
		Tahoe Tavern Rd	East of Intersection	Auto	821	35	1017	35
				MT	46	30	57	30
				HT	19	25	24	25
		Granlibakken Rd	West of Intersection	Auto	80	35	50	35
				MT	0	30	0	30
				HT	0	25	0	25
				Auto	143	35	167	35
				MT	0	30	0	30
				HT	0	25	0	25
7	New SR 89 / SR 89 (New "WYE")	New SR 89	North of Intersection	Auto	0	35	0	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
		New SR 28	East of Intersection	Auto	1017	35	1074	35
				MT	48	30	51	30
				HT	20	25	21	25
		Old SR 89	West of Intersection	Auto	1065	35	857	35
				MT	45	30	36	30
				HT	27	25	22	25
				Auto	1019	35	753	35
				MT	48	30	36	30
				HT	20	25	15	25
8	SR 89 / New SR 89 / Old SR 89	SR 89	North of Intersection	Auto	249	35	357	35
		Old SR 89	South of Intersection	MT	12	30	17	30
				HT	5	25	7	25
				Auto	899	35	1064	35
				MT	42	30	50	30
				HT	18	25	21	25
		New SR 89	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	1074	35	1017	35
				MT	51	30	48	30
				HT	21	25	20	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-6: PM Peak Hour Traffic Volumes – Alternative 3 (2018)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	20	35	36	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89		East of Intersection	Auto	1006	35	888
			West of Intersection	MT	48	30	42	30
				HT	20	25	17	25
				Auto	1009	35	906	35
				MT	48	30	43	30
				HT	20	25	18	25
2	Old SR 89 / SR 28 ("Old Wye")	Save Mart Access	North of Intersection	Auto	143	35	139	35
		SR 89	MT	0	30	0	30	
			HT	0	25	0	25	
			Auto	317	35	216	35	
			MT	18	30	12	30	
			HT	7	25	5	25	
			SR 28	East of Intersection	Auto	975	25	870
		SR 89		MT	23	20	20	20
				HT	14	15	12	15
			Auto	986	35	982	35	
			MT	47	30	47	30	
			HT	19	25	19	25	
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	864	35	1110	35
			South of Intersection	MT	49	30	63	30
				HT	20	25	26	25
				Auto	821	35	1017	35
				MT	46	30	57	30
				HT	19	25	24	25
		Tahoe Tavern Rd	East of Intersection	Auto	80	35	50	35
			Granlibakken Rd	MT	0	30	0	30
				HT	0	25	0	25
		Auto		143	35	167	35	
		MT		0	30	0	30	

				HT	0	25	0	25
7	New SR 89 / SR 89 (New "WYE")	New SR 89	North of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		New SR 89	South of Intersection	Auto	968	35	1063	35
				MT	46	30	50	30
				HT	19	25	21	25
		New SR 28	East of Intersection	Auto	1009	35	906	35
				MT	42	30	38	30
				HT	26	25	23	25
		Old SR 89	West of Intersection	Auto	959	35	761	35
				MT	46	30	36	30
				HT	19	25	15	25
8	SR 89 / New SR 89 / Old SR 89	SR 89	North of Intersection	Auto	50	35	90	35
				MT	2	30	4	30
				HT	1	25	2	25
		Old SR 89	South of Intersection	Auto	933	35	1068	35
				MT	44	30	50	30
				HT	18	25	21	25
		New SR 89	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	1063	35	968	35
				MT	50	30	46	30
				HT	21	25	19	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;
Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-7: PM Peak Hour Traffic Volumes – Alternative 4 (2018)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	20	35	36	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	1006	35	888	35
			West of Intersection	MT	48	30	42	30
				HT	20	25	17	25
				Auto	1009	35	906	35
				MT	48	30	43	30
				HT	20	25	18	25
2	Old SR 89 / SR 28 ("Old Wye")	Save Mart Access	North of Intersection	Auto	143	35	139	35
		SR 89	South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	317	35	216	35
				MT	18	30	12	30
				HT	7	25	5	25
		SR 28	East of Intersection	Auto	975	25	870	25
				MT	23	20	20	20
				HT	14	15	12	15
		SR 89	West of Intersection	Auto	986	35	982	35
				MT	47	30	47	30
				HT	19	25	19	25
5	New SR 89 / 64 Acres Access	64 Acres Access	North of Intersection	Auto	53	35	96	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	1056	35	922	35
			West of Intersection	MT	60	30	52	30
				HT	25	25	21	25
				Auto	1050	35	957	35
				MT	59	30	54	30

				HT	24	25	22	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	897	35	1110	35
			South of Intersection	MT	51	30	63	30
				HT	21	25	26	25
		Tahoe Tavern Rd	East of Intersection	Auto	821	35	1017	35
				MT	46	30	57	30
				HT	19	25	24	25
		Granlibakken Rd	West of Intersection	Auto	80	35	50	35
				MT	0	30	0	30
				HT	0	25	0	25
				Auto	178	35	167	35
				MT	0	30	0	30
				HT	0	25	0	25
7	New SR 89 / SR 89 (New "WYE")	New SR 89	North of Intersection	Auto	0	35	0	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
		New SR 28	East of Intersection	Auto	968	35	1063	35
				MT	46	30	50	30
				HT	19	25	21	25
		SR 89	West of Intersection	Auto	1009	35	906	35
				MT	42	30	38	30
				HT	26	25	23	25
				Auto	959	35	761	35
				MT	46	30	36	30
				HT	19	25	15	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-8: PM Peak Hour Traffic Volumes – Alternative 6 & 6A (2018)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	20	35	36	35
				MT	0	30	0	30
				HT	0	25	0	25
			South of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	982	35	743	35
				MT	47	30	35	30
				HT	19	25	15	25
			West of Intersection	Auto	965	35	741	35
				MT	46	30	35	30
				HT	19	25	15	25
2	SR 89 / SR 28 ("Wye") Alt 6	Save Mart Access	North of Intersection	Auto	186	35	200	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	South of Intersection	Auto	962	35	1147	35
				MT	54	30	65	30
				HT	22	25	27	25
		SR 28	East of Intersection	Auto	1029	35	936	35
				MT	24	30	22	30
				HT	15	25	13	25
		SR 89	West of Intersection	Auto	1104	35	839	35
				MT	52	30	40	30
				HT	22	25	16	25
4	SR 89 / Tavern Shores Access	SR 89	North of Intersection	Auto	900	35	1091	35
				MT	51	30	62	30
				HT	21	25	25	25
			South of Intersection	Auto	901	35	1092	35
				MT	51	30	62	30
				HT	21	25	25	25
		Tavern Shores Access	East of Intersection	Auto	14	35	14	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	30	0	30

				HT	0	25	0	25
5	SR 89 / 64 Acres Access	SR 89	North of Intersection	Auto	895	35	1087	35
				MT	51	30	61	30
				HT	21	25	25	25
		SR 89	South of Intersection	Auto	884	35	1089	35
				MT	50	30	61	30
				HT	21	25	25	25
		64 Acres Access	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	54	35	41	35
				MT	0	30	0	30
				HT	0	25	0	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	864	35	1110	35
				MT	49	30	63	30
				HT	20	25	26	25
		SR 89	South of Intersection	Auto	821	35	1017	35
				MT	46	30	57	30
				HT	19	25	24	25
		Granlibakken Rd	East of Intersection	Auto	80	35	50	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	143	35	167	35
				MT	0	30	0	30
				HT	0	25	0	25
2	SR 89 / SR 28 ("WYE") Alt 6A	SR 89	North of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	South of Intersection	Auto	962	35	1147	35
				MT	54	30	65	30
				HT	22	25	27	25
		SR 28	East of Intersection	Auto	1121	25	1041	25
				MT	26	20	24	20
				HT	16	15	15	15
			West of Intersection	Auto	1135	35	863	35
				MT	27	30	20	30
				HT	16	25	12	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-9: PM Peak Hour Traffic Volumes – No Build Alternative (2038)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	20	35	36	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	1111	35	792	35
			West of Intersection	MT	53	30	38	30
				HT	22	25	16	25
				Auto	1095	35	790	35
				MT	52	30	38	30
				HT	21	25	15	25
2	SR 89 / SR 28 ("Wye")	Save Mart Access	North of Intersection	Auto	186	35	202	35
		SR 89	South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	1024	35	1208	35
				MT	58	30	68	30
				HT	24	25	28	25
		SR 28	East of Intersection	Auto	1103	25	952	25
				MT	26	20	22	20
				HT	16	15	13	15
		SR 89	West of Intersection	Auto	1206	35	889	35
				MT	57	30	42	30
				HT	24	25	17	25
4	SR 89 / Tavern Shores Access	SR 89	North of Intersection	Auto	1045	35	1172	35
			South of Intersection	MT	59	30	66	30
				HT	24	25	27	25
				Auto	1046	35	1170	35
				MT	59	30	66	30
				HT	24	25	27	25
		Tavern Shores Access	East of Intersection	Auto	18	35	14	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	0	35	0	35
				MT	0	30	0	30

				HT	0	25	0	25
5	SR 89 / 64 Acres Access	SR 89	North of Intersection	Auto	1026	35	1150	35
				MT	58	30	65	30
				HT	24	25	27	25
			South of Intersection	Auto	1012	35	1149	35
				MT	57	30	65	30
				HT	24	25	27	25
		64 Acres Access	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	87	35	73	35
				MT	0	30	0	30
				HT	0	25	0	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	1003	35	1177	35
				MT	57	30	66	30
				HT	23	25	27	25
			South of Intersection	Auto	957	35	1084	35
				MT	54	30	61	30
				HT	22	25	25	25
		Granlibakken Rd	East of Intersection	Auto	80	35	53	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	144	35	168	35
				MT	0	30	0	30
				HT	0	25	0	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-10: PM Peak Hour Traffic Volumes – Alternative 1 (2038)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB EB	Speed	SB WB	Speed
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	21	35	36	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	923	35	724	35
			West of Intersection	MT	44	30	34	30
				HT	18	25	14	25
				Auto	926	35	741	35
				MT	44	30	35	30
				HT	18	25	15	25
2	Old SR 89 / SR 28 ("Old Wye")	Save Mart Access	North of Intersection	Auto	195	35	199	35
		SR 89	South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	448	35	471	35
				MT	25	30	27	30
				HT	10	25	11	25
		SR 28	East of Intersection	Auto	1103	25	952	25
				MT	26	20	22	20
				HT	16	15	13	15
		SR 89	West of Intersection	Auto	982	35	816	35
				MT	47	30	39	30
				HT	19	25	16	25
4	Old SR 89 / Tavern Shores Access	SR 89	North of Intersection	Auto	410	35	419	35
			South of Intersection	MT	23	30	24	30
				HT	10	25	10	25
				Auto	411	35	413	35
				MT	23	30	23	30
				HT	10	25	10	25
		Tavern Shores Access	East of Intersection	Auto	21	35	14	35
			West of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	30	0	30

				HT	0	25	0	25
5	Old SR 89 / 64 Acres Access	SR 89	North of Intersection	Auto	411	35	413	35
				MT	23	30	23	30
				HT	10	25	10	25
			South of Intersection	Auto	397	35	412	35
				MT	22	30	23	30
				HT	9	25	10	25
		64 Acres Access	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	87	35	73	35
				MT	0	30	0	30
				HT	0	25	0	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	1003	35	1177	35
				MT	57	30	66	30
				HT	23	25	27	25
			South of Intersection	Auto	957	35	1084	35
				MT	54	30	61	30
				HT	22	25	25	25
		Granlibakken Rd	East of Intersection	Auto	80	35	53	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	144	35	168	35
				MT	0	30	0	30
				HT	0	25	0	25
7	New SR 89 / SR 89 (New "WYE")	New SR 89	North of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			South of Intersection	Auto	718	35	838	35
				MT	34	30	40	30
				HT	14	25	16	25
		SR 89	East of Intersection	Auto	926	35	741	35
				MT	39	30	31	30
				HT	23	25	19	25
		Old SR 89	West of Intersection	Auto	1095	35	790	35
				MT	52	30	38	30
				HT	21	25	15	25
8	SR 89 / New SR 89 / Old SR 89	SR 89	North of Intersection	Auto	402	35	417	35
				MT	19	30	20	30
				HT	8	25	8	25
		Old SR 89	South of Intersection	Auto	1027	35	1162	35
				MT	48	30	55	30
				HT	20	25	23	25

		New SR 89	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	838	35	718	35
				MT	40	30	34	30
				HT	16	25	14	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-11: PM Peak Hour Traffic Volumes – Alternative 2 (2038)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB EB	Speed	SB WB	Speed
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	21	35	36	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	1174	35	917	35
			West of Intersection	MT	56	30	44	30
				HT	23	25	18	25
				Auto	1177	35	934	35
				MT	56	30	44	30
				HT	23	25	18	25
2	Old SR 89 / SR 28 ("Old Wye")	Save Mart Access	North of Intersection	Auto	150	35	138	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
		SR 89	South of Intersection	Auto	145	35	151	35
				MT	8	30	9	30
				HT	3	25	4	25
		SR 28	East of Intersection	Auto	1103	25	952	25
				MT	26	20	22	20
				HT	16	15	13	15
		SR 89	West of Intersection	Auto	1171	35	1008	35
				MT	56	30	48	30
				HT	23	25	20	25
5	Old SR 89 / 64 Acres Access	Old SR 89	North of Intersection	Auto	212	35	272	35
			South of Intersection	MT	12	30	15	30
				HT	5	25	6	25
				Auto	281	35	357	35
				MT	16	30	20	30
				HT	7	25	8	25
		64 Acres Access	East of Intersection	Auto	0	35	0	35
			West of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	101	35	84	35
				MT	0	30	0	30

				HT	0	25	0	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	1003	35	1177	35
			South of Intersection	MT	57	30	66	30
				HT	23	25	27	25
		Tahoe Tavern Rd	East of Intersection	Auto	957	35	1084	35
				MT	54	30	61	30
				HT	22	25	25	25
		Granlibakken Rd	West of Intersection	Auto	80	35	53	35
				MT	0	30	0	30
				HT	0	25	0	25
				Auto	144	35	168	35
				MT	0	30	0	30
				HT	0	25	0	25
7	New SR 89 / SR 89 (New "WYE")	New SR 89	North of Intersection	Auto	0	35	0	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
		New SR 28	East of Intersection	Auto	1140	35	1192	35
				MT	54	30	57	30
				HT	22	25	23	25
		Old SR 89	West of Intersection	Auto	1177	35	934	35
				MT	49	30	39	30
				HT	30	25	24	25
				Auto	1095	35	799	35
				MT	52	30	38	30
				HT	21	25	16	25
8	SR 89 / New SR 89 / Old SR 89	SR 89	North of Intersection	Auto	284	35	370	35
			South of Intersection	MT	13	30	17	30
				HT	6	25	7	25
		Old SR 89	East of Intersection	Auto	1033	35	1171	35
				MT	49	30	55	30
				HT	20	25	23	25
		New SR 89	West of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
				Auto	1192	35	1140	35
				MT	57	30	54	30
				HT	23	25	22	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-12: PM Peak Hour Traffic Volumes – Alternative 3 (2038)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	21	35	36	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	1162	35	943	35
			West of Intersection	MT	55	30	45	30
				HT	23	25	18	25
				Auto	1165	35	960	35
				MT	55	30	46	30
				HT	23	25	19	25
2	SR 89 / SR 28 ("Old Wye")	Save Mart Access	North of Intersection	Auto	146	35	139	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	357	35	287	35
				MT	20	30	16	30
				HT	8	25	7	25
		SR 28	West of Intersection	Auto	1103	25	952	25
				MT	26	20	22	20
				HT	16	15	13	15
		SR 89	North of Intersection	Auto	1156	35	1074	35
				MT	55	30	51	30
				HT	23	25	21	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	1003	35	1177	35
			South of Intersection	MT	57	30	66	30
				HT	23	25	27	25
				Auto	957	35	1084	35
				MT	54	30	61	30
				HT	22	25	25	25
		Tahoe Tavern Rd	East of Intersection	Auto	80	35	53	35
				MT	0	30	0	30
				HT	0	25	0	25
		Granlibakken Rd	West of Intersection	Auto	144	35	168	35
				MT	0	30	0	30

				HT	0	25	0	25
7	New SR 89 / SR 89 (New "WYE")	New SR 89	North of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		New SR 89	South of Intersection	Auto	1071	35	1156	35
				MT	51	30	55	30
				HT	21	25	23	25
		New SR 28	East of Intersection	Auto	1165	35	960	35
				MT	49	30	40	30
				HT	29	25	24	25
		Old SR 89	West of Intersection	Auto	1095	35	804	35
				MT	52	30	38	30
				HT	21	25	16	25
8	SR 89 / New SR 89 / Old SR 89	SR 89	North of Intersection	Auto	62	35	112	35
				MT	3	30	5	30
				HT	1	25	2	25
		Old SR 89	South of Intersection	Auto	1027	35	1162	35
				MT	48	30	55	30
				HT	20	25	23	25
		New SR 89	East of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	1156	35	1071	35
				MT	55	30	51	30
				HT	23	25	21	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-13: PM Peak Hour Traffic Volumes – Alternative 4 (2038)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	21	35	36	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89		East of Intersection	Auto	1162	35	943
			West of Intersection	MT	55	30	45	30
				HT	23	25	18	25
				Auto	1165	35	960	35
				MT	55	30	46	30
				HT	23	25	19	25
2	SR 89 / SR 28 ("Old Wye")	Save Mart Access	North of Intersection	Auto	146	35	139	35
		SR 89	MT	0	30	0	30	
			HT	0	25	0	25	
			Auto	357	35	287	35	
			MT	20	30	16	30	
			HT	8	25	7	25	
			SR 28	East of Intersection	Auto	1103	25	952
		SR 89		MT	26	20	22	20
				HT	16	15	13	15
			Auto	1156	35	1074	35	
			MT	55	30	51	30	
			HT	23	25	21	25	
5	New SR 89 / 64 Acres Access	64 Acres Access	North of Intersection	Auto	66	35	96	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	1147	35	1051	35
			West of Intersection	MT	65	30	59	30
				HT	27	25	24	25
				Auto	1153	35	1085	35
				MT	65	30	61	30

				HT	27	25	25	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	1003	35	1177	35
			South of Intersection	MT	57	30	66	30
				HT	23	25	27	25
		Tahoe Tavern Rd	East of Intersection	Auto	957	35	1084	35
				MT	54	30	61	30
				HT	22	25	25	25
		Granlibakken Rd	West of Intersection	Auto	80	35	53	35
				MT	0	30	0	30
				HT	0	25	0	25
				Auto	144	35	168	35
				MT	0	30	0	30
				HT	0	25	0	25
7	New SR 89 / SR 89 (New "WYE")	New SR 89	North of Intersection	Auto	0	35	0	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
		New SR 28	East of Intersection	Auto	1071	35	1156	35
				MT	51	30	55	30
				HT	21	25	23	25
		SR 89	West of Intersection	Auto	1165	35	960	35
				MT	49	30	40	30
				HT	29	25	24	25
				Auto	1095	35	804	35
				MT	52	30	38	30
				HT	21	25	16	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Table A-14: PM Peak Hour Traffic Volumes – Alternative 6 & 6A (2038)

No	Intersection Name	Roadway Name	Lanes Location	To TNM				
				Vehicle Type	NB	Speed	SB	Speed
					EB		WB	
1	SR 89 / Fairway Dr	Fairway Dr	North of Intersection	Auto	20	35	36	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
		SR 89	East of Intersection	Auto	1111	35	792	35
			West of Intersection	MT	53	30	38	30
				HT	22	25	16	25
				Auto	1095	35	790	35
				MT	52	30	38	30
				HT	21	25	15	25
2	SR 89 / SR 28 ("Wye") Alt 6	Save Mart Access	North of Intersection	Auto	186	35	202	35
		SR 89	South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	1024	35	1208	35
				MT	58	30	68	30
				HT	24	25	28	25
		SR 28	East of Intersection	Auto	1103	35	953	35
				MT	26	30	22	30
				HT	16	25	13	25
		SR 89	West of Intersection	Auto	1206	35	890	35
				MT	57	30	42	30
				HT	24	25	17	25
4	SR 89 / Tavern Shores Access	SR 89	North of Intersection	Auto	1045	35	1172	35
			South of Intersection	MT	59	30	66	30
				HT	24	25	27	25
				Auto	1046	35	1170	35
				MT	59	30	66	30
				HT	24	25	27	25
		Tavern Shores Access	East of Intersection	Auto	18	35	14	35
			West of Intersection	MT	0	30	0	30
				HT	0	25	0	25
				Auto	0	35	0	35
				MT	0	30	0	30

				HT	0	25	0	25
5	SR 89 / 64 Acres Access	SR 89	North of Intersection	Auto	1026	35	1150	35
			South of Intersection	MT	58	30	65	30
				HT	24	25	27	25
		64 Acres Access	East of Intersection	Auto	1012	35	1149	35
				MT	57	30	65	30
				HT	24	25	27	25
			West of Intersection	Auto	0	35	0	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	87	35	73	35
				MT	0	30	0	30
				HT	0	25	0	25
6	SR 89 / Granlibakken Rd	SR 89	North of Intersection	Auto	1000	35	1177	35
			South of Intersection	MT	56	30	66	30
				HT	23	25	27	25
		Granlibakken Rd	East of Intersection	Auto	957	35	1084	35
				MT	54	30	61	30
				HT	22	25	25	25
			West of Intersection	Auto	80	35	50	35
				MT	0	30	0	30
				HT	0	25	0	25
			West of Intersection	Auto	144	35	168	35
				MT	0	30	0	30
				HT	0	25	0	25
2	SR 89 / SR 28 ("WYE") Alt 6A	SR 89	North of Intersection	Auto	0	35	0	35
			South of Intersection	MT	0	30	0	30
				HT	0	25	0	25
		SR 28	East of Intersection	Auto	1024	35	1111	35
				MT	58	30	63	30
				HT	24	25	26	25
			West of Intersection	Auto	1194	25	960	25
				MT	28	20	22	20
				HT	17	15	14	15
			West of Intersection	Auto	1241	35	916	35
				MT	29	30	21	30
				HT	18	25	13	25

Notes:

TNM = Traffic Noise Model; EB = Eastbound; WB = Eastbound; NB = Northbound; SB = Southbound;

Auto = Automobiles; MT = Medium Truck; HT = Heavy Truck.

Source: Data compiled by AECOM in 2014

Appendix B TNM 2.5 Input and Output Data

CALIBRATION

EXISTING 2013

FUTURE (2018) NO-BUILD ALTERNATIVE

ALTERNATIVE 1 (2018)

ALTERNATIVE 2 (2018)

ALTERNATIVE 3 (2018)

ALTERNATIVE 4 (2018)

ALTERNATIVE 6 (2018)

ALTERNATIVE 6A (2018)

FUTURE (2038) NO-BUILD ALTERNATIVE

ALTERNATIVE 1 (2038)

ALTERNATIVE 2 (2038)

ALTERNATIVE 3 (2038)

ALTERNATIVE 4 (2038)

ALTERNATIVE 6 (2038)

ALTERNATIVE 6A (2038)

REFER TO CD-ROM

Appendix C TRPA - Community Noise Equivalent Level (CNEL) Analysis

C.1. CEQA Noise Analysis

The California Environmental Quality Act (CEQA) provides a broad basis for analyzing and abating highway traffic noise effects. CEQA requires a baseline (i.e., existing conditions) versus build analysis to assess whether a proposed project will have a noise impact. If a project is determined to have a significant noise impact under CEQA, then CEQA dictates that all feasible mitigation measures must be incorporated into the project. The analysis is provided in next sections. Because the proposed project would result in substantial noise level increases over corresponding modeled existing noise levels in the project area for build alternatives in 2018 and 2038, significant noise effect would occur under CEQA. Therefore, long-term effects would be significant. Mitigation measures are discussed under section C.3. “Noise Abatement”.

C.2. TRPA Noise Analysis

It is the Tahoe Regional Planning Agency’s (TRPA’s) purpose to implement its Regional Plan’s Goals and Policies, Land Use Element, and Noise Sub Element, and to attain and maintain the TRPA-required noise thresholds. TRPA regulates and evaluates traffic noise using the community noise equivalent level (CNEL) noise metric. CNEL is the time varying noise over a 24-hour period, with a weighting factor of 5 A-weighted decibels (dBA) applied to the hourly equivalent continuous sound level (L_{eq}) for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours), and a 10-dB weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). TRPA’s noise threshold standard for land uses within the State Route (SR) 28 and SR 89 corridors is 55 decibels (dB) CNEL. The FHWA Traffic Noise Model, version 2.5 (TNM 2.5) model was used to generate day, evening, and night (L_{den}) or CNEL noise levels. The TNM 2.5 model is the required prediction model for use on federally aided traffic noise studies. The traffic noise model results are summarized below.

C.2.1. TRPA Regional Plan

TRPA’s Code of Ordinances (Chapter 23, Section 23.8) states that TRPA-approved construction or maintenance project, or the demolition of structures, shall not be subject to TRPA noise standards provided such activities are limited to the hours between 8:00 a.m. and 6:30 p.m.

TRPA has adopted standards for noise, including single-event standards for aircraft and other motorized vehicles and standards for cumulative noise events measured in terms of the 24-hour average noise metric CNEL for various land use categories and transportation corridors. CNEL is the time varying noise over a 24-hour period, with a 5-dB weighting

factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours), and a 10 dB weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). The standards, established in the TRPA Code of Ordinances Goals and Policies, apply to the entire Lake Tahoe Region. Table 4-3 shows the TRPA noise threshold standards.

As a form of zoning, the TRPA has divided the Lake Tahoe Region into more than 175 separate Plan Areas. For each Plan Area, a “Statement” is made as to how that particular area should be regulated to achieve regional environmental and land uses objectives. As part of each “Statement,” an outdoor CNEL standard has been established, based on the “Thresholds.”

C.2.2. Community Plan Criteria

TRPA has established noise standards in community noise equivalent levels (CNEL) measured in dBA over a 24 hour period. TRPA Thresholds are 65 CNEL for commercial areas, 55 CNEL for residential and urban recreation, and 55 CNEL for highway corridors. Based on CNEL values for transportation corridors, 55 dBA CNEL would be applied for SR 28 and SR 89, as also shown in Table 4-3. Maximum Allowable Noise Levels (dBA) for motor vehicles less than or equal to 6,000 GVW, 76.0 dBA at 50 feet when traveling less than or equal to 35 mph for motor vehicles greater than 6,000 GVW, 82.0 dBA at 50 feet when traveling greater than 35 mph.

TRPA considers the following situations as a significant increase in noise levels:

- a CNEL increase of 3 dB;
- any exceedance of the Plan Area Statement noise standards; or
- any exceedance of other federal, state, or local jurisdiction’s noise standards with jurisdiction in the Basin.

TRPA thresholds establish different limits for different uses. The noise limitations of Chapter 23 of the TRPA Code apply; however, the Community Plan Area Statement establishes equal or superior standards pursuant to the noise thresholds. Placer County will use the TRPA and CP rules for noise. The maximum cumulative noise equivalent levels for Tahoe City Community Plan area are as follows:

- Where applicable, a maximum 55 CNEL override for the Highway 28 and Highway 89 corridors is permissible.

- The maximum CNEL for Special Areas #3 and #4 and #5 is 55 CNEL.
- The maximum CNEL for all areas of the Community Plan except as noted in 1 and 2 above is 65 CNEL.
- The maximum CNEL for Shorezone Tolerance Districts 4, 6 and 7 is 55 CNEL and the maximum for the lakezone is 50 CNEL.

Figure 3 of the Tahoe City Community Plan (attached at the end of this section) shows Specials areas within the Community Plan Area Boundary. All the receivers studied under this project are located within Special areas 1 through 5. Therefore, based on the CNEL standards of the Tahoe City Community Plan area, the threshold for all receivers would be considered as 55 dB CNEL.

C.2.3. Predicted Noise Levels—Site Geometry and Traffic

CNEL or Day Evening Night (L_{den}) noise levels were predicted using TNM 2.5 for 2018 and 2038 No-Build and build alternatives: the No-Build Alternative, Alternative 1 (Figure 2-4), Alternative 2 (Figure 2-5), Alternative 3 (Figure 2-6), Alternative 4 (Figure 2-7), Alternative 6 (Figure 2-8), and Alternative 6A (Figure 2-9). Existing and future ADT volumes on SR 28 and SR 89 were taken from the project traffic report (Wood Rodgers 2013). Speeds were developed from posted speed limits. Vehicle mixes for SR 89 and SR 28 were taken from the *Annual Average Daily Truck Traffic on the California State Highway System* (Caltrans 2012). The traffic mix used for West SR 89 was 94 percent automobile, 4 percent medium trucks, and 2 percent heavy trucks. The traffic mix used for South SR 89 was 93 percent automobile, 5 percent medium trucks, and 2 percent heavy trucks. Also, the traffic mix used for SR 28 was 96 percent automobile, 3 percent medium trucks, and 1 percent heavy trucks.

Future traffic speeds and vehicle mixes on all project area roadways were assumed to be the same as those used under existing conditions. The day, evening, and night percentages for automobiles, medium trucks, and heavy trucks; and also ADT volumes used in TNM 2.5 for predicting the L_{den} (CNEL) noise levels for existing and 2018 and 2038 No-Build and build alternatives, are provided in Appendix D. Receiver and building locations and elevations were taken from topographic survey data provided by the project engineer (AECOM 2013). Existing and future roadway geometric data were developed from project design drawings provided by the traffic engineer (Wood Rodgers 2012). Appendix E provides the model input and output sheets for both the No-Build Alternative and 2018 and 2038 build alternatives.

C.2.4. Traffic Noise Impacts (CNEL) – 2018 Alternatives

Predicted noise levels for the year 2018 No Build Alternative and Alternatives 1 through 6A as well as Existing 2013 condition are shown in Table C-1. Receiver locations are shown in Figure 5-1. The CNEL standard is 55 dBA in all special areas within the project boundary. Under the 2018 No-Build Alternative, noise levels would exceed the TRPA “CNEL standard” of 55 dBA CNEL at the golf course, represented by receiver ST-01; at residential receivers R-09, and R-57; at outdoor recreational areas represented by receivers R-19, ST-03, and ST-05; and at exterior locations of the hotels, represented by receivers R-16, R-18, R-40, R-43, R-51, R-53, R-54, and ST-02. Predicted noise levels at all other hotels under the No-Build Alternative would range from 43.1 to 54.8 dBA CNEL. Noise levels also would exceed the TRPA “CNEL standard” of 55 dBA CNEL at commercial/governmental receivers, represented by R-03 through R-07, R-21, through R-31, R-35, R-36, R-45, R-46, and R-56; and also at a driveway represented by LT-01. Also, trails within 64-Acre area that are represented by receivers R-32 and R-33 would exceed the TRPA “CNEL Standard” of 55 dBA CNEL. With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived;
- A change in noise levels of 3 dB is considered a just-perceivable difference;
- A change in level of at least 5 dB is required before any noticeable change in human response would be expected; and
- A 10 dB change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

The increases in traffic noise levels under 2018 No-Build Alternative over existing condition would range from 0.6 to 1.5 dB, which are less than 3 dB. These increases in noise levels would be caused by forecasted increases in traffic volumes (Wood Rodgers 2013).

As shown in Table C-1, the noise level increases associated with build alternatives over the No-Build Alternative would range between -21.5 and 8.5 dB CNEL. As with the 2018 No-Build Alternative, the primary cause of the noise level change would be the forecasted increases in traffic volumes. However, unlike with the No-Build Alternative, some noise level changes would result from the proposed SR 89 alignment under each build alternative. Particularly, the decreases in future build noise levels would be caused

Table C-1: Predicted 2018 Noise Levels (CNEL)

Receiver I.D.	Location or Address	Land Use	NU	Standard (CNEL)	Existing	No-Build 2018 Alternative			Alternative 1 (2018)				Alternative 2 (2018)				Alternative 3 (2018)			
					Predicted Noise Level	Predicted Noise Level	Increase over Existing	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type
					(dBA L _{eq})	(dBA L _{eq})	dB		(dBA L _{eq})	dB	dB		(dBA L _{eq})	dB	dB		(dBA L _{eq})	dB	dB	
LT-01	Tahoe Marina Lodge, Macinaw Rd	Driveway	0	NA	63.4	64.9	1.5	NA	64.1	0.7	-0.8	NA	64.6	1.2	-0.3	NA	64.6	1.2	-0.3	NA
R-01	255 N Lake Blvd	Hotel/Yard	0	55	48.6	49.9	1.3	None	48.9	0.3	-1.0	None	49.1	0.5	-0.8	None	49.1	0.5	-0.8	None
R-02	N Lake Blvd	Commercial	0	55	52.9	54.2	1.3	None	53.2	0.3	-1.0	None	53.4	0.5	-0.8	None	53.5	0.6	-0.7	None
R-03	Undeveloped\West of SaveMart	Commercial	0	55	63.9	64.6	0.7	Exceed	63.9	1.0	-0.7	Exceed	62.0	-1.9	-2.6	Exceed	64.1	0.2	-0.5	Exceed
R-04	Fairway Dr	Commercial	0	55	58.6	59.3	0.7	Exceed	58.5	-0.1	-0.8	Exceed	57.4	-1.2	-1.9	Exceed	58.9	0.3	-0.4	Exceed
R-05	Fairway Dr	Commercial	0	55	57.6	58.4	0.8	Exceed	58.4	0.8	0.0	Exceed	57.2	-0.4	-1.2	Exceed	58.7	1.1	0.3	Exceed
R-06	W River Rd	Governmental	0	55	55.9	56.6	0.7	Exceed	57.4	1.5	0.8	Exceed	57.0	1.1	0.4	Exceed	58.0	2.1	1.4	Exceed
R-07	W River Rd	Commercial	0	55	56.8	57.4	0.6	Exceed	57.6	0.8	0.2	Exceed	57.3	0.5	-0.1	Exceed	57.6	0.8	0.2	Exceed
R-08	W River Rd	Commercial	0	55	50.4	51.0	0.6	None	51.3	0.9	0.3	None	51.3	0.9	0.3	None	51.3	0.9	0.3	None
R-09	W River Rd	Residential	1	55	62.1	62.7	0.6	Exceed	62.8	0.7	0.1	Exceed	62.8	0.7	0.1	Exceed	62.8	0.7	0.1	Exceed
R-10	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	50.2	51.7	1.5	None	51.0	0.8	-0.7	None	51.6	1.4	-0.1	None	51.6	1.4	-0.1	None
R-11	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	44.9	46.2	1.3	None	45.1	0.2	-1.1	None	45.3	0.4	-0.9	None	45.3	0.4	-0.9	None
R-12	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.1	47.0	0.9	None	43.8	-2.3	-3.2	None	42.0	-4.1	-5.0	None	42.2	-3.9	-4.8	None
R-13	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	41.6	43.1	1.5	None	42.3	0.7	-0.8	None	42.8	1.2	-0.3	None	42.8	1.2	-0.3	None
R-14	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	47.4	48.4	1.0	None	46.8	-0.6	-1.6	None	46.1	-1.3	-2.3	None	46.3	-1.1	-2.1	None
R-15	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.5	48.0	1.5	None	47.2	0.7	-0.8	None	47.7	1.2	-0.3	None	47.7	1.2	-0.3	None
R-16	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.6	55.4	0.8	Exceed	51.1	-3.5	-4.3	None	43.6	-11.0	-11.8	None	43.8	-10.8	-11.6	None
R-17	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	53.0	53.7	0.7	None	49.9	-3.1	-3.8	None	43.8	-9.2	-9.9	None	44.1	-8.9	-9.6	None
R-18	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.5	55.3	0.8	Exceed	50.8	-3.7	-4.5	None	45.9	-8.6	-9.4	None	46.2	-8.3	-9.1	None
R-19	Tahoe Marina Lodge, Macinaw Rd	Hotel/Pool	0	55	54.7	55.5	0.8	Exceed	51.9	-2.8	-3.6	None	46.6	-8.1	-8.9	None	46.8	-7.9	-8.7	None
R-20	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	49.4	50.4	1.0	None	48.0	-1.4	-2.4	None	46.6	-2.8	-3.8	None	46.7	-2.7	-3.7	None
R-21	Macinaw Rd	Commercial	0	55	57.9	58.8	0.9	Exceed	55.9	-2.0	-2.9	Exceed	52.4	-5.5	-6.4	None	52.4	-5.5	-6.4	None
R-22	Macinaw Rd	Commercial	0	55	60.3	61.0	0.7	Exceed	57.0	-3.3	-4.0	Exceed	49.0	-11.3	-12.0	None	49.2	-11.1	-11.8	None
R-23	Macinaw Rd	Commercial	0	55	64.0	65.0	1.0	Exceed	63.6	-0.4	-1.4	Exceed	62.1	-1.9	-2.9	Exceed	62.3	-1.7	-2.7	Exceed
R-24	W Lake Blvd	Commercial	0	55	66.5	67.3	0.8	Exceed	65.7	-0.8	-1.6	Exceed	60.6	-5.9	-6.7	Exceed	61.2	-5.3	-6.1	Exceed
R-25	W River Rd	Commercial	0	55	63.0	63.7	0.7	Exceed	63.0	0.0	-0.7	Exceed	60.4	-2.6	-3.3	Exceed	63.4	0.4	-0.3	Exceed
R-26	W Lake Blvd	Commercial	0	55	69.2	69.9	0.7	Exceed	65.9	-3.3	-4.0	Exceed	48.4	-20.8	-21.5	None	49.2	-20.0	-20.7	None
R-27	W River Rd	Commercial	0	55	62.0	62.7	0.7	Exceed	59.1	-2.9	-3.6	Exceed	51.2	-10.8	-11.5	None	52.4	-9.6	-10.3	None
R-28	W River Rd	Commercial	0	55	61.3	62.0	0.7	Exceed	58.4	-2.9	-3.6	Exceed	52.6	-8.7	-9.4	None	53.9	-7.4	-8.1	None
R-29	W River Rd	Commercial	0	55	59.9	60.6	0.7	Exceed	58.0	-1.9	-2.6	Exceed	55.4	-4.5	-5.2	Exceed	56.7	-3.2	-3.9	Exceed
R-30	W River Rd	Commercial	0	55	59.9	60.6	0.7	Exceed	58.5	-1.4	-2.1	Exceed	57.3	-2.6	-3.3	Exceed	58.4	-1.5	-2.2	Exceed
R-31	W Lake Blvd	Commercial	0	55	62.3	63.0	0.7	Exceed	59.9	-2.4	-3.1	Exceed	53.3	-9.0	-9.7	None	55.1	-7.2	-7.9	Exceed
R-32	Tahoe Rim Trails	Trail	0	55	57.4	58.1	0.7	Exceed	56.6	-0.8	-1.5	Exceed	55.0	-2.4	-3.1	Exceed	56.1	-1.3	-2.0	Exceed
R-33	Tahoe Rim Trails	Trail	0	55	60.4	61.1	0.7	Exceed	61.4	1.0	0.3	Exceed	61.2	0.8	0.1	Exceed	62.2	1.8	1.1	Exceed
R-34	Tahoe Rim Trails	Trail	0	55	52.7	53.4	0.7	None	60.5	7.8	7.1	Substantial	61.9	9.2	8.5	Substantial	61.8	9.1	8.4	Substantial
R-35	176 W Lake Blvd	Commercial	0	55	70.1	70.8	0.7	Exceed	66.4	-3.7	-4.4	Exceed	52.9	-17.2	-17.9	None	53.4	-16.7	-17.4	None
R-36	Tahoe Tavern Rd	Commercial	0	55	58.1	58.9	0.8	Exceed	54.7	-3.4	-4.2	None	48.9	-9.2	-10.0	None	49.1	-9.0	-9.8	None
R-37	217 Tavern Shores	Hotel	4	55	50.4	51.2	0.8	None	47.9	-2.5	-3.3	None	43.9	-6.5	-7.3	None	44.1	-6.3	-7.1	None
R-38	217 Tavern Shores	Hotel	4	55	46.3	47.1	0.8	None	44.1	-2.2	-3.0	None	41.4	-4.9	-5.7	None	41.4	-4.9	-5.7	None
R-39	217 Tavern Shores	Hotel	4	55	50.4	51.2	0.8	None	47.9	-2.5	-3.3	None	44.7	-5.7	-6.5	None	44.8	-5.6	-6.4	None
R-40	217 Tavern Shores	Hotel	4	55	63.9	64.6	0.7	Exceed	59.8	-4.1	-4.8	Exceed	52.0	-11.9	-12.6	None	52.6	-11.3	-12.0	None
R-41	217 Tavern Shores	Hotel	4	55	51.1	51.8	0.7	None	48.8	-2.3	-3.0	None	45.4	-5.7	-6.4	None	45.4	-5.7	-6.4	None
R-42	217 Tavern Shores	Hotel	4	55	54.0	54.8	0.8	None	51.7	-2.3	-3.1	None	45.6	-8.4	-9.2	None	45.8	-8.2	-9.0	None
R-43	217 Tavern Shores	Hotel	4	55	58.1	58.8	0.7	Exceed	54.1	-4.0	-4.7	None	46.0	-12.1	-12.8	None	46.9	-11.2	-11.9	None
R-44	217 Tavern Shores	Hotel	4	55	50.7	51.4	0.7	None	49.6	-1.1	-1.8	None	47.4	-3.3	-4.0	None	47.4	-3.3	-4.0	None
R-45	W River Rd	Governmental	0	55	54.5	55.1	0.6	Exceed	55.9	1.4	0.8	Exceed	56.2	1.7	1.1	Exceed	56.2	1.7	1.1	Exceed
R-46	W River Rd	Governmental	0	55	57.6	58.2	0.6	Exceed	58.2	0.6	0.0	Exceed	58.3	0.7	0.1	Exceed	58.2	0.6	0.0	Exceed
R-47	W River Rd	Governmental	0	55	53.6	54.2	0.6	None	54.3	0.7	0.1	None	54.3	0.7	0.1	None	54.3	0.7	0.1	None
R-48	W River Rd	Residential	1	55	53.1	53.7	0.6	None	53.9	0.8	0.2	None	54.1	1.0	0.4	None	54.1	1.0	0.4	None
R-49	W River Rd	Residential	1	55	48.6	49.3	0.7	None	49.2	0.6	-0.1	None	49.6	1.0	0.3	None	49.6	1.0	0.3	None
R-50	217 Tavern Shores	Hotel	4	55	44.4	45.2	0.8	None	41.4	-3.0	-3.8	None	37.8	-6.6	-7.4	None	37.8	-6.6	-7.4	None
R-51	217 Tavern Shores	Hotel	4	55	64.0	64.7	0.7	Exceed	64.6	0.6	-0.1	Exceed	64.5	0.5	-0.2	Exceed	64.6	0.6	-0.1	Exceed

R-52	217 Tavern Shores	Hotel	4	55	45.8	46.5	0.7	None	46.8	1.0	0.3	None	46.8	1.0	0.3	None	46.9	1.1	0.4	None
R-53	217 Tavern Shores	Hotel	4	55	63.6	64.3	0.7	Exceed	64.3	0.7	0.0	Exceed	64.1	0.5	-0.2	Exceed	64.3	0.7	0.0	Exceed
R-54	217 Tavern Shores	Hotel	4	55	61.1	61.9	0.8	Exceed	62.1	1.0	0.2	Exceed	62.1	1.0	0.2	Exceed	62.2	1.1	0.3	Exceed
R-55	217 Tavern Shores	Hotel	4	55	45.7	46.5	0.8	None	44.4	-1.3	-2.1	None	40.9	-4.8	-5.6	None	41.1	-4.6	-5.4	None
R-56	Tahoe Tree Company	Commercial	0	55	58.7	59.4	0.7	Exceed	59.5	0.8	0.1	Exceed	59.3	0.6	-0.1	Exceed	59.5	0.8	0.1	Exceed
R-57	Kimberly Dr	Residential	1	55	54.8	55.4	0.6	Exceed	55.8	1.0	0.4	Exceed	55.8	1.0	0.4	Exceed	56.1	1.3	0.7	Exceed
R-58	Kimberly Dr	Residential	1	55	53.7	54.3	0.6	None	55.0	1.3	0.7	Exceed	55.0	1.3	0.7	Exceed	55.3	1.6	1.0	Exceed
R-59	Kimberly Dr	Residential	1	55	52.4	53.1	0.7	None	53.9	1.5	0.8	None	53.9	1.5	0.8	None	54.3	1.9	1.2	None
R-60	Kimberly Dr	Residential	1	55	52.9	53.6	0.7	None	55.0	2.1	1.4	Exceed	55.3	2.4	1.7	Exceed	55.5	2.6	1.9	Exceed
R-61	Kimberly Dr	Residential	1	55	42.6	43.3	0.7	None	43.3	0.7	0.0	None	43.2	0.6	-0.1	None	43.3	0.7	0.0	None
ST-01	N Lake Blvd	Golf Course	0	55	62.1	63.1	1.0	Exceed	61.5	-0.6	-1.6	Exceed	60.3	-1.8	-2.8	Exceed	60.6	-1.5	-2.5	Exceed
ST-02	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.8	56.1	1.3	Exceed	54.6	-0.2	-1.5	None	54.7	-0.1	-1.4	None	54.6	-0.2	-1.5	None
ST-03	217 Tavern Shores	Hotel/Pool	0	55	63.0	63.7	0.7	Exceed	59.4	-3.6	-4.3	Exceed	49.8	-13.2	-13.9	None	50.2	-12.8	-13.5	None
ST-04	411 Kimberly Dr	Residential	1	55	53.0	53.7	0.7	None	54.9	1.9	1.2	None	55.1	2.1	1.4	Exceed	55.4	2.4	1.7	Exceed
ST-05	217 Tavern Shores	Hotel/Tennis Court	0	55	66.6	67.3	0.7	Exceed	67.6	1.0	0.3	Exceed	67.5	0.9	0.2	Exceed	67.6	1.0	0.3	Exceed

Table C-1: Predicted 2018 Noise Levels (CNEL) (Continued)

Receiver I.D.	Location or Address	Land Use	NU	Standard (CNEL)	Existing	No-Build 2018 Alternative			Alternative 4 (2018)				Alternative 6 (2018)				Alternative 6A (2018)			
					Predicted Noise Level	Predicted Noise Level	Increase over Existing	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type
					(dBA L _{eq})	(dBA L _{eq})	dB		(dBA L _{eq})	dB	dB		(dBA L _{eq})	dB	dB		(dBA L _{eq})	dB	dB	
LT-01	Tahoe Marina Lodge, Macinaw Rd	Driveway	0	NA	63.4	64.9	1.5	NA	64.6	1.2	-0.3	NA	65.6	2.2	0.7	NA	64.1	0.7	-0.8	NA
R-01	255 N Lake Blvd	Hotel/Yard	0	55	48.6	49.9	1.3	None	49.0	0.4	-0.9	None	49.9	1.3	0.0	None	49.6	1.0	-0.3	None
R-02	N Lake Blvd	Commercial	0	55	52.9	54.2	1.3	None	53.3	0.4	-0.9	None	53.1	0.2	-1.1	None	52.4	-0.5	-1.8	None
R-03	Undeveloped\West of SaveMart	Commercial	0	55	63.9	64.6	0.7	Exceed	62.0	1.0	-2.6	Exceed	64.2	1.0	-0.4	Exceed	62.0	1.0	-2.6	Exceed
R-04	Fairway Dr	Commercial	0	55	58.6	59.3	0.7	Exceed	58.8	0.2	-0.5	Exceed	58.8	0.2	-0.5	Exceed	58.8	0.2	-0.5	Exceed
R-05	Fairway Dr	Commercial	0	55	57.6	58.4	0.8	Exceed	59.3	1.7	0.9	Exceed	57.9	0.3	-0.5	Exceed	57.4	-0.2	-1.0	Exceed
R-06	W River Rd	Governmental	0	55	55.9	56.6	0.7	Exceed	62.6	6.7	6.0	Substantial	56.5	0.6	-0.1	Exceed	56.4	0.5	-0.2	Exceed
R-07	W River Rd	Commercial	0	55	56.8	57.4	0.6	Exceed	59.8	3.0	2.4	Exceed	57.2	0.4	-0.2	Exceed	57.1	0.3	-0.3	Exceed
R-08	W River Rd	Commercial	0	55	50.4	51.0	0.6	None	53.1	2.7	2.1	None	51.0	0.6	0.0	None	50.9	0.5	-0.1	None
R-09	W River Rd	Residential	1	55	62.1	62.7	0.6	Exceed	63.0	0.9	0.3	Exceed	62.7	0.6	0.0	Exceed	62.7	0.6	0.0	Exceed
R-10	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	50.2	51.7	1.5	None	51.6	1.4	-0.1	None	52.1	1.9	0.4	None	51.6	1.4	-0.1	None
R-11	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	44.9	46.2	1.3	None	45.3	0.4	-0.9	None	45.8	0.9	-0.4	None	45.3	0.4	-0.9	None
R-12	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.1	47.0	0.9	None	42.8	-3.3	-4.2	None	44.4	-1.7	-2.6	None	43.7	-2.4	-3.3	None
R-13	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	41.6	43.1	1.5	None	42.8	1.2	-0.3	None	42.7	1.1	-0.4	None	42.8	1.2	-0.3	None
R-14	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	47.4	48.4	1.0	None	46.6	-0.8	-1.8	None	47.4	0.0	-1.0	None	46.6	-0.8	-1.8	None
R-15	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.5	48.0	1.5	None	47.7	1.2	-0.3	None	47.9	1.4	-0.1	None	47.7	1.2	-0.3	None
R-16	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.6	55.4	0.8	Exceed	43.1	-11.5	-12.3	None	51.0	-3.6	-4.4	None	49.3	-5.3	-6.1	None
R-17	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	53.0	53.7	0.7	None	44.8	-8.2	-8.9	None	49.7	-3.3	-4.0	None	48.2	-4.8	-5.5	None
R-18	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.5	55.3	0.8	Exceed	45.6	-8.9	-9.7	None	52.3	-2.2	-3.0	None	51.7	-2.8	-3.6	None
R-19	Tahoe Marina Lodge, Macinaw Rd	Hotel/Pool	0	55	54.7	55.5	0.8	Exceed	47.2	-7.5	-8.3	None	51.7	-3.0	-3.8	None	50.3	-4.4	-5.2	None
R-20	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	49.4	50.4	1.0	None	46.8	-2.6	-3.6	None	48.3	-1.1	-2.1	None	47.7	-1.7	-2.7	None
R-21	Macinaw Rd	Commercial	0	55	57.9	58.8	0.9	Exceed	52.2	-5.7	-6.6	None	55.8	-2.1	-3.0	Exceed	54.7	-3.2	-4.1	None
R-22	Macinaw Rd	Commercial	0	55	60.3	61.0	0.7	Exceed	48.4	-11.9	-12.6	None	56.8	-3.5	-4.2	Exceed	55.7	-4.6	-5.3	Exceed
R-23	Macinaw Rd	Commercial	0	55	64.0	65.0	1.0	Exceed	61.8	-2.2	-3.2	Exceed	64.0	0.0	-1.0	Exceed	60.2	-3.8	-4.8	Exceed
R-24	W Lake Blvd	Commercial	0	55	66.5	67.3	0.8	Exceed	59.4	-7.1	-7.9	Exceed	66.3	-0.2	-1.0	Exceed	62.7	-3.8	-4.6	Exceed
R-25	W River Rd	Commercial	0	55	63.0	63.7	0.7	Exceed	62.1	-0.9	-1.6	Exceed	63.2	0.2	-0.5	Exceed	61.5	-1.5	-2.2	Exceed
R-26	W Lake Blvd	Commercial	0	55	69.2	69.9	0.7	Exceed	51.0	-18.2	-18.9	None	66.6	-2.6	-3.3	Exceed	65.0	-4.2	-4.9	Exceed
R-27	W River Rd	Commercial	0	55	62.0	62.7	0.7	Exceed	52.9	-9.1	-9.8	None	59.4	-2.6	-3.3	Exceed	57.4	-4.6	-5.3	Exceed
R-28	W River Rd	Commercial	0	55	61.3	62.0	0.7	Exceed	54.5	-6.8	-7.5	None	59.2	-2.1	-2.8	Exceed	56.1	-5.2	-5.9	Exceed
R-29	W River Rd	Commercial	0	55	59.9	60.6	0.7	Exceed	57.3	-2.6	-3.3	Exceed	58.7	-1.2	-1.9	Exceed	56.9	-3.0	-3.7	Exceed
R-30	W River Rd	Commercial	0	55	59.9	60.6	0.7	Exceed	58.5	-1.4	-2.1	Exceed	59.4	-0.5	-1.2	Exceed	58.6	-1.3	-2.0	Exceed
R-31	W Lake Blvd	Commercial	0	55	62.3	63.0	0.7	Exceed	54.8	-7.5	-8.2	None	60.2	-2.1	-2.8	Exceed	58.4	-3.9	-4.6	Exceed
R-32	Tahoe Rim Trails	Trail	0	55	57.4	58.1	0.7	Exceed	56.9	-0.5	-1.2	Exceed	56.9	-0.5	-1.2	Exceed	56.2	-1.2	-1.9	Exceed
R-33	Tahoe Rim Trails	Trail	0	55	60.4	61.1	0.7	Exceed	65.1	4.7	4.0	Exceed	61.0	0.6	-0.1	Exceed	60.3	-0.1	-0.8	Exceed
R-34	Tahoe Rim Trails	Trail	0	55	52.7	53.4	0.7	None	61.4	8.7	8.0	Substantial	53.0	0.3	-0.4	None	52.6	-0.1	-0.8	None

R-35	176 W Lake Blvd	Commercial	0	55	70.1	70.8	0.7	Exceed	52.2	-17.9	-18.6	None	64.9	-5.2	-5.9	Exceed	64.5	-5.6	-6.3	Exceed
R-36	Tahoe Tavern Rd	Commercial	0	55	58.1	58.9	0.8	Exceed	48.9	-9.2	-10.0	None	57.7	-0.4	-1.2	Exceed	57.7	-0.4	-1.2	Exceed
R-37	217 Tavern Shores	Hotel	4	55	50.4	51.2	0.8	None	44.2	-6.2	-7.0	None	50.5	0.1	-0.7	None	50.4	0.0	-0.8	None
R-38	217 Tavern Shores	Hotel	4	55	46.3	47.1	0.8	None	40.7	-5.6	-6.4	None	46.4	0.1	-0.7	None	46.3	0.0	-0.8	None
R-39	217 Tavern Shores	Hotel	4	55	50.4	51.2	0.8	None	44.8	-5.6	-6.4	None	49.9	-0.5	-1.3	None	49.7	-0.7	-1.5	None
R-40	217 Tavern Shores	Hotel	4	55	63.9	64.6	0.7	Exceed	52.5	-11.4	-12.1	None	62.7	-1.2	-1.9	Exceed	62.4	-1.5	-2.2	Exceed
R-41	217 Tavern Shores	Hotel	4	55	51.1	51.8	0.7	None	45.2	-5.9	-6.6	None	51.4	0.3	-0.4	None	51.2	0.1	-0.6	None
R-42	217 Tavern Shores	Hotel	4	55	54.0	54.8	0.8	None	46.6	-7.4	-8.2	None	50.9	-3.1	-3.9	None	49.2	-4.8	-5.6	None
R-43	217 Tavern Shores	Hotel	4	55	58.1	58.8	0.7	Exceed	48.2	-9.9	-10.6	None	57.5	-0.6	-1.3	Exceed	57.2	-0.9	-1.6	Exceed
R-44	217 Tavern Shores	Hotel	4	55	50.7	51.4	0.7	None	48.0	-2.7	-3.4	None	51.2	0.5	-0.2	None	51.2	0.5	-0.2	None
R-45	W River Rd	Governmental	0	55	54.5	55.1	0.6	Exceed	59.1	4.6	4.0	Exceed	55.0	0.5	-0.1	Exceed	54.9	0.4	-0.2	None
R-46	W River Rd	Governmental	0	55	57.6	58.2	0.6	Exceed	59.1	1.5	0.9	Exceed	58.1	0.5	-0.1	Exceed	58.1	0.5	-0.1	Exceed
R-47	W River Rd	Governmental	0	55	53.6	54.2	0.6	None	54.6	1.0	0.4	None	54.2	0.6	0.0	None	54.2	0.6	0.0	None
R-48	W River Rd	Residential	1	55	53.1	53.7	0.6	None	55.9	2.8	2.2	Exceed	53.7	0.6	0.0	None	53.6	0.5	-0.1	None
R-49	W River Rd	Residential	1	55	48.6	49.3	0.7	None	52.0	3.4	2.7	None	49.1	0.5	-0.2	None	49.0	0.4	-0.3	None
R-50	217 Tavern Shores	Hotel	4	55	44.4	45.2	0.8	None	37.8	-6.6	-7.4	None	42.8	-1.6	-2.4	None	43.2	-1.2	-2.0	None
R-51	217 Tavern Shores	Hotel	4	55	64.0	64.7	0.7	Exceed	64.7	0.7	0.0	Exceed	65.5	1.5	0.8	Exceed	65.5	1.5	0.8	Exceed
R-52	217 Tavern Shores	Hotel	4	55	45.8	46.5	0.7	None	47.1	1.3	0.6	None	46.5	0.7	0.0	None	46.4	0.6	-0.1	None
R-53	217 Tavern Shores	Hotel	4	55	63.6	64.3	0.7	Exceed	64.6	1.0	0.3	Exceed	65.1	1.5	0.8	Exceed	65.1	1.5	0.8	Exceed
R-54	217 Tavern Shores	Hotel	4	55	61.1	61.9	0.8	Exceed	62.8	1.7	0.9	Exceed	62.4	1.3	0.5	Exceed	62.4	1.3	0.5	Exceed
R-55	217 Tavern Shores	Hotel	4	55	45.7	46.5	0.8	None	38.8	-6.9	-7.7	None	45.8	0.1	-0.7	None	45.5	-0.2	-1.0	None
R-56	Tahoe Tree Company	Commercial	0	55	58.7	59.4	0.7	Exceed	59.6	0.9	0.2	Exceed	59.3	0.6	-0.1	Exceed	59.3	0.6	-0.1	Exceed
R-57	Kimberly Dr	Residential	1	55	54.8	55.4	0.6	Exceed	58.3	3.5	2.9	Exceed	55.2	0.4	-0.2	Exceed	54.7	-0.1	-0.7	None
R-58	Kimberly Dr	Residential	1	55	53.7	54.3	0.6	None	57.7	4.0	3.4	Exceed	54.1	0.4	-0.2	None	53.6	-0.1	-0.7	None
R-59	Kimberly Dr	Residential	1	55	52.4	53.1	0.7	None	57.1	4.7	4.0	Exceed	53.0	0.6	-0.1	None	52.8	0.4	-0.3	None
R-60	Kimberly Dr	Residential	1	55	52.9	53.6	0.7	None	57.8	4.9	4.2	Exceed	53.2	0.3	-0.4	None	53.2	0.3	-0.4	None
R-61	Kimberly Dr	Residential	1	55	42.6	43.3	0.7	None	44.9	2.3	1.6	None	43.1	0.5	-0.2	None	42.1	-0.5	-1.2	None
ST-01	N Lake Blvd	Golf Course	0	55	62.1	63.1	1.0	Exceed	59.7	-2.4	-3.4	Exceed	61.6	-0.5	-1.5	Exceed	58.6	-3.5	-4.5	Exceed
ST-02	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.8	56.1	1.3	Exceed	54.6	-0.2	-1.5	None	55.7	0.9	-0.4	Exceed	55.1	0.3	-1.0	Exceed
ST-03	217 Tavern Shores	Hotel/Pool	0	55	63.0	63.7	0.7	Exceed	49.6	-13.4	-14.1	None	58.8	-4.2	-4.9	Exceed	58.1	-4.9	-5.6	Exceed
ST-04	411 Kimberly Dr	Residential	1	55	53.0	53.7	0.7	None	58.4	5.4	4.7	Substantial	53.4	0.4	-0.3	None	53.1	0.1	-0.6	None
ST-05	217 Tavern Shores	Hotel/Tennis Court	0	55	66.6	67.3	0.7	Exceed	67.6	1.0	0.3	Exceed	67.7	1.1	0.4	Exceed	67.7	1.1	0.4	Exceed

Notes:
NU = Number of Representing Units; CNEL = community equivalent noise level; dBA = A-weighted decibels; NA = not applicable;
Noise levels reported for Hotel receivers are reduced by 20 dB to represent interior noise levels.
Source: Data compiled by AECOM in 2014

by closing the existing north bound and south bound lanes of SR 89, which would result in reduced noise levels on receivers located along those segments.

Impacts have been identified under all 2018 build alternatives. However, all the impacted receivers were also approaching or exceeded the TRPA “CNEL standard” of 55 dBA CNEL under existing and the No-Build Alternative. Locations that would be impacted as a result of relocation of the SR 89 (Alternatives 1 through 4) and the increases in noise levels caused by the proposed project over the Existing and 2018 No-Build Alternative, are summarized in Table C-2. Receivers R-06, R-07, and R-45 would be located near the new intersection between New SR 89 and West SR 89; similarly, receivers R-33 and R-34 within 64-Acre Tract just north of the New SR 89 alignment, and receivers R-58 through R-60 to the south closest to New SR 89 alignment. The increases that would be caused from relocated SR 89 roadway under Alternatives 1 through 4 over Existing and No-Build Alternative conditions would be up to 9.2 dB, depending on the traffic volumes under each alternative at these locations, and on the distance and topography of the area between each receiver and the New SR 89 alignment.

Table C-2: 2018 Build Alternatives—Noise Level Increases

Receiver ID	Land Use	Change from Existing (dB)				Change from No-Build (dBA)			
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 1	Alt. 2	Alt. 3	Alt. 4
R-06	Governmental	1.5	1.1	2.1	6.7	0.8	0.4	1.4	6
R-07	Commercial	0.8	0.5	0.8	3	0.2	-0.1	0.2	2.4
R-33	Trail	1.0	0.8	1.8	4.7	0.3	0.1	1.1	4
R-34	Trail	7.8	9.2	9.1	8.7	7.1	8.5	8.4	8
R-45	Governmental	1.4	1.7	1.7	4.6	0.8	1.1	1.1	4
R-58	Residential	1.3	1.3	1.6	4	0.7	0.7	1	3.4
R-59	Residential	1.5	1.5	1.9	4.7	0.8	0.8	1.2	4
R-60	Residential	2.1	2.4	2.6	4.9	1.4	1.7	1.9	4.2
ST-04	Residential	1.9	2.1	2.4	5.4	1.2	1.4	1.7	4.7

Note: dBA = A-weighted decibels
Source: Data compiled by AECOM in 2014

As shown in Table C-1, and summarized in Table C-2, noise levels at receivers R-06, R-07, R-33, R-34, R-45, R-49, R-57 through R-60, and ST-04 increase 3 dB or more under Alternative 4 over the Existing and No Build conditions. All these receivers are located in the vicinity of New SR 89 and the two intersections of New SR 89 with existing SR 89 (Figure 5-1). Therefore, the increase in noise levels at these locations are mainly for realignment of SR 89 under Alternatives 1 through 4, that add a new noise source (New SR 89) closer to these receivers. Assuming an increase of 5 dB or more over existing condition (conservatively) as a substantial increase for the project area, receiver R-34

shows a substantial increase of 8 dB and above under Alternatives 1 through 4 relative to Existing and No Build conditions. This receiver is representing a trail, which is located just south of the New SR 89, and would be exposed to a higher noise increase than other receivers near the New SR 89.

Also, receiver R-06 would have a substantial increase of at least 6 dB under Alternative 4 with respect to Existing and No Build conditions. This receiver is representing a parking lot of a governmental unit located to the north close to the new intersection of West SR 89 and New SR 89, therefore, exposed to a higher noise increase relative to the other receivers near the New SR 89 intersection with West SR 89. Similarly, ST-04 representing a residential unit to the south near the new SR 89 intersection would be exposed to a substantial increase of 5 dB or more under Alternative 4. Under Alternatives 1 through 3, the traffic volumes along the road segments affecting these locations are lower than Alternative 4. Increases in noise levels at all other locations under the Alternatives 1 through 4, 6 and 6A would be less than 3 dB.

C.2.5. Traffic Noise Impacts (CNEL) – 2038 Alternatives

Predicted noise levels for the year 2038 No Build Alternative and Alternatives 1 through 4, 6 and 6A as well as Existing 2013 condition are shown in Table C-3. Receiver locations are shown in Figure 5-1. Under the 2038 No-Build Alternative, noise levels would exceed the TRPA “CNEL standard” of 55 dBA CNEL at the golf course, represented by receiver ST-01; at residential receivers R-09, R-57, and R-58; at outdoor recreational areas represented by receivers R-19, ST-03, and ST-05; and at exterior locations of the hotels, represented by receivers R-16, R-18, R-20, R-40, R-42, R-43, R-51, R-53, R-54, and ST-02. Predicted noise levels at all other hotels under the No-Build Alternative would range from 43.4 to 54.2 dBA CNEL. Noise levels also would exceed the TRPA “CNEL standard” of 55 dBA CNEL at commercial/governmental receivers, represented by R-04 through R-07, R-21, through R-31, R-35, R-36, R-45 through R-47, and R-56; and also at a driveway represented by LT-01. Also, trails within 64-Acre area that are represented by receivers R-32 through R-34 would exceed the TRPA “CNEL Standard” of 55 dBA CNEL. The changes in traffic noise levels under 2038 No-Build Alternative over Existing condition would range from 1.2 to 1.8 dB, and would be caused by forecasted increases in traffic volumes (Wood Rodgers 2013).

As shown in Table C-3, the changes associated with build alternatives over the No-Build Alternative would range between -21.6 and 8.3 dB. As with the 2038 No-Build Alternative, the primary cause of the noise level change would be the forecasted increases in traffic volumes. However, unlike with the No-Build Alternative, some noise level

changes would result from the proposed SR 89 alignment under each build alternative. Particularly, the decreases in future build noise levels would be caused by closing the existing north bound and south bound lanes of SR 89, which would result in reduced noise levels on receivers located along those segments.

Impacts have been identified under all 2038 build alternatives. However, all the impacted receivers were also exceeded the TRPA “CNEL standard” of 55 dBA CNEL under existing and the No-Build Alternative. Locations that would be impacted as a result of relocation of the SR 89 (Alternatives 1 through 4) and the increases in noise levels caused by the proposed project over the Existing and 2018 No-Build Alternative are summarized in Table C-4. Receivers R-06 through R-08 and R-45 would be located near the new intersection between New SR 89 and West SR 89; similarly, receivers R-33 and R-34 within 64-Acre just north of the New SR 89 alignment, and receivers R-57 through R-60 to the south closest to New SR 89 alignment. Increases at the locations represented by R-47, R-48, R-61, and ST-04 are mainly from the roadway improvements and traffic volume increases. The increases that would be caused from relocated SR 89 roadway under each build Alternative over Existing and No-Build Alternative conditions would be up to 9.7 dB, depending on the traffic volumes under each alternative at these locations, and also depending on the distance and topography of the area between each receiver and New SR 89 alignment.

Table C-4: 2038 Build Alternatives—Noise Level Increases

Receiver ID	Land Use	Change from Existing (dB)				Change from No-Build (dBA)			
		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 1	Alt. 2	Alt. 3	Alt. 4
R-06	Governmental	1.2	1.5	2.6	7.2	-0.4	-0.1	1	5.6
R-07	Commercial	1.4	1.3	1.6	3.9	-0.1	-0.2	0.1	2.4
R-08	Commercial	1.7	1.8	1.8	3.5	0.2	0.3	0.3	2
R-33	Trail	0.9	1.2	2.3	5.2	-0.7	-0.4	0.7	3.6
R-34	Trail	8.2	9.7	9.6	9.2	6.8	8.3	8.2	7.8
R-45	Governmental	2.2	2.5	2.5	5.3	0.7	1	1	3.8
R-48	Residential	1.6	2.5	2.5	5.3	0.7	1	1	3.8
R-49	Residential	1.2	1.6	1.6	2.4	0.0	0.1	0.1	0.9
R-57	Residential	1.6	1.7	2	4.2	0.1	0.2	0.5	2.7
R-58	Residential	1.8	1.9	2.3	4.8	0.4	0.5	0.9	3.4
R-59	Residential	1.9	2.2	2.5	5.4	0.4	0.7	1	3.9
R-60	Residential	2.5	2.9	3.2	5.5	1.1	1.5	1.8	4.1
R-61	Residential	1.3	1.3	1.5	3	-0.2	-0.2	0	1.5
ST-04	Residential	2.3	2.7	3.1	6.1	0.8	1.2	1.6	4.6

Note: dBA = A-weighted decibels

Source: Data compiled by AECOM in 2014

Table C-3: Predicted 2018 Noise Levels (CNEL)

Receiver I.D.	Location or Address	Land Use	NU	Standard (CNEL)	Existing	No-Build 2038 Alternative			Alternative 1 (2038)				Alternative 2 (2038)				Alternative 3 (2038)			
					Predicted Noise Level	Predicted Noise Level	Increase over Existing	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type
					(dBA Leq)	(dBA Leq)	dB		(dBA Leq)	dB	dB		(dBA Leq)	dB	dB		(dBA Leq)	dB	dB	
LT-01	Tahoe Marina Lodge, Macinaw Rd	Driveway	0	NA	63.4	65.2	1.8	NA	63.7	0.3	-1.5	NA	65.0	1.6	-0.2	NA	65.1	1.7	-0.1	NA
R-01	255 N Lake Blvd	Hotel/Yard	0	55	48.6	50.3	1.7	None	48.5	-0.1	-1.8	None	49.5	0.9	-0.8	None	49.6	1.0	-0.7	None
R-02	N Lake Blvd	Commercial	0	55	52.9	54.6	1.7	None	52.9	0.0	-1.7	None	53.8	0.9	-0.8	None	53.9	1.0	-0.7	None
R-03	Undeveloped\West of SaveMart	Commercial	0	55	63.9	65.4	1.5	Exceed	63.6	1.0	-1.8	Exceed	62.3	-1.6	-3.1	Exceed	64.6	0.7	-0.8	Exceed
R-04	Fairway Dr	Commercial	0	55	58.6	60.1	1.5	Exceed	58.2	-0.4	-1.9	Exceed	57.7	-0.9	-2.4	Exceed	59.4	0.8	-0.7	Exceed
R-05	Fairway Dr	Commercial	0	55	57.6	59.1	1.5	Exceed	58.2	0.6	-0.9	Exceed	57.6	0.0	-1.5	Exceed	59.1	1.5	0.0	Exceed
R-06	W River Rd	Governmental	0	55	55.9	57.5	1.6	Exceed	57.1	1.2	-0.4	Exceed	57.4	1.5	-0.1	Exceed	58.5	2.6	1.0	Exceed
R-07	W River Rd	Commercial	0	55	56.8	58.3	1.5	Exceed	58.2	1.4	-0.1	Exceed	58.1	1.3	-0.2	Exceed	58.4	1.6	0.1	Exceed
R-08	W River Rd	Commercial	0	55	50.4	51.9	1.5	None	52.1	1.7	0.2	None	52.2	1.8	0.3	None	52.2	1.8	0.3	None
R-09	W River Rd	Residential	1	55	62.1	63.7	1.6	Exceed	63.7	1.6	0.0	Exceed	63.7	1.6	0.0	Exceed	63.7	1.6	0.0	Exceed
R-10	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	50.2	52.0	1.8	None	50.6	0.4	-1.4	None	51.9	1.7	-0.1	None	52.0	1.8	0.0	None
R-11	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	44.9	46.6	1.7	None	44.8	-0.1	-1.8	None	45.7	0.8	-0.9	None	45.8	0.9	-0.8	None
R-12	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.1	47.4	1.3	None	43.8	-2.3	-3.6	None	42.4	-3.7	-5.0	None	42.6	-3.5	-4.8	None
R-13	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	41.6	43.4	1.8	None	41.9	0.3	-1.5	None	43.1	1.5	-0.3	None	43.2	1.6	-0.2	None
R-14	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	47.4	48.9	1.5	None	46.6	-0.8	-2.3	None	46.5	-0.9	-2.4	None	46.8	-0.6	-2.1	None
R-15	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.5	48.3	1.8	None	46.8	0.3	-1.5	None	48.1	1.6	-0.2	None	48.2	1.7	-0.1	None
R-16	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.6	55.8	1.2	Exceed	51.2	-3.4	-4.6	None	44.0	-10.6	-11.8	None	44.3	-10.3	-11.5	None
R-17	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	53.0	54.2	1.2	None	50.1	-2.9	-4.1	None	44.3	-8.7	-9.9	None	44.6	-8.4	-9.6	None
R-18	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.5	55.8	1.3	Exceed	50.9	-3.6	-4.9	None	46.3	-8.2	-9.5	None	46.7	-7.8	-9.1	None
R-19	Tahoe Marina Lodge, Macinaw Rd	Hotel/Pool	0	55	54.7	56.0	1.3	Exceed	52.0	-2.7	-4.0	None	47.0	-7.7	-9.0	None	47.3	-7.4	-8.7	None
R-20	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	49.4	50.8	1.4	None	47.8	-1.6	-3.0	None	47.0	-2.4	-3.8	None	47.2	-2.2	-3.6	None
R-21	Macinaw Rd	Commercial	0	55	57.9	59.2	1.3	Exceed	55.9	-2.0	-3.3	Exceed	52.7	-5.2	-6.5	None	52.9	-5.0	-6.3	None
R-22	Macinaw Rd	Commercial	0	55	60.3	61.5	1.2	Exceed	57.2	-3.1	-4.3	Exceed	49.4	-10.9	-12.1	None	49.7	-10.6	-11.8	None
R-23	Macinaw Rd	Commercial	0	55	64.0	65.5	1.5	Exceed	63.4	-0.6	-2.1	Exceed	62.4	-1.6	-3.1	Exceed	62.8	-1.2	-2.7	Exceed
R-24	W Lake Blvd	Commercial	0	55	66.5	67.8	1.3	Exceed	65.7	-0.8	-2.1	Exceed	61.0	-5.5	-6.8	Exceed	61.7	-4.8	-6.1	Exceed
R-25	W River Rd	Commercial	0	55	63.0	64.5	1.5	Exceed	62.6	-0.4	-1.9	Exceed	60.7	-2.3	-3.8	Exceed	63.9	0.9	-0.6	Exceed
R-26	W Lake Blvd	Commercial	0	55	69.2	70.4	1.2	Exceed	66.1	-3.1	-4.3	Exceed	48.8	-20.4	-21.6	None	49.7	-19.5	-20.7	None
R-27	W River Rd	Commercial	0	55	62.0	63.2	1.2	Exceed	59.3	-2.7	-3.9	Exceed	51.6	-10.4	-11.6	None	52.9	-9.1	-10.3	None
R-28	W River Rd	Commercial	0	55	61.3	62.6	1.3	Exceed	58.5	-2.8	-4.1	Exceed	53.0	-8.3	-9.6	None	54.4	-6.9	-8.2	None
R-29	W River Rd	Commercial	0	55	59.9	61.3	1.4	Exceed	57.9	-2.0	-3.4	Exceed	55.8	-4.1	-5.5	Exceed	57.2	-2.7	-4.1	Exceed
R-30	W River Rd	Commercial	0	55	59.9	61.3	1.4	Exceed	58.3	-1.6	-3.0	Exceed	57.7	-2.2	-3.6	Exceed	58.9	-1.0	-2.4	Exceed
R-31	W Lake Blvd	Commercial	0	55	62.3	63.6	1.3	Exceed	59.9	-2.4	-3.7	Exceed	53.7	-8.6	-9.9	None	55.6	-6.7	-8.0	Exceed
R-32	Tahoe Rim Trails	Trail	0	55	57.4	58.7	1.3	Exceed	56.6	-0.8	-2.1	Exceed	55.4	-2.0	-3.3	Exceed	56.6	-0.8	-2.1	Exceed
R-33	Tahoe Rim Trails	Trail	0	55	60.4	62.0	1.6	Exceed	61.3	0.9	-0.7	Exceed	61.6	1.2	-0.4	Exceed	62.7	2.3	0.7	Exceed
R-34	Tahoe Rim Trails	Trail	0	55	52.7	54.1	1.4	None	60.9	8.2	6.8	Substantial	62.4	9.7	8.3	Substantial	62.3	9.6	8.2	Substantial
R-35	176 W Lake Blvd	Commercial	0	55	70.1	71.3	1.2	Exceed	66.6	-3.5	-4.7	Exceed	53.3	-16.8	-18.0	None	53.8	-16.3	-17.5	None

Table C-3: Predicted 2018 Noise Levels (CNEL)

Receiver I.D.	Location or Address	Land Use	NU	Standard (CNEL)	Existing	No-Build 2038 Alternative			Alternative 1 (2038)				Alternative 2 (2038)				Alternative 3 (2038)			
					Predicted Noise Level	Predicted Noise Level	Increase over Existing	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type
					(dBA Leq)	(dBA Leq)	dB		(dBA Leq)	dB	dB		(dBA Leq)	dB	dB		(dBA Leq)	dB	dB	
R-36	Tahoe Tavern Rd	Commercial	0	55	58.1	59.3	1.2	Exceed	54.8	-3.3	-4.5	None	49.3	-8.8	-10.0	None	49.6	-8.5	-9.7	None
R-37	217 Tavern Shores	Hotel	4	55	50.4	51.7	1.3	None	48.1	-2.3	-3.6	None	44.4	-6.0	-7.3	None	44.6	-5.8	-7.1	None
R-38	217 Tavern Shores	Hotel	4	55	46.3	47.5	1.2	None	44.4	-1.9	-3.1	None	41.8	-4.5	-5.7	None	41.9	-4.4	-5.6	None
R-39	217 Tavern Shores	Hotel	4	55	50.4	51.7	1.3	None	48.1	-2.3	-3.6	None	45.1	-5.3	-6.6	None	45.3	-5.1	-6.4	None
R-40	217 Tavern Shores	Hotel	4	55	63.9	65.1	1.2	Exceed	60.0	-3.9	-5.1	Exceed	52.5	-11.4	-12.6	None	53.0	-10.9	-12.1	None
R-41	217 Tavern Shores	Hotel	4	55	51.1	52.3	1.2	None	49.0	-2.1	-3.3	None	45.8	-5.3	-6.5	None	45.9	-5.2	-6.4	None
R-42	217 Tavern Shores	Hotel	4	55	54.0	55.3	1.3	Exceed	51.9	-2.1	-3.4	None	46.1	-7.9	-9.2	None	46.3	-7.7	-9.0	None
R-43	217 Tavern Shores	Hotel	4	55	58.1	59.3	1.2	Exceed	54.2	-3.9	-5.1	None	46.5	-11.6	-12.8	None	47.4	-10.7	-11.9	None
R-44	217 Tavern Shores	Hotel	4	55	50.7	51.9	1.2	None	49.9	-0.8	-2.0	None	47.9	-2.8	-4.0	None	47.9	-2.8	-4.0	None
R-45	W River Rd	Governmental	0	55	54.5	56.0	1.5	Exceed	56.7	2.2	0.7	Exceed	57.0	2.5	1.0	Exceed	57.0	2.5	1.0	Exceed
R-46	W River Rd	Governmental	0	55	57.6	59.1	1.5	Exceed	59.1	1.5	0.0	Exceed	59.2	1.6	0.1	Exceed	59.2	1.6	0.1	Exceed
R-47	W River Rd	Governmental	0	55	53.6	55.1	1.5	Exceed	55.2	1.6	0.1	Exceed	55.2	1.6	0.1	Exceed	55.2	1.6	0.1	Exceed
R-48	W River Rd	Residential	1	55	53.1	54.6	1.5	None	54.7	1.6	0.1	None	54.9	1.8	0.3	None	54.9	1.8	0.3	None
R-49	W River Rd	Residential	1	55	48.6	50.1	1.5	None	49.8	1.2	-0.3	None	50.3	1.7	0.2	None	50.3	1.7	0.2	None
R-50	217 Tavern Shores	Hotel	4	55	44.4	45.6	1.2	None	41.6	-2.8	-4.0	None	38.2	-6.2	-7.4	None	38.3	-6.1	-7.3	None
R-51	217 Tavern Shores	Hotel	4	55	64.0	65.2	1.2	Exceed	65.0	1.0	-0.2	Exceed	64.9	0.9	-0.3	Exceed	65.1	1.1	-0.1	Exceed
R-52	217 Tavern Shores	Hotel	4	55	45.8	47.0	1.2	None	47.2	1.4	0.2	None	47.3	1.5	0.3	None	47.4	1.6	0.4	None
R-53	217 Tavern Shores	Hotel	4	55	63.6	64.8	1.2	Exceed	64.7	1.1	-0.1	Exceed	64.6	1.0	-0.2	Exceed	64.7	1.1	-0.1	Exceed
R-54	217 Tavern Shores	Hotel	4	55	61.1	62.3	1.2	Exceed	62.6	1.5	0.3	Exceed	62.5	1.4	0.2	Exceed	62.6	1.5	0.3	Exceed
R-55	217 Tavern Shores	Hotel	4	55	45.7	46.9	1.2	None	44.5	-1.2	-2.4	None	41.3	-4.4	-5.6	None	41.6	-4.1	-5.3	None
R-56	Tahoe Tree Company	Commercial	0	55	58.7	59.9	1.2	Exceed	59.9	1.2	0.0	Exceed	59.8	1.1	-0.1	Exceed	60.0	1.3	0.1	Exceed
R-57	Kimberly Dr	Residential	1	55	54.8	56.3	1.5	Exceed	56.4	1.6	0.1	Exceed	56.5	1.7	0.2	Exceed	56.8	2.0	0.5	Exceed
R-58	Kimberly Dr	Residential	1	55	53.7	55.1	1.4	Exceed	55.5	1.8	0.4	Exceed	55.6	1.9	0.5	Exceed	56.0	2.3	0.9	Exceed
R-59	Kimberly Dr	Residential	1	55	52.4	53.9	1.5	None	54.3	1.9	0.4	None	54.6	2.2	0.7	None	54.9	2.5	1.0	None
R-60	Kimberly Dr	Residential	1	55	52.9	54.3	1.4	None	55.4	2.5	1.1	Exceed	55.8	2.9	1.5	Exceed	56.1	3.2	1.8	Exceed
R-61	Kimberly Dr	Residential	1	55	42.6	44.1	1.5	None	43.9	1.3	-0.2	None	43.9	1.3	-0.2	None	44.1	1.5	0.0	None
ST-01	N Lake Blvd	Golf Course	0	55	62.1	63.6	1.5	Exceed	61.3	-0.8	-2.3	Exceed	60.7	-1.4	-2.9	Exceed	61.1	-1.0	-2.5	Exceed
ST-02	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.8	56.4	1.6	Exceed	54.2	-0.6	-2.2	None	55.0	0.2	-1.4	Exceed	55.1	0.3	-1.3	Exceed
ST-03	217 Tavern Shores	Hotel/Pool	0	55	63.0	64.2	1.2	Exceed	59.6	-3.4	-4.6	Exceed	50.2	-12.8	-14.0	None	50.7	-12.3	-13.5	None
ST-04	411 Kimberly Dr	Residential	1	55	53.0	54.5	1.5	None	55.3	2.3	0.8	Exceed	55.7	2.7	1.2	Exceed	56.1	3.1	1.6	Exceed
ST-05	217 Tavern Shores	Hotel/Tennis Court	0	55	66.6	67.8	1.2	Exceed	68.1	1.5	0.3	Exceed	67.9	1.3	0.1	Exceed	68.1	1.5	0.3	Exceed

Table C-3: Predicted 2018 Noise Levels (CNEL) (Continued)

Receiver I.D.	Location or Address	Land Use	NU	Standard (CNEL)	Existing	No-Build 2038 Alternative			Alternative 4 (2038)				Alternative 6 (2038)				Alternative 6A (2038)			
					Predicted Noise Level	Predicted Noise Level	Increase over Existing	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type
					(dBA L _{eq})	(dBA L _{eq})	dB		(dBA L _{eq})	dB	dB		(dBA L _{eq})	dB	dB		(dBA L _{eq})	dB	dB	
LT-01	Tahoe Marina Lodge, Macinaw Rd	Driveway	0	NA	63.4	65.2	1.8	NA	65.1	1.7	-0.1	NA	65.9	2.5	0.7	NA	64.5	1.1	-0.7	NA
R-01	255 N Lake Blvd	Hotel/Yard	0	55	48.6	50.3	1.7	None	49.5	0.9	-0.8	None	50.3	1.7	0.0	None	50.0	1.4	-0.3	None
R-02	N Lake Blvd	Commercial	0	55	52.9	54.6	1.7	None	53.7	0.8	-0.9	None	53.6	0.7	-1.0	None	52.8	-0.1	-1.8	None
R-03	Undeveloped\West of SaveMart	Commercial	0	55	63.9	65.4	1.5	Exceed	62.5	1.0	-2.9	Exceed	65.1	1.0	-0.3	Exceed	62.8	1.0	-2.6	Exceed
R-04	Fairway Dr	Commercial	0	55	58.6	60.1	1.5	Exceed	59.3	0.7	-0.8	Exceed	59.7	1.1	-0.4	Exceed	59.7	1.1	-0.4	Exceed
R-05	Fairway Dr	Commercial	0	55	57.6	59.1	1.5	Exceed	59.8	2.2	0.7	Exceed	58.7	1.1	-0.4	Exceed	58.2	0.6	-0.9	Exceed
R-06	W River Rd	Governmental	0	55	55.9	57.5	1.6	Exceed	63.1	7.2	5.6	Substantial	57.4	1.5	-0.1	Exceed	57.3	1.4	-0.2	Exceed
R-07	W River Rd	Commercial	0	55	56.8	58.3	1.5	Exceed	60.7	3.9	2.4	Exceed	58.1	1.3	-0.2	Exceed	58.0	1.2	-0.3	Exceed
R-08	W River Rd	Commercial	0	55	50.4	51.9	1.5	None	53.9	3.5	2.0	None	51.9	1.5	0.0	None	51.8	1.4	-0.1	None
R-09	W River Rd	Residential	1	55	62.1	63.7	1.6	Exceed	63.9	1.8	0.2	Exceed	63.7	1.6	0.0	Exceed	63.7	1.6	0.0	Exceed
R-10	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	50.2	52.0	1.8	None	52.0	1.8	0.0	None	52.4	2.2	0.4	None	51.9	1.7	-0.1	None
R-11	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	44.9	46.6	1.7	None	45.8	0.9	-0.8	None	46.1	1.2	-0.5	None	45.7	0.8	-0.9	None
R-12	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.1	47.4	1.3	None	43.3	-2.8	-4.1	None	44.9	-1.2	-2.5	None	44.2	-1.9	-3.2	None
R-13	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	41.6	43.4	1.8	None	43.2	1.6	-0.2	None	43.0	1.4	-0.4	None	43.2	1.6	-0.2	None
R-14	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	47.4	48.9	1.5	None	47.1	-0.3	-1.8	None	47.8	0.4	-1.1	None	47.0	-0.4	-1.9	None
R-15	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.5	48.3	1.8	None	48.2	1.7	-0.1	None	48.2	1.7	-0.1	None	48.0	1.5	-0.3	None
R-16	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.6	55.8	1.2	Exceed	43.6	-11.0	-12.2	None	51.5	-3.1	-4.3	None	49.8	-4.8	-6.0	None
R-17	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	53.0	54.2	1.2	None	45.3	-7.7	-8.9	None	50.2	-2.8	-4.0	None	48.7	-4.3	-5.5	None
R-18	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.5	55.8	1.3	Exceed	46.1	-8.4	-9.7	None	52.7	-1.8	-3.1	None	52.2	-2.3	-3.6	None
R-19	Tahoe Marina Lodge, Macinaw Rd	Hotel/Pool	0	55	54.7	56.0	1.3	Exceed	47.7	-7.0	-8.3	None	52.1	-2.6	-3.9	None	50.7	-4.0	-5.3	None
R-20	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	49.4	50.8	1.4	None	47.3	-2.1	-3.5	None	48.7	-0.7	-2.1	None	48.1	-1.3	-2.7	None
R-21	Macinaw Rd	Commercial	0	55	57.9	59.2	1.3	Exceed	52.6	-5.3	-6.6	None	56.2	-1.7	-3.0	Exceed	55.1	-2.8	-4.1	Exceed
R-22	Macinaw Rd	Commercial	0	55	60.3	61.5	1.2	Exceed	48.9	-11.4	-12.6	None	57.3	-3.0	-4.2	Exceed	56.2	-4.1	-5.3	Exceed
R-23	Macinaw Rd	Commercial	0	55	64.0	65.5	1.5	Exceed	62.3	-1.7	-3.2	Exceed	64.5	0.5	-1.0	Exceed	60.6	-3.4	-4.9	Exceed
R-24	W Lake Blvd	Commercial	0	55	66.5	67.8	1.3	Exceed	59.9	-6.6	-7.9	Exceed	66.8	0.3	-1.0	Exceed	63.3	-3.2	-4.5	Exceed
R-25	W River Rd	Commercial	0	55	63.0	64.5	1.5	Exceed	62.6	-0.4	-1.9	Exceed	64.1	1.1	-0.4	Exceed	62.4	-0.6	-2.1	Exceed
R-26	W Lake Blvd	Commercial	0	55	69.2	70.4	1.2	Exceed	51.5	-17.7	-18.9	None	67.0	-2.2	-3.4	Exceed	65.4	-3.8	-5.0	Exceed
R-27	W River Rd	Commercial	0	55	62.0	63.2	1.2	Exceed	53.4	-8.6	-9.8	None	60.0	-2.0	-3.2	Exceed	57.9	-4.1	-5.3	Exceed
R-28	W River Rd	Commercial	0	55	61.3	62.6	1.3	Exceed	55.1	-6.2	-7.5	Exceed	59.7	-1.6	-2.9	Exceed	56.7	-4.6	-5.9	Exceed
R-29	W River Rd	Commercial	0	55	59.9	61.3	1.4	Exceed	57.7	-2.2	-3.6	Exceed	59.4	-0.5	-1.9	Exceed	57.7	-2.2	-3.6	Exceed
R-30	W River Rd	Commercial	0	55	59.9	61.3	1.4	Exceed	58.9	-1.0	-2.4	Exceed	60.3	0.4	-1.0	Exceed	59.5	-0.4	-1.8	Exceed
R-31	W Lake Blvd	Commercial	0	55	62.3	63.6	1.3	Exceed	55.4	-6.9	-8.2	Exceed	60.8	-1.5	-2.8	Exceed	59.0	-3.3	-4.6	Exceed
R-32	Tahoe Rim Trails	Trail	0	55	57.4	58.7	1.3	Exceed	57.4	0.0	-1.3	Exceed	57.6	0.2	-1.1	Exceed	56.9	-0.5	-1.8	Exceed
R-33	Tahoe Rim Trails	Trail	0	55	60.4	62.0	1.6	Exceed	65.6	5.2	3.6	Substantial	61.9	1.5	-0.1	Exceed	61.3	0.9	-0.7	Exceed
R-34	Tahoe Rim Trails	Trail	0	55	52.7	54.1	1.4	None	61.9	9.2	7.8	Substantial	53.7	1.0	-0.4	None	53.3	0.6	-0.8	None
R-35	176 W Lake Blvd	Commercial	0	55	70.1	71.3	1.2	Exceed	52.7	-17.4	-18.6	None	65.4	-4.7	-5.9	Exceed	64.9	-5.2	-6.4	Exceed

Table C-3: Predicted 2018 Noise Levels (CNEL) (Continued)

Receiver I.D.	Location or Address	Land Use	NU	Standard (CNEL)	Existing	No-Build 2038 Alternative			Alternative 4 (2038)				Alternative 6 (2038)				Alternative 6A (2038)			
					Predicted Noise Level	Predicted Noise Level	Increase over Existing	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type	Predicted Noise Level	Increase over Existing	Increase over No Build	Impact Type
					(dBA L _{eq})	(dBA L _{eq})	dB		(dBA L _{eq})	dB	dB		(dBA L _{eq})	dB	dB		(dBA L _{eq})	dB	dB	
R-36	Tahoe Tavern Rd	Commercial	0	55	58.1	59.3	1.2	Exceed	49.4	-8.7	-9.9	None	58.2	0.1	-1.1	Exceed	58.2	0.1	-1.1	Exceed
R-37	217 Tavern Shores	Hotel	4	55	50.4	51.7	1.3	None	44.7	-5.7	-7.0	None	51.0	0.6	-0.7	None	50.9	0.5	-0.8	None
R-38	217 Tavern Shores	Hotel	4	55	46.3	47.5	1.2	None	41.2	-5.1	-6.3	None	46.9	0.6	-0.6	None	46.8	0.5	-0.7	None
R-39	217 Tavern Shores	Hotel	4	55	50.4	51.7	1.3	None	45.3	-5.1	-6.4	None	50.4	0.0	-1.3	None	50.1	-0.3	-1.6	None
R-40	217 Tavern Shores	Hotel	4	55	63.9	65.1	1.2	Exceed	53.0	-10.9	-12.1	None	63.2	-0.7	-1.9	Exceed	62.9	-1.0	-2.2	Exceed
R-41	217 Tavern Shores	Hotel	4	55	51.1	52.3	1.2	None	45.7	-5.4	-6.6	None	51.9	0.8	-0.4	None	51.7	0.6	-0.6	None
R-42	217 Tavern Shores	Hotel	4	55	54.0	55.3	1.3	Exceed	47.1	-6.9	-8.2	None	51.4	-2.6	-3.9	None	49.7	-4.3	-5.6	None
R-43	217 Tavern Shores	Hotel	4	55	58.1	59.3	1.2	Exceed	48.8	-9.3	-10.5	None	57.9	-0.2	-1.4	Exceed	57.7	-0.4	-1.6	Exceed
R-44	217 Tavern Shores	Hotel	4	55	50.7	51.9	1.2	None	48.5	-2.2	-3.4	None	51.6	0.9	-0.3	None	51.6	0.9	-0.3	None
R-45	W River Rd	Governmental	0	55	54.5	56.0	1.5	Exceed	59.8	5.3	3.8	Substantial	55.9	1.4	-0.1	Exceed	55.8	1.3	-0.2	Exceed
R-46	W River Rd	Governmental	0	55	57.6	59.1	1.5	Exceed	60.0	2.4	0.9	Exceed	59.1	1.5	0.0	Exceed	59.1	1.5	0.0	Exceed
R-47	W River Rd	Governmental	0	55	53.6	55.1	1.5	Exceed	55.5	1.9	0.4	Exceed	55.1	1.5	0.0	Exceed	55.1	1.5	0.0	Exceed
R-48	W River Rd	Residential	1	55	53.1	54.6	1.5	None	56.7	3.6	2.1	Exceed	54.6	1.5	0.0	None	54.5	1.4	-0.1	None
R-49	W River Rd	Residential	1	55	48.6	50.1	1.5	None	52.7	4.1	2.6	None	50.0	1.4	-0.1	None	49.8	1.2	-0.3	None
R-50	217 Tavern Shores	Hotel	4	55	44.4	45.6	1.2	None	38.3	-6.1	-7.3	None	43.2	-1.2	-2.4	None	43.6	-0.8	-2.0	None
R-51	217 Tavern Shores	Hotel	4	55	64.0	65.2	1.2	Exceed	65.1	1.1	-0.1	Exceed	65.9	1.9	0.7	Exceed	66.0	2.0	0.8	Exceed
R-52	217 Tavern Shores	Hotel	4	55	45.8	47.0	1.2	None	47.6	1.8	0.6	None	47.0	1.2	0.0	None	46.9	1.1	-0.1	None
R-53	217 Tavern Shores	Hotel	4	55	63.6	64.8	1.2	Exceed	65.1	1.5	0.3	Exceed	65.6	2.0	0.8	Exceed	65.6	2.0	0.8	Exceed
R-54	217 Tavern Shores	Hotel	4	55	61.1	62.3	1.2	Exceed	63.3	2.2	1.0	Exceed	62.9	1.8	0.6	Exceed	62.9	1.8	0.6	Exceed
R-55	217 Tavern Shores	Hotel	4	55	45.7	46.9	1.2	None	39.3	-6.4	-7.6	None	46.2	0.5	-0.7	None	45.9	0.2	-1.0	None
R-56	Tahoe Tree Company	Commercial	0	55	58.7	59.9	1.2	Exceed	60.0	1.3	0.1	Exceed	59.8	1.1	-0.1	Exceed	59.8	1.1	-0.1	Exceed
R-57	Kimberly Dr	Residential	1	55	54.8	56.3	1.5	Exceed	59.0	4.2	2.7	Exceed	56.1	1.3	-0.2	Exceed	55.6	0.8	-0.7	Exceed
R-58	Kimberly Dr	Residential	1	55	53.7	55.1	1.4	Exceed	58.5	4.8	3.4	Exceed	54.9	1.2	-0.2	None	54.5	0.8	-0.6	None
R-59	Kimberly Dr	Residential	1	55	52.4	53.9	1.5	None	57.8	5.4	3.9	Substantial	53.8	1.4	-0.1	None	53.7	1.3	-0.2	None
R-60	Kimberly Dr	Residential	1	55	52.9	54.3	1.4	None	58.4	5.5	4.1	Substantial	54.0	1.1	-0.3	None	53.9	1.0	-0.4	None
R-61	Kimberly Dr	Residential	1	55	42.6	44.1	1.5	None	45.6	3.0	1.5	None	44.0	1.4	-0.1	None	42.9	0.3	-1.2	None
ST-01	N Lake Blvd	Golf Course	0	55	62.1	63.6	1.5	Exceed	60.2	-1.9	-3.4	Exceed	62.2	0.1	-1.4	Exceed	59.1	-3.0	-4.5	Exceed
ST-02	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.8	56.4	1.6	Exceed	55.1	0.3	-1.3	Exceed	56.1	1.3	-0.3	Exceed	55.5	0.7	-0.9	Exceed
ST-03	217 Tavern Shores	Hotel/Pool	0	55	63.0	64.2	1.2	Exceed	50.1	-12.9	-14.1	None	59.3	-3.7	-4.9	Exceed	58.5	-4.5	-5.7	Exceed
ST-04	411 Kimberly Dr	Residential	1	55	53.0	54.5	1.5	None	59.1	6.1	4.6	Substantial	54.2	1.2	-0.3	None	54.0	1.0	-0.5	None
ST-05	217 Tavern Shores	Hotel/Tennis Court	0	55	66.6	67.8	1.2	Exceed	68.1	1.5	0.3	Exceed	68.2	1.6	0.4	Exceed	68.2	1.6	0.4	Exceed

Notes:
NU = Number of Representing Units; CNEL = community equivalent noise level; dBA = A-weighted decibels; NA = not applicable;
Noise levels reported for Hotel receivers are reduced by 20 dB to represent interior noise levels.
Source: Data compiled by AECOM in 2014

As shown in Table C-3, and summarized in Table C-4, noise levels at receivers R-06, R-07, R-08, R-33, R-34, R-45, R-49, R-57 through R-60, and ST-04 increase by 2 dB or more under Build Alternative 4 over the Existing and No Build conditions. All these receivers are located in the vicinity of New SR 89 and the two intersections of New SR 89 with existing SR 89 (Figure 5-1). Therefore, the increase in noise levels at these locations are mainly for realignment of SR 89 under Build Alternatives 1 through 4, that add a new noise source (New SR 89) closer to these receivers. Assuming an increase of 5 dB or more over existing condition (conservatively) as a substantial increase for the project area, receiver R-34 shows a substantial increase of 6.8 dB and above under Alternatives 1 through 4 relative to Existing and No Build conditions. This receiver is representing a trail, which is located just south of the New SR 89, and would be exposed to a higher noise increase than other receivers near the New SR 89.

Also, receiver R-06 would have a substantial increase of at least 5 dB under Alternative 4 with respect to Existing and No Build conditions. This receiver is representing a parking lot of a governmental unit located to the north close to the new intersection of West SR 89 and New SR 89, therefore, exposed to a higher noise increase relative to the other receivers near the New SR 89 intersection with West SR 89. Similarly, ST-04 representing a residential unit to the south near the new SR 89 intersection would be exposed to a substantial increase of 4.6 dB or more under Alternative 4. Receivers R-57 through R-60 representing residential uses to the south near the new SR 89 alignment would be exposed to a substantial increase of 2.7 to 5.5 dB under Alternative 4. Under Alternatives 1 through 3, the traffic volumes along the road segments affecting these locations are lower than Alternative 4. Increases in noise levels at all other locations under the Alternatives 1 through 6A would be less than 3 dB.

C.3. Noise Abatement

Noise abatement must be considered where traffic noise impacts are identified. According to FHWA/Caltrans criteria, noise abatement must be considered at affected receivers where an exposed area of frequent human use (such as a yard, patio, or deck) exists and a lowered noise level would be of benefit. Frequent human use is defined as any activity that would result in frequent human exposure to traffic noise over the course of a year in a specific location. Impacts have been identified at commercial/governmental areas, trails, and exterior locations of hotels represented by receivers, shown in Tables C-1 and C-3. Because these receivers represent commercial/governmental areas, trails, and exterior hotel locations, use of barriers for mitigation of traffic noise impacts at these locations would not be feasible or reasonable because barriers would require substantial

gaps to access numerous driveways and recreation areas along SR 89. Gaps or openings in a sound wall would compromise the barrier effectiveness. In addition, there would likely be aesthetic effects of constructing barriers along the SR-89 corridor. Therefore, no noise barriers were modeled for the impacted receivers shown in Tables C-2 and C-3, and it is determined that a barrier would not be feasible or reasonable.

A noise abatement decision report (NADR) typically is prepared when a noise study report identifies receiver locations that would be exposed to noise levels that would approach or exceed the noise abatement criteria, those receivers that are areas of frequent human use, and when abatement would be beneficial. As stated above, it is determined that a barrier would not be feasible or reasonable. Therefore, a NADR is not required.

C.4. Feasibility of Noise Abatement

As summarized in Table C-5, noise levels under 2018 future build alternatives, would exceed the TRPA CNEL standard of 55 dBA CNEL beyond 5 dB (by up to 12.7 dB).

As shown in Table C-5, noise levels at a residential use represented by R-09, at a driveway represent by LT-01; at commercial\governmental areas represented by R-03, R-06, R-23, R-24, R-25, R-26, R-31, R-35; at trails represented by R-33 and R-34; at exterior locations of hotels represented by R-40, R-51, R-53, R-54, and at outdoor activity areas represented by ST-01, and ST-05 would increase 5 dB or more over the TRPA CNEL Standard of 55 dBA CNEL. However, except at receiver R-34, at all these receivers, the standard is already exceeded under Existing condition, and would be exceeding under No Build Alternative. At receiver R-34 which is representing the trail in 64-Acre area, the existing and No Build Alternative noise levels are 52.7 dBA CNEL and 53.4 dBA CNEL, respectively. The noise increase at this location would be because of relocation of SR 89 within 64-Acre Area, and the increases would be 5.5 dB to 6.5 dB, over the TRPA CNEL Standard.

Similarly, as summarized in Table C-6, noise levels under 2038 future build alternatives, would exceed the TRPA CNEL standard of 55 dBA CNEL beyond 5 dB (by up to 13.2 dB). As shown in Table C-6, noise levels at a residential use represented by R-09, at a driveway represent by LT-01; at commercial\governmental areas represented by R-03, R-06, R-07, R-23 through R-27, R-31, R-35, R-46, and R-56; at trails represented by R-33 and R-34; at exterior locations of hotels represented by R-40, R-51, R-53, R-54, and at outdoor activity areas represented by ST-01, and ST-05 would increase 5 dB or more over the TRPA CNEL Standard of 55 dBA CNEL. However, except at receiver R-34, at all these receivers, the standard is already exceeded under Existing condition, and would

Table C-5: 2018 Build Alternatives—Noise Level Increases of CNEL Standard

Receiver I.D.	Location or Address	Land Use	NU	CNEL	2018 Predicted Noise Level (dBA L _{eq})		Increase Over Standard of 55 dB CNEL					
					Existing	No Build	Alt.1	Alt.2	Alt.3	Alt.4	Alt.6	Alt.6a
LT-01	Tahoe Marina Lodge, Macinaw Rd	Driveway	0	55	63.4	64.9	9.1	9.6	9.6	9.6	10.6	9.1
R-01	255 N Lake Blvd	Hotel/Yard	0	55	48.6	49.9	-6.1	-5.9	-5.9	-6.0	-5.1	-5.4
R-02	N Lake Blvd	Commercial	0	55	52.9	54.2	-1.8	-1.6	-1.5	-1.7	-1.9	-2.6
R-03	Undeveloped\West of SaveMart	Commercial	0	55	63.9	64.6	8.9	7.0	9.1	7.0	9.2	7.0
R-04	Fairway Dr	Commercial	0	55	58.6	59.3	3.5	2.4	3.9	3.8	3.8	3.8
R-05	Fairway Dr	Commercial	0	55	57.6	58.4	3.4	2.2	3.7	4.3	2.9	2.4
R-06	W River Rd	Governmental	0	55	55.9	56.6	2.4	2.0	3.0	7.6	1.5	1.4
R-07	W River Rd	Commercial	0	55	56.8	57.4	2.6	2.3	2.6	4.8	2.2	2.1
R-08	W River Rd	Commercial	0	55	50.4	51.0	-3.7	-3.7	-3.7	-1.9	-4.0	-4.1
R-09	W River Rd	Residential	1	55	62.1	62.7	7.8	7.8	7.8	8.0	7.7	7.7
R-10	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	50.2	51.7	-4.0	-3.4	-3.4	-3.4	-2.9	-3.4
R-11	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	44.9	46.2	-9.9	-9.7	-9.7	-9.7	-9.2	-9.7
R-12	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.1	47.0	-11.2	-13.0	-12.8	-12.2	-10.6	-11.3
R-13	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	41.6	43.1	-12.7	-12.2	-12.2	-12.2	-12.3	-12.2
R-14	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	47.4	48.4	-8.2	-8.9	-8.7	-8.4	-7.6	-8.4
R-15	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.5	48.0	-7.8	-7.3	-7.3	-7.3	-7.1	-7.3
R-16	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.6	55.4	-3.9	-11.4	-11.2	-11.9	-4.0	-5.7
R-17	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	53.0	53.7	-5.1	-11.2	-10.9	-10.2	-5.3	-6.8
R-18	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.5	55.3	-4.2	-9.1	-8.8	-9.4	-2.7	-3.3
R-19	Tahoe Marina Lodge, Macinaw Rd	Hotel/Pool	0	55	54.7	55.5	-3.1	-8.4	-8.2	-7.8	-3.3	-4.7
R-20	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	49.4	50.4	-7.0	-8.4	-8.3	-8.2	-6.7	-7.3
R-21	Macinaw Rd	Commercial	0	55	57.9	58.8	0.9	-2.6	-2.6	-2.8	0.8	-0.3
R-22	Macinaw Rd	Commercial	0	55	60.3	61.0	2.0	-6.0	-5.8	-6.6	1.8	0.7
R-23	Macinaw Rd	Commercial	0	55	64.0	65.0	8.6	7.1	7.3	6.8	9.0	5.2
R-24	W Lake Blvd	Commercial	0	55	66.5	67.3	10.7	5.6	6.2	4.4	11.3	7.7
R-25	W River Rd	Commercial	0	55	63.0	63.7	8.0	5.4	8.4	7.1	8.2	6.5
R-26	W Lake Blvd	Commercial	0	55	69.2	69.9	10.9	-6.6	-5.8	-4.0	11.6	10.0
R-27	W River Rd	Commercial	0	55	62.0	62.7	4.1	-3.8	-2.6	-2.1	4.4	2.4
R-28	W River Rd	Commercial	0	55	61.3	62.0	3.4	-2.4	-1.1	-0.5	4.2	1.1
R-29	W River Rd	Commercial	0	55	59.9	60.6	3.0	0.4	1.7	2.3	3.7	1.9
R-30	W River Rd	Commercial	0	55	59.9	60.6	3.5	2.3	3.4	3.5	4.4	3.6
R-31	W Lake Blvd	Commercial	0	55	62.3	63.0	4.9	-1.7	0.1	-0.2	5.2	3.4
R-32	Tahoe Rim Trails	Trail	0	55	57.4	58.1	1.6	0.0	1.1	1.9	1.9	1.2
R-33	Tahoe Rim Trails	Trail	0	55	60.4	61.1	6.4	6.2	7.2	10.1	6.0	5.3
R-34	Tahoe Rim Trails	Trail	0	55	52.7	53.4	5.5	6.9	6.8	6.4	-2.0	-2.4

Table C-5: 2018 Build Alternatives—Noise Level Increases of CNEL Standard

Receiver I.D.	Location or Address	Land Use	NU	CNEL	2018 Predicted Noise Level (dBA L _{eq})		Increase Over Standard of 55 dB CNEL					
					Existing	No Build	Alt.1	Alt.2	Alt.3	Alt.4	Alt.6	Alt.6a
R-35	176 W Lake Blvd	Commercial	0	55	70.1	70.8	11.4	-2.1	-1.6	-2.8	9.9	9.5
R-36	Tahoe Tavern Rd	Commercial	0	55	58.1	58.9	-0.3	-6.1	-5.9	-6.1	2.7	2.7
R-37	217 Tavern Shores	Hotel	4	55	50.4	51.2	-7.1	-11.1	-10.9	-10.8	-4.5	-4.6
R-38	217 Tavern Shores	Hotel	4	55	46.3	47.1	-10.9	-13.6	-13.6	-14.3	-8.6	-8.7
R-39	217 Tavern Shores	Hotel	4	55	50.4	51.2	-7.1	-10.3	-10.2	-10.2	-5.1	-5.3
R-40	217 Tavern Shores	Hotel	4	55	63.9	64.6	4.8	-3.0	-2.4	-2.5	7.7	7.4
R-41	217 Tavern Shores	Hotel	4	55	51.1	51.8	-6.2	-9.6	-9.6	-9.8	-3.6	-3.8
R-42	217 Tavern Shores	Hotel	4	55	54.0	54.8	-3.3	-9.4	-9.2	-8.4	-4.1	-5.8
R-43	217 Tavern Shores	Hotel	4	55	58.1	58.8	-0.9	-9.0	-8.1	-6.8	2.5	2.2
R-44	217 Tavern Shores	Hotel	4	55	50.7	51.4	-5.4	-7.6	-7.6	-7.0	-3.8	-3.8
R-45	W River Rd	Governmental	0	55	54.5	55.1	0.9	1.2	1.2	4.1	0.0	-0.1
R-46	W River Rd	Governmental	0	55	57.6	58.2	3.2	3.3	3.2	4.1	3.1	3.1
R-47	W River Rd	Governmental	0	55	53.6	54.2	-0.7	-0.7	-0.7	-0.4	-0.8	-0.8
R-48	W River Rd	Residential	1	55	53.1	53.7	-1.1	-0.9	-0.9	0.9	-1.3	-1.4
R-49	W River Rd	Residential	1	55	48.6	49.3	-5.8	-5.4	-5.4	-3.0	-5.9	-6.0
R-50	217 Tavern Shores	Hotel	4	55	44.4	45.2	-13.6	-17.2	-17.2	-17.2	-12.2	-11.8
R-51	217 Tavern Shores	Hotel	4	55	64.0	64.7	9.6	9.5	9.6	9.7	10.5	10.5
R-52	217 Tavern Shores	Hotel	4	55	45.8	46.5	-8.2	-8.2	-8.1	-7.9	-8.5	-8.6
R-53	217 Tavern Shores	Hotel	4	55	63.6	64.3	9.3	9.1	9.3	9.6	10.1	10.1
R-54	217 Tavern Shores	Hotel	4	55	61.1	61.9	7.1	7.1	7.2	7.8	7.4	7.4
R-55	217 Tavern Shores	Hotel	4	55	45.7	46.5	-10.6	-14.1	-13.9	-16.2	-9.2	-9.5
R-56	Tahoe Tree Company	Commercial	0	55	58.7	59.4	4.5	4.3	4.5	4.6	4.3	4.3
R-57	Kimberly Dr	Residential	1	55	54.8	55.4	0.8	0.8	1.1	3.3	0.2	-0.3
R-58	Kimberly Dr	Residential	1	55	53.7	54.3	0.0	0.0	0.3	2.7	-0.9	-1.4
R-59	Kimberly Dr	Residential	1	55	52.4	53.1	-1.1	-1.1	-0.7	2.1	-2.0	-2.2
R-60	Kimberly Dr	Residential	1	55	52.9	53.6	0.0	0.3	0.5	2.8	-1.8	-1.8
R-61	Kimberly Dr	Residential	1	55	42.6	43.3	-11.7	-11.8	-11.7	-10.1	-11.9	-12.9
ST-01	N Lake Blvd	Golf Course	0	55	62.1	63.1	6.5	5.3	5.6	4.7	6.6	3.6
ST-02	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.8	56.1	-0.4	-0.3	-0.4	-0.4	0.7	0.1
ST-03	217 Tavern Shores	Hotel/Pool	0	55	63.0	63.7	4.4	-5.2	-4.8	-5.4	3.8	3.1
ST-04	411 Kimberly Dr	Residential	1	55	53.0	53.7	-0.1	0.1	0.4	3.4	-1.6	-1.9
ST-05	217 Tavern Shores	Hotel/Tennis Court	0	55	66.6	67.3	12.6	12.5	12.6	12.6	12.7	12.7

Table C-6: 2038 Build Alternatives—Noise Level Increases of CNEL Standard

Receiver I.D.	Location or Address	Land Use	NU	CNEL	2018 Predicted Noise Level (dBA L _{eq})		Increase Over Standard of 55 dB CNEL					
					Existing	No Build	Alt.1	Alt.2	Alt.3	Alt.4	Alt.6	Alt.6a
LT-01	Tahoe Marina Lodge, Macinaw Rd	Driveway	0	55	63.4	64.9	8.7	10.0	10.1	10.1	10.9	9.5
R-01	255 N Lake Blvd	Hotel/Yard	0	55	48.6	49.9	-6.5	-5.5	-5.4	-5.5	-4.7	-5.0
R-02	N Lake Blvd	Commercial	0	55	52.9	54.2	-2.1	-1.2	-1.1	-1.3	-1.4	-2.2
R-03	Undeveloped\West of SaveMart	Commercial	0	55	63.9	64.6	8.6	7.3	9.6	7.5	10.1	7.8
R-04	Fairway Dr	Commercial	0	55	58.6	59.3	3.2	2.7	4.4	4.3	4.7	4.7
R-05	Fairway Dr	Commercial	0	55	57.6	58.4	3.2	2.6	4.1	4.8	3.7	3.2
R-06	W River Rd	Governmental	0	55	55.9	56.6	2.1	2.4	3.5	8.1	2.4	2.3
R-07	W River Rd	Commercial	0	55	56.8	57.4	3.2	3.1	3.4	5.7	3.1	3.0
R-08	W River Rd	Commercial	0	55	50.4	51.0	-2.9	-2.8	-2.8	-1.1	-3.1	-3.2
R-09	W River Rd	Residential	1	55	62.1	62.7	8.7	8.7	8.7	8.9	8.7	8.7
R-10	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	50.2	51.7	-4.4	-3.1	-3.0	-3.0	-2.6	-3.1
R-11	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	44.9	46.2	-10.2	-9.3	-9.2	-9.2	-8.9	-9.3
R-12	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.1	47.0	-11.2	-12.6	-12.4	-11.7	-10.1	-10.8
R-13	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	41.6	43.1	-13.1	-11.9	-11.8	-11.8	-12.0	-11.8
R-14	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	47.4	48.4	-8.4	-8.5	-8.2	-7.9	-7.2	-8.0
R-15	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	46.5	48.0	-8.2	-6.9	-6.8	-6.8	-6.8	-7.0
R-16	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.6	55.4	-3.8	-11.0	-10.7	-11.4	-3.5	-5.2
R-17	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	53.0	53.7	-4.9	-10.7	-10.4	-9.7	-4.8	-6.3
R-18	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.5	55.3	-4.1	-8.7	-8.3	-8.9	-2.3	-2.8
R-19	Tahoe Marina Lodge, Macinaw Rd	Hotel/Pool	0	55	54.7	55.5	-3.0	-8.0	-7.7	-7.3	-2.9	-4.3
R-20	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	49.4	50.4	-7.2	-8.0	-7.8	-7.7	-6.3	-6.9
R-21	Macinaw Rd	Commercial	0	55	57.9	58.8	0.9	-2.3	-2.1	-2.4	1.2	0.1
R-22	Macinaw Rd	Commercial	0	55	60.3	61.0	2.2	-5.6	-5.3	-6.1	2.3	1.2
R-23	Macinaw Rd	Commercial	0	55	64.0	65.0	8.4	7.4	7.8	7.3	9.5	5.6
R-24	W Lake Blvd	Commercial	0	55	66.5	67.3	10.7	6.0	6.7	4.9	11.8	8.3
R-25	W River Rd	Commercial	0	55	63.0	63.7	7.6	5.7	8.9	7.6	9.1	7.4
R-26	W Lake Blvd	Commercial	0	55	69.2	69.9	11.1	-6.2	-5.3	-3.5	12.0	10.4
R-27	W River Rd	Commercial	0	55	62.0	62.7	4.3	-3.4	-2.1	-1.6	5.0	2.9
R-28	W River Rd	Commercial	0	55	61.3	62.0	3.5	-2.0	-0.6	0.1	4.7	1.7
R-29	W River Rd	Commercial	0	55	59.9	60.6	2.9	0.8	2.2	2.7	4.4	2.7
R-30	W River Rd	Commercial	0	55	59.9	60.6	3.3	2.7	3.9	3.9	5.3	4.5
R-31	W Lake Blvd	Commercial	0	55	62.3	63.0	4.9	-1.3	0.6	0.4	5.8	4.0
R-32	Tahoe Rim Trails	Trail	0	55	57.4	58.1	1.6	0.4	1.6	2.4	2.6	1.9
R-33	Tahoe Rim Trails	Trail	0	55	60.4	61.1	6.3	6.6	7.7	10.6	6.9	6.3
R-34	Tahoe Rim Trails	Trail	0	55	52.7	53.4	5.9	7.4	7.3	6.9	-1.3	-1.7

Table C-6: 2038 Build Alternatives—Noise Level Increases of CNEL Standard

Receiver I.D.	Location or Address	Land Use	NU	CNEL	2018 Predicted Noise Level (dBA L _{eq})		Increase Over Standard of 55 dB CNEL					
					Existing	No Build	Alt.1	Alt.2	Alt.3	Alt.4	Alt.6	Alt.6a
R-35	176 W Lake Blvd	Commercial	0	55	70.1	70.8	11.6	-1.7	-1.2	-2.3	10.4	9.9
R-36	Tahoe Tavern Rd	Commercial	0	55	58.1	58.9	-0.2	-5.7	-5.4	-5.6	3.2	3.2
R-37	217 Tavern Shores	Hotel	4	55	50.4	51.2	-6.9	-10.6	-10.4	-10.3	-4.0	-4.1
R-38	217 Tavern Shores	Hotel	4	55	46.3	47.1	-10.6	-13.2	-13.1	-13.8	-8.1	-8.2
R-39	217 Tavern Shores	Hotel	4	55	50.4	51.2	-6.9	-9.9	-9.7	-9.7	-4.6	-4.9
R-40	217 Tavern Shores	Hotel	4	55	63.9	64.6	5.0	-2.5	-2.0	-2.0	8.2	7.9
R-41	217 Tavern Shores	Hotel	4	55	51.1	51.8	-6.0	-9.2	-9.1	-9.3	-3.1	-3.3
R-42	217 Tavern Shores	Hotel	4	55	54.0	54.8	-3.1	-8.9	-8.7	-7.9	-3.6	-5.3
R-43	217 Tavern Shores	Hotel	4	55	58.1	58.8	-0.8	-8.5	-7.6	-6.2	2.9	2.7
R-44	217 Tavern Shores	Hotel	4	55	50.7	51.4	-5.1	-7.1	-7.1	-6.5	-3.4	-3.4
R-45	W River Rd	Governmental	0	55	54.5	55.1	1.7	2.0	2.0	4.8	0.9	0.8
R-46	W River Rd	Governmental	0	55	57.6	58.2	4.1	4.2	4.2	5.0	4.1	4.1
R-47	W River Rd	Governmental	0	55	53.6	54.2	0.2	0.2	0.2	0.5	0.1	0.1
R-48	W River Rd	Residential	1	55	53.1	53.7	-0.3	-0.1	-0.1	1.7	-0.4	-0.5
R-49	W River Rd	Residential	1	55	48.6	49.3	-5.2	-4.7	-4.7	-2.3	-5.0	-5.2
R-50	217 Tavern Shores	Hotel	4	55	44.4	45.2	-13.4	-16.8	-16.7	-16.7	-11.8	-11.4
R-51	217 Tavern Shores	Hotel	4	55	64.0	64.7	10.0	9.9	10.1	10.1	10.9	11.0
R-52	217 Tavern Shores	Hotel	4	55	45.8	46.5	-7.8	-7.7	-7.6	-7.4	-8.0	-8.1
R-53	217 Tavern Shores	Hotel	4	55	63.6	64.3	9.7	9.6	9.7	10.1	10.6	10.6
R-54	217 Tavern Shores	Hotel	4	55	61.1	61.9	7.6	7.5	7.6	8.3	7.9	7.9
R-55	217 Tavern Shores	Hotel	4	55	45.7	46.5	-10.5	-13.7	-13.4	-15.7	-8.8	-9.1
R-56	Tahoe Tree Company	Commercial	0	55	58.7	59.4	4.9	4.8	5.0	5.0	4.8	4.8
R-57	Kimberly Dr	Residential	1	55	54.8	55.4	1.4	1.5	1.8	4.0	1.1	0.6
R-58	Kimberly Dr	Residential	1	55	53.7	54.3	0.5	0.6	1.0	3.5	-0.1	-0.5
R-59	Kimberly Dr	Residential	1	55	52.4	53.1	-0.7	-0.4	-0.1	2.8	-1.2	-1.3
R-60	Kimberly Dr	Residential	1	55	52.9	53.6	0.4	0.8	1.1	3.4	-1.0	-1.1
R-61	Kimberly Dr	Residential	1	55	42.6	43.3	-11.1	-11.1	-10.9	-9.4	-11.0	-12.1
ST-01	N Lake Blvd	Golf Course	0	55	62.1	63.1	6.3	5.7	6.1	5.2	7.2	4.1
ST-02	Tahoe Marina Lodge, Macinaw Rd	Hotel	4	55	54.8	56.1	-0.8	0.0	0.1	0.1	1.1	0.5
ST-03	217 Tavern Shores	Hotel/Pool	0	55	63.0	63.7	4.6	-4.8	-4.3	-4.9	4.3	3.5
ST-04	411 Kimberly Dr	Residential	1	55	53.0	53.7	0.3	0.7	1.1	4.1	-0.8	-1.0
ST-05	217 Tavern Shores	Hotel/Tennis Court	0	55	66.6	67.3	13.1	12.9	13.1	13.1	13.2	13.2

be exceeding under No Build Alternative. At receiver R-34 which is representing the trail in 64-Acre area, the existing and No Build Alternative noise levels are 52.7 dBA CNEL and 53.4 dBA CNEL, respectively. The noise increase at this location would be because of relocation of SR 89 within 64-Acre Area, and the increases would be 5.9 dB to 7.4 dB, over the TRPA CNEL Standard.

The use of noise-reducing paving materials along the roadways that would undergo improvements within the project site appears to be a feasible means of achieving a 4 to 5 dB decrease in traffic noise and would reduce the potential for adverse public reaction to future traffic noise levels at most of the sensitive areas along the roadways.

No soundwalls are recommended as discussed above under the *Noise Abatement* section. Thus, a feasibility analysis is not required and has not been conducted.

C.5. Reasonable Noise Abatement

No soundwalls are required. Thus, a reasonable allowance analysis is not required.

C.6. Areas Where Abatement Is Not Feasible

No soundwalls are required. Thus, none have been found not feasible.

Appendix D Traffic Data (CNEL Calculation)

EXISTING 2013

FUTURE (2018) NO-BUILD ALTERNATIVE

ALTERNATIVE 1 (2018)

ALTERNATIVE 2 (2018)

ALTERNATIVE 3 (2018)

ALTERNATIVE 4 (2018)

ALTERNATIVE 6 (2018)

ALTERNATIVE 6A (2018)

FUTURE (2038) NO-BUILD ALTERNATIVE

ALTERNATIVE 1 (2038)

ALTERNATIVE 2 (2038)

ALTERNATIVE 3 (2038)

ALTERNATIVE 4 (2038)

ALTERNATIVE 6 (2038)

ALTERNATIVE 6A (2038)

Table D-1: Average Daily Traffic Volume for Existing Condition, 2018 and 2038 No-Build Alternatives

Roadway	From	To	ADT 2013	ADT 2018	ADT 2038
SR 89 E/W	West of Fairway Drive	Fairway Drive	16,600	19,100	23,700
SR 28	SR 89	Grove Street	17,300	24,600	26,400
SR 89 N/S	SR 28	Tavern Shores Access	22,300	26,400	29,300

Notes:

EB = eastbound; NB = northbound; SB = southbound; SR = State Route; WB = westbound

Source: Data compiled by AECOM in 2013

Table D-2: Average Daily Traffic Volume with 2018 and 2038 Alternative 1

Roadway	From	To	ADT 2018	ADT 2038
New SR 89	SR 89 E/W	SR 89 N/S	17,600	19,300
SR 89 E/W	West of New SR 89	New SR 89	19,100	23,700
SR 28	Fairway Dr	Old SR 89	21,200	19,200
Old SR 89	SR 28	Tavern Shores Access	10,800	11,300
SR 89 N/S	New SR 89	Tahoe Tavern Rd	26,400	29,300

Notes:

EB = eastbound; NB = northbound; SB = southbound; SR = State Route; WB = westbound

Source: Data compiled by AECOM in 2013

Table D-3: Average Daily Traffic Volume with 2018 and 2038 Alternative 2

Roadway	From	To	ADT 2018	ADT 2038
New SR 89	SR 89 E/W	SR 89 N/S	25,900	28,900
SR 89 E/W	West of New SR 89	New SR 89	19,100	23,700
SR 28	Fairway Drive	Old SR 89	24,500	26,500
SR 89 N/S	New SR 89	Tahoe Tavern Road	26,400	29,300

Notes:

EB = eastbound; NB = northbound; SB = southbound; SR = State Route; WB = westbound

Source: Data compiled by AECOM in 2013

Table D-4: Average Daily Traffic Volume with 2018 and 2038 Alternative 3

Roadway	From	To	ADT 2018	ADT 2038
New SR 89	SR 89 E/W	SR 89 N/S	25,100	28,000
SR 89 E/W	West of New SR 89	New SR 89	19,100	23,700
SR 28	Fairway Drive	Old SR 89	24,300	27,100
SR 89 N/S	New SR 89	Tahoe Tavern Road	26,400	29,300

Notes:

EB = eastbound; NB = northbound; SB = southbound; SR = State Route; WB = westbound

Source: Data compiled by AECOM in 2013

Table D-5: Average Daily Traffic Volume with 2018 and 2038 Alternative 4

Roadway	From	To	ADT 2018	ADT 2038
New SR 89	SR 28	64 Acres Access	26,400	29,300
SR 89 E/W	West of New SR 89	New SR 89	19,100	23,700
SR 28	Fairway Drive	Old SR 89	24,300	27,100

Notes:

EB = eastbound; NB = northbound; SB = southbound; SR = State Route; WB = westbound

Source: Data compiled by AECOM in 2013

Table D-6: Average Daily Traffic Volume with 2018 and 2038 Alternatives 6 and 6A

Roadway	From	To	ADT 2018	ADT 2038
SR 89 E/W	West of Fairway Drive	Fairway Drive	19,100	23,700
SR 28	SR 89	Grove St	24,600	26,400
SR 89 N/S	SR 28	Tavern Shores Access	26,400	29,300

Notes:

EB = eastbound; NB = northbound; SB = southbound; SR = State Route; WB = westbound

Source: Data compiled by AECOM in 2013

Table D-7: Day, Evening, and Night Traffic Percentages for L_{dn} or CNEL Calculation

Roadway Name	% Day	% Evening	% Night	Speed (mph)
SR 89 West	94	94	94	35
	4	4	4	30
	2	2	2	25
SR 89 South	93	93	93	35
	5	5	5	30
	2	2	2	25
SR 28	96	96	96	25
	3	3	3	20
	1	1	1	15

Notes:

CNEL = community noise equivalent level; L_{dn} = day-night average noise level; mph = miles per hour; SR = State Route

Source: Data compiled by AECOM in 2014

Appendix E FHWA TNM 2.5 Input and Output Data (L_{dn} or CNEL)

CALIBRATION RUNS EXISTING CONDITIONS

FUTURE (2018) NO-BUILD ALTERNATIVE CONDITION

**ALTERNATIVE 1 (2018)
ALTERNATIVE 2 (2018)
ALTERNATIVE 3 (2018)
ALTERNATIVE 4 (2018)
ALTERNATIVE 6 (2018)
ALTERNATIVE 6A (2018)**

FUTURE (2038) NO-BUILD ALTERNATIVE CONDITION

**ALTERNATIVE 1 (2038)
ALTERNATIVE 2 (2038)
ALTERNATIVE 3 (2038)
ALTERNATIVE 4 (2038)
ALTERNATIVE 6 (2038)
ALTERNATIVE 6A (2038)**

REFER TO CD-ROM

Appendix F Supplemental Data

This appendix includes the Field Measurements Summary Log. Field notes and marked drawings are available on request.

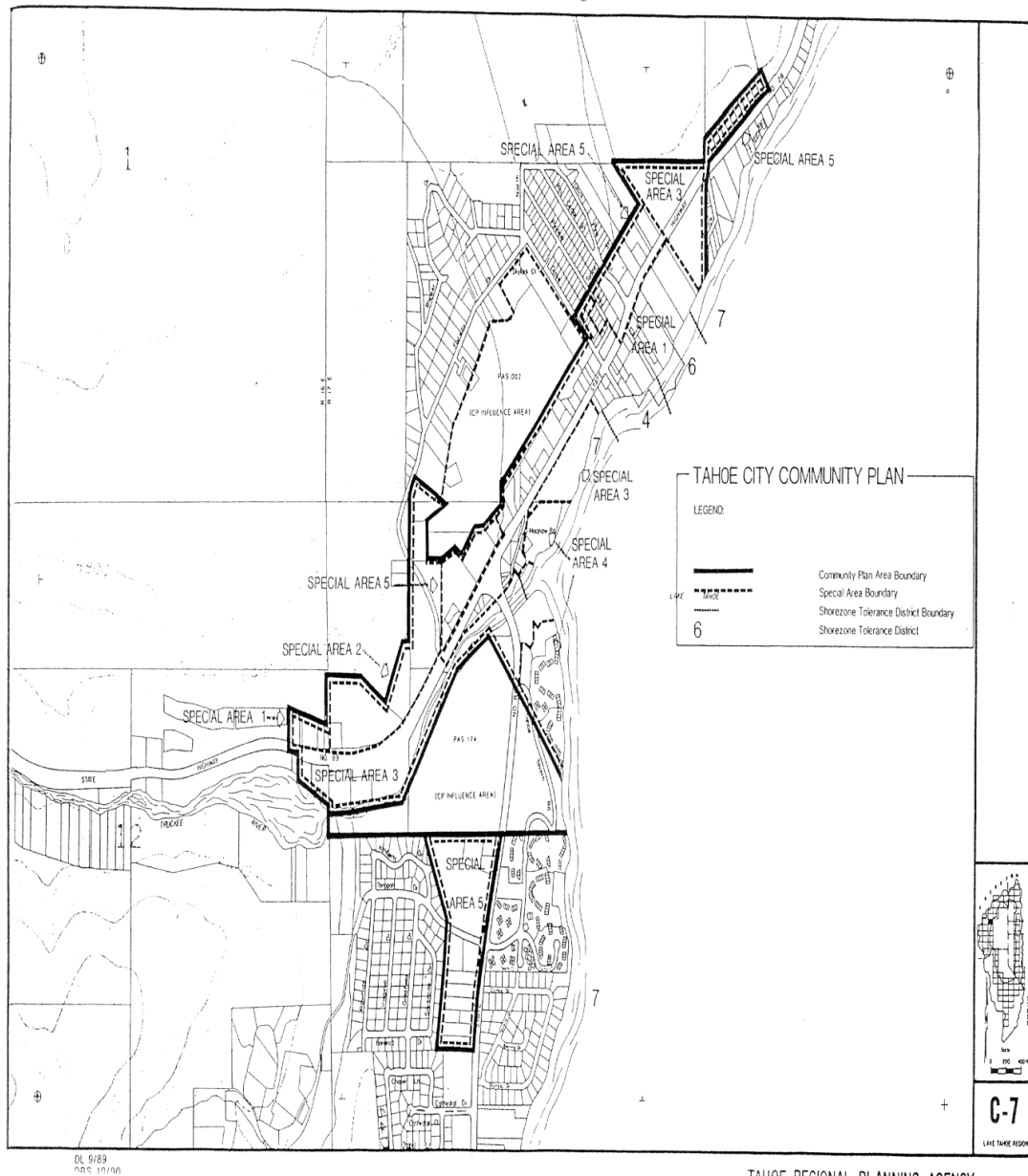
Long-Term 24 Hour Continuous Noise Monitoring Model Input Sheet

Project: Fanny Bridge - Traffic Noise

Date: January 10 - 11, 2014

Site: LT-02

Hour	L _{eq}	L _{max}	L ₅₀	L ₉₀	Averages				
16:00	64.3	78.5	62.9	57.4		L _{eq}	L _{max}	L ₅₀	L ₉₀
17:00	63.1	78.1	61.3	55.5	Daytime (7 a.m. - 7 p.m.)	65.2	79.9	62.7	57.2
18:00	60.9	77.8	58.5	51.6	Evening (7 p.m. - 9 p.m.)	59.8	77.0	55.1	47.0
19:00	58.8	72.4	55.5	48.1	Nighttime (9 p.m. - 7 a.m.)	56.6	72.3	47.1	41.8
20:00	61.1	86.5	55.3	47.2					
21:00	59.0	72.0	54.4	45.6					
22:00	59.8	72.7	55.4	45.5					
23:00	59.1	71.0	53.2	43.6					
0:00	55.3	70.8	43.5	39.5					
1:00	54.2	70.3	44.0	39.0	Daytime (7 a.m. - 7 p.m.)	67.3	92.2	65.6	61.0
2:00	56.4	82.2	40.5	38.5	Evening (7 p.m. - 9 p.m.)	61.1	86.5	55.5	48.1
3:00	46.8	67.3	38.9	38.2	Nighttime (9 p.m. - 7 a.m.)	59.8	82.2	57.0	52.8
4:00	48.4	67.9	39.5	38.3					
5:00	54.8	73.0	52.3	40.7					
6:00	59.5	75.6	57.0	52.8					
7:00	62.6	73.9	61.0	57.3					
8:00	67.3	92.2	61.3	57.1					
9:00	62.3	75.6	60.2	56.2					
10:00	64.0	79.2	61.9	55.9					
11:00	66.4	78.7	65.1	59.3					
12:00	66.4	79.9	65.2	58.2					
13:00	67.1	81.1	65.6	61.0					
14:00	66.4	86.3	65.0	59.7					
15:00	66.1	77.8	64.3	57.6					
					Uppermost-Level				
					L _{eq}	L _{max}	L ₅₀	L ₉₀	
					Daytime (7 a.m. - 7 p.m.)	67.3	92.2	65.6	61.0
					Evening (7 p.m. - 9 p.m.)	61.1	86.5	55.5	48.1
					Nighttime (9 p.m. - 7 a.m.)	59.8	82.2	57.0	52.8
					Percentage of Energy				
					Daytime	85%			
					Evening	6%			
					Nighttime	9%			
					Calculated CNEL, dBA				
					65.7				



TAHOE REGIONAL PLANNING AGENCY

Adopted by TRPA: 02-23-94

Adopted by Placer County: 03-07-94

Figure 3