Table 3.9-18 Internal "Trip Matching" Percentages
Buildout "Without Forest Ranch" Scenario

Non-residential Land Use	Internal Project Trips (Trips Matched with a Foresthill Residential Trip)	External Project Trips (Trips Beginning or Ending Outside Foresthill)
Retail	90 percent	10 percent
Office	60 percent	40 percent
Industrial	40 percent	60 percent
Schools	90 percent	10 percent
Reference: Sacramento Area Council of Governments, "2000 Sacramento Area Household Travel Survey – Final Report," November 2000.		

Trip Distribution

The internal trips were again distributed proportionately to and from the locations in the Plan area where the land uses are proposed in the Buildout "Without Forest Ranch" scenario. The external trip distribution followed the same patterns as in the previous scenarios. Thus, it was assumed that 5 percent of trips will be oriented to and from the east on Foresthill Road, and the remaining trips would travel to and from the west, towards the City of Auburn. At the I-80 interchange study intersections, the same trip distribution used in the Year 2030 analysis was used in the Buildout analysis; the detailed distribution was illustrated on Figure 3.9-4.

Project Traffic Assignment

For the roadway segment analysis, the internal and external trips were added to the existing traffic volumes, with the result being the "Cumulative Plus Project" traffic volumes for the Buildout "Without Forest Ranch" scenario. The roadway segment traffic volumes for this scenario are presented in Table 3.9-19.

For the analysis of the study intersections, the external trips were added to the "Cumulative No Project" traffic volumes, resulting in the "Cumulative Plus Project" traffic volumes for the Buildout "Without Forest Ranch" scenario. Figure 3.9-7 displays the intersection traffic volumes and assumed future lane configurations for this scenario.

Roadway Segment Level of Service

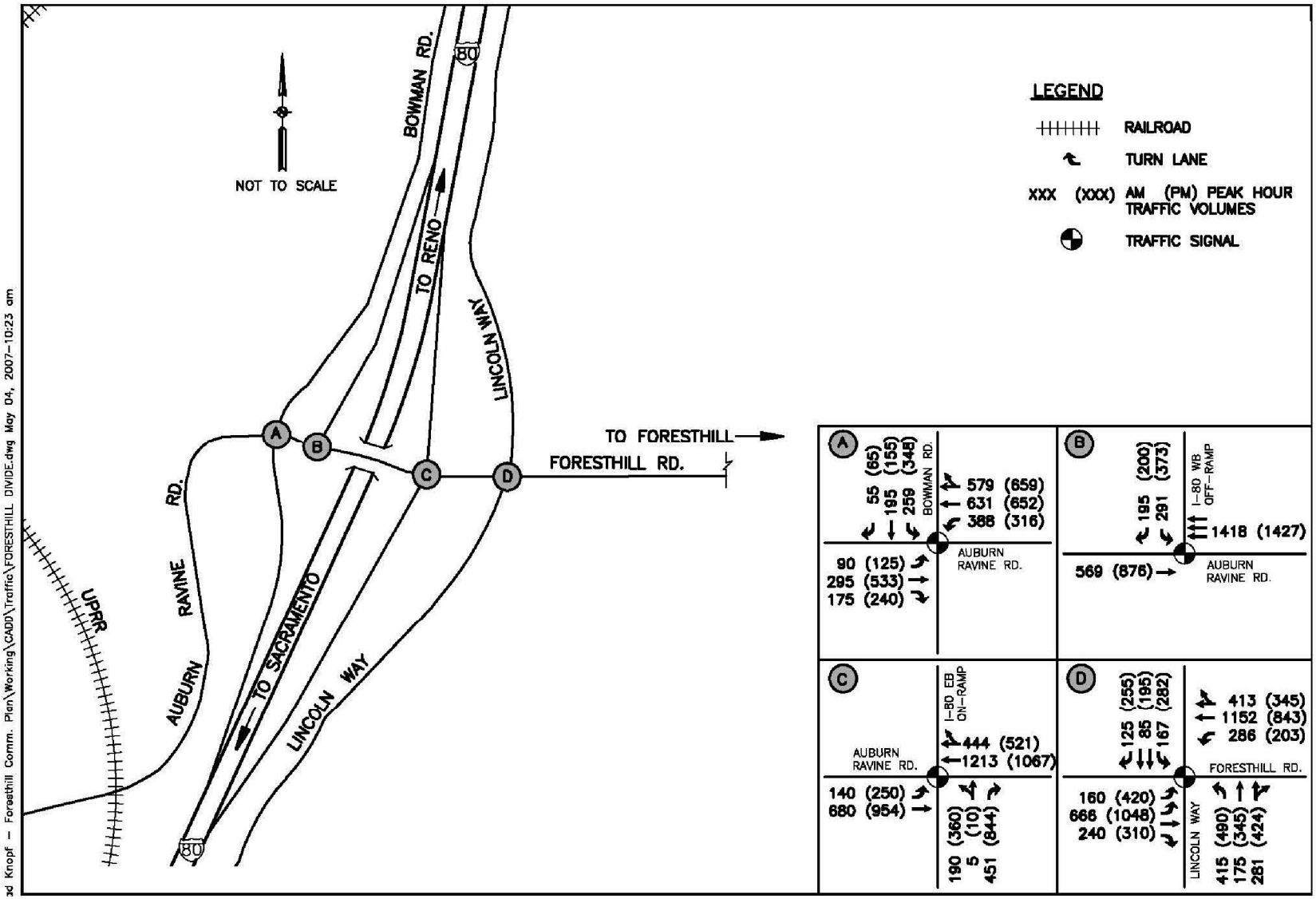
Table 3.9-19 also presents the roadway segment levels of service, in addition to the traffic volumes. The levels of service for the other two roadway types, Secondary/Feeder Roads and Local Access Roads, were determined using the level of service thresholds presented in Tables 3.9-3 and 3.9-4.

Table 3.9-19 Roadway Segment Level of Service Summary[1] – Cumulative + Project Conditions Buildout "Without Forest Ranch" Scenario

Roadway Segment	Direction	AM Peak Hour		PM Peak Hour	
		Peak Hour Volume	LOS[2]	Peak Hour Volume	LOS
Foresthill Road – Foresthill Bridge to Spring Garden Road	Eastbound	1,040	E[3]	1,574	E
	Westbound	1,768	F	1,210	F
Foresthill Road – Spring Garden Rd. to Todd Valley Rd. (West)	Eastbound	1,160	E	1,117	E
	Westbound	1,215	E	1,305	E
Foresthill Road – Todd Valley Road (West) to Owl Hill Court	Eastbound	1,129	E	1,026	D
	Westbound	1,082	E	1,233	E
Foresthill Road – Owl Hill Court to Yankee Jim's Road	Eastbound	700	D	749	D
	Westbound	754		717	
Foresthill Road – Yankee Jim's Road to Michigan Bluff Road	Eastbound	168	C	302	C
	Westbound	304		206	
Foresthill Road – East of Michigan Bluff Rd.	Eastbound	114	B	138	B
	Westbound	134		106	
McKeon-Ponderosa Way	Northbound	204	C	63	C
	Southbound	42		210	
Spring Garden Road	Northbound	68	C	239	C
	Southbound	274		117	
Happy Pines Drive	Northbound	196	C	80	C
	Southbound	67		180	
Todd Valley Road (West)	Northbound	336	D	174	D
	Southbound	95		285	
Todd Valley Road (East)	Northbound	103	C	239	C
	Southbound	233		110	
Mosquito Ridge Road	Northbound	80	B	53	B
	Southbound	38		80	
Yankee Jim's Road	Northbound	39	B	140	C
	Southbound	129		67	
Main Street	Eastbound	69	B	88	B
	Westbound	33		118	
Michigan Bluff Road	Northbound	68	B	34	B
	Southbound	21		67	
Race Track Street	Eastbound	46	B	99	B
	Westbound	71		53	

Notes:
1 Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
2 Level of service.
3 Shading denotes an unacceptable level of service.

As shown in Table 3.9-19, thirteen of the study roadway segments are projected to operate at LOS D or better. However, from the Foresthill Bridge to Spring Garden Road, the eastbound direction of Foresthill Road is expected to operate at LOS E, while the westbound direction will operate at LOS F. From Spring Garden Road to Todd Valley Road the LOS is projected to be E for both direction in the AM and PM peak hour. From Todd Valley to Owl Hill Court, both directions of Foresthill Road are projected to operate at LOS E in the AM peak along with the westbound PM peak. Therefore, the traffic generated in the Buildout "Without Forest Ranch" scenario will significantly impact traffic operations on these portions of Foresthill Road.



Source: MRO Engineers, 2007 / Quad Knopf, 2007

Quad Knopf

INTERSECTION PEAK HOUR TRAFFIC VOLUMES
CUMULATIVE + PROJECT CONDITIONS
BUILDOUT "WITHOUT FOREST RANCH" SCENARIO

Figure 3.9-7

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Based on the conclusion that at least some roadway segments will operate at unacceptable levels of service at project build out this impact would be ***potentially significant***.

Mitigation Measures

Although implementation of the following mitigation measures would reduce this impact to a ***less-than-significant*** level the mitigation measure available is not economically feasible until funding to accomplish the improvements has been secured the impacts will remain ***potentially significant***. If the identified improvements are not funded, this impact would remain ***significant and unavoidable***.

3.9-5 *Foresthill Road between the Foresthill Bridge and Owl Hill Court: This entire section (consisting of both directions of three study roadway segments) would need to be widened to two lanes in each direction to meet the LOS D policy. This mitigation measure would result in LOS B in both peak hours in both directions of the three study segments.*

The widening of Foresthill Road immediately east of the Foresthill Bridge would also require that the bridge be widened to two lanes in each direction. Between Lincoln Way and the Foresthill Bridge, the eastbound direction of Foresthill Road would also need to be widened to two lanes (for a total of two lanes in each direction). However, the widening of the bridge is not feasible and, therefore, the traffic generated in this scenario will result in a ***significant and unavoidable*** *impact.*

Impact 3.9-6 Increased traffic throughout the Community Plan area at buildout due to development in accordance with the FDCP including the Forest Ranch Concept Plan.

Discussion/Conclusion: In the Build out "With Forest Ranch" scenario, several of the Foresthill Road segments are expected to operate at levels of service that fail to meet the County's LOS D requirement.

Trip Generation

The trip generation rates in Table 3.9-7 were applied to the Foresthill Divide Community Plan land uses, and the rates in Table 3.9-8 were applied to the proposed Forest Ranch land uses. The resulting Buildout "With Forest Ranch" scenario trip generation estimates are displayed in Table 3.9-20.

Table 3.9-20 Trip Generation Estimate - Buildout "With Forest Ranch" Scenario

Land Use	Size		AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
Total Trips								
SF Residential (Foresthill)	4,342	DU[1]	434	1,563	1,997	1433	695	2128
SF Residential (FR[2])	513	DU	39	157	196	110	37	147

Land Use	Size		AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
SF Residential Subtotal	4,855	DU	473	1,720	2,193	1,543	732	2,275
Multi-Family Residential	314	DU	16	69	85	69	35	104
Age-Restricted Res.	1,700	DU	102	170	272	221	136	357
Retail (Foresthill)	350,000	SF[3]	130	81	211	333	427	760
	-20% Pass-by		26	16	42	67	85	152
	Net Trips (Foresthill)		104	65	169	266	342	608
Retail (FR)	67,762	SF	25	16	41	77	84	161
Retail Subtotal	417,762	SF	129	81	210	343	426	769
Office (Foresthill)	180,954	SF	197	27	224	36	179	215
Office (FR Off-site)	23,092	SF	25	3	28	5	23	28
Office Subtotal	204,046	SF	222	30	252	41	202	243
Medical Office (FR)	34,592	SF	23	6	29	12	31	43
Industrial	1,638,443	SF	901	197	1,098	229	901	1130
Golf Course (FR)	18	Holes	11	3	14	7	9	16
Equestrian Center (FR)	50	Horses	2	2	4	2	2	4
RV Park (FR)	100	Spaces	8	12	20	26	11	37
High School	565	Students	158	73	231	40	40	80
		Gross Total	**2,045**	**2,363**	**4,408**	**2,533**	**2,525**	**5,058**
Internal Trips								
Single-Family Residential	4,855	DU	196	686	882	787	387	1174
Multi-Family Residential	314	DU	7	28	35	35	18	53
Age-Restricted Res.	1,700	DU	42	68	110	113	72	185
Retail	417,762	SF	116	73	189	309	383	692
Office	204,046	SF	133	18	151	25	121	146
Medical Office	34,592	SF	21	5	26	11	28	39
Industrial	1,638,443	SF	361	79	440	92	360	452
Golf Course	18	Holes	7	2	9	4	5	9
Equestrian Center	50	Horses	2	2	4	2	2	4
RV Park	100	Spaces	0	0	0	0	0	0
High School	565	Students	142	66	208	34	36	70
		Total Internal Trips	**1,027**	**1,027**	**2,054**	**1,412**	**1,412**	**2,824**
Net External Trips								
Single-Family Residential	4,855	SF	277	1,034	1,311	756	345	1,101
Multi-Family Residential	314	SF	9	41	50	34	17	51
Age-Restricted Res.	1,700	SF	60	102	162	108	64	172
Retail	417,762	SF	13	8	21	34	43	77
Office	204,046	SF	89	12	101	16	81	97
Medical Office	34,592	SF	2	1	3	1	3	4
Industrial	1,638,443	SF	540	118	658	137	541	678
Golf Course	18	Holes	4	1	5	3	4	7
Equestrian Center	50	Horses	0	0	0	0	0	0

Land Use	Size		AM Peak Hour Trips			PM Peak Hour Trips		
			In	Out	Total	In	Out	Total
RV Park	100	Spaces	8	12	20	26	11	37
High School	565	Students	16	7	23	6	4	10
Total External Trips			**1,018**	**1,336**	**2,354**	**1,121**	**1,113**	**2,234**

Notes:
[1] Dwelling unit
[2] Forest Ranch – This indicates that this trip generation estimate is for a Forest Ranch land use. In the *Internal Trips* and *Net External Trips* portions of the table, the Foresthill and Forest Ranch land uses were combined into one category.
[3] Square feet

As shown in the table, the land uses proposed in the Buildout "With Forest Ranch" scenario will generate a gross total of about 4,408 AM peak hour trips and 5,058 PM peak hour trips. The gross totals in Table 3.9-23 include all trips generated by the Foresthill Divide Community Plan and the Forest Ranch-generated trips that are "external" to Forest Ranch.

Forest Ranch Internal Trips

The following summarizes the internal trip assumptions applied to the Forest Ranch land uses. These assumptions are identical to those used in the corresponding Year 2030 analysis scenario.

- Two-thirds of the non-residential trips (except RV Park trips) will match a residential trip within Forest Ranch.
- One-third of the non-residential Forest Ranch trips will have an origin or destination outside of that project (and possibly, but not necessarily, outside Foresthill).
- The internal Forest Ranch trips were eliminated from the roadway segment analysis, as these trips would never reach the study roadway segments.
- The RV Park was assumed to generate trips that have one trip end entirely external to both Forest Ranch and Foresthill.

Foresthill Internal Trips

As shown in Table 3.9-20, the trip generation estimates for each land use were split into external trips and internal trips. In the AM peak hour, 2,054 internal trips are projected, and 2,824 internal trips are expected in the PM peak hour. In general, the internal "trip matching" percentages from the Year 2030 "With Forest Ranch" scenario were also used for the Buildout "With Forest Ranch" scenario, with the exception being the industrial land use category. As described previously, the amount of industrial square footage in the Foresthill community is projected to increase significantly by the Plan buildout year. The magnitude of the industrial land use will be sufficient to require that employees be drawn from outside Foresthill. As such, it was assumed that only 40 percent of trips generated by the industrial land use category will be matched internally with a residential trip in the Foresthill Community.

Table 3.9-21 describes the internal trip matching percentages used in this scenario:

Table 3.9-21 Internal "Trip Matching" Percentages Buildout "With Forest Ranch" Scenario

Non-residential Land Use	Internal Project Trips (Trips Matched with a Foresthill Residential Trip)	External Project Trips (Trips Beginning or Ending Outside Foresthill)
Retail	90 percent	10 percent
Medical Office	90 percent	10 percent
Office	60 percent	40 percent
Industrial	40 percent	60 percent
Schools	90 percent	10 percent
Equestrian Center	90 percent	10 percent
Recreation Vehicle Park	0 percent	100 percent
Golf Course	60 percent	40 percent
Reference: Sacramento Area Council of Governments, "2000 Sacramento Area Household Travel Survey – Final Report," November 2000.		

Foresthill External Trips

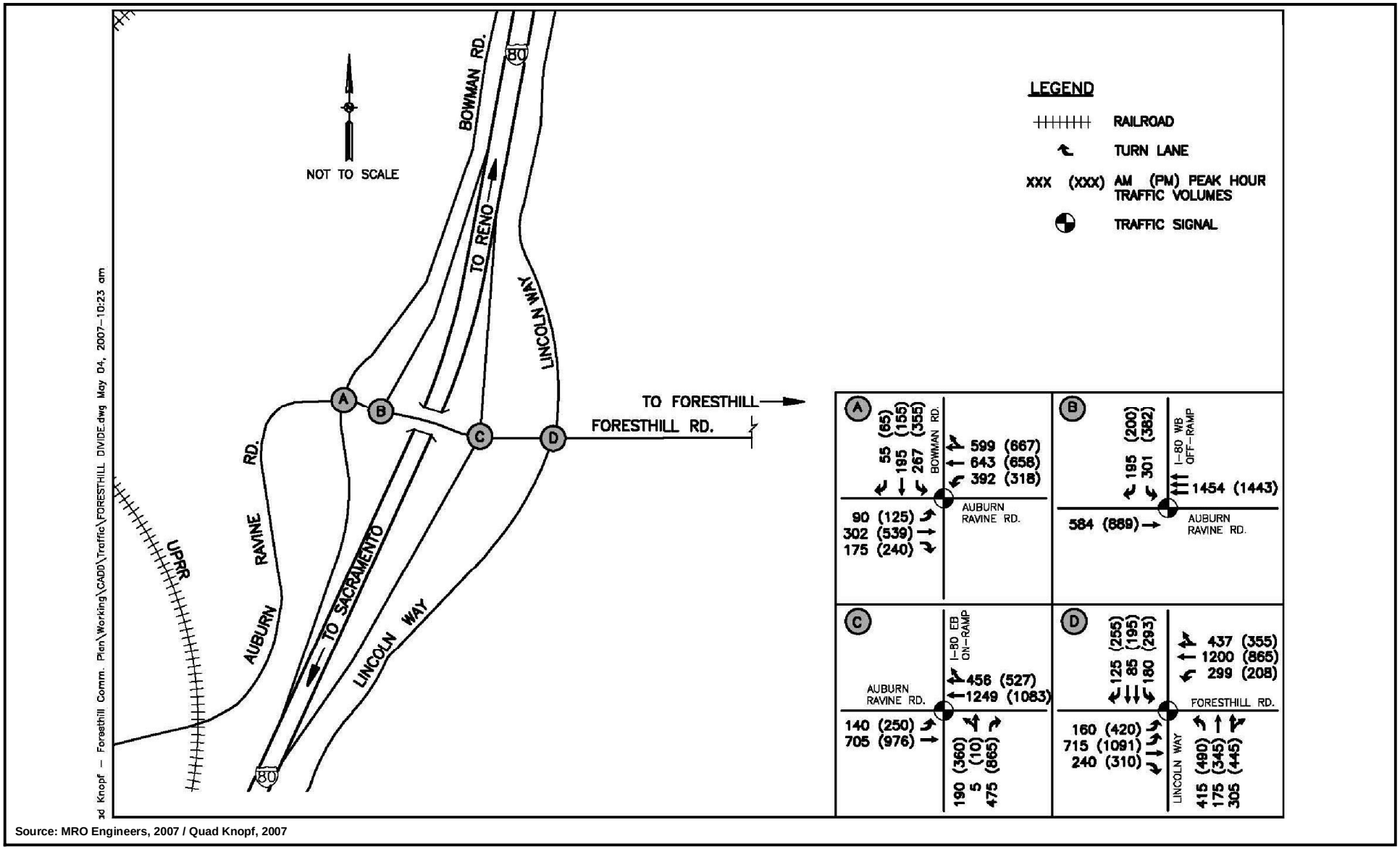
As shown in the lower portion of Table 3.9-20, 2,354 external trips are expected in the AM peak hour and 2,234 external trips are expected in the PM peak hour. These external trips will have one end of the trip in the Community Plan area (either in Foresthill or Forest Ranch), and one end of the trip outside of the Plan area.

Trip Distribution

As in the previous scenario, the internal trip pairs were distributed to the roadway network proportionately to where in the Plan area the land uses will be located. For the study intersections, the same distribution used in all the previous scenarios was used for the Buildout "With Forest Ranch" scenario. Figure 3.9-4 presented the detailed trip distribution for the I-80 interchange.

Project Traffic Assignment

The traffic associated with the Buildout "With Forest Ranch" scenario was added to the existing roadway segment traffic volumes and the "Cumulative No Project" intersection volumes. The resulting traffic volumes for the roadway segments for this scenario are displayed in Table 3.9-22. The Buildout "With Forest Ranch" scenario intersection traffic volumes and lane configurations are illustrated on Figure 3.9-8.



Source: MRO Engineers, 2007 / Quad Knopf, 2007

Quad Knopf

INTERSECTION PEAK HOUR TRAFFIC VOLUMES
CUMULATIVE + PROJECT CONDITIONS
BUILDOUT "WITH FOREST RANCH" SCENARIO

Figure 3.9-8

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Table 3.9-22 Roadway Segment Level of Service Summary[1] – Cumulative + Project Conditions Buildout "With Forest Ranch" Scenario

Roadway Segment	Direction	AM Peak Hour		PM Peak Hour	
		Peak Hour Volume	LOS[2]	Peak Hour Volume	LOS
Foresthill Road – Foresthill Bridge to Spring Garden Road	Eastbound	1,126	E[3]	1,649	E
	Westbound	1,853	F	1,247	F
Foresthill Road – Spring Garden Rd. to Todd Valley Rd. (West)	Eastbound	1,234	E	1,203	E
	Westbound	1,286	E	1,355	E
Foresthill Road – Todd Valley Road (West) to Owl Hill Court	Eastbound	1,203	E	1,124	E
	Westbound	1,162	E	1,297	E
Foresthill Road – Owl Hill Court to Yankee Jim's Road	Eastbound	794	E	894	E
	Westbound	859		851	
Foresthill Road – Yankee Jim's Road to Michigan Bluff Road	Eastbound	167	C	300	C
	Westbound	304		199	
Foresthill Road – East of Michigan Bluff Rd.	Eastbound	118	B	140	B
	Westbound	138		109	
McKeon-Ponderosa Way	Northbound	204	C	62	C
	Southbound	41		211	
Spring Garden Road	Northbound	71	C	252	C
	Southbound	290		121	
Happy Pines Drive	Northbound	192	C	76	C
	Southbound	66		173	
Todd Valley Road (West)	Northbound	334	D	172	D
	Southbound	94		282	
Todd Valley Road (East)	Northbound	105	C	233	C
	Southbound	240		109	
Mosquito Ridge Road	Northbound	78	B	57	B
	Southbound	44		78	
Yankee Jim's Road	Northbound	56	C	186	C
	Southbound	162		98	
Main Street	Eastbound	73	B	91	B
	Westbound	34		119	
Michigan Bluff Road	Northbound	66	B	33	B
	Southbound	20		66	
Race Track Street	Eastbound	55	B	116	B
	Westbound	86		64	

Notes:
1 Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
2 Level of service.
3 Shading denotes an unacceptable level of service.

Roadway Segment Level of Service

In addition to the traffic volumes, the roadway segment levels of service for the Build out "With the Forest Ranch Concept Plan" scenario are presented in Table 3.9-22.

During the AM peak hour, twelve of the study roadway segments are projected to operate at acceptable levels of service (i.e., LOS D or better). The traffic generated by the Forest Ranch project will exacerbate the unacceptable operations anticipated in the Build out "Without Forest

Ranch" scenario on the Foresthill Road segments between the Foresthill Bridge and Yankee Jim's Road. Therefore, these roadway segments will continue to fail to meet the County's LOS D requirement.

Similarly, in the PM peak hour, the levels of service on the Foresthill Road segments between the Foresthill Bridge and Yankee Jim's Road are not expected to meet the County's policy calling for LOS D or better. The Forest Ranch project will exacerbate unacceptable operations by adding traffic to these roadway segments.

Based on the conclusion that at least some roadway segments will operate at unacceptable levels of service at project build out this impact would be ***potentially significant***.

Mitigation Measures

Although implementation of the following mitigation measures would reduce this impact to a ***less-than-significant*** level, the mitigation measure available is not economically feasible until funding to accomplish the improvements has been secured the impacts will remain ***potentially significant***. If the identified improvements are not funded, this impact would remain ***significant and unavoidable***.

The same mitigation measures that were recommended in the Build out "Without the Forest Ranch Concept Plan" scenario are proposed for the Build out "With the Forest Ranch Concept Plan" scenario.

3.9-*6a* *Foresthill Road between the Foresthill Bridge and Yankee Jim's Road: This portion of Foresthill Road would need to be widened to two lanes in each direction to meet the LOS D policy. The mitigated level of service results would be unchanged from the results presented above. The Forest Ranch "fair share" portion of the cost of improvements is described below:*

- *Foresthill Road between the Foresthill Bridge and Spring Garden Road: Forest Ranch should contribute 8 percent of the cost of the eastbound improvement and 5 percent of the westbound improvement.*

- *Foresthill Road between Spring Garden Road and Todd Valley Road: Forest Ranch would be responsible for 8 percent of the cost of improvements in the eastbound direction and 6 percent of the cost of the westbound improvements.*

- *Foresthill Road between Todd Valley Road and Owl Hill Court: With respect to improvements in the eastbound direction, Forest Ranch would be responsible for a 14 percent "fair share" contribution. In the westbound direction, Forest Ranch would also be responsible for 14 percent.*

- *Foresthill Road between Owl Hill Court and Yankee Jim's Road: Forest Ranch would be accountable for 100 percent of the cost of the improvements because no mitigation measures were needed in the "without" scenario.*

As mentioned above, the Foresthill Bridge would need to be widened to two lanes each way to avoid creating a bottleneck at the bridge, and the eastbound direction of Foresthill Road between Lincoln Way and the bridge should be widened to two lanes in each direction. However, as previously discussed, the bridge widening mitigation measure is not feasible. As such, the traffic generated in this scenario will result in a ***significant and unavoidable*** impact.

3.96b *Foresthill Road between the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection and the Foresthill Bridge – widen the eastbound direction to two lanes. Forest Ranch Responsibility: 8 percent.*

Impact 3.9-7 Potential decrease in Level of Service at key intersections at the I-80/Auburn Ravine Road/Foresthill Road interchange at buildout due to increased traffic in the Community Plan area excluding the Forest Ranch Concept Plan.

Discussion/Conclusion:

Intersection Level of Service

The Buildout "Without Forest Ranch" scenario AM and PM peak hour intersection levels of service are shown in Table 3.9-23.

During the AM peak hour, the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection is expected to operate at LOS F, thereby failing to meet the Caltrans LOS D requirement. The other three study intersections are projected to operate acceptably at LOS D or better.

In the PM peak hour, two of the four study intersections will fail to meet the Caltrans LOS D requirement. Both the Auburn Ravine Road/I-80 Eastbound Ramps intersection and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection are projected to operate at LOS F.

Table 3.9-23 Intersection Level of Service Summary[1] – Cumulative + Project Conditions Buildout "Without Forest Ranch" Scenario

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay[2]	LOS[3]	Delay	LOS
Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp	Signal	33.8	C	30.6	C
Auburn Ravine Road/I-80 Westbound Off-ramp	Signal	12.0	B	11.2	B
Auburn Ravine Road/I-80 Eastbound Ramps	Signal	39.3	D	> 80.0	F
Auburn Ravine Road/Foresthill Road/Lincoln Way	Signal	> 80.0	F[4]	> 80.0	F

Notes:
1 Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
2 Seconds/vehicle
3 Level of service
4 Shading denotes an unacceptable level of service

This impact would be ***potentially significant***.

Mitigation Measures

Although implementation of the following mitigation measures would reduce this impact to a ***less-than-significant*** level, until funding to accomplish the improvements has been secured the impacts will remain ***potentially significant***. If the identified improvements are not funded, this impact would remain ***significant and unavoidable***.

3.9-7a *Auburn Ravine Road/I-80 Eastbound Ramps intersection – Modify the westbound approach to convert the shared through/right-turn lane to separate through and right-turn lanes and add an additional northbound-to-eastbound right-turn lane on the off-ramp. This improvement will provide LOS B operations in the AM peak hour and LOS D in the PM peak hour.*

3.9-7b *Auburn Ravine Road/Foresthill Road/Lincoln Way intersection – Due to topographic and geometric constraints, modifications to the intersection will not be sufficient to bring the level of service into an acceptable range (i.e., LOS A through LOS D). It would operate at LOS F, even with the build-out mitigation measures. As such, the impact to this intersection is considered significant and unavoidable. Although not considered feasible, the following mitigation measures would be required at this intersection to bring the level of service to LOS D:*

- *Convert the northbound shared through/right-turn lane to separate through and right-turn lanes;*
- *Provide an additional northbound left-turn lane;*
- *Provide two additional eastbound through lanes;*
- *Provide an additional southbound left-turn lane; and*
- *Convert the westbound shared through/right-turn lane to separate through and right-turn lanes.*

Impact 3.9-8 Potential decrease in Level of Service at key intersections at the I-80/Auburn Ravine Road/Foresthill Road interchange at build out due to increased traffic in the Community Plan area including the Forest Ranch Concept Plan.

Discussion/Conclusion:

Intersection Level of Service

The AM and PM peak hour intersection levels of service for the Buildout "With Forest Ranch" scenario are presented in Table 3.9-24.

The additional traffic generated by Forest Ranch is not expected to result in any changes in levels of service at the study intersections, although delay values will generally increase at the most-affected intersections. In the AM peak hour, three of the four study intersections are projected to meet the Caltrans Level of Service D standard. The Auburn Ravine Road/Foresthill Road/Lincoln Way intersection, however, is expected to operate at LOS F.

During the PM peak hour, the Auburn Ravine Road/I-80 Eastbound Ramps intersection and the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection are expected to operate at LOS F. Therefore, the addition of traffic generated by Buildout of the Plan combined with the traffic generated by Forest Ranch is expected to cause significant traffic impacts at these two intersections.

Table 3.9-24 Intersection Level of Service Summary[1] – Cumulative + Project Conditions Buildout "With Forest Ranch" Scenario

Intersection	Traffic Control	AM Peak Hour		PM Peak Hour	
		Delay[2]	LOS[3]	Delay	LOS
Auburn Ravine Road/Bowman Road/I-80 Westbound On-ramp	Signal	31.8	C	30.5	C
Auburn Ravine Road/I-80 Westbound Off-ramp	Signal	10.8	B	11.5	B
Auburn Ravine Road/I-80 Eastbound Ramps	Signal	52.2	D	> 80.0	F[4]
Auburn Ravine Road/Foresthill Road/Lincoln Way	Signal	> 80.0	F	> 80.0	F

Notes:
1 Reference: Transportation Research Board, *Highway Capacity Manual*, 2000.
2 Seconds/vehicle
3 Level of service
4 Shading denotes an unacceptable level of service

This impact would be ***potentially significant***.

Mitigation Measures

Although implementation of the following mitigation measures would reduce this impact to a ***less-than-significant*** level, until funding to accomplish the improvements has been secured the impacts will remain ***potentially significant***. If the identified improvements are not funded, this impact would remain ***significant and unavoidable***.

At the Auburn Ravine Road/I-80 Eastbound Ramps intersection, the mitigation measures recommended in the Year 2030 "With Forest Ranch" scenario were evaluated. However, the additional westbound right-turn lane will only improve conditions to LOS C in the AM peak hour; the intersection will remain at LOS F in the PM peak hour. Therefore, the mitigation

measures recommended in the Buildout "Without Forest Ranch" scenario are again necessary in the "With Forest Ranch" scenario:

- Convert the westbound shared through/right-turn lane to a separate through and right-turn lane; and

- Provide an additional northbound right-turn lane (for a total of two right-turn lanes) on the off-ramp.

The combination of the mitigation measures described above will result in LOS B in the AM peak hour and LOS D in the PM peak hour at the Auburn Ravine Road/I-80 Eastbound Ramps.

The mitigation measures recommended at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection in the Year 2030 "With Forest Ranch" scenario were evaluated to determine their effectiveness in the Buildout "With Forest Ranch" scenario. However, the mitigation measures will only result in LOS E in the AM peak hour and LOS F in the PM peak hour. Other mitigation measures were evaluated, but without reconstructing the entire interchange, little opportunity exists to improve operating conditions. Therefore, the Buildout "With Forest Ranch" scenario will also result in *significant and unavoidable* impacts at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection, even with the implementation of the mitigation measures recommended in the Year 2030 "With Forest Ranch" scenario.

In addition, the Forest Ranch project is responsible for a percentage of the cost of mitigation measures at the Auburn Ravine Road/I-80 Eastbound Ramps intersection. Specifically, Forest Ranch generates 5 percent of the traffic growth at this intersection during the PM peak hour and is responsible for that percentage of the cost of improvements (Mitigation Measure 3.9-a).

Similarly, Forest Ranch generates 6 percent of the new total peak hour traffic at the Auburn Ravine Road/Foresthill Road/Lincoln Way intersection (Mitigation Measure 3.9-b). However, because it was determined that the impacts at this intersection are "significant and unavoidable," no mitigation measures are recommended. If Placer County should ever decide to reconstruct the interchange to meet the future travel demand, the necessary "fair share" contribution of the Forest Ranch project should be assessed.

3.9-8a *Auburn Ravine Road/I-80 Eastbound Ramps intersection – Modify the westbound approach to convert the shared through/right-turn lane to separate through and right-turn lanes and add an additional northbound-to-eastbound right-turn lane on the off-ramp. This improvement will provide LOS B in the AM peak hour and LOS D in the PM peak hour. Forest Ranch Responsibility: 5 percent.*

3.9-8b *Auburn Ravine Road/Foresthill Road/Lincoln Way intersection – Due to topographic and geometric constraints, modifications to the intersection will not be sufficient to bring the level of service into an acceptable range (i.e., LOS A through LOS D). It would operate at LOS F, even with the Year 2030 mitigation measures. As such, the impact to this intersection is considered significant and unavoidable. Forest Ranch represents 6 percent of the peak hour traffic growth. Although not considered*

feasible, the following mitigation measures would be required at this intersection to bring the level of service to LOS D:

- *Convert the northbound shared through/right-turn lane to separate through and right-turn lanes;*
- *Provide an additional northbound left-turn lane;*
- *Provide two additional eastbound through lanes;*
- *Provide an additional southbound left-turn lane; and*
- *Convert the westbound shared through/right-turn lane to separate through and right-turn lanes.*

3.10 NOISE

This section of the EIR examines the existing noise environment and potential noise-related impacts which may occur as part of the development of the Foresthill Divide Community Plan and Forest Ranch Concept Plan. The noise study was prepared by Bollard and Brennan, Inc., acoustical consultants.

3.10.1 INTRODUCTION

Noise is often defined simply as unwanted sound, and thus is a subjective reaction to characteristics of a physical phenomenon. Researchers for many years have grappled with the problem of translating objective measurements of sound into directly correlated measures of public reaction to noise. The descriptors of community noise in current use are the results of these efforts, and represent simplified, practical measurement tools to gauge community response. Figure 3.10-1 provides examples of maximum or continuous noise levels associated with common noise sources. For an explanation of terms used in this section, see Appendix E of this EIR.

A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which is the sound level corresponding to a steady-state A-weighted sound level in decibels (dB) containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptors such as L_{dn} and CNEL, and shows very good correlation with community response to noise.

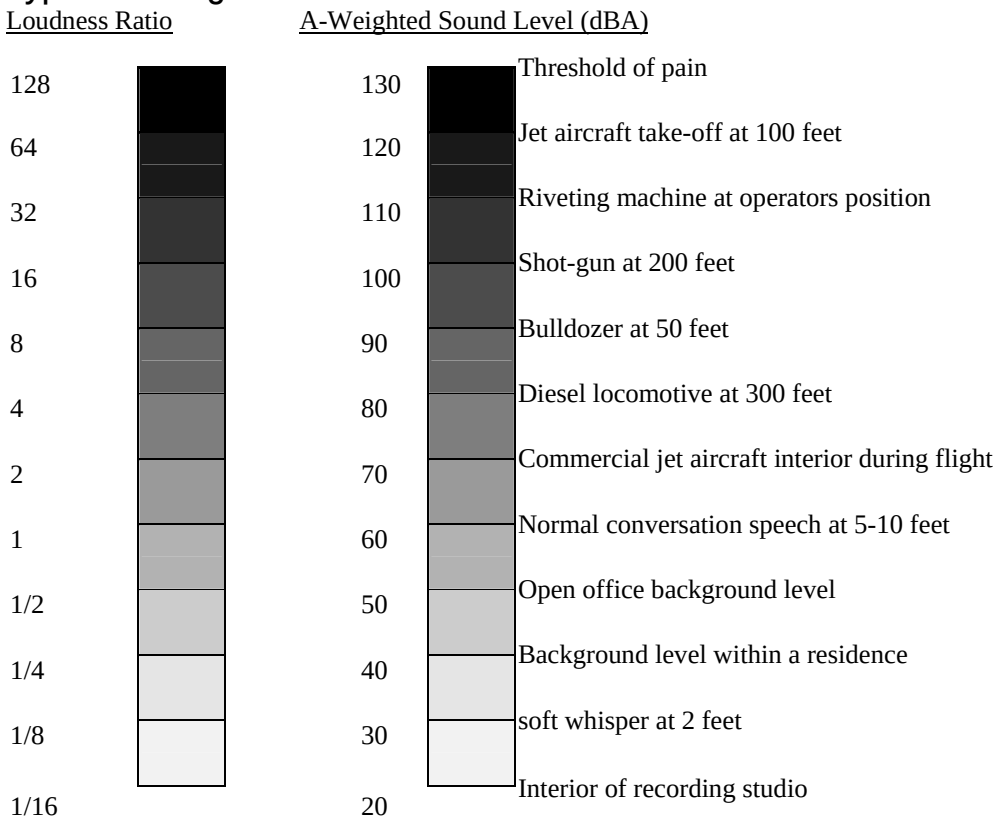
Two composite noise descriptors are in common use today: L_{dn} and CNEL. The L_{dn} (Day-Night Average Level) is based upon the average hourly L_{eq} over a 24-hour day, with a +10 decibel weighting applied to nighttime (10:00 p.m. to 7:00 a.m.) L_{eq} values. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were subjectively twice as loud as daytime exposures. The CNEL (Community Noise Equivalent Level), like L_{dn}, is based upon the weighted average hourly L_{eq} over a 24-hour day, except that an additional +4.77 decibel penalty is applied to evening (7:00 p.m. to 10:00 p.m.) hourly L_{eq} values. Measured L_{dn} and CNEL values are generally within 1 dB of one another. The CNEL was developed for the California Airport Noise Regulations, and is normally applied to airport/aircraft noise assessment. The L_{dn} descriptor is a simplification of the CNEL concept, but the two will usually agree, for a given situation, within 1 dB. Like the L_{eq}, these descriptors are also averages and tend to disguise short-term variations in the noise environment. Because they presume increased evening or nighttime sensitivity, these descriptors are best applied as criteria for land uses where nighttime noise exposures are critical to the acceptability of the noise environment, such as residential developments.

The State Office of Planning and Research Noise Element Guidelines require that major noise sources be identified and quantified by preparing generalized noise contours for current and projected conditions. Significant noise sources include traffic on major roadways and highways, and representative industrial activities and fixed noise sources.

Noise modeling techniques and noise measurements were used to develop generalized L_{dn}/CNEL or L_{eq} noise contours for the major roadways and fixed noise sources in the Foresthill Divide Community Plan area for existing conditions.

Figure 3.10-1

Typical A-Weighted Sound Levels of Common Noise Sources



Source: Bollard & Brennan, Inc., 2000.

Modeling methods have been developed for a number of environmental noise sources including roadways, railroad line operations, railroad yard operations and industrial plants. Such methods produce reliable results as long as data inputs and assumptions are valid. The modeling methods used in this EIR closely follow recommendations made by the State Office of Noise Control, and were supplemented where appropriate by field-measured noise level data to account for local conditions. The noise exposure contours are based upon annual average conditions. Because local topography, vegetation or intervening structures may significantly affect noise exposure at a particular location, the noise contours should not be considered site-specific.

3.10.2 SETTING

NOISE LEVEL STANDARDS

The FDCP does not include goals and policies related to noise; the goals and policies of the Placer County General Plan apply within the Plan area. The Placer County General Plan Noise

Element policies pertaining to noise are designed to protect county residents from the harmful and annoying effects of exposure to excessive noise. Policies applicable to the proposed FDCP are presented below:

Goal 9.A: To protect County residents from the harmful and annoying effects of exposure to excessive noise.

9.A.1 The County shall not allow development of new noise-sensitive uses where the noise level due to non-transportation noise sources will exceed the noise level standards of Table [3.10-1] as measured immediately within the property line of the new development, unless effective noise mitigation measures have been incorporated into the development design to achieve the standards specified in Table 3.10-1 (Table 9-1 of the Placer County General Plan Noise Element).

9.A.2 The County shall require that noise created by new non-transportation noise sources be mitigated so as not to exceed the noise level standards of Table 3.10-1 as measured immediately within the property line of lands designated for noise- sensitive uses.

9.A.4 Impulsive noise produced by blasting should not be subject to the criteria listed in Table 3.10-1. Single event impulsive noise levels produced by gunshots or blasting shall not exceed a peak linear overpressure of 122 dB, or a C-weighted Sound Exposure Level (SEL) of 98 dBC. The cumulative noise level from impulsive sounds such as gunshots and blasting shall not exceed 60 dB LCDN or CNEL-C on any given day. These standards shall be applied at the property line of a receiving land use.

9.A.6 The feasibility of proposed projects with respect to existing and future transportation noise levels shall be evaluated by comparison to Table 3.10-2 (Table 9-3 of the Placer County General Plan Noise Element).

9.A.6 Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated so as not to exceed the levels specified in Table 3.10-2 at the outdoor activity areas or interior spaces of existing noise-sensitive land uses.

9.A.11 The County shall implement one or more of the following mitigation measures where existing noise levels significantly impact existing noise-sensitive land uses, or where the cumulative increase in noise levels resulting from new development significantly impacts noise-sensitive land uses:

a. Rerouting traffic onto streets that have available traffic capacity and that do not adjoin noise-sensitive land uses;
b. Lowering speed limits, if feasible and practical;
c. Programs to pay for noise mitigation such as low cost loans to owners of noise-impacted property or establishment of developer fees;
d. Acoustical treatment of buildings; or
e. Construction of noise barriers.

9.A.12 Where noise mitigation measures are required to achieve the standards of Tables 3.10-1 and 3.10-2, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered as a means of achieving the noise standards only after all other practical design-related noise mitigation measures have been incorporated into the Plan area.

Table 3.10-1 Allowable L_{dn} Noise Levels Within Specified Zone Districts Applicable to New Projects Affected by or Including Non-Transportation Noise Sources

Zone District of Receptor	Property Line of Receiving Use	Interior Spaces
Residential Adjacent to Industrial	60 dBA	45 dBA
Other Residential	50 dBA	45 dBA
Office/Professional	70 dBA	45 dBA
Neighborhood Commercial	70dBA	45 dBA

Notes for Table 3.10-1:

1. Except where noted otherwise, noise exposures will be those which occur at the property line of the receiving use.
2. Interior spaces are defined as any locations where some degree of noise-sensitivity exists. Examples include all habitable rooms of residences, and areas where communication and speech intelligibility are essential, such as classrooms and offices.

Source: 1994 Placer County General Plan.

Table 3.10-2 Maximum Allowable Noise Exposure (Ldn) Transportation Noise Sources

Land Use	Outdoor Activity Areas (a)	Interior Spaces	
	L_{dn} / CNEL,dB	L_{dn} / CNEL, dB	L_{eq}, dB (b)
Residential	60 (c)	45	---
Transient Lodging	60 (c)	45	---
Hospitals, Nursing Homes	60 (c)	45	---
Theaters, Auditoriums	---	---	---
Churches, Meeting Halls	60 (c)	---	35
Office Buildings	---	---	40
Schools, Libraries, Museums	---	---	45

(a) 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.

(b) As determined for a typical worst-case hour during periods of use.

(c) 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 dB 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: 1994 Placer County General Plan

Foresthill General Plan Goals and Policies

Noise

Goal: To protect the health, safety, and welfare of the Foresthill area residents by providing a livable environment free from excessive noise.

1. Enforce acceptable noise exposure levels for various land use categories adopted in the Placer County Noise Element.

2. Avoid the interface of noise-producing and noise-sensitive land uses.

3. Require implementation of noise abatement techniques on new projects where warranted.

4. Locate noise sensitive land uses within areas of acceptable community noise equivalent levels.

AMBIENT NOISE ENVIRONMENT

Existing Roadway Noise – Foresthill Divide Community Plan

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD_77_108) was used to develop L_{dn} contours for all major roadways. The FHWA Model is the analytical method presently favored for traffic noise prediction by most state and local agencies, including Caltrans. The current version of the model is based upon the CALVENO noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver and the acoustical characteristics of the site. The FHWA Model predicts hourly L_{eq} values for free-flowing traffic conditions, and is generally considered to be accurate within 1.5 dB. To predict L_{dn} values, it is necessary to determine the hourly distribution of traffic for a typical 24-hour day and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Traffic data representing annual average traffic volumes for existing conditions (Year 2006) were obtained from MRO Transportation Engineers. Using the FHWA methodology, traffic noise levels as defined by L_{dn} were calculated for existing traffic volumes. Appendix F contains the Highway Traffic Noise Prediction Model Input Data. Distances from the centerlines of selected roadways to the existing 55 dB, 60 dB, and 65 dB L_{dn} contours are summarized in Table 3.10-3.

In some cases, the actual distances to noise level contours may vary from the distances predicted by the FHWA model. Factors such as roadway curvature, roadway grade, shielding from local topography or structures, elevated roadways, or elevated receivers may affect actual sound propagation. Therefore, the distances reported in Table 3.10-3 are estimates of noise exposure along roadways in the Foresthill Divide Community Plan area.

The effects of factors such as roadway curvature, grade, etc. can be determined from site-specific traffic noise measurements. The noise measurement results can be compared to the FHWA model results by entering the observed traffic volumes, speed and distance as inputs to the FHWA model. The differences between the measured and predicted noise levels can be used to adjust the FHWA model and more precisely determine the locations of the traffic noise contours.

Table 3.10-3 Existing (2006) Noise Contour Data Distance (Feet) from Center of Roadway to Ldn Contours

Segment	Description	Existing		
		55 dB	60 dB	65 dB
Yankee Jim's Road				
1	North of Race Track Road	15	7	3
Foresthill Road				

Segment	Description	Existing		
		55 dB	60 dB	65 dB
2	East of Foresthill Bridge	371	172	80
3	South of Lutheran Church	234	109	50
4	South of Michigan Bluff Road	66	31	14
5	North of Michigan Bluff Road	47	22	10
6	North of Happy Pines Road	221	103	48
Main Street				
7	East of Foresthill Road	26	12	6
McKeon-Ponderosa Way				
8	South of Foresthill Road	62	29	13
Michigan Bluff Road				
9	East of Foresthill Road	16	8	3
Race Track Road				
10	North of Foresthill Road	44	20	10
Todd Valley Road				
11	Northeast of Foresthill Road	22	10	5
12	Southeast of Foresthill Road	91	42	20
Happy Pines Road				
13	East of Foresthill Road	56	26	12
Mosquito Ridge Road				
14	East of Foresthill Road	18	8	4
Spring Garden Road				
15	West of Foresthill Road	35	16	7

Source: Bollard & Brennan, Inc., 2002.

Truck traffic heading downhill can affect the noise environment, primarily maximum noise levels due to the use of jake brakes. However, based on the number of trucks which actually use jake brakes compared to overall traffic volumes and numbers of trucks, the computed 24-hour L_{dn} value will not change.

Table 3.10-4 has been prepared to serve as a guide when applying the traffic noise exposure contour information presented in this section to areas with varying topography. The table is used by adding the correction factor to the noise level predicted at a given distance. It should be noted that the adjustment factors presented in this table are intended to provide conservative (worst-case) results, and that complex situations should be evaluated by an acoustical consultant where the potential for significant noise impact exists.

Table 3.10-4 Traffic Noise Adjustments for Various Topographic Conditions

Topographic Situation	Distance from Center of Roadway (Feet)		
	<200	200 - 400	>400
Hillside overlooks roadway	-0-	+1 dB	+3 dB
Roadway Elevated (>15')	-5 dB	-2 dB	-0-
Roadway in cut/below embankment	-5 dB	-5 dB	-5 dB
Dense vegetation (100 feet or more)	-5 dB	-5 dB	-5 dB

Source: Bollard & Brennan, Inc., 2002.

Existing Roadway Noise – Forest Ranch Concept Plan

Short-term noise monitoring was conducted at three sites on June 10th and 12th, 2002. Two continuous hourly noise monitoring sites were established on the Plan area to record day-night statistical noise level trends. The data collected included the L_{eq}, the maximum level during the measurement period (L_{max}) and other statistical descriptors. Noise monitoring sites, measured noise levels, and estimated L_{dn} values at each site are summarized in Table 3.10-5.

Table 3.10-5 Predicted Existing Traffic Noise Level Data

Segment	Description	Distances to Traffic Noise Contours (ft.)		
		55 dB	60 dB	65 dB
Foresthill Road				
1	East of Foresthill Bridge	264	123	57
2	West of Spring Garden Road	268	125	58
3	East of Happy Pines Drive	215	100	46
4	West of Owl Hill Court	228	106	49
5	West of Mosquito Ridge Road	213	99	46
6	West of Yankee Jim's Road	187	87	40
7	East of Yankee Jim's Road	119	55	26
8	West of Blackhawk Lane	89	41	19
9	West of Michigan Bluff Road	64	30	14
10	East of Michigan Bluff Road	46	21	10
McKeon-Ponderosa Way				
11	South of Foresthill Road	98	45	21
Spring Garden Road				
12	North of Foresthill Road	55	25	12
Happy Pines Drive				
13	South of Foresthill Road	89	41	19
Todd Valley Road (West)				
14	South of Foresthill Road	144	67	31
Todd Valley Road (East)				
15	South of Foresthill Road	35	16	8
Mosquito Ridge Road				
16	South of Foresthill Road	28	13	6
Yankee Jim's Road				
17	North of Race Track Street	24	11	5
Main Street				
18	South of Foresthill Road	58	27	13
Michigan Bluff Road				
19	South of Foresthill Road	26	12	6
Race Track Street				
20	North of Foresthill Road	70	32	15

Aircraft

The Plan area is not served by a public/commercial airport. The closest airports to Foresthill are the Georgetown Airport and Auburn Municipal Airport.

Fixed Noise Sources

The production of noise is a result of many industrial processes, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by federal and State employee health and safety regulations (OSHA and Cal-OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational and public service facility activities can also produce noise which affects adjacent sensitive land uses. These noise sources can be continuous and may contain tonal components which may be annoying to individuals who live in the nearby vicinity. In addition, noise generation from fixed noise sources may vary based upon climatic conditions, time of day and existing ambient noise levels.

From a land use planning perspective, fixed-source noise control issues focus upon two goals: to prevent the introduction of new noise-producing uses in noise-sensitive areas, and to prevent encroachment of noise sensitive uses upon existing noise-producing facilities. The first goal can be achieved by applying noise level performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in near proximity to noise-producing facilities include mitigation measures to ensure compliance with noise performance standards.

The types of uses which may typically be characterized as stationary or fixed noise sources include but are not limited to: industrial facilities including lumber mills, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, and athletic fields.

Field observations within the Plan area identified three potential fixed noise sources. These included the Auburn State Recreation Area Off-Highway Vehicle Park, the Transfer Station which is located off of Todd Valley Road, and the shooting range which is located off of Yankee Jim's Road. A brief description has been provided for each of the three identified noise sources.

Auburn State Recreation Area Off-Highway Vehicle (OHV) Park. The Auburn State Recreation Area OHV Park is located in the southeast portion of the Plan area, and is generally in the area of Lake Clementine Road and the Auburn Foresthill Road. A detailed analysis of noise impacts was prepared for this site in 1996 by Brown-Buntin Associates, Inc. (*Environmental Noise Analysis, Mammoth Bar OHV Park Expansion*, BBA, 12-11-96).

In general, the OHV Park is located in a remote area bounded by the North and Middle Forks of the American River. Primarily motorcycles in the range of 50 cc to 500 cc in size operate in this area. Maximum noise levels due to these types of motorcycles can range between 70 dB and 90 dB at a distance of 100 feet, depending on the motorcycle, size of the engine, modifications which may have been made to the bike, and the number of vehicles operating in a given area at the same time.

Transfer Station. The Transfer Station is located south of Foresthill near Todd Valley Road, at the end of Patent Road. Transfer stations generally contain tipping areas for garbage, material recovery facilities (MRF) and recycling areas. Noise levels attributed to transfer stations are primarily due to truck traffic to and from the site. Other equipment such as fork lifts and front-end loaders also operate on these sites. In some cases portable tub grinders which are used for chipping wood waste are also located on these sites. Generally, if residences are located within 300 feet of these facilities, noise levels can exceed locally acceptable noise level criteria.

Shooting Range. A local shooting range is located on Yankee Jim's Road, north of Spring Garden Road. No individuals were at the shooting range during the field investigations. Noise generated by firearms usage consists of bursts of high-energy impulsive sound. This differs from sound generated by common community noise sources. Noise level data collected for other small arms firing ranges indicate that maximum A-weighted noise levels range between 89 dB for a 9mm handgun to 97 dB for an AR-15 rifle at a distance of 100 feet. Maximum noise levels due to multiple handguns and rifles firing simultaneously have been measured to be approximately 102 dB at a distance of 100 feet.

Community Noise Survey – Foresthill Divide Community Plan

A community noise survey was conducted to document noise exposure in regions of the Plan area which are away from the major roadways.

Short-term noise monitoring was conducted at four sites on June 8 and 9, 2000. Each site was monitored during the day and night so that estimates of L_{dn} could be prepared. Two continuous hourly noise monitoring sites were established in the Plan area to record day-night statistical noise level trends. The data collected included the L_{eq}, the maximum level during the measurement period (L_{max}), and other statistical descriptors. Noise monitoring sites, measured noise levels, and estimated L_{dn} values at each site are summarized in Table 3.10-6. Figure 3.10-2 shows the noise measurement locations.

Community noise monitoring systems were calibrated with acoustical calibrators in the field prior to use. The systems comply with all pertinent requirements of the American National Standards Institute (ANSI) for Type I sound level meters.

The community noise survey results indicate that typical noise levels in noise sensitive areas of the Plan area are in the range of 41.3 dB to 46.6 dB L_{dn}. Traffic on local roadways and neighborhood activities are the controlling factors for background noise levels in the majority of the Plan area. In general, the Plan area could be characterized as very quiet to relatively quiet.

The L_{eq} values in Table 3.10-6 represent the average measured noise levels during the sample periods. The L_{eq} values were the basis of the estimated L_{dn} values. The L_{max} values show the maximum noise levels observed during the samples. The L_{50} and L_{90} values represent the noise levels exceeded 50 percent and 90 percent of the time during the sample period. The continuous monitoring data are shown graphically in Figure 3.10-3. The graphs show that ambient noise levels generally reach a minimum at the hour of 2:00 a.m., increasing during the daytime hours as a function of increased traffic and other human activities.

Table 3.10-6 Summary of Measured Noise Levels and Estimated Day/Night Average Levels (Ldn)

Site	Location	Time Period	Sound Level, dB				
			L_{eq}	L_{50}	L_{90}	L_{max}	Estimated L_{dn}
1*	Todd Valley Road Church of Latter Day Saints	6/8-9/2000 Daytime (7am-10pm) Nighttime(10pm-7am)	 41.2 36.9	 39 33	 33 30	 54.8 50.8	44.2
2*	Foresthill 625 Harrison Street	6/8-9/2000 Daytime (7am-10pm) Nighttime(10pm-7am)	 44.2 32.0	 38 27	 34 25	 63.2 51.5	43.5
3	Yankee Jim's Road @ Spring Garden Road	6/8/2000 (Ld) 6/9/2000 (Ln)	36.2 34.1	36 33	33 32	44.7 45.0	43.5
4	Todd Valley Road @ Patent Road	6/8/2000 (Ld) 6/9/2000 (Ln)	38.1 36.6	38 35	36 33	46.4 44.6	43.3
5	Foresthill @Church Street Cemetery	6/8/2000 (Ld) 6/9/2000 (Ln)	41.2 40.0	39 37	34 32	51.0 49.4	46.6
6	Baker Ranch Sequoia Road	6/8/2000 (Ld) 6/9/2000 (Ln)	37.5 34.2	37 34	31 31	47.2 45.7	41.3

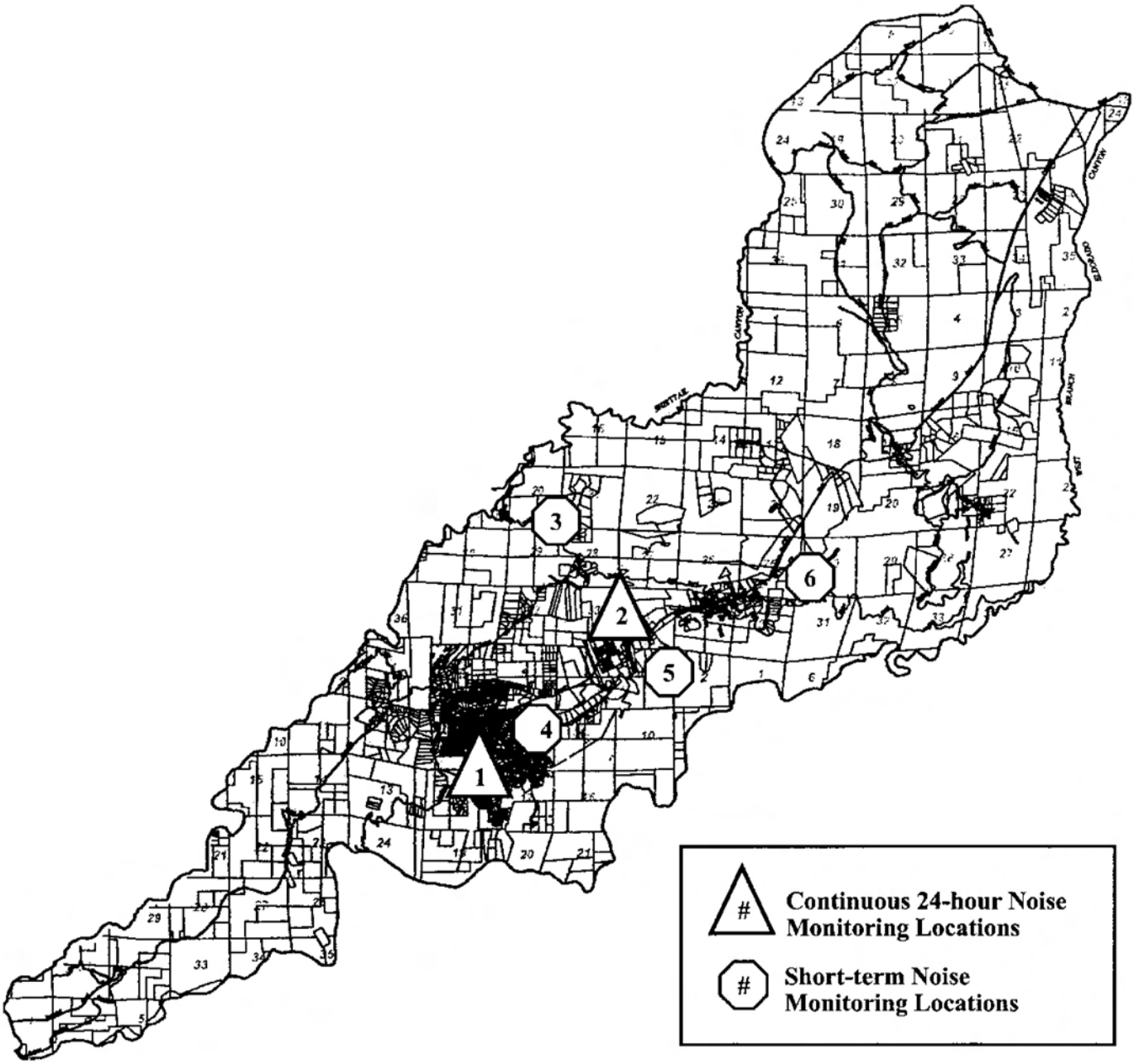
* = Continuous Monitoring Site
Ld = Measured noise level during daytime hours (7:00 am - 10:00 pm)
Ln = Measured noise level during nighttime hours (10:00 pm - 7:00 am)
Source: Bollard & Brennan, 2000

Community Noise Survey – Forest Ranch Concept Plan

A community noise survey was conducted to document noise exposure in different areas of the Forest Ranch Concept Plan area. Community noise monitoring systems were calibrated with acoustical calibrators in the field prior to use. The systems comply with all pertinent requirements of the American National Standards Institute (ANSI) for Type I sound level meters.

The community noise survey results indicate that typical background noise levels in the Plan area vicinity are in the range of approximately 39 dB L_{dn} to 57 dB L_{dn}. Traffic on local roadways is the primary controlling factor for background noise in this area. In general, the Forest Ranch project area could be characterized as very quiet to relatively quiet.

The L_{eq} values in Table 3.10-7 represent the average measured noise levels during the sample periods. The L_{eq} values were the basis of the estimated L_{dn} values. The L_{max} values show the maximum noise levels observed during the sample periods. The L50 and L90 values represent the noise levels exceeded 50 percent and 90 percent of the time during the sample period.

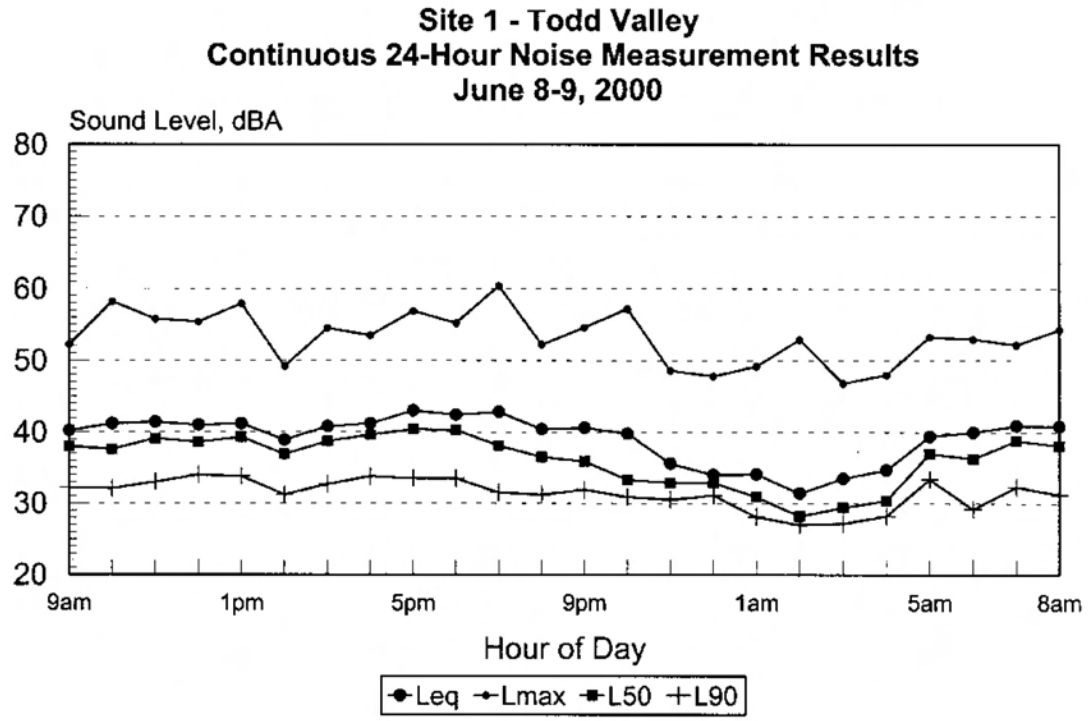


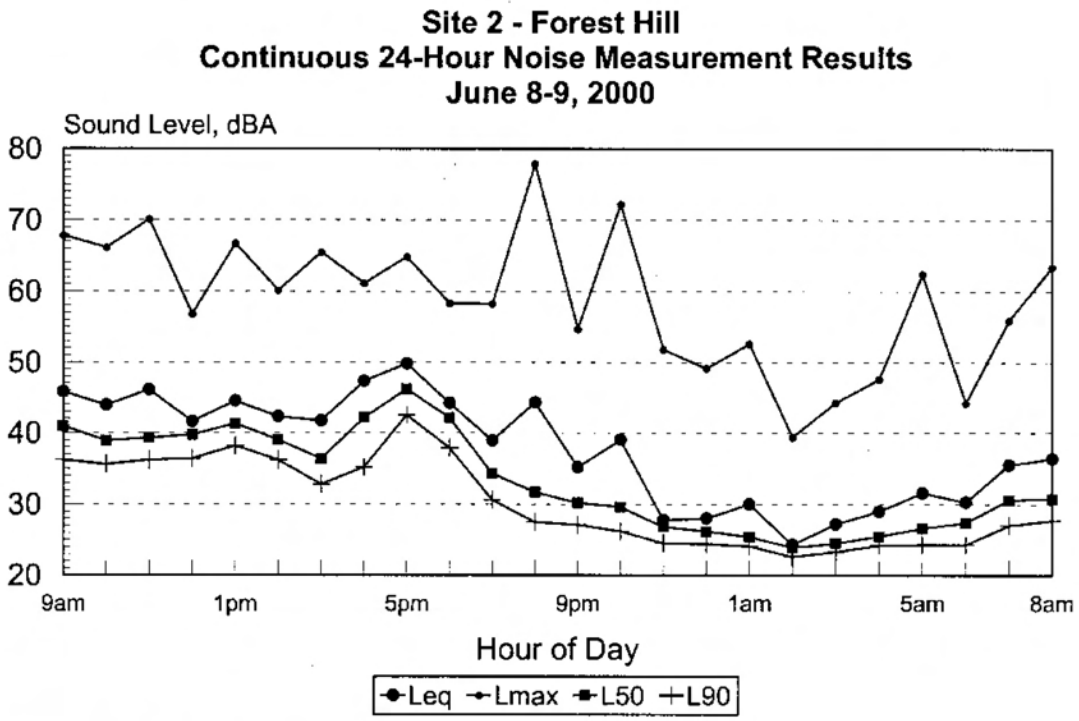
Source: Bollard & Brennan, 2000 / Quad Knopf, Inc., 2002

Quad Knopf

FORESTHILL DIVIDE COMMUNITY PLAN EIR
NOISE MONITORING LOCATIONS

Figure 3.10-2





Source: Bollard & Brennan, 2000 / Quad Knopf, Inc., 2002

Quad Knopf

FORESTHILL DIVIDE COMMUNITY PLAN EIR
CONTINUOUS 24-HOUR NOISE MEASUREMENT RESULTS

Figure 3.10-3

Table 3.10-7 Summary of Measured Noise Levels and Day/Night Average Levels (Ldn)

Site	Location	Time Period	Sound Level, dB				
			Daytime Leq	Daytime L50	Daytime L90	Daytime L_{max}	Calculated or Estimated Ldn
1*	Southwest of Blackhawk Ln. and Foresthill Rd Intersection	6/10-12/2002 Daytime (7am-10pm) Nighttime (10pm-7am)	54	40	32	73	57.1
2*	North of Yankee Jim's Road	6/10-9/2000 Daytime (7am-10pm) Nighttime (10pm-7am)	48	34	30	71	49.3
A	South of Yankee Jim's Road	6/10/2002 6/12/2002 6/12/2002	44 41 40	43 36 35	41 32 32	48 53 54	44
B	North of Blackhawk Lane	6/10/2002 6/12/2002 6/12/2002	40 50 52	39 40 43	38 36 38	46 70 72	50
C	North of Yankee Jim's Road	6/12/2002 6/12/2002	34 38	33 32	32 30	42 52	39

* Continuous Monitoring Site

Note: The L_{dn} at the short term monitoring locations are estimations based upon daytime measurements alone.

3.10.3 IMPACT EVALUATION CRITERIA

Appendix G (Environmental Checklist Form) of the State CEQA Guidelines indicates that significant noise impacts occur when a project exposes people to noise levels in excess of standards established in local noise ordinances or general plan noise elements, or causes a substantial permanent or temporary increase in noise levels above levels existing without the project. Following is a discussion of local noise level criteria; the concept of substantial noise increases; and the standard of significance for construction noise, existing industrial/commercial noise that may affect the Foresthill Divide Community Plan area, on-site traffic noise, offsite traffic noise and aircraft noise.

Local Noise Level Criteria

For transportation-related noise sources the Placer County stand of significance is 60 db L_{dn}. The 60 dB L_{dn} applied by Placer County is also the standard of significance for non-transportation-related noise sources.

Substantial Noise Increases

Transportation-Related Noise Sources

CEQA does not define the word "substantial" as used in the Guidelines. Some guidance to the concept of substantial noise increases was provided in 1992 by the Federal Interagency

Committee on Noise (FICON), which addressed changes in noise levels resulting from aircraft operations. Their recommendations are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of the L_{dn} or CNEL. Annoyance is a summary measure of the general adverse reaction of people to noise that generated speech interference, sleep disturbance or interference with the desire for a tranquil environment.

Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis for all transportation noise sources that are described in terms of cumulative noise exposure descriptors such as the L_{dn} or CNEL. These descriptors define noise exposure in terms of average noise exposure during a 24-hour period, with penalties added to noise that occurs during the nighttime or evening. Table 3.10-8 summarizes the FICON recommendations.

Table 3.10-8 Substantial Increases for Transportation Noise Exposure

Ambient Noise Level Without Project (L_{dn} or CNEL)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+5 dB or more
60-65 dB	+3 dB or more
>65 dB	+2 dB or more

Sources: FICON, as applied by Brown-Buntin Associates, Inc.

Non-Transportation-Related Noise Sources

For these types of noise sources, it is common to assume that a minimum 3 dB increase in noise levels represents a substantial increase in ambient noise levels. This is based on laboratory tests that indicate a 3 dB increase is the minimum change perceptible to most people.

Construction Noise

Construction noise compatibility criteria are not specifically addressed in the Placer County Noise Element.

Existing Industrial/Commercial Noise

The 60 dB L_{dn} exterior and 45 dB L_{dn} interior criteria apply to existing industrial/commercial facilities that may affect residential uses in the proposed Plan area.

Aircraft Noise

The 60 dB L_{dn} exterior and 45 dB L_{dn} interior criteria apply to aircraft noise that may affect residential uses in the proposed Plan area.

On-Site Traffic Noise

The 60 dB L_{dn} exterior and 45 dB L_{dn} interior criteria apply to new noise-sensitive land uses in the proposed Plan area.

Offsite Traffic Noise

The 60 dB L_{dn} exterior and 45 dB L_{dn} interior criteria apply to existing noise-sensitive uses outside the Plan area that may be affected by increased traffic attributable to the FDCP. Also, substantial increases in traffic noise levels attributable to the Plan are significant impacts.

3.10.4 IMPACTS AND MITIGATION MEASURES

Impact 3.10-1 Noise impacts due to increased roadway traffic in the FDCP area.

Discussion/Conclusion: To describe traffic noise levels due to and upon the FDCP area, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict traffic noise levels in terms of L_{dn}, it is necessary to adjust the input volume to account for the day/night distribution of traffic.

Traffic volumes for future conditions and scenarios were provided by kdAnderson Transportation Engineers. A complete listing of the FHWA Model input data for future conditions is provided in Appendix F.

Table 3.10-9 shows the predicted traffic noise levels. The table is provided in terms of L_{dn} at a standard distance of 100 feet from the centerlines of the Plan area. Placement of noise-sensitive uses within the distances shown on Table 3.10-9 would result in a ***potentially significant*** impact.

Table 3.10-9 Future Traffic Noise Levels Distance (Feet) from Center of Roadway to L_{dn} Contours

Segment	Description	Ldn Contour		
		55 dB	60 dB	65 dB
Yankee Jim's Road				
1	North of Race Track Road	56	26	12
Foresthill Road				
2	East of Foresthill Bridge	532	247	115
3	South of Lutheran Church	362	168	78
4	West of Race Track Road	376	174	81
5	At Yankee Jim's Road	335	156	72
Main Street				
6	East of Foresthill Road	30	14	7

Segment	Description	Ldn Contour		
		55 dB	60 dB	65 dB
McKeon-Ponderosa Way				
7	South of Foresthill Road	67	31	15
Michigan Bluff Road				
8	East of Foresthill Road	26	12	6
Race Track Road				
9	North of Foresthill Road	63	29	14
Todd Valley Road				
10	At Foresthill Road West	101	47	22
11	At Foresthill Road East	30	14	6
12	Todd Valley Road Extension (Proposed)	44	20	10
Happy Pines Road				
13	East of Foresthill Road	61	28	13
Mosquito Ridge Road				
14	East of Foresthill Road	63	29	14
Spring Garden Road				
15	West of Foresthill Road	49	23	11
Power Line Road (Proposed)				
16	Proposed New Road	13	6	3

Distances to roadway noise contours are from the roadway centerline.
Traffic Data Provided by kdAnderson Transportation Engineers.
Source: Bollard and Brennan, 2002.

Mitigation Measures

The Noise Element of the Placer County General Plan requires preparation of an acoustical analysis under certain circumstances, including when proposed non-residential land uses are likely to produce noise levels that exceed adopted standards at existing or planned noise sensitive uses, or where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding adopted standards. The project-specific acoustical analysis will recommend appropriate mitigation to achieve compliance with the policies and standards of the Noise Element, giving preference to proper site planning and design over mitigation measures which require construction of noise barriers or structural modifications to buildings which contain noise-sensitive land uses. Implementation of one or more of the following measures on a project-by-project basis should reduce impacts to a ***less than significant level:***

3.10-1a *Use of Setbacks. Noise exposure may be reduced by increasing the distance between the noise source and receiving use. Setback areas can take the form of open space, frontage roads, recreational areas, storage yards, etc. The available noise attenuation from this technique is limited by the characteristics of the noise source, but is generally about 4 to 6 dB per doubling of distance from the source.*

3.10-1b *Use of Barriers. Shielding by barriers can be obtained by placing walls, berms or other structures, such as buildings, between the noise source and the receiver. The effectiveness of a barrier depends upon blocking line-of-sight between the source and receiver, and is improved with increasing the distance the sound must travel to pass*

over the barrier as compared to a straight line from source to receiver. The difference between the distance over a barrier and a straight line between source and receiver is called the "path length difference," and is the basis for calculating barrier noise reduction.

Barrier effectiveness depends upon the relative heights of the source, barrier and receiver. In general, barriers are most effective when placed close to either the receiver or the source. An intermediate barrier location yields a smaller path-length-difference for a given increase in barrier height than does a location closer to either source or receiver.

For maximum effectiveness, barriers must be continuous and relatively airtight along their length and height. To ensure that sound transmission through the barrier is insignificant, barrier mass should be about 4 lbs./square foot, although a lesser mass may be acceptable if the barrier material provides sufficient transmission loss. Satisfaction of the above criteria requires substantial and well-fitted barrier materials, placed to intercept line of sight to all significant noise sources. Earth, in the form of berms or the face of a depressed area, is also an effective barrier material.

Transparent noise barriers may be employed, and have the advantage of being aesthetically pleasing in some environments. Transparent barrier materials such as laminated glass and polycarbonate provide adequate transmission loss for most highway noise control applications. Transparent barrier materials may be flammable, and may be easily abraded. Some materials may lose transparency upon extended exposure to sunlight. Maintaining aesthetic values requires that transparent barriers be washed on a regular basis. These properties of transparent barrier materials require that the feasibility of their use be considered on a case-by-case basis.

The attenuation provided by a barrier depends upon the frequency content of the source. Generally, higher frequencies are attenuated (reduced) more readily than lower frequencies. This results because a given barrier height is relatively large compared to the shorter wavelengths of high frequency sounds, while relatively small compared to the longer wavelengths of the low frequency sounds. The effective center frequency for traffic noise is usually considered to be 550 Hz. Railroad engines, cars and horns emit noise with differing frequency content, so the effectiveness of a barrier will vary for each of these sources. Frequency analyses are necessary to properly calculate barrier effectiveness for noise from sources other than highway traffic.

There are practical limits to the noise reduction provided by barriers. For highway traffic noise, a 5 to 10 dB noise reduction may often be reasonably attained. A 15 dB noise reduction is sometimes possible, but a 20 dB noise reduction is extremely difficult to achieve. Barriers usually are provided in the form of walls, berms, or berm/wall combinations. The use of an earth berm in lieu of a solid wall may provide

up to 3 dB additional attenuation over that attained by a solid wall alone, due to the absorption provided by the earth. Berm/wall combinations offer slightly better acoustical performance than solid walls, and are often preferred for aesthetic reasons.

3.10-1c *Site Design. Buildings can be placed on a project site to shield other structures or areas, to remove them from noise-impacted areas, and to prevent an increase in noise level caused by reflections. The use of one building to shield another can significantly reduce overall project noise control costs, particularly if the shielding structure is insensitive to noise. As an example, carports or garages can be used to form or complement a barrier shielding adjacent dwellings or an outdoor activity area. Similarly, one residential unit can be placed to shield another so that noise reduction measures are needed for only the building closest to the noise source. Placement of outdoor activity areas within the shielded portion of a building complex, such as a central courtyard, can be an effective method of providing a quiet retreat in an otherwise noisy environment. Patios or balconies should be placed on the side of a building opposite the noise source, and "wing walls" can be added to buildings or patios to help shield sensitive uses.*

3.10-1d *Building Design. When structures have been located to provide maximum noise reduction by barriers or site design, noise reduction measures may still be required to achieve an acceptable interior noise environment. The cost of such measures may be reduced by placement of interior dwelling unit features. For example, bedrooms, living rooms, family rooms and other noise-sensitive portions of a dwelling can be located on the side of the unit farthest from the noise source.*

Bathrooms, closets, stairwells and food preparation areas are relatively insensitive to exterior noise sources, and can be placed on the noisy side of a unit. When such techniques are employed, noise reduction requirements for the building facade can be significantly reduced, although the architect must take care to isolate the noise impacted areas by the use of partitions or doors.

In some cases, external building facades can influence reflected noise levels affecting adjacent buildings. This is primarily a problem where high-rise buildings are proposed, and the effect is most evident in urban areas, where an "urban canyon" may be created. Bell-shaped or irregular building facades and attention to the orientation of the building can reduce this effect.

3.10-1e *Noise Reduction by Building Facades. When interior noise levels are of concern in a noisy environment, noise reduction may be obtained through acoustical design of building facades. Standard residential construction practices provide 10-15 dB noise reduction for building facades with open windows, and approximately 20 dB to 25 dB noise reduction when windows are closed. Thus a 20 dB exterior-to-interior noise reduction can be obtained by the requirement that building design include adequate ventilation systems, allowing windows on a noise-impacted facade to remain closed under any weather condition.*

Where greater noise reduction is required, acoustical treatment of the building facade is necessary. Reduction of relative window area is the most effective control technique, followed by providing acoustical glazing (thicker glass or increased air space between panes) in low air infiltration rate frames, use of fixed (non-movable) acoustical glazing or the elimination of windows. Noise transmitted through walls can be reduced by increasing wall mass (using stucco or brick in lieu of wood siding), isolating wall members by the use of double- or staggered- stud walls, or mounting interior walls on resilient channels. Noise control for exterior doorways is provided by reducing door area, using solid-core doors, and by acoustically sealing door perimeters with suitable gaskets. Roof treatments may include the use of plywood sheathing under roofing materials.

Whichever noise control techniques are employed, it is essential that attention be given to installation of weather stripping and caulking of joints. Openings for attic or sub-floor ventilation may also require acoustical treatment; tight-fitting fireplace dampers and glass doors may be needed in aircraft noise-impacted areas.

Design of acoustical treatment for building facades should be based upon analysis of the level and frequency content of the noise source. The transmission loss of each building component should be defined, and the composite noise reduction for the complete facade calculated, accounting for absorption in the receiving room. A one-third octave band analysis is a definitive method of calculating the A-weighted noise reduction of a facade.

3.10-1f *<u>Use of Vegetation.</u> Trees and other vegetation are often thought to provide significant noise attenuation. However, approximately 100 feet of dense foliage (so that no visual path extends through the foliage) is required to achieve a 5 dB attenuation of traffic noise. Thus the use of vegetation as a noise barrier should not be considered a practical method of noise control unless large tracts of dense foliage are part of the existing landscape.*

Vegetation can be used to acoustically "soften" intervening ground between a noise source and receiver, increasing ground absorption of sound and thus increasing the attenuation of sound with distance. Planting of trees and shrubs is also of aesthetic and psychological value, and may reduce adverse public reaction to a noise source by removing the source from view, even though noise levels will be largely unaffected. It should be noted, however, that trees planted on the top of a noise control berm can actually slightly degrade the acoustical performance of the barrier. This effect can occur when high frequency sounds are diffracted (bent) by foliage and directed downward over a barrier.

In summary, the effects of vegetation upon noise transmission are minor, and are primarily limited to increased absorption of high frequency sounds and to reducing adverse public reaction to the noise by providing aesthetic benefits.

Discussion/Conclusion with Incorporation of the Forest Ranch Concept Plan: To describe the Existing + Project traffic noise levels due to and upon the Concept Plan area, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict traffic noise levels in terms of L_{dn}, it is necessary to adjust the input volume to account for the day/night distribution of traffic. Traffic volumes for the Existing + Project conditions were provided by MRO Transportation Engineers. Table 3.10-10 shows the predicted Existing + Project traffic noise levels.

Table 3.10-10 also shows the expected change in traffic noise levels due to the Concept Plan, when compared to the predicted existing traffic noise levels. Based upon Table 3.10-10, the changes in traffic noise levels ranged between 0 dB L_{dn} and 13 dB L_{dn}.

Where a significant increase in noise levels occurs, the increase has been highlighted in bold.

Tables 3.10-11 and 3.10-12 show the predicted Future and Future + Project traffic noise levels. Once again the FHWA model was used for predicting traffic noise levels. Table 3.10-12 also shows the expected increase in traffic noise levels due to the Concept Plan. Based upon Table 3.10-12, the future traffic associated with the Concept Plan will not contribute to a significant increase in traffic noise levels.

Table 3.10-10 Predicted Existing + Project Traffic Noise Level Data

Segment	Description	Ldn , dB @ 100'	Increase in Noise Levels, dB	Distance to Traffic Noise Contours (ft.)	
				60 dB	65 dB
Foresthill Road					
1	East of Foresthill Bridge	64	**+3**	194	90
2	West of Spring Garden Road	64	**+3**	197	91
3	East of Happy Pines Drive	64	**+4**	179	83
4	West of Owl Hill Court	64	**+3.5**	183	85
5	West of Mosquito Ridge Road	64	**+4**	177	82
6	West of Yankee Jim's Road	63	**+4**	169	79
7	East of Yankee Jim's Road	61	**+5**	117	54
8	West of Blackhawk Lane	55	+1	46	22
9	West of Michigan Bluff Road	53	+1	36	17
10	East of Michigan Bluff Road	52	+2.5	31	14
McKeon-Ponderosa Way					
11	South of Foresthill Road	55	0	45	21
Spring Garden Road					
12	North of Foresthill Road	51	0	26	12
Happy Pines Drive					
13	South of Foresthill Road	54	0	41	19
Todd Valley Road (West)					
14	South of Foresthill Road	57	0	66	31

Segment	Description	Ldn , dB @ 100'	Increase in Noise Levels, dB	Distance to Traffic Noise Contours (ft.)	
				60 dB	65 dB
Todd Valley Road (East)					
15	South of Foresthill Road	48	0	16	7
Mosquito Ridge Road					
16	South of Foresthill Road	47	+0.5	14	6
Yankee Jim's Road					
17	North of Race Track Street	59	**+13**	84	39
Main Street					
18	South of Foresthill Road	51	0	25	11
Michigan Bluff Road					
19	South of Foresthill Road	46	0	12	6
Race Track Street					
20	North of Foresthill Road	56	**+3**	53	25

Table 3.10-11 Predicted Future Traffic Noise Level Data

Segment	Description	Ldn, dB @ 100'	Distance to Traffic Noise Contours (ft.)	
			60 dB	65 dB
Foresthill Road				
1	East of Foresthill Bridge	64	176	82
2	West of Spring Garden Road	64	179	83
3	East of Happy Pines Drive	63	160	74
4	West of Owl Hill Court	63	163	76
5	West of Mosquito Ridge Road	63	169	79
6	West of Yankee Jim's Road	63	151	70
7	East of Yankee Jim's Road	61	118	55
8	West of Blackhawk Lane	58	73	34
9	West of Michigan Bluff Road	55	44	21
10	East of Michigan Bluff Road	54	37	17
McKeon-Ponderosa Way				
11	South of Foresthill Road	55	49	23
Spring Garden Road				
12	North of Foresthill Road	53	36	17
Happy Pines Drive				
13	South of Foresthill Road	55	44	21
Todd Valley Road (West)				
14	South of Foresthill Road	58	74	34
Todd Valley Road (East)				
15	South of Foresthill Road	50	22	10
Mosquito Ridge Road				
16	South of Foresthill Road	55	47	22
Yankee Jim's Road				
17	North of Race Track Street	55	46	22
Main Street				
18	South of Foresthill Road	53	32	15

Segment	Description	Ldn, dB @ 100'	Distance to Traffic Noise Contours (ft.)	
			60 dB	65 dB
Michigan Bluff Road				
19	South of Foresthill Road	49	19	9
Race Track Street				
20	North of Foresthill Road	55	42	20
Todd Valley Connection				
21	Todd Valley to Foresthill	53	32	15
Spring Garden Connection				
22	East of Spring Garden Road	45	10	5
23	North of Foresthill Road	56	52	24

Table 3.10-12 Predicted Cumulative Plus Project Traffic Noise Level Data

Segment	Description	Ldn @ 100'	Increase in Noise Levels, dB	Distance to Traffic Noise Contours (ft.)	
				60 dB	65 dB
Foresthill Road					
1	East of Foresthill Bridge	65	+0.5	225	104
2	West of Spring Garden Road	65	+1.5	226	105
3	East of Happy Pines Drive	65	+1.5	206	96
4	West of Owl Hill Court	65	+1.5	203	94
5	West of Mosquito Ridge Road	65	+1	201	93
6	West of Yankee Jim's Road	64	+1	177	82
7	East of Yankee Jim's Road	63	+1.5	152	71
8	West of Blackhawk Lane	58	+0.5	78	36
9	West of Michigan Bluff Road	56	+1	51	24
10	East of Michigan Bluff Road	54	+1	42	20
McKeon-Ponderosa Way					
11	South of Foresthill Road	55	+1	49	23
Spring Garden Road					
12	North of Foresthill Road	54	+0.5	38	18
Happy Pines Drive					
13	South of Foresthill Road	55	0	44	21
Todd Valley Road (West)					
14	South of Foresthill Road	58	0	75	35
Todd Valley Road (East)					
15	South of Foresthill Road	51	+1	25	11
Mosquito Ridge Road					
16	South of Foresthill Road	55	0	43	20
Yankee Jim's Road					
17	North of Race Track Street	56	+1.5	57	26
Main Street					
18	South of Foresthill Road	53	0	32	15
Michigan Bluff Road					
19	South of Foresthill Road	49	0	19	9
Race Track Street					
20	North of Foresthill Road	55	+1	49	23

Segment	Description	Ldn @ 100'	Increase in Noise Levels, dB	Distance to Traffic Noise Contours (ft.)	
				60 dB	65 dB
Todd Valley Connection					
21	Todd Valley to Foresthill	52	-1	27	13
Spring Garden Connection					
22	East of Spring Garden Road	43	-2	7	3
23	North of Foresthill Road	58	+2	72	33

This Concept Plan-generated traffic is expected to result in traffic noise level increases over existing levels which are considered to be significant along portions of Foresthill Road and Yankee Jim's Road. Since the portion of Yankee Jim's Road which is exposed to a significant increase in traffic noise levels is confined to the Concept Plan site, the increase in traffic noise levels along Yankee Jim's Road will not affect any existing residences, and is considered less than significant. However, existing residences are located adjacent to Foresthill Road, and impacts on these residences will be significant.

In addition, the Concept Plan includes residential uses adjacent to Foresthill Road and Yankee Jim's Road. The Concept Plan site could be exposed to traffic noise levels which exceed 60 dB L_{dn} at the outdoor areas. In addition, the Concept Plan site could be exposed to interior traffic noise levels which exceed an interior noise level standard of 45 dB L_{dn}. However, since site designs are not available, overall noise levels cannot be determined at this time. Therefore, a detailed analysis of traffic noise levels will need to be conducted for proposed residences adjacent to Foresthill Road and Yankee Jim's Road when site designs have been completed. This impact is considered to be ***potentially significant***.

Mitigation Measures

Implementation of the following mitigation measures for the Forest Ranch Concept Plan will reduce traffic noise impacts to a ***less than significant level***:

3.10-1g *The extent by which various land uses will be affected by increases in traffic noise levels associated with the development of the region will vary depending on the proximity of those uses to the roadways in question and the individual sensitivities of those uses to noise.*

Because the increase in traffic noise levels along Foresthill Road would affect existing noise sensitive land uses (primarily residences) which are already located adjacent to Foresthill Road, the only way to practically reduce noise levels at those locations would be to construct noise barriers between the roadway and the residences, or to repave the roadways in question with noise-reducing asphalt. The construction of solid noise barriers could reduce traffic noise levels at the nearest noise sensitive receptors to the roadways. However, barriers may not be feasible, as access to the residences is from the roadway. The use of alternative roadway pavements such as rubberized asphalt or open gap asphalt have been shown to reduce overall traffic noise levels by approximately 3 dB to 5 dB. Payment of fair

share fees towards these road improvements shall be required prior to issuance of any building permit.

3.10-1h *A detailed analysis of traffic noise levels shall be required for tentative subdivision maps for proposed residences adjacent to Foresthill Road and Yankee Jim's Road. The noise analysis will be required to incorporate mitigation measures which would reduce noise impacts at proposed residences to be in conformance with standards and criteria set forth in the Placer County General Plan.*

Impact 3.10-2 Noise impacts due to the introduction of additional stationary noise sources in the FDCP area.

Discussion/Conclusion: There are a variety of noise sources associated with future development within the FDCP area which have the potential to create noise levels in excess of the General Plan noise standards or result in annoyance at existing and future noise-sensitive developments within the Plan area. Such uses/noise sources include, but are not limited to, fire stations, commercial loading docks associated with grocery stores, school playgrounds and neighborhood parks.

At the Community Plan level, detailed site and grading plans associated with these types of noise sources have not yet been developed. As a result, it is not feasible to identify specific noise impacts associated with these sources. Rather, the potential for these sources to generate significant excessive or annoying noise levels is identified, and consideration of that potential during the design phases of the development is encouraged. Additional discussion and examples of noise generation of some of these types of uses follows:

Loading Docks. Due to the elevated noise emissions of heavy trucks and the common practice of utilizing loading docks during late night or early morning hours, adverse public reaction to loading dock usage is not uncommon. This is especially true if heavy trucks idle during unloading or if refrigeration trucks are parked in proximity to residential boundaries.

Average noise levels for single idling trucks generally range from 60 to 65 dB L_{eq} at a distance of 100 feet, and maximum noise levels associated with heavy truck passages range from 70 to 75 dB L_{max} at a distance of 100 feet. Maximum noise levels generated by passages of medium duty delivery trucks generally range from 55 to 65 dB at a distance of 100 feet, depending on whether or not the driver is accelerating. In light of these levels, a single heavy truck pass-by on a loading dock access route could result in adverse public reaction to noise levels and could exceed the General Plan criteria.

The potential for adverse noise impacts associated with loading dock usage could be reduced by restricting heavy truck arrivals or departures during the nighttime hours, by requiring that heavy truck drivers turn off their engines while parked at the loading dock, and by requiring solid noise barriers along the side of the loading docks. It should be noted, however, that such measures may not be sufficient to ensure compliance with the applicable Noise Element standards. Due to the potential for adverse pubic reaction to new loading docks in close proximity to existing

residential uses, the noise effects associated with proposals for new loading docks are ***potentially significant*** and should be carefully evaluated.

Schools/Playgrounds/Day Care Centers. Children playing on school playgrounds, at neighborhood parks and in day care centers are often considered significant noise sources which could adversely affect adjacent noise-sensitive land uses. Typical noise levels associated with groups of approximately 50 children playing at a distance of 50 feet generally range from 55 to 60 dB L_{eq}, with maximum noise levels ranging from 70 to 75 dB.

Given the proximity of most schools, parks and day care centers to residential uses, the potential for exceeding Noise Element standards exists, depending on the orientation and proximity of the play areas to those nearest residences, the number of children using the play areas at a given time, and the types of activities the children are engaged in.

Practical noise mitigation measures could be utilized to reduce the potential for adverse noise impacts associated with children playing at these types of uses. Such measures could include requiring minimum setbacks between play areas and residential property lines, requiring noise barriers at the perimeter of the play areas, and by limiting the number of children using the play areas at a given time. Nonetheless, because sounds consisting of speech have been shown to be more annoying than broad-band noise, and because children often take great pride in being loud, the potential for annoyance associated with these uses is ***potentially significant*** and cannot practically be eliminated, except through proper separation of land uses, as provided by the FDCP and the General Plan Noise Element.

Mitigation Measures

Implementation of one or more of the following mitigation measures listed in Mitigation Measure 3.10-1 a through f above on a project-by-project basis should reduce impacts to a ***less than significant level.***

Discussion/Conclusion with Incorporation of the Forest Ranch Concept Plan: Maintenance of fairways and greens on a golf course generally occur throughout the early morning and daytime hours. This type of activity is inherent to golf courses. The noise levels could potentially be annoying to future residents adjacent to the golf course. Therefore, this impact is considered ***potentially significant***.

Noise generated by the 100-space recreational vehicle park will be primarily associated with the arrival and departure of vehicles and the use of generators, in the absence of electrical outlets. Therefore, this impact is ***potentially significant***.

Noise generated by the Forest Ranch Concept Plan wastewater treatment plant may result in noise levels which exceed acceptable standards at nearby residential uses. If electric pump motors are located inside of buildings which are designed to control noise, exterior noise levels at a distance of 100 feet are generally less than 40 dBA and would comply with State Office of Noise Control Model Community Noise Control Ordinance recommended 40 dBA hourly L_{eq}, nighttime exterior noise level standard. If these types of pumping facilities are located closer

than 100 feet from the nearest residential property line, impacts are significant. Noise impacts from filtration systems and diesel-powered generators can be significant under certain circumstances. Therefore, this impact is ***potentially significant.***

Mitigation Measures

Implementation of the following measures will reduce golf course operations, recreational vehicle park and wastewater treatment plant associated noise impacts to a less than ***significant level***:

3.10-2a *All maintenance equipment shall be kept in good working order and fitted with mufflers. In addition, all future residents which purchase property adjacent to the proposed golf course shall sign a disclosure which fully identifies that noise levels associated with golf course maintenance will occur. The golf course operator shall schedule maintenance of those areas abutting residences in a sensitive manner.*

3.10-2b *To reduce adverse public reaction to nighttime recreational vehicle park generator noise, generators shall not be allowed to operate between the hours of 9:00 p.m. and 7:00 a.m. In addition, if the recreational vehicle park is located within 500 feet of any existing or proposed residential uses, a detailed acoustical analysis of noise impacts shall be conducted when a detailed site plan for the RV park is available, and additional mitigation measures shall be implemented in accordance with the recommendations of the acoustical analysis.*

3.10-2c *Wastewater treatment plant pumping equipment which may operate during the nighttime hours shall not exceed an hourly average noise level of 40 dBA Leq at the project property line or at adjacent residential property lines. Routine testing of emergency generator(s) shall be conducted during daytime periods. Emergency generators shall not exceed an hourly average noise level of 50 dBA Leq at the project property line or at adjacent residential property lines.*

Impact 3.10-3 Interior noise impacts for all sources within the FDCP area, including the Forest Ranch Concept Plan area.

Discussion/Conclusion: Standard residential construction (wood siding, STC-26 windows, door weather stripping, exterior wall insulation, composition plywood roof), results in an exterior to interior noise reduction between 20 dB and 25 dB with windows closed, and approximately 15 dB with windows open. Generally, exterior building facades which are exposed to noise levels exceeding 65 dB L_{dn} require either a detailed analysis of interior noise levels when building plans are available, or additional noise control measures can be incorporated into the project design. Living spaces within the first floors which receive adequate shielding from noise barriers to reduce overall noise levels to less than 65 dB L_{dn} do not require further mitigation or analysis. Therefore, first or second floor facades which are exposed to exterior noise levels in excess of 65 dB L_{dn} could exceed the interior noise level criteria, a ***potentially significant*** impact.

Mitigation Measure

Implementation of one or more of the Mitigation Measures listed in Mitigation Measure 3.10-1 a through f above on a project-by-project basis should reduce impacts to a ***less than significant level.***

Impact 3.10-4 Noise from construction-related activities in the FDCP and Forest Ranch Concept Plan area may exceed adopted noise standards.

Discussion/Conclusion: Noise from construction activities in the FDCP area could potentially affect noise-sensitive land uses in the immediate area. Construction activities would be scattered throughout the Plan area (though more likely to occur in the community of Foresthill), would be temporary in nature, and would most likely occur only during the daytime hours. Construction noise impacts could result in annoyance or sleep disruption for nearby residents if nighttime operations were to occur, or if equipment is not properly muffled or maintained. This impact is ***potentially significant***.

The Forest Ranch Concept Plan may also have activities associated with construction that will result in elevated noise levels within the immediate area. Activities involved in construction would typically generate maximum noise levels ranging from 85 to 90 dB at a distance of 50 feet. Due the relatively small distance between the existing noise-sensitive uses and the uses proposed, construction will result in periods of significant ambient noise level increases. Because construction activities could result in periods of elevated noise levels at existing residences, this impact is ***potentially significant***.

Mitigation Measure

Implementation of the following measure will reduce construction-related noise impacts to the FDCP area and the Forest Ranch Concept Plan area to a ***less than significant level***:

3.10-4 *The hours of operation of noise-producing construction equipment shall be restricted to 7:00 a.m. to 7:00 p.m. Mondays through Fridays, and 9:00 a.m. to 6:00 p.m. on Saturdays. Noise from construction activities is prohibited on Sunday and Holidays. Effective mufflers shall be fitted to gas- and diesel-powered equipment to reduce noise levels as much as possible.*

3.10 NOISE

This section of the EIR examines the existing noise environment and potential noise-related impacts which may occur as part of the development of the Foresthill Divide Community Plan and Forest Ranch Concept Plan. The noise study was prepared by Bollard and Brennan, Inc., acoustical consultants.

3.10.1 INTRODUCTION

Noise is often defined simply as unwanted sound, and thus is a subjective reaction to characteristics of a physical phenomenon. Researchers for many years have grappled with the problem of translating objective measurements of sound into directly correlated measures of public reaction to noise. The descriptors of community noise in current use are the results of these efforts, and represent simplified, practical measurement tools to gauge community response. Figure 3.10-1 provides examples of maximum or continuous noise levels associated with common noise sources. For an explanation of terms used in this section, see Appendix E of this EIR.

A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which is the sound level corresponding to a steady-state A-weighted sound level in decibels (dB) containing the same total energy as a time-varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptors such as L_{dn} and CNEL, and shows very good correlation with community response to noise.

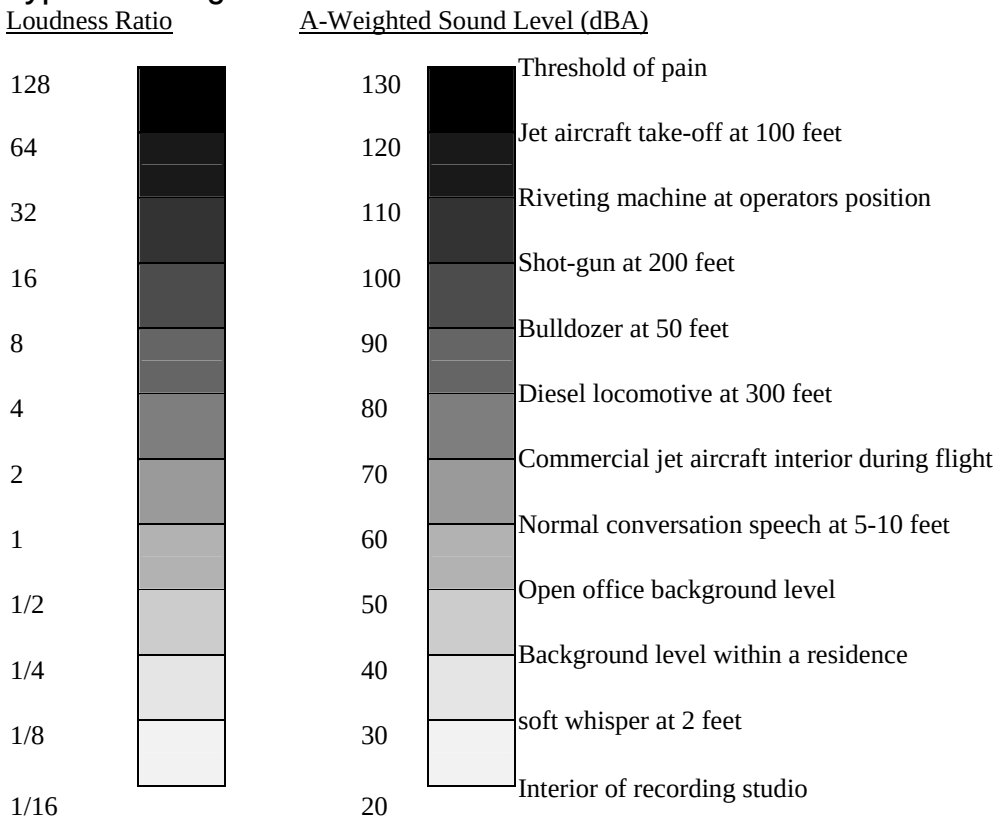
Two composite noise descriptors are in common use today: L_{dn} and CNEL. The L_{dn} (Day-Night Average Level) is based upon the average hourly L_{eq} over a 24-hour day, with a +10 decibel weighting applied to nighttime (10:00 p.m. to 7:00 a.m.) L_{eq} values. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were subjectively twice as loud as daytime exposures. The CNEL (Community Noise Equivalent Level), like L_{dn}, is based upon the weighted average hourly L_{eq} over a 24-hour day, except that an additional +4.77 decibel penalty is applied to evening (7:00 p.m. to 10:00 p.m.) hourly L_{eq} values. Measured L_{dn} and CNEL values are generally within 1 dB of one another. The CNEL was developed for the California Airport Noise Regulations, and is normally applied to airport/aircraft noise assessment. The L_{dn} descriptor is a simplification of the CNEL concept, but the two will usually agree, for a given situation, within 1 dB. Like the L_{eq}, these descriptors are also averages and tend to disguise short-term variations in the noise environment. Because they presume increased evening or nighttime sensitivity, these descriptors are best applied as criteria for land uses where nighttime noise exposures are critical to the acceptability of the noise environment, such as residential developments.

The State Office of Planning and Research Noise Element Guidelines require that major noise sources be identified and quantified by preparing generalized noise contours for current and projected conditions. Significant noise sources include traffic on major roadways and highways, and representative industrial activities and fixed noise sources.

Noise modeling techniques and noise measurements were used to develop generalized L_{dn}/CNEL or L_{eq} noise contours for the major roadways and fixed noise sources in the Foresthill Divide Community Plan area for existing conditions.

Figure 3.10-1

Typical A-Weighted Sound Levels of Common Noise Sources



Source: Bollard & Brennan, Inc., 2000.

Modeling methods have been developed for a number of environmental noise sources including roadways, railroad line operations, railroad yard operations and industrial plants. Such methods produce reliable results as long as data inputs and assumptions are valid. The modeling methods used in this EIR closely follow recommendations made by the State Office of Noise Control, and were supplemented where appropriate by field-measured noise level data to account for local conditions. The noise exposure contours are based upon annual average conditions. Because local topography, vegetation or intervening structures may significantly affect noise exposure at a particular location, the noise contours should not be considered site-specific.

3.10.2 SETTING

NOISE LEVEL STANDARDS

The FDCP does not include goals and policies related to noise; the goals and policies of the Placer County General Plan apply within the Plan area. The Placer County General Plan Noise

Element policies pertaining to noise are designed to protect county residents from the harmful and annoying effects of exposure to excessive noise. Policies applicable to the proposed FDCP are presented below:

Goal 9.A: To protect County residents from the harmful and annoying effects of exposure to excessive noise.

9.A.1 The County shall not allow development of new noise-sensitive uses where the noise level due to non-transportation noise sources will exceed the noise level standards of Table [3.10-1] as measured immediately within the property line of the new development, unless effective noise mitigation measures have been incorporated into the development design to achieve the standards specified in Table 3.10-1 (Table 9-1 of the Placer County General Plan Noise Element).

9.A.2 The County shall require that noise created by new non-transportation noise sources be mitigated so as not to exceed the noise level standards of Table 3.10-1 as measured immediately within the property line of lands designated for noise- sensitive uses.

9.A.4 Impulsive noise produced by blasting should not be subject to the criteria listed in Table 3.10-1. Single event impulsive noise levels produced by gunshots or blasting shall not exceed a peak linear overpressure of 122 dB, or a C-weighted Sound Exposure Level (SEL) of 98 dBC. The cumulative noise level from impulsive sounds such as gunshots and blasting shall not exceed 60 dB LCDN or CNEL-C on any given day. These standards shall be applied at the property line of a receiving land use.

9.A.6 The feasibility of proposed projects with respect to existing and future transportation noise levels shall be evaluated by comparison to Table 3.10-2 (Table 9-3 of the Placer County General Plan Noise Element).

9.A.6 Noise created by new transportation noise sources, including roadway improvement projects, shall be mitigated so as not to exceed the levels specified in Table 3.10-2 at the outdoor activity areas or interior spaces of existing noise-sensitive land uses.

9.A.11 The County shall implement one or more of the following mitigation measures where existing noise levels significantly impact existing noise-sensitive land uses, or where the cumulative increase in noise levels resulting from new development significantly impacts noise-sensitive land uses:

a. Rerouting traffic onto streets that have available traffic capacity and that do not adjoin noise-sensitive land uses;
b. Lowering speed limits, if feasible and practical;
c. Programs to pay for noise mitigation such as low cost loans to owners of noise-impacted property or establishment of developer fees;
d. Acoustical treatment of buildings; or
e. Construction of noise barriers.

9.A.12 Where noise mitigation measures are required to achieve the standards of Tables 3.10-1 and 3.10-2, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered as a means of achieving the noise standards only after all other practical design-related noise mitigation measures have been incorporated into the Plan area.

Table 3.10-1 Allowable L_{dn} Noise Levels Within Specified Zone Districts Applicable to New Projects Affected by or Including Non-Transportation Noise Sources

Zone District of Receptor	Property Line of Receiving Use	Interior Spaces
Residential Adjacent to Industrial	60 dBA	45 dBA
Other Residential	50 dBA	45 dBA
Office/Professional	70 dBA	45 dBA
Neighborhood Commercial	70dBA	45 dBA

Notes for Table 3.10-1:

1. Except where noted otherwise, noise exposures will be those which occur at the property line of the receiving use.
2. Interior spaces are defined as any locations where some degree of noise-sensitivity exists. Examples include all habitable rooms of residences, and areas where communication and speech intelligibility are essential, such as classrooms and offices.

Source: 1994 Placer County General Plan.

Table 3.10-2 Maximum Allowable Noise Exposure (Ldn) Transportation Noise Sources

Land Use	Outdoor Activity Areas (a)	Interior Spaces	
	L_{dn} / CNEL,dB	L_{dn} / CNEL, dB	L_{eq}, dB (b)
Residential	60 (c)	45	---
Transient Lodging	60 (c)	45	---
Hospitals, Nursing Homes	60 (c)	45	---
Theaters, Auditoriums	---	---	---
Churches, Meeting Halls	60 (c)	---	35
Office Buildings	---	---	40
Schools, Libraries, Museums	---	---	45

(a) 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.

(b) As determined for a typical worst-case hour during periods of use.

(c) 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 dB 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: 1994 Placer County General Plan

Foresthill General Plan Goals and Policies

Noise

Goal: To protect the health, safety, and welfare of the Foresthill area residents by providing a livable environment free from excessive noise.

1. Enforce acceptable noise exposure levels for various land use categories adopted in the Placer County Noise Element.

2. Avoid the interface of noise-producing and noise-sensitive land uses.

3. Require implementation of noise abatement techniques on new projects where warranted.

4. Locate noise sensitive land uses within areas of acceptable community noise equivalent levels.

AMBIENT NOISE ENVIRONMENT

Existing Roadway Noise – Foresthill Divide Community Plan

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD_77_108) was used to develop L_{dn} contours for all major roadways. The FHWA Model is the analytical method presently favored for traffic noise prediction by most state and local agencies, including Caltrans. The current version of the model is based upon the CALVENO noise emission factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver and the acoustical characteristics of the site. The FHWA Model predicts hourly L_{eq} values for free-flowing traffic conditions, and is generally considered to be accurate within 1.5 dB. To predict L_{dn} values, it is necessary to determine the hourly distribution of traffic for a typical 24-hour day and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Traffic data representing annual average traffic volumes for existing conditions (Year 2006) were obtained from MRO Transportation Engineers. Using the FHWA methodology, traffic noise levels as defined by L_{dn} were calculated for existing traffic volumes. Appendix F contains the Highway Traffic Noise Prediction Model Input Data. Distances from the centerlines of selected roadways to the existing 55 dB, 60 dB, and 65 dB L_{dn} contours are summarized in Table 3.10-3.

In some cases, the actual distances to noise level contours may vary from the distances predicted by the FHWA model. Factors such as roadway curvature, roadway grade, shielding from local topography or structures, elevated roadways, or elevated receivers may affect actual sound propagation. Therefore, the distances reported in Table 3.10-3 are estimates of noise exposure along roadways in the Foresthill Divide Community Plan area.

The effects of factors such as roadway curvature, grade, etc. can be determined from site-specific traffic noise measurements. The noise measurement results can be compared to the FHWA model results by entering the observed traffic volumes, speed and distance as inputs to the FHWA model. The differences between the measured and predicted noise levels can be used to adjust the FHWA model and more precisely determine the locations of the traffic noise contours.

Table 3.10-3 Existing (2006) Noise Contour Data Distance (Feet) from Center of Roadway to Ldn Contours

Segment	Description	Existing		
		55 dB	60 dB	65 dB
Yankee Jim's Road				
1	North of Race Track Road	15	7	3
Foresthill Road				

Segment	Description	Existing		
		55 dB	60 dB	65 dB
2	East of Foresthill Bridge	371	172	80
3	South of Lutheran Church	234	109	50
4	South of Michigan Bluff Road	66	31	14
5	North of Michigan Bluff Road	47	22	10
6	North of Happy Pines Road	221	103	48
Main Street				
7	East of Foresthill Road	26	12	6
McKeon-Ponderosa Way				
8	South of Foresthill Road	62	29	13
Michigan Bluff Road				
9	East of Foresthill Road	16	8	3
Race Track Road				
10	North of Foresthill Road	44	20	10
Todd Valley Road				
11	Northeast of Foresthill Road	22	10	5
12	Southeast of Foresthill Road	91	42	20
Happy Pines Road				
13	East of Foresthill Road	56	26	12
Mosquito Ridge Road				
14	East of Foresthill Road	18	8	4
Spring Garden Road				
15	West of Foresthill Road	35	16	7

Source: Bollard & Brennan, Inc., 2002.

Truck traffic heading downhill can affect the noise environment, primarily maximum noise levels due to the use of jake brakes. However, based on the number of trucks which actually use jake brakes compared to overall traffic volumes and numbers of trucks, the computed 24-hour L_{dn} value will not change.

Table 3.10-4 has been prepared to serve as a guide when applying the traffic noise exposure contour information presented in this section to areas with varying topography. The table is used by adding the correction factor to the noise level predicted at a given distance. It should be noted that the adjustment factors presented in this table are intended to provide conservative (worst-case) results, and that complex situations should be evaluated by an acoustical consultant where the potential for significant noise impact exists.

Table 3.10-4 Traffic Noise Adjustments for Various Topographic Conditions

Topographic Situation	Distance from Center of Roadway (Feet)		
	<200	200 - 400	>400
Hillside overlooks roadway	-0-	+1 dB	+3 dB
Roadway Elevated (>15')	-5 dB	-2 dB	-0-
Roadway in cut/below embankment	-5 dB	-5 dB	-5 dB
Dense vegetation (100 feet or more)	-5 dB	-5 dB	-5 dB

Source: Bollard & Brennan, Inc., 2002.

Existing Roadway Noise – Forest Ranch Concept Plan

Short-term noise monitoring was conducted at three sites on June 10th and 12th, 2002. Two continuous hourly noise monitoring sites were established on the Plan area to record day-night statistical noise level trends. The data collected included the L_{eq}, the maximum level during the measurement period (L_{max}) and other statistical descriptors. Noise monitoring sites, measured noise levels, and estimated L_{dn} values at each site are summarized in Table 3.10-5.

Table 3.10-5 Predicted Existing Traffic Noise Level Data

Segment	Description	Distances to Traffic Noise Contours (ft.)		
		55 dB	60 dB	65 dB
Foresthill Road				
1	East of Foresthill Bridge	264	123	57
2	West of Spring Garden Road	268	125	58
3	East of Happy Pines Drive	215	100	46
4	West of Owl Hill Court	228	106	49
5	West of Mosquito Ridge Road	213	99	46
6	West of Yankee Jim's Road	187	87	40
7	East of Yankee Jim's Road	119	55	26
8	West of Blackhawk Lane	89	41	19
9	West of Michigan Bluff Road	64	30	14
10	East of Michigan Bluff Road	46	21	10
McKeon-Ponderosa Way				
11	South of Foresthill Road	98	45	21
Spring Garden Road				
12	North of Foresthill Road	55	25	12
Happy Pines Drive				
13	South of Foresthill Road	89	41	19
Todd Valley Road (West)				
14	South of Foresthill Road	144	67	31
Todd Valley Road (East)				
15	South of Foresthill Road	35	16	8
Mosquito Ridge Road				
16	South of Foresthill Road	28	13	6
Yankee Jim's Road				
17	North of Race Track Street	24	11	5
Main Street				
18	South of Foresthill Road	58	27	13
Michigan Bluff Road				
19	South of Foresthill Road	26	12	6
Race Track Street				
20	North of Foresthill Road	70	32	15

Aircraft

The Plan area is not served by a public/commercial airport. The closest airports to Foresthill are the Georgetown Airport and Auburn Municipal Airport.

Fixed Noise Sources

The production of noise is a result of many industrial processes, even when the best available noise control technology is applied. Noise exposures within industrial facilities are controlled by federal and State employee health and safety regulations (OSHA and Cal-OSHA), but exterior noise levels may exceed locally acceptable standards. Commercial, recreational and public service facility activities can also produce noise which affects adjacent sensitive land uses. These noise sources can be continuous and may contain tonal components which may be annoying to individuals who live in the nearby vicinity. In addition, noise generation from fixed noise sources may vary based upon climatic conditions, time of day and existing ambient noise levels.

From a land use planning perspective, fixed-source noise control issues focus upon two goals: to prevent the introduction of new noise-producing uses in noise-sensitive areas, and to prevent encroachment of noise sensitive uses upon existing noise-producing facilities. The first goal can be achieved by applying noise level performance standards to proposed new noise-producing uses. The second goal can be met by requiring that new noise-sensitive uses in near proximity to noise-producing facilities include mitigation measures to ensure compliance with noise performance standards.

The types of uses which may typically be characterized as stationary or fixed noise sources include but are not limited to: industrial facilities including lumber mills, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, and athletic fields.

Field observations within the Plan area identified three potential fixed noise sources. These included the Auburn State Recreation Area Off-Highway Vehicle Park, the Transfer Station which is located off of Todd Valley Road, and the shooting range which is located off of Yankee Jim's Road. A brief description has been provided for each of the three identified noise sources.

Auburn State Recreation Area Off-Highway Vehicle (OHV) Park. The Auburn State Recreation Area OHV Park is located in the southeast portion of the Plan area, and is generally in the area of Lake Clementine Road and the Auburn Foresthill Road. A detailed analysis of noise impacts was prepared for this site in 1996 by Brown-Buntin Associates, Inc. (*Environmental Noise Analysis, Mammoth Bar OHV Park Expansion*, BBA, 12-11-96).

In general, the OHV Park is located in a remote area bounded by the North and Middle Forks of the American River. Primarily motorcycles in the range of 50 cc to 500 cc in size operate in this area. Maximum noise levels due to these types of motorcycles can range between 70 dB and 90 dB at a distance of 100 feet, depending on the motorcycle, size of the engine, modifications which may have been made to the bike, and the number of vehicles operating in a given area at the same time.

Transfer Station. The Transfer Station is located south of Foresthill near Todd Valley Road, at the end of Patent Road. Transfer stations generally contain tipping areas for garbage, material recovery facilities (MRF) and recycling areas. Noise levels attributed to transfer stations are primarily due to truck traffic to and from the site. Other equipment such as fork lifts and front-end loaders also operate on these sites. In some cases portable tub grinders which are used for chipping wood waste are also located on these sites. Generally, if residences are located within 300 feet of these facilities, noise levels can exceed locally acceptable noise level criteria.

Shooting Range. A local shooting range is located on Yankee Jim's Road, north of Spring Garden Road. No individuals were at the shooting range during the field investigations. Noise generated by firearms usage consists of bursts of high-energy impulsive sound. This differs from sound generated by common community noise sources. Noise level data collected for other small arms firing ranges indicate that maximum A-weighted noise levels range between 89 dB for a 9mm handgun to 97 dB for an AR-15 rifle at a distance of 100 feet. Maximum noise levels due to multiple handguns and rifles firing simultaneously have been measured to be approximately 102 dB at a distance of 100 feet.

Community Noise Survey – Foresthill Divide Community Plan

A community noise survey was conducted to document noise exposure in regions of the Plan area which are away from the major roadways.

Short-term noise monitoring was conducted at four sites on June 8 and 9, 2000. Each site was monitored during the day and night so that estimates of L_{dn} could be prepared. Two continuous hourly noise monitoring sites were established in the Plan area to record day-night statistical noise level trends. The data collected included the L_{eq}, the maximum level during the measurement period (L_{max}), and other statistical descriptors. Noise monitoring sites, measured noise levels, and estimated L_{dn} values at each site are summarized in Table 3.10-6. Figure 3.10-2 shows the noise measurement locations.

Community noise monitoring systems were calibrated with acoustical calibrators in the field prior to use. The systems comply with all pertinent requirements of the American National Standards Institute (ANSI) for Type I sound level meters.

The community noise survey results indicate that typical noise levels in noise sensitive areas of the Plan area are in the range of 41.3 dB to 46.6 dB L_{dn}. Traffic on local roadways and neighborhood activities are the controlling factors for background noise levels in the majority of the Plan area. In general, the Plan area could be characterized as very quiet to relatively quiet.

The L_{eq} values in Table 3.10-6 represent the average measured noise levels during the sample periods. The L_{eq} values were the basis of the estimated L_{dn} values. The L_{max} values show the maximum noise levels observed during the samples. The L_{50} and L_{90} values represent the noise levels exceeded 50 percent and 90 percent of the time during the sample period. The continuous monitoring data are shown graphically in Figure 3.10-3. The graphs show that ambient noise levels generally reach a minimum at the hour of 2:00 a.m., increasing during the daytime hours as a function of increased traffic and other human activities.

Table 3.10-6 Summary of Measured Noise Levels and Estimated Day/Night Average Levels (Ldn)

Site	Location	Time Period	Sound Level, dB				
			L_{eq}	L_{50}	L_{90}	L_{max}	Estimated L_{dn}
1*	Todd Valley Road Church of Latter Day Saints	6/8-9/2000 Daytime (7am-10pm) Nighttime(10pm-7am)	 41.2 36.9	 39 33	 33 30	 54.8 50.8	44.2
2*	Foresthill 625 Harrison Street	6/8-9/2000 Daytime (7am-10pm) Nighttime(10pm-7am)	 44.2 32.0	 38 27	 34 25	 63.2 51.5	43.5
3	Yankee Jim's Road @ Spring Garden Road	6/8/2000 (Ld) 6/9/2000 (Ln)	36.2 34.1	36 33	33 32	44.7 45.0	43.5
4	Todd Valley Road @ Patent Road	6/8/2000 (Ld) 6/9/2000 (Ln)	38.1 36.6	38 35	36 33	46.4 44.6	43.3
5	Foresthill @Church Street Cemetery	6/8/2000 (Ld) 6/9/2000 (Ln)	41.2 40.0	39 37	34 32	51.0 49.4	46.6
6	Baker Ranch Sequoia Road	6/8/2000 (Ld) 6/9/2000 (Ln)	37.5 34.2	37 34	31 31	47.2 45.7	41.3

* = Continuous Monitoring Site
Ld = Measured noise level during daytime hours (7:00 am - 10:00 pm)
Ln = Measured noise level during nighttime hours (10:00 pm - 7:00 am)
Source: Bollard & Brennan, 2000

Community Noise Survey – Forest Ranch Concept Plan

A community noise survey was conducted to document noise exposure in different areas of the Forest Ranch Concept Plan area. Community noise monitoring systems were calibrated with acoustical calibrators in the field prior to use. The systems comply with all pertinent requirements of the American National Standards Institute (ANSI) for Type I sound level meters.

The community noise survey results indicate that typical background noise levels in the Plan area vicinity are in the range of approximately 39 dB L_{dn} to 57 dB L_{dn}. Traffic on local roadways is the primary controlling factor for background noise in this area. In general, the Forest Ranch project area could be characterized as very quiet to relatively quiet.

The L_{eq} values in Table 3.10-7 represent the average measured noise levels during the sample periods. The L_{eq} values were the basis of the estimated L_{dn} values. The L_{max} values show the maximum noise levels observed during the sample periods. The L50 and L90 values represent the noise levels exceeded 50 percent and 90 percent of the time during the sample period.

Table 3.10-7 Summary of Measured Noise Levels and Day/Night Average Levels (Ldn)

Site	Location	Time Period	Sound Level, dB				
			Daytime Leq	Daytime L50	Daytime L90	Daytime L_{max}	Calculated or Estimated Ldn
1*	Southwest of Blackhawk Ln. and Foresthill Rd Intersection	6/10-12/2002 Daytime (7am-10pm) Nighttime (10pm-7am)	54	40	32	73	57.1
2*	North of Yankee Jim's Road	6/10-9/2000 Daytime (7am-10pm) Nighttime (10pm-7am)	48	34	30	71	49.3
A	South of Yankee Jim's Road	6/10/2002 6/12/2002 6/12/2002	44 41 40	43 36 35	41 32 32	48 53 54	44
B	North of Blackhawk Lane	6/10/2002 6/12/2002 6/12/2002	40 50 52	39 40 43	38 36 38	46 70 72	50
C	North of Yankee Jim's Road	6/12/2002 6/12/2002	34 38	33 32	32 30	42 52	39

* Continuous Monitoring Site

Note: The L_{dn} at the short term monitoring locations are estimations based upon daytime measurements alone.

3.10.3 IMPACT EVALUATION CRITERIA

Appendix G (Environmental Checklist Form) of the State CEQA Guidelines indicates that significant noise impacts occur when a project exposes people to noise levels in excess of standards established in local noise ordinances or general plan noise elements, or causes a substantial permanent or temporary increase in noise levels above levels existing without the project. Following is a discussion of local noise level criteria; the concept of substantial noise increases; and the standard of significance for construction noise, existing industrial/commercial noise that may affect the Foresthill Divide Community Plan area, on-site traffic noise, offsite traffic noise and aircraft noise.

Local Noise Level Criteria

For transportation-related noise sources the Placer County stand of significance is 60 db L_{dn}. The 60 dB L_{dn} applied by Placer County is also the standard of significance for non-transportation-related noise sources.

Substantial Noise Increases

Transportation-Related Noise Sources

CEQA does not define the word "substantial" as used in the Guidelines. Some guidance to the concept of substantial noise increases was provided in 1992 by the Federal Interagency

Committee on Noise (FICON), which addressed changes in noise levels resulting from aircraft operations. Their recommendations are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of the L_{dn} or CNEL. Annoyance is a summary measure of the general adverse reaction of people to noise that generated speech interference, sleep disturbance or interference with the desire for a tranquil environment.

Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis for all transportation noise sources that are described in terms of cumulative noise exposure descriptors such as the L_{dn} or CNEL. These descriptors define noise exposure in terms of average noise exposure during a 24-hour period, with penalties added to noise that occurs during the nighttime or evening. Table 3.10-8 summarizes the FICON recommendations.

Table 3.10-8 Substantial Increases for Transportation Noise Exposure

Ambient Noise Level Without Project (L_{dn} or CNEL)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+5 dB or more
60-65 dB	+3 dB or more
>65 dB	+2 dB or more

Sources: FICON, as applied by Brown-Buntin Associates, Inc.

Non-Transportation-Related Noise Sources

For these types of noise sources, it is common to assume that a minimum 3 dB increase in noise levels represents a substantial increase in ambient noise levels. This is based on laboratory tests that indicate a 3 dB increase is the minimum change perceptible to most people.

Construction Noise

Construction noise compatibility criteria are not specifically addressed in the Placer County Noise Element.

Existing Industrial/Commercial Noise

The 60 dB L_{dn} exterior and 45 dB L_{dn} interior criteria apply to existing industrial/commercial facilities that may affect residential uses in the proposed Plan area.

Aircraft Noise

The 60 dB L_{dn} exterior and 45 dB L_{dn} interior criteria apply to aircraft noise that may affect residential uses in the proposed Plan area.

On-Site Traffic Noise

The 60 dB L_{dn} exterior and 45 dB L_{dn} interior criteria apply to new noise-sensitive land uses in the proposed Plan area.

Offsite Traffic Noise

The 60 dB L_{dn} exterior and 45 dB L_{dn} interior criteria apply to existing noise-sensitive uses outside the Plan area that may be affected by increased traffic attributable to the FDCP. Also, substantial increases in traffic noise levels attributable to the Plan are significant impacts.

3.10.4 IMPACTS AND MITIGATION MEASURES

Impact 3.10-1 Noise impacts due to increased roadway traffic in the FDCP area.

Discussion/Conclusion: To describe traffic noise levels due to and upon the FDCP area, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict traffic noise levels in terms of L_{dn}, it is necessary to adjust the input volume to account for the day/night distribution of traffic.

Traffic volumes for future conditions and scenarios were provided by kdAnderson Transportation Engineers. A complete listing of the FHWA Model input data for future conditions is provided in Appendix F.

Table 3.10-9 shows the predicted traffic noise levels. The table is provided in terms of L_{dn} at a standard distance of 100 feet from the centerlines of the Plan area. Placement of noise-sensitive uses within the distances shown on Table 3.10-9 would result in a ***potentially significant*** impact.

Table 3.10-9 Future Traffic Noise Levels Distance (Feet) from Center of Roadway to L_{dn} Contours

Segment	Description	Ldn Contour		
		55 dB	60 dB	65 dB
Yankee Jim's Road				
1	North of Race Track Road	56	26	12
Foresthill Road				
2	East of Foresthill Bridge	532	247	115
3	South of Lutheran Church	362	168	78
4	West of Race Track Road	376	174	81
5	At Yankee Jim's Road	335	156	72
Main Street				
6	East of Foresthill Road	30	14	7

Segment	Description	Ldn Contour		
		55 dB	60 dB	65 dB
McKeon-Ponderosa Way				
7	South of Foresthill Road	67	31	15
Michigan Bluff Road				
8	East of Foresthill Road	26	12	6
Race Track Road				
9	North of Foresthill Road	63	29	14
Todd Valley Road				
10	At Foresthill Road West	101	47	22
11	At Foresthill Road East	30	14	6
12	Todd Valley Road Extension (Proposed)	44	20	10
Happy Pines Road				
13	East of Foresthill Road	61	28	13
Mosquito Ridge Road				
14	East of Foresthill Road	63	29	14
Spring Garden Road				
15	West of Foresthill Road	49	23	11
Power Line Road (Proposed)				
16	Proposed New Road	13	6	3

Distances to roadway noise contours are from the roadway centerline.
Traffic Data Provided by kdAnderson Transportation Engineers.
Source: Bollard and Brennan, 2002.

Mitigation Measures

The Noise Element of the Placer County General Plan requires preparation of an acoustical analysis under certain circumstances, including when proposed non-residential land uses are likely to produce noise levels that exceed adopted standards at existing or planned noise sensitive uses, or where noise-sensitive land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding adopted standards. The project-specific acoustical analysis will recommend appropriate mitigation to achieve compliance with the policies and standards of the Noise Element, giving preference to proper site planning and design over mitigation measures which require construction of noise barriers or structural modifications to buildings which contain noise-sensitive land uses. Implementation of one or more of the following measures on a project-by-project basis should reduce impacts to a ***less than significant level:***

3.10-1a *Use of Setbacks. Noise exposure may be reduced by increasing the distance between the noise source and receiving use. Setback areas can take the form of open space, frontage roads, recreational areas, storage yards, etc. The available noise attenuation from this technique is limited by the characteristics of the noise source, but is generally about 4 to 6 dB per doubling of distance from the source.*

3.10-1b *Use of Barriers. Shielding by barriers can be obtained by placing walls, berms or other structures, such as buildings, between the noise source and the receiver. The effectiveness of a barrier depends upon blocking line-of-sight between the source and receiver, and is improved with increasing the distance the sound must travel to pass*

over the barrier as compared to a straight line from source to receiver. The difference between the distance over a barrier and a straight line between source and receiver is called the "path length difference," and is the basis for calculating barrier noise reduction.

Barrier effectiveness depends upon the relative heights of the source, barrier and receiver. In general, barriers are most effective when placed close to either the receiver or the source. An intermediate barrier location yields a smaller path-length-difference for a given increase in barrier height than does a location closer to either source or receiver.

For maximum effectiveness, barriers must be continuous and relatively airtight along their length and height. To ensure that sound transmission through the barrier is insignificant, barrier mass should be about 4 lbs./square foot, although a lesser mass may be acceptable if the barrier material provides sufficient transmission loss. Satisfaction of the above criteria requires substantial and well-fitted barrier materials, placed to intercept line of sight to all significant noise sources. Earth, in the form of berms or the face of a depressed area, is also an effective barrier material.

Transparent noise barriers may be employed, and have the advantage of being aesthetically pleasing in some environments. Transparent barrier materials such as laminated glass and polycarbonate provide adequate transmission loss for most highway noise control applications. Transparent barrier materials may be flammable, and may be easily abraded. Some materials may lose transparency upon extended exposure to sunlight. Maintaining aesthetic values requires that transparent barriers be washed on a regular basis. These properties of transparent barrier materials require that the feasibility of their use be considered on a case-by-case basis.

The attenuation provided by a barrier depends upon the frequency content of the source. Generally, higher frequencies are attenuated (reduced) more readily than lower frequencies. This results because a given barrier height is relatively large compared to the shorter wavelengths of high frequency sounds, while relatively small compared to the longer wavelengths of the low frequency sounds. The effective center frequency for traffic noise is usually considered to be 550 Hz. Railroad engines, cars and horns emit noise with differing frequency content, so the effectiveness of a barrier will vary for each of these sources. Frequency analyses are necessary to properly calculate barrier effectiveness for noise from sources other than highway traffic.

There are practical limits to the noise reduction provided by barriers. For highway traffic noise, a 5 to 10 dB noise reduction may often be reasonably attained. A 15 dB noise reduction is sometimes possible, but a 20 dB noise reduction is extremely difficult to achieve. Barriers usually are provided in the form of walls, berms, or berm/wall combinations. The use of an earth berm in lieu of a solid wall may provide

up to 3 dB additional attenuation over that attained by a solid wall alone, due to the absorption provided by the earth. Berm/wall combinations offer slightly better acoustical performance than solid walls, and are often preferred for aesthetic reasons.

3.10-1c *Site Design. Buildings can be placed on a project site to shield other structures or areas, to remove them from noise-impacted areas, and to prevent an increase in noise level caused by reflections. The use of one building to shield another can significantly reduce overall project noise control costs, particularly if the shielding structure is insensitive to noise. As an example, carports or garages can be used to form or complement a barrier shielding adjacent dwellings or an outdoor activity area. Similarly, one residential unit can be placed to shield another so that noise reduction measures are needed for only the building closest to the noise source. Placement of outdoor activity areas within the shielded portion of a building complex, such as a central courtyard, can be an effective method of providing a quiet retreat in an otherwise noisy environment. Patios or balconies should be placed on the side of a building opposite the noise source, and "wing walls" can be added to buildings or patios to help shield sensitive uses.*

3.10-1d *Building Design. When structures have been located to provide maximum noise reduction by barriers or site design, noise reduction measures may still be required to achieve an acceptable interior noise environment. The cost of such measures may be reduced by placement of interior dwelling unit features. For example, bedrooms, living rooms, family rooms and other noise-sensitive portions of a dwelling can be located on the side of the unit farthest from the noise source.*

Bathrooms, closets, stairwells and food preparation areas are relatively insensitive to exterior noise sources, and can be placed on the noisy side of a unit. When such techniques are employed, noise reduction requirements for the building facade can be significantly reduced, although the architect must take care to isolate the noise impacted areas by the use of partitions or doors.

In some cases, external building facades can influence reflected noise levels affecting adjacent buildings. This is primarily a problem where high-rise buildings are proposed, and the effect is most evident in urban areas, where an "urban canyon" may be created. Bell-shaped or irregular building facades and attention to the orientation of the building can reduce this effect.

3.10-1e *Noise Reduction by Building Facades. When interior noise levels are of concern in a noisy environment, noise reduction may be obtained through acoustical design of building facades. Standard residential construction practices provide 10-15 dB noise reduction for building facades with open windows, and approximately 20 dB to 25 dB noise reduction when windows are closed. Thus a 20 dB exterior-to-interior noise reduction can be obtained by the requirement that building design include adequate ventilation systems, allowing windows on a noise-impacted facade to remain closed under any weather condition.*

Where greater noise reduction is required, acoustical treatment of the building facade is necessary. Reduction of relative window area is the most effective control technique, followed by providing acoustical glazing (thicker glass or increased air space between panes) in low air infiltration rate frames, use of fixed (non-movable) acoustical glazing or the elimination of windows. Noise transmitted through walls can be reduced by increasing wall mass (using stucco or brick in lieu of wood siding), isolating wall members by the use of double- or staggered- stud walls, or mounting interior walls on resilient channels. Noise control for exterior doorways is provided by reducing door area, using solid-core doors, and by acoustically sealing door perimeters with suitable gaskets. Roof treatments may include the use of plywood sheathing under roofing materials.

Whichever noise control techniques are employed, it is essential that attention be given to installation of weather stripping and caulking of joints. Openings for attic or sub-floor ventilation may also require acoustical treatment; tight-fitting fireplace dampers and glass doors may be needed in aircraft noise-impacted areas.

Design of acoustical treatment for building facades should be based upon analysis of the level and frequency content of the noise source. The transmission loss of each building component should be defined, and the composite noise reduction for the complete facade calculated, accounting for absorption in the receiving room. A one-third octave band analysis is a definitive method of calculating the A-weighted noise reduction of a facade.

3.10-1f *<u>Use of Vegetation.</u> Trees and other vegetation are often thought to provide significant noise attenuation. However, approximately 100 feet of dense foliage (so that no visual path extends through the foliage) is required to achieve a 5 dB attenuation of traffic noise. Thus the use of vegetation as a noise barrier should not be considered a practical method of noise control unless large tracts of dense foliage are part of the existing landscape.*

Vegetation can be used to acoustically "soften" intervening ground between a noise source and receiver, increasing ground absorption of sound and thus increasing the attenuation of sound with distance. Planting of trees and shrubs is also of aesthetic and psychological value, and may reduce adverse public reaction to a noise source by removing the source from view, even though noise levels will be largely unaffected. It should be noted, however, that trees planted on the top of a noise control berm can actually slightly degrade the acoustical performance of the barrier. This effect can occur when high frequency sounds are diffracted (bent) by foliage and directed downward over a barrier.

In summary, the effects of vegetation upon noise transmission are minor, and are primarily limited to increased absorption of high frequency sounds and to reducing adverse public reaction to the noise by providing aesthetic benefits.

Discussion/Conclusion with Incorporation of the Forest Ranch Concept Plan: To describe the Existing + Project traffic noise levels due to and upon the Concept Plan area, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is based upon the Calveno reference noise factors for automobiles, medium trucks and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To predict traffic noise levels in terms of L_{dn}, it is necessary to adjust the input volume to account for the day/night distribution of traffic. Traffic volumes for the Existing + Project conditions were provided by MRO Transportation Engineers. Table 3.10-10 shows the predicted Existing + Project traffic noise levels.

Table 3.10-10 also shows the expected change in traffic noise levels due to the Concept Plan, when compared to the predicted existing traffic noise levels. Based upon Table 3.10-10, the changes in traffic noise levels ranged between 0 dB L_{dn} and 13 dB L_{dn}.

Where a significant increase in noise levels occurs, the increase has been highlighted in bold.

Tables 3.10-11 and 3.10-12 show the predicted Future and Future + Project traffic noise levels. Once again the FHWA model was used for predicting traffic noise levels. Table 3.10-12 also shows the expected increase in traffic noise levels due to the Concept Plan. Based upon Table 3.10-12, the future traffic associated with the Concept Plan will not contribute to a significant increase in traffic noise levels.

Table 3.10-10 Predicted Existing + Project Traffic Noise Level Data

Segment	Description	Ldn , dB @ 100'	Increase in Noise Levels, dB	Distance to Traffic Noise Contours (ft.)	
				60 dB	65 dB
Foresthill Road					
1	East of Foresthill Bridge	64	**+3**	194	90
2	West of Spring Garden Road	64	**+3**	197	91
3	East of Happy Pines Drive	64	**+4**	179	83
4	West of Owl Hill Court	64	**+3.5**	183	85
5	West of Mosquito Ridge Road	64	**+4**	177	82
6	West of Yankee Jim's Road	63	**+4**	169	79
7	East of Yankee Jim's Road	61	**+5**	117	54
8	West of Blackhawk Lane	55	+1	46	22
9	West of Michigan Bluff Road	53	+1	36	17
10	East of Michigan Bluff Road	52	+2.5	31	14
McKeon-Ponderosa Way					
11	South of Foresthill Road	55	0	45	21
Spring Garden Road					
12	North of Foresthill Road	51	0	26	12
Happy Pines Drive					
13	South of Foresthill Road	54	0	41	19
Todd Valley Road (West)					
14	South of Foresthill Road	57	0	66	31

Segment	Description	Ldn , dB @ 100'	Increase in Noise Levels, dB	Distance to Traffic Noise Contours (ft.)	
				60 dB	65 dB
Todd Valley Road (East)					
15	South of Foresthill Road	48	0	16	7
Mosquito Ridge Road					
16	South of Foresthill Road	47	+0.5	14	6
Yankee Jim's Road					
17	North of Race Track Street	59	**+13**	84	39
Main Street					
18	South of Foresthill Road	51	0	25	11
Michigan Bluff Road					
19	South of Foresthill Road	46	0	12	6
Race Track Street					
20	North of Foresthill Road	56	**+3**	53	25

Table 3.10-11 Predicted Future Traffic Noise Level Data

Segment	Description	Ldn, dB @ 100'	Distance to Traffic Noise Contours (ft.)	
			60 dB	65 dB
Foresthill Road				
1	East of Foresthill Bridge	64	176	82
2	West of Spring Garden Road	64	179	83
3	East of Happy Pines Drive	63	160	74
4	West of Owl Hill Court	63	163	76
5	West of Mosquito Ridge Road	63	169	79
6	West of Yankee Jim's Road	63	151	70
7	East of Yankee Jim's Road	61	118	55
8	West of Blackhawk Lane	58	73	34
9	West of Michigan Bluff Road	55	44	21
10	East of Michigan Bluff Road	54	37	17
McKeon-Ponderosa Way				
11	South of Foresthill Road	55	49	23
Spring Garden Road				
12	North of Foresthill Road	53	36	17
Happy Pines Drive				
13	South of Foresthill Road	55	44	21
Todd Valley Road (West)				
14	South of Foresthill Road	58	74	34
Todd Valley Road (East)				
15	South of Foresthill Road	50	22	10
Mosquito Ridge Road				
16	South of Foresthill Road	55	47	22
Yankee Jim's Road				
17	North of Race Track Street	55	46	22
Main Street				
18	South of Foresthill Road	53	32	15

Segment	Description	Ldn, dB @ 100'	Distance to Traffic Noise Contours (ft.)	
			60 dB	65 dB
Michigan Bluff Road				
19	South of Foresthill Road	49	19	9
Race Track Street				
20	North of Foresthill Road	55	42	20
Todd Valley Connection				
21	Todd Valley to Foresthill	53	32	15
Spring Garden Connection				
22	East of Spring Garden Road	45	10	5
23	North of Foresthill Road	56	52	24

Table 3.10-12 Predicted Cumulative Plus Project Traffic Noise Level Data

Segment	Description	Ldn @ 100'	Increase in Noise Levels, dB	Distance to Traffic Noise Contours (ft.)	
				60 dB	65 dB
Foresthill Road					
1	East of Foresthill Bridge	65	+0.5	225	104
2	West of Spring Garden Road	65	+1.5	226	105
3	East of Happy Pines Drive	65	+1.5	206	96
4	West of Owl Hill Court	65	+1.5	203	94
5	West of Mosquito Ridge Road	65	+1	201	93
6	West of Yankee Jim's Road	64	+1	177	82
7	East of Yankee Jim's Road	63	+1.5	152	71
8	West of Blackhawk Lane	58	+0.5	78	36
9	West of Michigan Bluff Road	56	+1	51	24
10	East of Michigan Bluff Road	54	+1	42	20
McKeon-Ponderosa Way					
11	South of Foresthill Road	55	+1	49	23
Spring Garden Road					
12	North of Foresthill Road	54	+0.5	38	18
Happy Pines Drive					
13	South of Foresthill Road	55	0	44	21
Todd Valley Road (West)					
14	South of Foresthill Road	58	0	75	35
Todd Valley Road (East)					
15	South of Foresthill Road	51	+1	25	11
Mosquito Ridge Road					
16	South of Foresthill Road	55	0	43	20
Yankee Jim's Road					
17	North of Race Track Street	56	+1.5	57	26
Main Street					
18	South of Foresthill Road	53	0	32	15
Michigan Bluff Road					
19	South of Foresthill Road	49	0	19	9
Race Track Street					
20	North of Foresthill Road	55	+1	49	23

Segment	Description	Ldn @ 100'	Increase in Noise Levels, dB	Distance to Traffic Noise Contours (ft.)	
				60 dB	65 dB
Todd Valley Connection					
21	Todd Valley to Foresthill	52	-1	27	13
Spring Garden Connection					
22	East of Spring Garden Road	43	-2	7	3
23	North of Foresthill Road	58	+2	72	33

This Concept Plan-generated traffic is expected to result in traffic noise level increases over existing levels which are considered to be significant along portions of Foresthill Road and Yankee Jim's Road. Since the portion of Yankee Jim's Road which is exposed to a significant increase in traffic noise levels is confined to the Concept Plan site, the increase in traffic noise levels along Yankee Jim's Road will not affect any existing residences, and is considered less than significant. However, existing residences are located adjacent to Foresthill Road, and impacts on these residences will be significant.

In addition, the Concept Plan includes residential uses adjacent to Foresthill Road and Yankee Jim's Road. The Concept Plan site could be exposed to traffic noise levels which exceed 60 dB L_{dn} at the outdoor areas. In addition, the Concept Plan site could be exposed to interior traffic noise levels which exceed an interior noise level standard of 45 dB L_{dn}. However, since site designs are not available, overall noise levels cannot be determined at this time. Therefore, a detailed analysis of traffic noise levels will need to be conducted for proposed residences adjacent to Foresthill Road and Yankee Jim's Road when site designs have been completed. This impact is considered to be ***potentially significant***.

Mitigation Measures

Implementation of the following mitigation measures for the Forest Ranch Concept Plan will reduce traffic noise impacts to a ***less than significant level***:

3.10-1g *The extent by which various land uses will be affected by increases in traffic noise levels associated with the development of the region will vary depending on the proximity of those uses to the roadways in question and the individual sensitivities of those uses to noise.*

Because the increase in traffic noise levels along Foresthill Road would affect existing noise sensitive land uses (primarily residences) which are already located adjacent to Foresthill Road, the only way to practically reduce noise levels at those locations would be to construct noise barriers between the roadway and the residences, or to repave the roadways in question with noise-reducing asphalt. The construction of solid noise barriers could reduce traffic noise levels at the nearest noise sensitive receptors to the roadways. However, barriers may not be feasible, as access to the residences is from the roadway. The use of alternative roadway pavements such as rubberized asphalt or open gap asphalt have been shown to reduce overall traffic noise levels by approximately 3 dB to 5 dB. Payment of fair

share fees towards these road improvements shall be required prior to issuance of any building permit.

3.10-1h *A detailed analysis of traffic noise levels shall be required for tentative subdivision maps for proposed residences adjacent to Foresthill Road and Yankee Jim's Road. The noise analysis will be required to incorporate mitigation measures which would reduce noise impacts at proposed residences to be in conformance with standards and criteria set forth in the Placer County General Plan.*

Impact 3.10-2 Noise impacts due to the introduction of additional stationary noise sources in the FDCP area.

Discussion/Conclusion: There are a variety of noise sources associated with future development within the FDCP area which have the potential to create noise levels in excess of the General Plan noise standards or result in annoyance at existing and future noise-sensitive developments within the Plan area. Such uses/noise sources include, but are not limited to, fire stations, commercial loading docks associated with grocery stores, school playgrounds and neighborhood parks.

At the Community Plan level, detailed site and grading plans associated with these types of noise sources have not yet been developed. As a result, it is not feasible to identify specific noise impacts associated with these sources. Rather, the potential for these sources to generate significant excessive or annoying noise levels is identified, and consideration of that potential during the design phases of the development is encouraged. Additional discussion and examples of noise generation of some of these types of uses follows:

Loading Docks. Due to the elevated noise emissions of heavy trucks and the common practice of utilizing loading docks during late night or early morning hours, adverse public reaction to loading dock usage is not uncommon. This is especially true if heavy trucks idle during unloading or if refrigeration trucks are parked in proximity to residential boundaries.

Average noise levels for single idling trucks generally range from 60 to 65 dB L_{eq} at a distance of 100 feet, and maximum noise levels associated with heavy truck passages range from 70 to 75 dB L_{max} at a distance of 100 feet. Maximum noise levels generated by passages of medium duty delivery trucks generally range from 55 to 65 dB at a distance of 100 feet, depending on whether or not the driver is accelerating. In light of these levels, a single heavy truck pass-by on a loading dock access route could result in adverse public reaction to noise levels and could exceed the General Plan criteria.

The potential for adverse noise impacts associated with loading dock usage could be reduced by restricting heavy truck arrivals or departures during the nighttime hours, by requiring that heavy truck drivers turn off their engines while parked at the loading dock, and by requiring solid noise barriers along the side of the loading docks. It should be noted, however, that such measures may not be sufficient to ensure compliance with the applicable Noise Element standards. Due to the potential for adverse pubic reaction to new loading docks in close proximity to existing

residential uses, the noise effects associated with proposals for new loading docks are ***potentially significant*** and should be carefully evaluated.

Schools/Playgrounds/Day Care Centers. Children playing on school playgrounds, at neighborhood parks and in day care centers are often considered significant noise sources which could adversely affect adjacent noise-sensitive land uses. Typical noise levels associated with groups of approximately 50 children playing at a distance of 50 feet generally range from 55 to 60 dB L_{eq}, with maximum noise levels ranging from 70 to 75 dB.

Given the proximity of most schools, parks and day care centers to residential uses, the potential for exceeding Noise Element standards exists, depending on the orientation and proximity of the play areas to those nearest residences, the number of children using the play areas at a given time, and the types of activities the children are engaged in.

Practical noise mitigation measures could be utilized to reduce the potential for adverse noise impacts associated with children playing at these types of uses. Such measures could include requiring minimum setbacks between play areas and residential property lines, requiring noise barriers at the perimeter of the play areas, and by limiting the number of children using the play areas at a given time. Nonetheless, because sounds consisting of speech have been shown to be more annoying than broad-band noise, and because children often take great pride in being loud, the potential for annoyance associated with these uses is ***potentially significant*** and cannot practically be eliminated, except through proper separation of land uses, as provided by the FDCP and the General Plan Noise Element.

Mitigation Measures

Implementation of one or more of the following mitigation measures listed in Mitigation Measure 3.10-1 a through f above on a project-by-project basis should reduce impacts to a ***less than significant level.***

Discussion/Conclusion with Incorporation of the Forest Ranch Concept Plan: Maintenance of fairways and greens on a golf course generally occur throughout the early morning and daytime hours. This type of activity is inherent to golf courses. The noise levels could potentially be annoying to future residents adjacent to the golf course. Therefore, this impact is considered ***potentially significant***.

Noise generated by the 100-space recreational vehicle park will be primarily associated with the arrival and departure of vehicles and the use of generators, in the absence of electrical outlets. Therefore, this impact is ***potentially significant***.

Noise generated by the Forest Ranch Concept Plan wastewater treatment plant may result in noise levels which exceed acceptable standards at nearby residential uses. If electric pump motors are located inside of buildings which are designed to control noise, exterior noise levels at a distance of 100 feet are generally less than 40 dBA and would comply with State Office of Noise Control Model Community Noise Control Ordinance recommended 40 dBA hourly L_{eq}, nighttime exterior noise level standard. If these types of pumping facilities are located closer

than 100 feet from the nearest residential property line, impacts are significant. Noise impacts from filtration systems and diesel-powered generators can be significant under certain circumstances. Therefore, this impact is ***potentially significant.***

Mitigation Measures

Implementation of the following measures will reduce golf course operations, recreational vehicle park and wastewater treatment plant associated noise impacts to a less than ***significant level***:

3.10-2a *All maintenance equipment shall be kept in good working order and fitted with mufflers. In addition, all future residents which purchase property adjacent to the proposed golf course shall sign a disclosure which fully identifies that noise levels associated with golf course maintenance will occur. The golf course operator shall schedule maintenance of those areas abutting residences in a sensitive manner.*

3.10-2b *To reduce adverse public reaction to nighttime recreational vehicle park generator noise, generators shall not be allowed to operate between the hours of 9:00 p.m. and 7:00 a.m. In addition, if the recreational vehicle park is located within 500 feet of any existing or proposed residential uses, a detailed acoustical analysis of noise impacts shall be conducted when a detailed site plan for the RV park is available, and additional mitigation measures shall be implemented in accordance with the recommendations of the acoustical analysis.*

3.10-2c *Wastewater treatment plant pumping equipment which may operate during the nighttime hours shall not exceed an hourly average noise level of 40 dBA Leq at the project property line or at adjacent residential property lines. Routine testing of emergency generator(s) shall be conducted during daytime periods. Emergency generators shall not exceed an hourly average noise level of 50 dBA Leq at the project property line or at adjacent residential property lines.*

Impact 3.10-3 Interior noise impacts for all sources within the FDCP area, including the Forest Ranch Concept Plan area.

Discussion/Conclusion: Standard residential construction (wood siding, STC-26 windows, door weather stripping, exterior wall insulation, composition plywood roof), results in an exterior to interior noise reduction between 20 dB and 25 dB with windows closed, and approximately 15 dB with windows open. Generally, exterior building facades which are exposed to noise levels exceeding 65 dB L_{dn} require either a detailed analysis of interior noise levels when building plans are available, or additional noise control measures can be incorporated into the project design. Living spaces within the first floors which receive adequate shielding from noise barriers to reduce overall noise levels to less than 65 dB L_{dn} do not require further mitigation or analysis. Therefore, first or second floor facades which are exposed to exterior noise levels in excess of 65 dB L_{dn} could exceed the interior noise level criteria, a ***potentially significant*** impact.

Mitigation Measure

Implementation of one or more of the Mitigation Measures listed in Mitigation Measure 3.10-1 a through f above on a project-by-project basis should reduce impacts to a ***less than significant level.***

Impact 3.10-4 Noise from construction-related activities in the FDCP and Forest Ranch Concept Plan area may exceed adopted noise standards.

Discussion/Conclusion: Noise from construction activities in the FDCP area could potentially affect noise-sensitive land uses in the immediate area. Construction activities would be scattered throughout the Plan area (though more likely to occur in the community of Foresthill), would be temporary in nature, and would most likely occur only during the daytime hours. Construction noise impacts could result in annoyance or sleep disruption for nearby residents if nighttime operations were to occur, or if equipment is not properly muffled or maintained. This impact is ***potentially significant***.

The Forest Ranch Concept Plan may also have activities associated with construction that will result in elevated noise levels within the immediate area. Activities involved in construction would typically generate maximum noise levels ranging from 85 to 90 dB at a distance of 50 feet. Due the relatively small distance between the existing noise-sensitive uses and the uses proposed, construction will result in periods of significant ambient noise level increases. Because construction activities could result in periods of elevated noise levels at existing residences, this impact is ***potentially significant***.

Mitigation Measure

Implementation of the following measure will reduce construction-related noise impacts to the FDCP area and the Forest Ranch Concept Plan area to a ***less than significant level***:

3.10-4 *The hours of operation of noise-producing construction equipment shall be restricted to 7:00 a.m. to 7:00 p.m. Mondays through Fridays, and 9:00 a.m. to 6:00 p.m. on Saturdays. Noise from construction activities is prohibited on Sunday and Holidays. Effective mufflers shall be fitted to gas- and diesel-powered equipment to reduce noise levels as much as possible.*