3.6 Traffic

The following discussion summarizes the existing traffic, pedestrian, and bicyclist conditions and the regulatory environment, as well as an analysis of direct and indirect environmental effects of the proposed action. Where feasible, mitigation measures are recommended to reduce the severity of identified impacts. A complete traffic report, providing additional methodology and results of the traffic analysis, is provided in *Kings Beach Urban Improvement Project Traffic Report* (Appendix L).

3.6.1 Affected Environment

3.6.1.1 Existing Roadways

Roadways in the action area can be characterized as follows:

- SR 28 is the major roadway serving Lake Tahoe's North Shore, linking Kings Beach with Incline Village, Nevada, to the east and Tahoe Vista and Tahoe City, California, to the west. In the vicinity of the site, SR 28 is a four-lane facility with two lanes of travel in each direction. East of Kings Beach and west of Tahoe Vista, SR 28 is a two-lane facility. The posted speed limit on this segment of SR 28 is 48 kilometers per hour (kph) (30 miles per hour [mph]).
- SR 267 is a two-lane highway running in a general northwest-southeast alignment between Interstate 80 in Truckee and SR 28 in Kings Beach. This highway consists of two travel lanes with a speed limit of 89 kph (55 mph) in the rural sections.
- Local streets in the Kings Beach area consist of a grid of north-south streets mostly named after mammals (such as Chipmunk Street, Fox Street, Coon Street, Bear Street, and Deer Street) that are intersected by east-west streets mostly named after fish species (such as Speckled Avenue, Dolly Varden Avenue, Trout Avenue, and Brook Avenue). These Placer County roadways all provide a single travel lane in each direction.

Traffic control at intersections in Kings Beach is currently provided by stop signs on side street approaches, with the exception of traffic signals located at the SR 28/SR 267 and the SR 28/Coon Street intersections. The only dedicated turn lanes consist of eastbound and westbound left-turn lanes as well as a southbound right-turn lane at the SR 28/SR 267 intersection. A map depicting the traffic study area is presented in Figure 3.6-1.

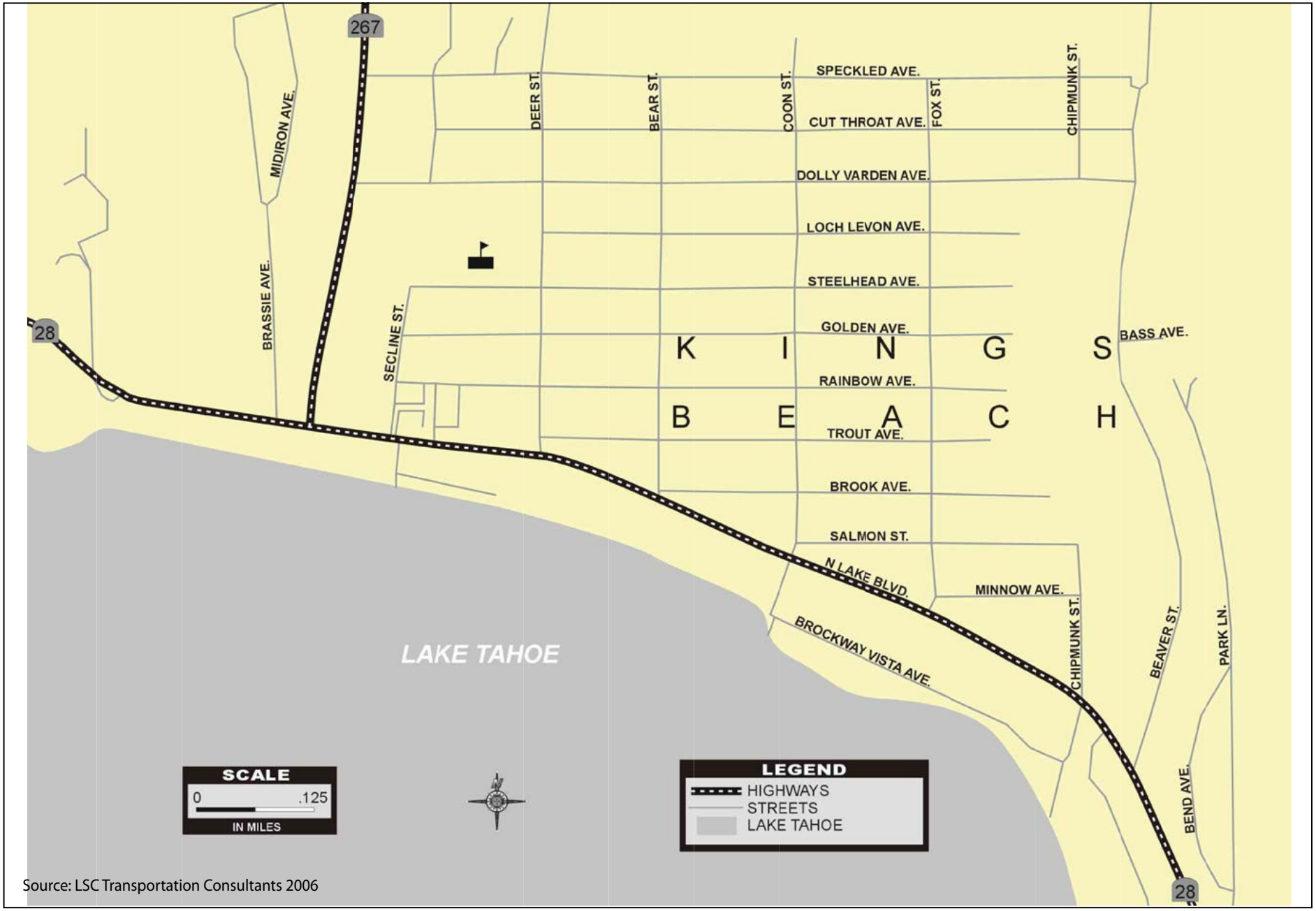
3.6.1.2 Existing Pedestrian and Bicycle Conditions

Sidewalks in the Kings Beach commercial core area are very limited and discontinuous. Although some individual property owners have installed sections of sidewalk along portions of SR 28 and the local streets near SR 28, most pedestrian travel in the area requires walking along roadway shoulders or around parked cars. These poor conditions are exacerbated in winter, when snow often forces pedestrians to walk in travel lanes. The only protected crossing locations along SR 28 are provided by the traffic signals at SR 267 and Coon Street. While these signals are provided with crosswalks and pedestrian signal indicators, crossing SR 28 at other locations requires negotiating four lanes of moving traffic.

Bicycle conditions in the study area are also poor. There are currently no dedicated bicycle paths or lanes in the area. As a result, most cycling occurs along the outer edge of the travel lanes on SR 28.

3.6.1.3 Existing Transit Conditions

The Kings Beach area is served year-round by the TART program, which is operated by Placer County DPW. Service is provided to Kings Beach along SR 28 between Incline Village to the east, and Tahoe City to the west every hour, except during peak summer months when the service is provided every 30 minutes. Additionally the Tahoe Trolley operates on an hourly schedule between Crystal Bay, NV and Tahoe Vista every 30 minutes during peak summer months during the day, with hourly service through the corridor from Squaw Valley to the Hyatt Regency in Incline Village until midnight during evening hours. Connecting services to Truckee and the West Shore are available in Tahoe City. Additional rubber-tired trolley serves are operated in the summer: a



Source: LSC Transportation Consultants 2006

06676.06 (03-07)

Figure 3.6-1
Kings Beach Commercial Core Improvement Project
Traffic Study Area

daytime trolley operating every half hour between Tahoe Vista and Crystal Bay and an evening trolley operating every hour between Squaw Valley and Incline Village. In addition, the Town of Truckee's service contractor offers daytime hourly service in winter between Kings Beach and Northstar-At-Tahoe (with connecting service to Truckee). Transit stops are provided along both sides of SR 28 near Secline Street, Bear Street, Coon Street, Fox Street, and Chipmunk Street. In addition, there is a westbound stop near Deer Street.

3.6.1.4 Existing Traffic Data

Historical Traffic Volumes

Historical traffic volumes along SR 28 near the study area were obtained from *Traffic Volumes on California State Highways* (California Department of Transportation 1992, 2002) and are presented in Table 3.6-1. As shown, Peak Month Average Daily Traffic (PMADT) volumes range as high as 24,100 vehicles per day on SR 28 (just east of SR 267). The peak month of traffic in the action area typically occurs in July. Annual Average Daily Traffic (AADT) volumes have increased at a rate higher than the growth in PMADT volumes in the area. On SR 28 between SR 267 and Coon Street, AADT increased by 2,000 vehicles between 1992 and 2002, while PMADT volumes actually declined by 100. Although this drop in PMADT is reported for SR 28 west of Coon Street, PMADT increased by 600 vehicles per day between 1992 and 2002 for the segment of SR 28 east of Coon Street. Except for SR 28 east of SR 267 and SR 267 over Brockway Summit, peak-hour traffic volumes were reported to decline on the state highways between 1992 and 2002.

Traffic data for years prior to 1992 is also useful in providing a context to traffic issues in the community. Caltrans District 3 data for PMADT traffic volume counts on SR 28 to the east of SR 267 indicates that volumes were 18,100 in 1970, 20,500 in 1975, 29,000 in 1980, 23,700 in 1985, and 24,100 in 2002. This data indicates that current volumes are roughly 17% below the peak recorded volumes, which were observed in 1980.

SR 28 Hourly Count Data

Extensive summer traffic volume data along SR 28 was collected in 2002 at the Caltrans count station located on SR 28 just to the east of SR 267. There is a strong weekly variation in traffic volumes, with the highest traffic volumes typically observed on Saturdays or Sundays, and the lowest volumes observed on Monday or Wednesday. The highest total traffic volumes were recorded on the first Friday in July, with a total two-direction traffic volume of 32,708. There is a strong eastbound traffic flow on Friday afternoon/evening, which can be assumed to consist largely of drivers traveling to Incline Village for the weekend. Volumes on Saturday reach high levels roughly between 10 a.m. and 6 p.m., with slightly higher volumes in the westbound direction than the eastbound direction. On Sunday, there is a strong mid-day peak in traffic volumes in the westbound direction, which probably largely reflects motorists leaving the Incline Village area at the end of the weekend. Data is also available from Caltrans counts for winter conditions on SR 28 east of SR 267. A review of this data indicates that the peak eastbound volumes are comparable to the summer 30th-highest volumes, though peak westbound volumes are substantially lower in winter than in summer. This data indicates that the peak hour of observed winter traffic activity occurred on Friday, January 3, between 4:00 PM and 5:00 PM, when a total of 2,124 vehicles were observed (1,174 eastbound and 950 westbound).

SR 28 Intersection Turning Movement Volumes

Summer counts conducted by Caltrans staff in the late 1990s, a winter count conducted by LSC staff at SR 28/SR 267 in January 2003, and Caltrans count data along SR 28 were used to develop a consistent set of intersection turning movement volumes. *A Policy on Geometric Design of Highways and Street* (American Association of State Highway and Transportation Officials 2003) indicates that "[t]he design hourly volume for rural highways … should be generated by the 30th-highest volume of the future year chosen for design". As this traffic level corresponds closely with peak-hour volumes observed on a busy Saturday in August, the peak-hour of a busy Saturday in August was used as

Table 3.6-1. 1992–2002 Caltrans Traffic Counts on State Routes in Kings Beach Area

		1992 2-Way Traffic Volumes			2002 2-Way Traffic Volumes			Annual 1992–2002 Change		
Route	Location	Average Annual Daily	Peak Month Average Daily	Peak Hour	Average Annual Daily	Peak Month Average Daily	Peak Hour	Average Annual Daily	Peak Month Average Daily	Peak Hour
28	West of SR 267 in Tahoe Vista	16,800	23,900	2,200	18,100	23,700	2,250	0.75%	-0.08%	0.22%
28	East of SR 267 in Kings Beach	17,100	24,200	2,100	19,100	24,100	2,050	1.11%	-0.04%	–0.24%
28	East of Coon St. in Kings Beach	13,200	18,800	1,700	15,100	19,400	1,650	1.35%	0.31%	–0.30%
267	South of Northstar Drive	6,700	8,800	920	8,100	9,900	1,150	1.92%	1.18%	2.26%
267	North of North Avenue	7,800	10,500	1,000	8,500	10,800	800	0.86%	0.28%	–2.21%
267	North of SR 28	8,000	11,100	1,000	9,200	11,900	880	1.41%	0.70%	–1.27%

Source: California Department of Transportation 1992, 2002.

the summer analysis period for this study. A similar process was used to develop winter design volumes.

Traffic Volumes on Local Kings Beach Roadways

In the summer of 2002, Placer County DPW conducted a series of intersection and road tube traffic counts throughout the county roadway network in Kings Beach. This count data indicates that there is little existing "cut through" traffic between SR 28 and SR 267, as evidenced in particular by the volumes on Speckled Avenue and Dolly Varden Avenue at SR 267, which are consistent with the level of land use development served by the internal streets. Not surprisingly, existing traffic volumes on the local streets are highest near SR 267 and particularly near SR 28. Volumes on north-south streets drop substantially north of the first two blocks off of SR 28. Coon Street has the greatest traffic activity of any of the local streets, particularly in the southbound direction. This reflects the relative ease of access to SR 28 provided by the existing traffic signal.

Existing Pedestrian/Bicycle Activity Counts

Recent summer counts of pedestrian and bicycle activity in the Kings Beach area observed up to 44 pedestrians per hour walking along the north side of SR 28 and up to 71 along the south side. Existing bicycle activity of up to 19 and 29 cyclists per hour were observed on the north side and south side of the highway, respectively. The data indicates that existing pedestrian crossing volumes for SR 28 are highest at Bear Street (with the probable exception of Coon Street, for which no data is available), with 144 pedestrians and one cyclist crossing the state highway in the peak observed summer hour. As these counts were limited to specific days, they may not reflect actual peak levels of activity.

Winter pedestrian and bicycle counts in the study area were conducted over the 2004 winter holiday period. These indicate that no more than five pedestrians per hour cross SR 28 at any one intersection, while a maximum of 11 pedestrians per hour were observed to cross SR 28 mid-block (between public road intersections) along any one block. Winter pedestrian activity along SR 28 was highest at Coon Street, with 27

pedestrians walking along the north side of the highway and two along the south side. Bicycle activity was also relatively low in the winter, with a maximum of three cyclists per hour observed along any one block.

Existing Intersection Level of Service

The Highway Capacity Software programs were used to identify the existing LOS at the various intersections.

LOS is a term that describes the operating performance of an intersection or roadway. LOS is measured quantitatively and reported qualitatively on a scale from A to F, with A representing the best performance and F the worst. Tables 3.6-2 and 3.6-3 relate the operational characteristics associated with each level of service category for signalized and unsignalized intersections, respectively.

Table 3.6-2. Signalized Intersection LOS Criteria

Level of Service	Description	V/C Ratio*
A	Stable flow—Very slight or no delay. Conditions are such that no approach phase is fully utilized by traffic and no vehicle waits longer than one red indication.	0.00–0.60
B	Stable flow—Slight delay. An occasional approach phase is fully utilized.	0.61–0.70
C	Stable flow—Acceptable delay. A few drivers arriving at the end of a queue may have to wait through one signal cycle.	0.71–0.80
D	Approaching unstable flow—Tolerable delay. Delay may be substantial during short periods, but excessive back ups do not occur.	0.81–0.90
E	Unstable flow—Intolerable delay. Delay may be great—up to several signal cycles. Long queues form upstream of intersection.	0.91–1.00
F	Forced flow—Excessive delay. Volumes vary widely, depending on downstream queue conditions.	> 1.00

* V/C = volume to capacity ratio.

Source: Circular 212 Interim Materials on Highway Capacity (Transportation Research Board, January 1980).

The analysis of roadway LOS and traffic volumes used the Highway Capacity Manual (2000) methodology for urban arterials was applied. Under this methodology, LOS is a measure of total travel speed through the corridor.

Table 3.6-3. Level of Service Definitions for Signalized Intersections

Level of Service	Average Control Delay (seconds/vehicle)
A	<10.0
B	10.1–20.0
C	20.1–35.0
D	35.1–55.0
E	55.1–80.0
F	>80.0

Source: Transportation Research Board 2000.

For unsignalized (all-way stop-controlled and side-street stop-controlled) intersections, the *Highway Capacity Manual* (Transportation Research Board 2000) methodology was utilized. With this method, operations are defined by average control delay per vehicle (measured in seconds) for each stop-controlled movement. This incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For side-street stop-controlled intersections, delay for the worst movement is reported. Table 3.6-4 summarizes the relationship between delay and LOS for unsignalized intersections.

Table 3.6-4. Relationship Between Delay and LOS for Unsignalized Intersections

Level of Service	Description	Average Control Per Vehicle (seconds)
A	Little or no delays	<10.0
B	Short traffic delays	>10.0 to 15.0
C	Average traffic delays	>15.0 to 25.0
D	Long traffic delays	>25.0 to 35.0
E	Very long traffic delays	>35.0 to 50.0
F	Extreme traffic delays with intersection capacity exceeded	>50.0

Source: Transportation Research Board 2000.

For roundabout intersections, the SIDRA method was utilized. With this method, operations are defined by average control delay per vehicle (measured in seconds) for each movement. This incorporates delay associated with deceleration, acceleration, merging, and moving through the roundabout.

As indicated in Table 3.6-5, the existing signalized SR 267/SR 28 intersection operates at an adequate LOS of C in the summer design period, while the SR 28/Coon Street intersection operates at LOS B. The unsignalized Secline, Bear, Fox and Chipmunk Street intersections, however, operate at LOS F (very long delays) for the worst approach (the side street approaches to SR 28), while the worst approach operates at LOS D at Deer Street and LOS E at Chipmunk Street. In winter, the existing signalized SR 267/SR 28 intersection operates at an adequate LOS of D in the winter design period while the SR 28/Coon Street intersection operates at LOS A. However, the unsignalized Secline, Bear, and Fox Street intersections operate at LOS F for the worst approach (the side street approaches to SR 28), while the worst approach operates at LOS C at Deer Street and LOS D at Chipmunk Street.

Table 3.6-5. Existing Summer Design Peak Hour Intersection Levels of Service

SR 28 at:	Existing Traffic Control	Worst Approach		Total Intersection	
		Delay s/veh	LOS	Delay s/veh	LOS
SR 267	Signal	–	–	27.5	C
Secline Street*	Two-Way Stop Controlled	536.0	F	–	–
Deer Street	Two-Way Stop Controlled	27.5	D	–	–
Bear Street*	Two-Way Stop Controlled	169.0	F	–	–
Coon Street	Signal	–	–	10.1	B
Fox Street	Two-Way Stop Controlled	178.7	F	–	–
Chipmunk Street	Two-Way Stop Controlled	41.4	E	–	–

Note:

* Although none of the minor street southbound approaches are striped with separate right-turn lanes, the southbound approaches to the Secline and Bear Street intersections are wide and used as if there are separate right-turn lanes. Therefore, the LOS at these two intersections was calculated assuming separate right-turn lanes on the southbound approaches.

Existing Traffic Safety

Table 3.6-6 presents a summary of accident history along SR 28 in Kings Beach for an 8.75-year period (April 1, 1996 through December 31, 2004). Per standards of the Caltrans Headquarters Highway Safety Investigations Branch, accidents within 250 feet of an intersection are assigned to the intersection. As indicated, a total of 259 accidents were recorded over this period, of which 70 resulted in injuries, one resulted in a fatality, and the remainder resulted in property damage only. The highest number of accidents occurred at the SR 28/Deer Street intersection (44 total accidents, or an average of 4.9 accidents per year), followed by 36 at the SR 28/Fox Street intersection, 35 at the SR 28/Secline Street intersection, and 34 at the SR 28/SR 267 intersection. For the roadway segments away from the intersections, the segment of SR 28 between Secline Avenue and Deer Street had the highest number of accidents (11). By type, the largest proportion were broadside accidents (90), which is a relatively hazardous type of accident, followed by rear-end accidents (78) and sideswipes (40). Fourteen pedestrian accidents were recorded, including the single fatality, as well as eight bicycle accidents.

Within the last few years, several serious accidents have occurred within the Kings Beach commercial core area along SR 28.

Accident rates for intersections were compared by dividing the number of accidents by the estimated total Million Vehicle (MV) movements over the data period, while accident rates for roadway segments were compared by dividing the number of accidents by the estimate total Million Vehicle-Miles (MVM). As shown in the table, the intersection accident rates were relatively high for the SR 28/Deer Street and SR 28/Secline Street intersections. Roadway segment accident rates were relatively high between Secline and Deer Streets and between Coon and Fox Streets. Finally, these rates can be compared against California statewide averages for similar types of facilities in rural areas, as presented in *2003 Collision Data on California State Highways* (California Department of Transportation 2005). As indicated in the far right portion of the table, the two signalized intersections at SR 28/SR 267 and at SR 28/Coon Street had relatively low rates, at 69% and 66% the statewide average, respectively. However, accident rates (both total and injury) exceeded the statewide average at all roadway segments and other intersections. For injury and fatal accidents, the statewide average is exceeded at the SR 28 intersections at Secline, Deer, and Fox Streets and along the segment between Coon and Fox Streets. In particular, the total rate at the Deer and Fox Street intersections exceeded the statewide average by at least a factor of three. While some of this increased rate can be attributed to snow conditions (as the majority of intersections statewide are below the snow line), the greater factors are probably excessive speeding and the difficulties of judging an acceptable gap in traffic on a four-lane roadway in high volume conditions. Accident data from January 2001 to January 2006 indicates that 80.5% of all accidents in the CCIP occurred on dry surfaces, while 11.8% occurred while the road surface was snow or icy (California Department of Transportation 2005).

Table 3.6-6. Accident History

		Total Accidents		Fatalities		Injuries		Estimated	Accident Rate/MVM		Average California Statewide Rate per MVM (1)			% of Statewide Average	
SR 28 Intersection	MP	N	P	N	P	N	P	MVM	T	I	T	I	F	T	I
Location of Accident															
Junction 267	9.340	12	17.9%	0	0.0%	3	4.5%	24.4	0.49	0.12	0.70	0.32	0.01	70%	39%
Secline Street	9.430	11	16.4%	0	0.0%	3	4.5%	21.3	0.52	0.14	0.22	0.09	0.00	236%	150%
Deer Street	9.585	12	17.9%	0	0.0%	3	4.5%	20.4	0.59	0.15	0.22	0.09	0.00	268%	157%
Bear Street and Brook Street	9.720	6	9.0%	0	0.0%	0	0.0%	21	0.29	0.00	0.33	0.15	0.01	88%	0%
Coon Street	9.880	9	13.4%	0	0.0%	1	1.5%	20.8	0.43	0.05	0.70	0.32	0.01	61%	15%
Fox Street	10.025	7	10.4%	0	0.0%	2	3.0%	18.7	0.37	0.11	0.22	0.09	0.00	168%	114%
Chipmunk Street	10.215	7	10.4%	0	0.0%	2	3.0%	17.5	0.40	0.11	0.22	0.09	0.00	182%	122%
Beaver Street	10.263	3	4.5%	0	0.0%	0	0.0%	17.2	0.17	0.00	0.22	0.09	0.00	77%	0%
3-Year Total		*67*	*100.0%*	*0*	*0.0%*	*14*	*20.9%*								
Year of Accident															
1996 (Apr–Dec)	–	16	23.9%	0	0.0%	1	1.5%								
1997	–	24	35.8%	0	0.0%	6	9.0%								
1998	–	22	32.8%	0	0.0%	6	9.0%								
1999 (Jan–Mar)	–	5	7.5%	0	0.0%	1	1.5%								
3-Year Total	–	*67*	*100.0%*	*0*	*0.0%*	*14*	*20.9%*								
Type of Collision															
Head-On	–	2	3.0%	0	0.0%	2	3.0%								
Sideswipe	–	10	14.9%	0	0.0%	1	1.5%								
Rear-End	–	15	22.4%	0	0.0%	3	4.5%								

Table 3.6-6. Continued

		Total Accidents		Fatalities		Injuries		Estimated	Accident Rate/MVM		Average California Statewide Rate per MVM (1)			% of Statewide Average	
SR 28 Intersection	MP	N	P	N	P	N	P	MVM	T	I	T	I	F	T	I
Broadside	–	25	37.3%	0	0.0%	3	4.5%								
Hit Object	–	9	13.4%	0	0.0%	2	3.0%								
Auto/Pedestrian	–	2	3.0%	0	0.0%	2	3.0%								
Other	–	4	6.0%	0	0.0%	1	1.5%								
3-Year Total	–	67	100.0%	0	0.0%	14	20.9%								

Notes:

MVM = Million Vehicle Movements through the intersection

MP = Milepost

N = Number

P = Percent

T = Total

I = Injury

F = Fatality

Source: Caltrans District 3 TASAS Table B Accident Records (April, 1996 through March 31, 1999), and “2000 Accident Data on California State Highways (Caltrans).

3.6.2 Regulatory Setting/Tahoe Regional Planning Agency Thresholds

3.6.2.1 California Department of Transportation

Caltrans roadway standards are identified in the *State Route 28 Transportation Concept Report* (California Department of Transportation 1997a). The "concept LOS" identified for SR 28 is LOS F. As the TRPA standards are more restrictive than this level, the TRPA standards are pertinent to this study.

A signal warrant analysis was performed based upon Caltrans standards, as Caltrans has jurisdiction along SR 28. The *California Supplement to the Manual on Uniform Traffic Control Devices* (California Department of Transportation 2006) signal warrants were used to assess the appropriateness of the traffic control devices (either signal or roundabout) proposed in the two alternatives. Although there are no adopted warrants for installation of a roundabout, the signal warrants are assumed to be pertinent guidance regarding the placement of a roundabout because both signals and roundabouts are intended as traffic control devices. Levels of service at signalized and stop sign controlled intersections were evaluated using the Highway Capacity Software package. Per Caltrans requirements, SIDRA (Version 3.1) was used to evaluate roundabout LOS. Based on all available information and forecasts, if it is determined that a traffic control device is proposed at a location that does not meet minimum signal warrants, this would be considered an adverse effect.

3.6.2.2 Placer County

Placer County DPW has indicated that the maximum preferred traffic volume along a largely residential local street (like the majority of Kings Beach's "internal" streets) to be 2,000 to 3,000 vehicles per day for streets serving residential zoning of 0.10 hectare (0.25 acre) or less with front-on lotting. Although lots in Kings Beach were originally laid out to front on the east-west streets, housing has developed that fronts onto every north-south street as well. Considering the narrow pavement width, density of development, lack of sidewalks, and necessity for pedestrians in winter to walk in the travel lanes, a standard of 3,000 vehicles per day is considered for local streets in Kings Beach for purposes of

this analysis. A project that causes daily traffic levels to exceed this volume or exacerbates no-project levels exceeding this value will be considered an adverse effect.

3.6.2.3 Kings Beach Community Plan

Each alternative is reviewed for consistency with existing adopted *Kings Beach Community Plan* goals and policies. In addition, the impact of these alternatives on nonauto travel modes (pedestrian, bicyclist and transit) is evaluated. Any existing adopted goals, policies, or plans that the roadway alternatives would make infeasible to achieve would be identified as an adverse effect.

3.6.2.4 Tahoe Regional Planning Agency

The TRPA standard is to achieve LOS D or better at signalized intersections, with up to 4 hours per day at LOS E allowed. "LOS" is measured on a scale of LOS A (free-flow conditions with little or no delay) to LOS F (stop-and-go congestion); more detailed descriptions of the individual levels of service are provided in the traffic report. In summer, traffic volumes on SR 28 in Kings Beach vary over the day such that volumes on the fifth-highest hour are frequently within 10% of the peak volume, indicating that LOS E conditions could exist during more than 4 hours if the peak-hour LOS is E. For summer conditions, therefore, a peak-hour LOS standard of D is applied. However, the hourly winter traffic data indicates that the fifth-highest hourly volume is well below the peak-hour volumes; therefore, a peak-hour LOS of E is used in this study as the standard for winter conditions. While TRPA does not have specific standards for roundabouts, the TRPA LOS standards for signalized intersections are assumed to apply. TRPA also has no standards specific to unsignalized intersections, though intersection approaches with LOS F conditions are typically considered to be a concern by TRPA staff. (Cornell pers. comm.). Finally, roadway traffic volumes providing LOS F conditions in any one-hour or more than 4 hours per day of LOS E conditions (between 90 and 100% of roadway capacity) will be considered to exceed standards.

3.6.3 Environmental Consequences (Permanent, Temporary, Direct, Indirect)

3.6.3.1 Study Methods and Procedures

Future traffic conditions are evaluated for the first year that the potential roadway modifications could be in place (2008) and for twenty years beyond this first year (2028). The methodology used to forecast traffic volumes for this analysis is presented in full in the *Kings Beach Urban Improvement Project Traffic Report* (Appendix L). In short, because there is currently no available computer travel-demand forecasting model of future traffic conditions in the TRPA area (Norberg pers. comm.), it was necessary for the purposes of this analysis to generate new forecasts. Forecasts for 2008 were generated by reviewing annual traffic trends between 1992 and 2002 (0.31% per year on SR 28, and 0.70% per year on SR 267) and applying these rates to the observed 2002 traffic volumes. As a regional traffic model is not available, and consistent with standard traffic engineering practice, 2028 forecasts reflect "buildout" of all adopted land use plans that could substantially impact study area traffic volumes; these land use plans are as follows:

- The community plans for the Kings Beach Commercial area, the Kings Beach Industrial area, Crystal Bay, Incline Village, Tahoe Vista, Carnelian Bay, Tahoe City, and Martis Valley;
- The Town of Truckee 1995 General Plan; and
- Buildout of other available residential development outside of the community plan areas within the Tahoe Basin.

In addition, a volume increase associated with growth in "through" traffic (not stopping anywhere within the various plan areas) was included. Finally, the limitation that the existing Crystal Bay pedestrian signal would have on traffic through Kings Beach was evaluated. Assuming this signal will remain in the future (with timing modified to reduce

traffic delays), it would "cap" traffic volumes in 2028 (but not in 2008); this effect was used to adjust the 2028 traffic volume forecasts.

The resulting forecast were then evaluated using standard traffic engineering methodologies, as provided in the *Highway Capacity Software* program for signalized and stop sign controlled intersections and in the *SIDRA 3.1* computer program for roundabouts. Table 3.6-7 includes a summary of LOS conditions under the various alternatives.

As discussed in Chapter 3, up to 220 new parking spaces will need to be provided in off-street lots or along local roadways near SR 28 to mitigate loss of parking along or accessed from SR 28. It is not presently possible to conduct a detailed evaluation of the traffic impacts associated with this shift in parking on local streets or the local street intersections with SR 28 because the specific locations of replacement parking have not been identified by the project proponent. Some of the potential new parking lots are accessed directly off of SR 28 and thus would not add to traffic volumes on the local streets. Conservatively, ignoring that some traffic is already generated on local streets due to drivers using the local streets to turn around to enter or exit on-street parking, assuming that 60% of the future replacement spaces require travel on the local streets, and applying a turnover rate per parking space of 7 vehicles per day and 0.5 vehicles per peak-hour, the shift in parking would generate roughly 1,850 additional one-way vehicle-trips over the course of a day on local streets and 132 in the peak-hour.

These trips, however, would be distributed over all local streets accessing the potential lots, which can be expected to consist of Deer, Bear, Coon, Fox, and Chipmunk Streets, along with the segments of the east-west streets within two blocks of the state highway. A reasonable planning assumption is that any one street segment would not carry more than one-third of this total traffic, or roughly 620 daily trips or 44 peak-hour trips (total of both directions). In light of these relatively low peak-hour volume impacts on any one street and the results of the intersection LOS analyses, it can be concluded that there is little potential that relocated parking would result in adverse effects to intersection or

Table 3.6-7. Summary of Alternative Traffic Level of Service Impacts

			2008				2028			
Existing			A1	A2	A3	A4	A1	A2	A3	A4
SR 28 Summer Intersection LOS[1]										
SR 267		C	C	C	C	C	F(2)	F(2)	F(2)	F(2)
Secline Street		F	F	F	F	F	F	F	F	F
Deer Street		D	E	E	E	E	F	F	F	F
Bear Street		F	F	B	A	B	F	F	B	F
Coon Street		B	A	B	A	B	D	F	D	F
Fox Street		F	F	F	F	F	F	F	F	F
Chipmunk Street		E	E	F	E	F	F	F	F	F
SR 28 Winter Intersection LOS[1]										
SR 267		D	D	C	D	C	F[2]	F(2)	F[2] (2)	F(2)
Secline Street		F	F	F	F	F	F	F	F	E
Deer Street		C	C	D	C	D	F	F	F	F
Bear Street		F	F	B	A	B	F	F	B	F
Coon Street		A	A	B	A	B	D	F	D	F
Fox Street		F	F	E	F	E	F	F	F	F
Chipmunk Street		E	D	C	D	C	F	F	F	F
Summer Roadway LOS										
Peak Direction LOS		B	B	F	B	F	E	F	E	F
TRPA LOS Standard Exceeded?	EB	No	No	Yes	No	Yes	No	Yes	No	Yes
	WB	No	No	Yes	No	Yes	No	Yes	No	Yes
Days per Year TRPA LOS Standard Exceeded	EB	0	0	10	0	10	0	104	0	104
	WB	0	0	5	0	5	0	108	0	108
Days per Year With 1 or More Hour of LOS F	EB	0	0	10	0	10	0	104	0	104
	WB	0	0	5	0	5	0	108	0	108
Hours per Year of LOS F	EB	0	0	28	0	28	0	670	0	670
	WB	0	0	15	0	15	0	774	0	774
Maximum Hours per Day of LOS F	EB	0	0	7	0	7	0	11	0	11
	WB	0	0	6	0	6	0	11	0	11
Winter Roadway LOS										
Peak Direction LOS		B	B	F	B	E	E	F	E	F
TRPA LOS Standard Exceeded?	EB	No	No	Yes	No	No	No	Yes	No	Yes
	WB	No	No	Yes	No	No	No	Yes	No	Yes
Hours per Peak Day LOS F	EB	0	0	3	0	0	0	3	0	3
	WB	0	0	1	0	0	0	1	0	1
Maximum Daily Traffic Volume on Residential Streets		2000	2000	2000	2000	2000	2800	5400[3]	2800	5400[3]

Notes:

[1] Total intersection LOS for signalized intersection, worst approach LOS for roundabout and stop sign controlled.

[2] Unmitigated. With separated WB right-turn lane, LOS D provided.

[3] To better understand how this volume would change the character of the street, it is worthwhile to consider traffic levels on a per-minute basis. Considering both the traffic diverted off of SR 28 by congestion as well as the traffic generated by the neighborhood, 5,400 vehicles per day of non- would equate to roughly 9 vehicles per minute during the busiest traffic hour of the day (total of both directions, based on a typical 10 percent of daily traffic occurring in the peak hour), or one vehicle every 6 or 7 seconds.

roadway LOS. It should also be noted that future individual public parking lot projects will require specific individual environmental analysis.

Impact TRA-1: Degradation of SR 28 Roadway Level of Service (LOS) Below Applicable Standards

Alternative 1

To analyze roadway LOS under the existing four-lane roadway configuration, the *Highway Capacity Manual* methodology for urban arterials was applied. Under this methodology, LOS is a measure of total travel speed through the corridor. For the design period in the peak direction, LOS B was determined for summer 2008 conditions in the peak direction, with a travel speed of 49.2 kph (30.5 mph). LOS B conditions were also found for winter 2008 conditions, with a travel speed of 47.6 kph (29.6 mph).

Applying the *Highway Capacity Manual* methodology for urban arterials, LOS E was determined for 2028 summer conditions in the peak direction, with a travel speed of 26.2 kph (16.3 mph). For winter conditions, LOS E was determined for 2028 conditions in the peak direction, with a travel speed of 22.2 kph (13.8 mph). It is anticipated that 2028 ADT on SR 28 is estimated to equal 39,700 vehicles per day on the average day of the peak month (August).

The no build alternative (Alternative 1) would attain roadway LOS standards in 2008 and 2028. Consequently, Alternative 1 would not result in adverse effects on LOS. No mitigation is required.

Alternative 2

Alternative 2 consists of a three-lane cross-section along SR 28, with single-lane roundabouts at Bear Street and at Coon Street. The existing signal at SR 267 would remain. Brook Avenue would be converted to one-way eastbound from Bear Street to Coon Street. While on-street parallel parking would be provided along both sides of SR 28, parking would be prohibited during the summer season.

There is no standard traffic engineering analysis technique regarding the capacity associated with urban three-lane roadways operating under congested conditions with heavy parking, pedestrian, and bicycle activity. Therefore, capacity of SR 28 under this alternative was estimated based upon the observed capacity of the existing similar cross section of SR 28 in Tahoe City, adjusted for the differences between the two segments. The maximum capacity of SR 28 in Kings Beach under this alternative in the eastbound direction would be 1,241 vehicles per hour, while the westbound capacity would be 1,171 vehicles per hour. A similar analysis of winter conditions was found to have substantially lower roadway capacity: the eastbound capacity was found to equal 968 vehicles per hour, while westbound capacity was found to equal 953 vehicles per hour.

These capacities were then compared with the estimated directional traffic volumes by hour to identify those hours during which volumes would exceed capacity (thereby resulting in the formation of traffic queues). A summary of the results is shown in Table 3.6-7 and reflects the following for 2008 conditions.

- The TRPA LOS standard has two criteria: whether the peak-hour is LOS D or better, and whether no more than 4 hours per day exceed LOS E. In the eastbound direction, the peak-hour exceeds LOS E on 10 days, and the number of days per year with more than 4 hours exceeding LOS D is six (which occurred on the same days that LOS E was exceeded in the peak hour). Therefore, the TRPA LOS standard is exceeded on 10 days per year. In the westbound direction, the peak-hour exceeds LOS E on five days, while the number of days per year with more than 4 hours exceeding LOS D is four, indicating that the TRPA LOS standard is exceeded 5 days per year (again, on the same days that LOS E is exceeded).
- It is also useful to evaluate the extent to which volumes would exceed the absolute roadway capacity, which is when slow-moving traffic queues would form. In the westbound direction, absolute roadway capacity would be exceeded during a total of 15 hours over the course of the summer. These hours would occur over 5 individual days, and up to 6 hours of traffic queues would occur on an individual day. In the

eastbound direction, absolute roadway capacity would be exceeded during 28 hours of the summer. These hours will occur over the course of 10 individual days. Up to 7 hours of queuing would occur on an individual day.

- When traffic queues form on SR 28, drivers can be expected to divert onto parallel local roads. Under all of the hours in which diversion is forecast to occur, the diverted volume is expected to range up to no more than 200 vehicles per hour.
- A consideration in the evaluation of future traffic conditions along SR 28 in Kings Beach is if eastbound traffic queues generated by the pedestrian signal at North Stateline would impact Kings Beach. An evaluation of the operation of this pedestrian signal indicates that a queue would not be formed into Kings Beach at any time throughout the summer in 2008.
- Because hourly directional traffic volumes in the winter are not available over numerous days, the winter roadway LOS analysis was confined to a single peak day (specifically, the Friday after New Year's Day). Under Alternative 2, the TRPA standard would be exceeded in both directions in 2008 in winter, and absolute roadway capacity would be exceeded for 3 hours in the eastbound direction and 1 hour in the westbound direction.

A similar analysis for 2028 conditions yields the following conclusions.

- The TRPA LOS standard would be exceeded on 104 days per summer in the eastbound direction and 108 days in the westbound direction.
- In the westbound direction, roadway capacity would be exceeded (resulting in LOS F and the formation of slow-moving traffic queues along SR 28) during a total of 774 hours over the course of the summer. These hours would occur over virtually all days of the summer, and up to 11 hours of traffic queues would occur on an individual day. In the eastbound direction, roadway capacity would be exceeded (LOS F) during 670 hours of the summer. These hours will occur over the course of

104 individual days. Up to 11 hours of LOS F queuing would occur on an individual day.

- The diverted volume is expected to range up to between 400 and 500 vehicles per hour in the eastbound direction (for 124 hours per summer) and 400 to 500 vehicles per hour in the westbound direction (for 144 hours per summer).
- Eastbound traffic queues generated by the North Stateline pedestrian signal will form back into Kings Beach during 69 hours per summer. Subtracting this figure from the 670 total hours of eastbound queuing per summer, this roadway alternative in Kings Beach would generate 601 additional hours of queues over and above the 69 hours resulting from the North Stateline signal.
- Peak winter day conditions would exceed the TRPA LOS standard and would exceed the absolute roadway capacity during 8 hours in the eastbound direction and 12 hours in the westbound direction over the peak winter design day.

As a result of implementation of Alternative 2, there is the potential to exceed the TRPA LOS standard on SR 28 in Kings Beach.

- In 2008, the TRPA LOS standard would be exceeded for 10 days per summer in the eastbound direction and 5 days per summer in the westbound direction. TRPA LOS standards would also be exceeded on a peak winter day, in both directions. TRPA standards do not identify how many days per year or per season are required to be considered an adverse effect. (As traffic studies typically do not evaluate multiple days per season, this issue is not typically raised.) Standard traffic engineering practice does not generally establish significance based upon a single peak hour or peak day but rather considers a “typical peak” condition (such as the 30th-highest volume in a year). For a seasonal daily standard, the tenth-highest day is assumed to be applicable for purposes of this study. Based upon this, LOS impacts in 2008 in the eastbound direction are considered to be an adverse effect. In comparison, the no build alternative (Alternative 1) would attain roadway LOS standards in 2008.

- In 2028, the TRPA LOS standard would be exceeded every one of the 108 days in the summer season in the westbound direction and 104 days per summer season in the eastbound direction, as well as in both directions on a peak winter day. In comparison, the no build alternative (Alternative 1) would attain roadway LOS standards in 2028.

It should be noted that an option to Alternative 2 has been proposed, which would widen the bike lanes on either side by two feet to improve traffic flow. As Alternative 2 (as well as Alternative 4, in winter) does not include on-street parking, the only traffic flow benefit would be a modest reduction in the friction factor associated with bicycle side friction. As this factor is less than 2% of total capacity, a reduction in this factor would not have a material effect on the results of the analysis. *Friction factors* are conditions that reduce through traffic capacity. They include pedestrian crossings, vehicle turning movements into/out of driveways and on-street parking spaces, and the tendency of at least some drivers to slow while passing bicyclists. In the case of SR 28 through Kings Beach, these friction factors are key in setting the capacity and thus the level of service of the roadway segments.

Alternative 3

This alternative consists of four through travel lanes along SR 267 with traffic signals at SR 267, at Bear Street, and at Coon Street. New left-turn lanes along SR 28 would be provided at Bear Street, Coon Street, and Fox Street. Brook Avenue would be converted to one-way eastbound from Bear Street to Coon Street.

For both the summer and winter design periods in both directions, the TRPA LOS standard would be attained, in both 2008 and 2028.

Alternative 4

This alternative is identical to Alternative 2, except that no on-street parking spaces would be provided along SR 28, effectively prohibiting on-street parking year-round rather than solely in the summer.

The roadway LOS for Alternative 4 during the key summer season is identical to that identified for Alternative 2, as these alternatives only differ (from a traffic perspective) regarding the provision of on-street parking in the nonsummer seasons. An analysis for 2008 conditions yields the following conclusions:

- In the eastbound direction, the TRPA LOS standard is exceeded on 10 days per year. In the westbound direction, the TRPA LOS standard is exceeded 5 days per year.
- In the eastbound direction, absolute roadway capacity would be exceeded during 28 hours of the summer. These hours will occur over the course of 10 individual days, and up to 7 hours of queuing would occur on an individual day. Westbound, absolute roadway capacity would be exceeded resulting in the formation of slow-moving traffic queues along SR 28 during a total of 15 hours over the course of the summer. These hours would occur over 5 individual days, and up to 6 hours of traffic queues would occur on an individual day.
- When traffic queues form on SR 28, drivers can be expected to divert onto parallel local roads. Under all of the hours in which diversion is forecast to occur, the diverted volume is expected to range to no more than 200 vehicles per hour.
- Eastbound traffic queues generated by the North Stateline pedestrian signal will not form back into Kings Beach at any time throughout the summer.
- 2008 winter roadway LOS conditions under Alternative 4 would attain the TRPA standard.

A similar analysis for 2028 conditions yields the following conclusions.

- The TRPA LOS standard would be exceeded on 104 days per summer in the eastbound direction and 108 days in the westbound direction.
- Westbound roadway capacity would be exceeded during a total of 774 hours over the course of the summer. These hours would occur over virtually all days of the summer, and up to 11 hours of traffic queues would occur on an individual day. In

the eastbound direction, roadway capacity would be exceeded (LOS F) during 670 hours of the summer. These hours will occur over the course of 104 individual days. Up to 11 hours of LOS F queuing would occur on an individual day.

- The diverted volume is expected to range up to between 400 and 500 vehicles per hour in the eastbound direction (for 124 hours per summer), and 400 to 500 vehicles per hour in the westbound direction (for 144 hours per summer).
- Eastbound traffic queues generated by the North Stateline pedestrian signal will form back into Kings Beach during 69 hours per summer. Subtracting this figure from the 670 total hours of eastbound queuing per summer, this roadway alternative in Kings Beach would generate 601 additional hours of queues over and above the 69 hours resulting from the North Stateline signal.
- Peak winter day conditions would generate 3 hours of LOS F conditions in the eastbound direction and 10 hours in the westbound direction, exceeding the TRPA LOS standard.

As a result of implementation of Alternative 4, there is the potential to exceed the TRPA standard of no more than 4 hours per day of LOS E on SR 28 in Kings Beach.

- In 2008, the TRPA LOS standard would be exceeded on 10 days per summer in the eastbound direction and 5 days per summer in the westbound direction. Based upon this, LOS impacts in 2008 in the eastbound direction are considered to be an adverse effect. In comparison, the no build alternative (Alternative 1) would attain roadway LOS standards in 2008.
- In 2028, the TRPA LOS standard would be exceeded every one of the 108 days in the summer season in the westbound direction, and 104 days per summer season in the eastbound direction. In addition, the TRPA LOS standard would be exceeded in both directions on a peak winter day. In comparison, the no build alternative (Alternative 1) would attain roadway LOS standards in 2028.

As a result of implementation of Alternative 4, in 2008 the TRPA LOS standard would be exceeded on 10 days per summer in the eastbound direction, and 5 days per summer in the westbound direction. In 2028, the TRPA LOS standard would be exceeded each of the 108 days in the summer season in the westbound direction and 104 days per summer season in the eastbound direction. In addition, the TRPA LOS standard would be exceeded in both directions on a peak winter day.

Impact TRA-2: Increase in Average Daily Traffic on Residential Streets in Excess of Applicable Standards

Alternative 1

Alternative 1 would not increase average daily traffic (ADT) on residential streets because it represents the no build condition and adequate capacity would be provided along the state highways. There would be no adverse effects.

Alternative 2

By 2028, roadway segments with traffic expected to divert from the highway because of congestion in excess of 3,000 ADT would occur on Fox Street between Brook Avenue and Trout Avenue (an additional 3,200 ADT). Growth in ADT is forecast to reach as high as 2,000 on Coon Street between Trout Avenue and Rainbow Avenue, 3,200 on Chipmunk Street between SR 28 and Minnow Avenue, and 3,400 on Fox Street between Minnow Avenue and Salmon Avenue. Based on these results, it can be expected that many other residential street segments would also experience substantial increases in traffic levels due to diverted traffic in 2028.

Existing ADT volumes on these key impacted streets range from roughly 600 to 2,000, and, in the absence of changes on SR 28, are expected to increase by 2028 to 800–2,800. Adding these volumes to the diversion volumes, ADT under this alternative on Fox Street between Minnow Avenue and Salmon Street would be 5,400 and 4,000 on Chipmunk Street between SR 28 and Minnow Avenue.

Alternative 3

Because SR 28 roadway volumes would not exceed capacity and intersections (with mitigation) would not generate adverse levels of delay, Alternative 3 is not anticipated to experience diverted traffic in excess of 3,000 ADT on residential streets for 2008 and 2028 conditions.

Alternative 4

Impacts during the peak summer season on residential street volumes for Alternative 4 are also identical to those of Alternative 2. Alternative 4 is not forecasted to experience diverted traffic in excess of 3,000 ADT on residential streets in 2008. Growth in ADT is forecasted to reach as high as 2,000 on Coon Street between Trout Avenue and Rainbow Avenue, 3,200 on Chipmunk Street between SR 28 and Minnow Avenue, and 3,400 on Fox Street between Minnow Avenue and Salmon Avenue. Based on these results, it can be expected that many other residential street segments would also experience substantial increases in traffic levels due to diverted traffic in 2028.

As a result of implementation of Alternative 4, there is the potential to exceed diverted traffic in excess of 3,000 ADT on a residential street with front-on lotting. It is anticipated that diverted traffic is not expected to exceed 3,000 ADT in 2008. However, by 2028 it is anticipated that portions of the following roadways would experience diverted traffic in excess of 3,000 ADT: Chipmunk Street (up to 4,000 ADT) and Fox Street (up to 5,400 ADT). As many of these residential streets are relatively narrow with little or no shoulder and substantial pedestrian activity, the increase in traffic would create an increased potential for accidents. This is considered an adverse effect. In comparison, the no build alternative (Alternative 1) would not have an adverse effect on residential streets in 2028.

Impact TRA-3: Degradation of Intersection Levels of Service Below Applicable Standards

Alternative 1)

Under Alternative 1, the SR 28/SR 267 intersection in 2008 would operate at LOS C and LOS D for summer and winter conditions, respectively, while the SR 28/Coon Street intersection would operate at LOS A, for both summer and winter conditions. Also for both summer and winter, the worst approach (side street) LOS on Secline Street, Bear Street, and Fox Street would be LOS F. The Deer Street intersection would both provide LOS D/worst-approach conditions in the summer and LOS C in the winter, while the Chipmunk Street intersection would provide LOS E in the summer and LOS D in the winter.

By 2028, LOS F would be provided at the SR 267/SR 28 intersection and LOS D at the SR 28/Coon Street intersection in both summer and winter. LOS F conditions would occur at least 1 hour per day throughout the summer and on all busy ski days in the winter. To provide adequate LOS at the SR 267/SR 28 intersection, a separate westbound right-turn lane would be required. All side street approaches to SR 28 would provide LOS F conditions in both summer and winter.

Alternative 2

LOS F conditions would be provided at the SR 28 / Coon Street roundabout on the eastbound approach in 2008 in both summer and winter, with long traffic queues (over 2,000 feet) during peak times. LOS F would be provided on roughly 40 hours of the summer.

While worst-approach LOS of E would be provided at the SR 28 / Bear Street roundabout in 2008, long queues would also form in the eastbound direction in both peak seasons. Adequate LOS of D or better would be provided at the SR 267 signal and at Chipmunk Street, while poor (LOS E or F) conditions would be provided on the side street approaches at the other unsignalized intersections.

LOS would not attain TRPA standards in 2028 at any study intersection. LOS F conditions at the SR 28/SR 267 intersection would occur at least 1 hour per day throughout the summer and on all busy ski days in the winter. A single-lane roundabout would not provide adequate (LOS E or better) traffic conditions at the Bear Street/SR 28 roundabout or Coon Street/SR 28 roundabout. LOS F conditions would occur for at least 1 hour on every day of the summer at both roundabouts, as well as on peak winter ski days. Instead, dual-lane roundabouts would be required. At the Bear Street and Coon Street intersections, dual-lane roundabouts are not considered to be feasible, due to the impacts on adjacent properties. Winter LOS analysis results are very similar, with the roundabouts providing LOS equal to or better than summer conditions and the unsignalized intersections providing worst-approach LOS of E or F.

The proposed single-lane configuration of the SR 28/Bear Street and SR 28/Coon Street roundabouts would provide unacceptable LOS F conditions on eastbound and westbound approaches in 2028, as well as on the SR 28/Coon Street roundabout in 2008. This would be an adverse effect. In comparison, the no build alternative (Alternative 1) would attain LOS standards at Coon Street in 2008 and 2028 but would not provide LOS of E or better at SR 28/Bear Street or provide acceptable LOS at the SR 28/SR 267 intersection in 2028. Implementation of Mitigation Measure TRA-1 would help to reduce the severity of this effect at the SR 28/SR 267 intersection.

Alternative 3

Adequate summer LOS of C or better would be provided under this alternative in 2008, except that the Secline and Fox Street intersections would provide poor (LOS E or F) conditions for side street approaches to the state highway in 2008. Winter peak-day LOS would be similar to summer LOS, except that the SR 267 intersections would provide LOS D.

Summer LOSs would attain TRPA standards in 2028, except for the stop sign controlled intersections along SR 28, which will continue to provide poor (LOS F) conditions for side street approaches. In addition, a separate westbound right-turn lane would be

required to provide adequate LOS at the SR 267/SR 28 signal; this would provide a total intersection LOS of D. Without this additional lane, LOS F conditions would occur at least 1 hour per day throughout the summer and on all busy ski days in the winter. The results of the winter LOS analysis parallel those of the summer analysis.

The project alternative configuration of the SR 28/SR 267 intersection would provide unacceptable LOS F conditions in 2028 (but not in 2008). This would be an adverse effect. In comparison, the no-build alternative (Alternative 1) would also not attain LOS standards at this intersection in 2028 (but would attain standards in 2008).

Implementation of Mitigation Measure TRA-1 would help to reduce the severity of this effect.

Alternative 4

The intersection LOS reported above for Alternative 2 also applies to Alternative 4 because there is no difference in the intersection configuration between these two alternatives.

LOS F conditions would be provided at the SR 28/Coon Street roundabout on the eastbound approach in 2008 in both summer and winter, with long traffic queues (over 2,000 feet) during peak times. LOS F would be provided on roughly 40 hours of the summer.

While a worst-approach LOS of E would occur at the SR 28/Bear Street roundabout in 2008, long queues would also form in the eastbound direction in both peak seasons. Adequate LOS of D or better would be provided at the SR 267 signal and at Chipmunk Street, while poor (LOS E or F) conditions would be provided on the side street approaches at the other unsignalized intersections.

Impact TRA-4: Degradation of Bicycle and Pedestrian Conditions along SR 28

Alternative 1

Because Alternative 1 is the no build alternative, there would be no adverse effects on pedestrian or bicyclist mobility or safety. Existing poor pedestrian and bicycle conditions along SR 28 would remain. No mitigation measures are required.

Alternative 2

Alternative 2 would provide sidewalks and Class II bike lanes along both sides of SR 28 through the commercial core area. The provision of a roundabout at SR 28/Bear Street would provide a substantially improved pedestrian crossing opportunity of the state highway, as the presence of a median "splitter island" would allow pedestrians to only cross one lane of traffic at a time and as the roundabout would slow traffic and increase the proportion of drivers yielding to pedestrians at the crosswalks. The reduction of SR 28 from four to three travel lanes would also benefit pedestrians crossing at other locations.

This would result in a beneficial impact. No mitigation measures are required.

Alternative 3

Alternative 3 would provide sidewalks and Class II bike lanes along both sides of SR 28 through the commercial core area. The provision of a signal at SR 28/Bear Street would provide an additional pedestrian crossing opportunity of the state highway. This would result in a beneficial impact. No mitigation measures are required.

Alternative 4

Alternative 4 would provide sidewalks and Class II bike lanes along both sides of SR 28 through the commercial core area. The provision of a roundabout at SR 28/Bear Street would provide a substantially improved pedestrian crossing opportunity of the state highway, as the presence of a median "splitter island" would allow pedestrians to only cross one lane of traffic at a time and as the roundabout would slow traffic and increase the proportion of drivers yielding to pedestrians at the crosswalks. The reduction of SR

28 from four to three travel lanes would also benefit pedestrians crossing at other locations. This would result in a beneficial impact. No mitigation measures are required.

Impact TRA-5: Degradation of Transit Operations

Alternative 1

Because Alternative 1 is the no build alternative, there would be no adverse effects on transit operations. No mitigation is required.

Alternative 2

The traffic congestion that would result from Alternative 2 would result in delays to TART operations. As a result, the ability to adhere to the existing schedule (half-hour runs between Tahoe City and Crystal Bay) and make timed service connections along the route would be degraded, and the on-time performance of the service would be reduced. This would result in an adverse effect. No mitigation is available to reduce the severity of this effect.

Alternative 3

The traffic congestion associated with Alternative 3 would not be substantially different than for Alternative 1, the no build alternative. Consequently, Alternative 3 would not result in an adverse effect on transit. No mitigation is required.

Alternative 4

The traffic congestion that would result from Alternative 4 is similar to Alternative 2.

Impact TRA-6: Degradation of Emergency Access or Response Times

Alternative 1

Since Alternative 1 is the no build alternative, there would be no change in emergency access. This is not considered an adverse effect. No mitigation measures are required.

Alternative 2

Reduction of capacity under Alternative 2 would tend to be reduced due to increased congestion along SR-28. However, the provision of bicycle lanes along both sides of SR 28 would allow motorists to move out of travel lanes in advance of fire or medical vehicles. Observations of emergency vehicle travel along SR 28 in Tahoe City (which has a similar roadway configuration to this alternative) under congested conditions indicate that auto drivers have the space to maneuver out of the traffic lane to make way for emergency vehicles and that emergency vehicle travel speeds are not significantly reduced; thus, this alternative would not result in an adverse effect on emergency response times.

Alternative 3

Emergency access under Alternative 3 would not be substantially different than for Alternative 1, the no build alternative. Consequently, Alternative 3 would not result in an adverse effect on emergency response times. No mitigation is required.

Alternative 4

Emergency access under Alternative 4 is similar to Alternative 2.

Impact TRA-7: Short-Term Construction-Related Changes in Circulation and Local Traffic Patterns

Alternative 1

Because Alternative 1 is the no build alternative, there would be no construction and no adverse effects on traffic. No mitigation is required.

Alternatives 2, 3, and 4

Although detailed construction plans and phasing are not available, it is expected that Alternative 2 would require significant periods of lane closures and turn restrictions along SR 28. Though it should be possible to provide one lane of travel in each direction except for relatively short periods, traffic volumes in busy periods would exceed the

capacity provided by one lane of travel in each direction. This would result in an adverse effect. Mitigation Measure TRA-2 would reduce the severity of this effect.

The effects of construction on traffic operations under Alternatives 3 and 4 are similar to Alternative 2.

3.6.4 Mitigation, Avoidance, Minimization, and Compensation Measures

Mitigation Measure TRA-1: Provide Westbound Right-Turn Lane at SR 28/267 Intersection

Placer County will provide a westbound right-turn lane at the SR 28/SR 267 intersection.

Mitigation Measure TRA-2: Implement a Construction Traffic Management Plan during Construction

During the final stage of project design, Placer County will prepare a Construction TMP in accordance with the Manual on Uniform Traffic Control Devices, California Supplement 2003, Part 6 Temporary Traffic Control (or current version) and Caltrans draft *Guidelines for Projects Located on the California State Highways in the Lake Tahoe Basin* (California Department of Transportation n.d.) that specifies those days and periods of each day over the construction season that specific lane closures can be accommodated without resulting in delays exceeding Caltrans construction delay standards. In addition, traffic diverting onto local streets should be monitored when delays to SR 28 traffic is expected, and temporary traffic controls should be implemented as necessary. Caltrans requires TMPs for all construction activities on the state highway system. Where several consecutive, related, or linking projects within a region or corridor create a cumulative need for a TMP, Caltrans coordinates individual TMPs or develops a single Regional Transportation Management Plan (RTMP). When implemented, a TMP results in a minimized project-related traffic delay and fewer accidents through the effective combination of public and

motorist information, demand management, incident management, system management, alternate route strategies, construction strategies, and other strategies.

TMPs are designed to reduce the amount of significant delay time due to lane closures and construction related activity. Significant delay time is 30 minutes above normal recurring traffic delay on the existing facility or the delay threshold set by the district traffic manager, whichever is less. Caltrans traffic management has indicated that SR corridors on the North Shore of Lake Tahoe might require a cumulative delay time of less than 30 minutes per TMP guidelines. The Caltrans TMP Unit is still making determinations of thresholds for delays as the development of the RTMP is being undertaken. Once these thresholds have been established, Placer County will ensure that they are incorporated into the TMP.

It is recommended that Caltrans develop a RTMP due to the large number of related transportation improvement proposals scheduled to occur within a similar timeframe in the greater action area. A RTMP would be expected to promote greater coordination between agencies and projects to minimize potentially significant impacts associated with multiple construction projects.

The following are objectives to be achieved from the RTMP, as described in the Caltrans draft *Guidelines for Projects Located on the California State Highways in the Lake Tahoe Basin* (California Department of Transportation n.d.).

- Provide accurate and timely information to the public.
- Minimize traffic delays while maximizing public and worker safety during construction.
- Minimize impacts on businesses, residences, schools, public services, and special events during construction.

- Provide design and instructional information regarding traffic management to the Project Engineer, Resident Engineer, and project specific Standard Special Provisions (SSPs) to be included in the project contract.
- Ensure that no more than 30 minutes of cumulative corridor delay will occur.

Timing and execution remain the greatest concern for most proposed construction projects in the immediate and greater action area. The degree of economic impact on the North Shore and West Shore of the Lake Tahoe Basin may be directly influenced by construction scheduling and staging of these projects. Therefore, project coordination between Caltrans' functional units is crucial and will take place. In particular, interagency synchronization within Caltrans will include the TMP Unit, Environmental Management, District 03 Public Information Office, Construction Engineering, and the project development teams. Close contact with local stakeholder agencies will be maintained in order to minimize cumulative socioeconomic-related impacts that would otherwise result from these related projects.

3.6.5 Compliance with Tahoe Regional Planning Agency Code

Table 3.6-8 presents an assessment of the consistency of each alternative with the adopted objectives and policies of the *Kings Beach Community Plan*, as adopted by TRPA and Placer County in 1996. Of those objectives and policies that pertain to the proposed action, Alternative 3 would be consistent with the community plan. Alternatives 2 and 4 would not be consistent with the community plan because the resulting roadway traffic congestion would effectively preclude attainment of several traffic circulation goals and policies as well as the transit objective (transit services would be negatively impacted by traffic congestion).

Table 3.6-8. Assessment of Alternatives Consistency with Transportation Goals of the KBCP

Kings Beach Community Plan Goals and Policies		Alternative 1		Alternatives 2 and 4		Alternative 3	
		Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion
Traffic Circulation and Parking Goal:	Reduce dependency on the automobile and improve the movement of people, goods, and services within Kings Beach and the Lake Tahoe Region consistent with the economic and environmental goals of the Community Plan.	No	No projects would be implemented to reduce auto use.	Partially Yes, Partially No	Although sidewalk improvements would reduce automobile dependency, recurring traffic congestion would degrade the movement of people, goods, and services both within Kings Beach and the Lake Tahoe Region.	Yes	Sidewalk improvements could be provided while avoiding degradation in movement of drivers, passengers, and goods and services.
Objective 1:	Provide a safe and efficient transportation system for the residents of the Kings Beach area and others who use the system.	No		No	Recurring traffic congestion would not be efficient. Traffic safety along SR 28 would be improved, though diverted traffic on local street would degrade safety.	Yes	Safety could be enhanced by traffic calming measures to moderate traffic speeds on SR 28.
Policy 1a:	The LOS on major roadways (i.e., arterial and collector routes as defined by Placer County) shall be LOS D and signalized intersections shall be LOS D (LOS E may be acceptable during peak periods, not to exceed 4 hours per day).	No		Partially Yes, Partially No	Recurring traffic congestion on SR 28.	Yes	Roadway and intersections meet LOS standards through 2004, with mitigation.
Policy 1b:	Provide for the various functions currently accommodated in the public rights-of-way (e.g., through vehicle traffic, parking search, pedestrian activity, bicyclist activity, and parking).	No	Pedestrian and bicycle activity not enhanced.	No	Pedestrian and bicycle functions would be better accommodated, but through traffic would be degraded..	Yes	So long as final design provides adequate sidewalks.

Table 3.6-8. Continued

Kings Beach Community Plan Goals and Policies		Alternative 1		Alternatives 2 and 4		Alternative 3	
		Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion
Policy 1c:	Implement a parking management program that provides: adequate parking, limits traffic, considers connections between parking lots, encourages community parking lots, and complements transit.	No		Possibly	Should be incorporated into detailed planning.	Possibly	Should be incorporated into detailed planning.
Policy 1d:	When designating transportation improvements, consider traffic calming strategies such as alternative truck routes, speed reductions on SR 28, entry features, highlighted pedestrian cross walks, etc.	No		Possibly	Should be incorporated into detailed planning.	Possibly	Should be incorporated into detailed planning.
Objective 2:	Provide for sufficient capital improvements to meet the LOS target, meet the target for VMT reductions, and provide adequate parking facilities as development occurs in the community plan area.	No		No/NA	Does not meet LOS target. Project not intended to address VMT reduction or to address parking associated with development	Yes/Not Applicable	Meets LOS target, with mitigation. Project not intended to address VMT reduction or to address parking associated with development
Policy 2e:	Provide sufficient funding to finance the projects in the Capital Improvement Program (CIP).	NA		NA		NA	
Objective 3:	The Kings Beach Commercial Community Plan should promote land use changes and development patterns that will encourage the use of alternative transportation	NA		Yes/NA	The project does not change land use patterns. Provision of sidewalks encourages use of alternative transportation modes.	NA/Yes	The project does not change land use patterns. Provision of sidewalks encourages use of alternative transportation modes.

Table 3.6-8. Continued

Kings Beach Community Plan Goals and Policies		Alternative 1		Alternatives 2 and 4		Alternative 3	
		Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion
	modes and reduce travel distances with the Community Plan.						
Policy 3a:	The community plan should provide for the in-fill of existing developed areas that would utilize existing transportation facilities while promoting alternatives to the private automobile.	NA		Yes/NA	The project does not change land use patterns. Provision of sidewalks encourages use of alternative transportation modes.	NA/Yes	The project does not change land use patterns. Provision of sidewalks encourages use of alternative transportation modes.
Objective 4:	The Kings Beach Commercial Community Plan should encourage the use of public and private transit.	No	Sidewalks that assist transit passengers to reach transit stops would not be implemented	No	Recurring traffic congestion on SR 28 would negatively impact transit services.	Neutral	The project does not change transit services. Services would not be negatively impacted by traffic congestion.
Policy 4a:	Provide for the opportunity for water transit service.	NA		NA		NA	
Objective 5:	The community plan shall develop sidewalks along both sides of SR 28 and local commercial streets. This includes landscaping, lighting, trash receptacles, and bicycle racks.	No		Yes		Yes	
Policy 5a:	Implement a program through review of projects or preferably through improvement districts that provides for the street improvements.	No		Yes		Yes	

Table 3.6-8. Continued

Kings Beach Community Plan Goals and Policies		Alternative 1		Alternatives 2 and 4		Alternative 3	
		Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion
Objective 6:	The Kings Beach Commercial Community Plan should develop a bicycle recreational trails network with connections to recreation and commercial land uses.	No	Pedestrian and bicycle activity not enhanced.	Yes		Yes	
Policy 6a:	Provide for a system of bicycle recreation trails in the community plan improvement program.	No	Pedestrian and bicycle activity not enhanced.	Yes		Yes	
Objective 8:	Transportation System Management (TSM) measures should be provided to improve the efficiency of the existing transportation system within the Community Plan.	NA		NA		NA	
Policy 8a:	Driveways and access-egress points to commercial businesses along SR 28 should be coordinated to reduce the number of turn movements and improve the flow along SR 28.	No	Not implemented.	Yes	The number of access points along SR 28 would be reduced.	Yes	The number of access points along SR 28 would be reduced.
Policy 8b:	Parking guidelines within Kings Beach Commercial Community Plan should encourage the consolidation of off-street public parking within the commercial streets.	No	Not implemented.	Yes	So long as loss of SR 28 parking is addressed by provision of equal number of spaces in new public parking areas.	Yes	So long as loss of SR 28 parking is addressed by provision of equal number of spaces in new public parking areas.

Table 3.6-8. Continued

Kings Beach Community Plan Goals and Policies		Alternative 1		Alternatives 2 and 4		Alternative 3	
		Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion	Consistency with Community Plan	Discussion
Objective 9:	The Community Plans for Carnelian Bay, Tahoe Vista, Kings Beach, and North Stateline all propose the completion of a follow-up study, after plan adoption, that will examine a number of transportation issues affecting SR 28. This study, intended to involve Caltrans, Placer County, TRPA, and interested citizens, will examine such issues as the appropriate number of travel lanes on the highway, the use of center medians, techniques for "traffic calming," and regulation of travel speed.	No	Pedestrian and bicycle activity not enhanced.	Yes	The project addresses these issues, at least for the Kings Beach area.	Yes	The project addresses these issues, at least for the Kings Beach area.

Sources:

LSC Transportation Consultants, Inc.

KB Com Plan Consistency.wb3.

North Tahoe Community Plan, TRPA, Adopted April 1, 1996.