

June 1, 2007

Mr. David Mohlenbrok
City of Rocklin Community Development
39780 Rocklin Road
Rocklin, CA 95677

Subject: Additional Analysis of Sierra College Boulevard and UPRR noise levels at the Clover Valley Project.

Dear Mr. Mohlenbrok:

This letter and the attached appendices are in response to the City's request for additional noise barrier analysis for the Clover Valley project. This additional analysis was requested due to the fact that more recent grading maps and wall details for the project have become available since the original analysis was prepared. In addition, this letter also contains our response to Comment 182-3 on the DEIR, which pertains to increases in noise levels at the existing homes on Rawhide Road and Clover Valley Road resulting from the project.

Response to Comment 182-3:

The residences on Rawhide Road and Clover Valley Road near the southern site boundary will be between 5,000 feet south of the nearest point of the future Valley View Parkway (where it intersects Park Drive, and 9,500 feet south of the furthest point of that roadway (where it intersects Sierra College Boulevard). Because future Valley View Parkway traffic noise levels are predicted to be approximately 60 dB Ldn at a reference distance of 100 feet from that roadway, the levels would be reduced to less than 40 dB Ldn at the nearest existing residences on Rawhide and Clover Valley Roads.

As noted in the DEIR, existing ambient noise levels in the Valley are approximately 46-48 dB Ldn, which is considered a fairly quiet noise environment. Because Valley View parkway noise levels are predicted to be well below measured existing ambient noise levels at the residences on Rawhide and Clover Valley Roads, no adverse noise impacts are anticipated at that location.

With respect to the comment regarding reflections of Valley View Parkway traffic noise levels off of retaining walls back toward Rawhide Road and Clover Valley Roads, the following response is offered. If a perfect reflection of noise were to result from such walls, Valley View Parkway noise levels would be approximately 3 dB higher at the residences in question. This is because a 3 dB increase represents a doubling of sound energy (which would be the case with a perfect reflection). However, the proposed terracing of walls and some sound absorption associated with the wall material will ensure that the walls do not provide a perfect reflection of sound. As a result, and reflections resulting from Valley View Parkway retaining walls would likely be on the order of 1-2 dB at the nearest residences, which would still be well below existing noise levels and applicable noise standards.

Supplemental Analysis of Noise Barrier Requirements Along Sierra College and the UPRR Right of Way:

BAC used the latest site and grading plans and cross sections provided by the City of Rocklin to re-evaluate noise impacts and noise barrier requirements for the residences proposed adjacent to Sierra College Boulevard and the UPRR tracks. The barrier requirements evaluated at representative lots located adjacent to Sierra College Boulevard and the UPRR tracks, with the detailed results of the analysis included in the attached appendices.

Sierra College Boulevard Noise Barriers:

The lots proposed along sierra college fall into two distinct categories. Those lots which are north of Valley View Parkway (115, 116, 125, 126, 133-137) will all have pad elevations (and corresponding back yard elevations), which are **below** the elevation of Sierra College Boulevard following site grading. As a result, there will be varying degrees of natural shielding provided by the intervening topography. After accounting for this shielding, it was determined that a 6-foot tall solid noise barrier along the portion of Sierra College Boulevard north of Valley View Road would be adequate to reduce future Sierra College Boulevard traffic noise levels to 60 dB Ldn or less. It is important to note, however, that these barriers should be constructed at the top of the slopes for these lots, rather than at the back yard elevation or intermediate position, as a lower barrier placement could lead to traffic having a “view” over the top of the walls.

Those lots which are south of Valley View Parkway (191-214) will all have pad elevations (and corresponding back yard elevations), which are **above** the elevation of Sierra College Boulevard following site grading. As a result, there will be varying degrees of natural shielding provided by the intervening topography. After accounting for this shielding, it was determined that a 6-foot tall solid noise barrier along the portion of Sierra College Boulevard south of Valley View Road would be adequate to reduce future Sierra College Boulevard traffic noise levels to 60 dB Ldn or less. It is important to note, however, that this barrier should be constructed relative to backyard elevation (the direct opposite as the recommendation of the lots north of Valley View), as a lower barrier placement could lead to traffic having a “view” over the top of the walls.

Railroad Noise Barriers:

Those lots which abut the UPRR tracks (210-214 and lots further south) will all have pad elevations (and corresponding back yard elevations), which will be well **above** the elevation of the UPRR tracks following site grading. As a result of this considerable change in elevation, as well as the substantial setback between the tracks and nearest proposed residences, there will be considerable natural shielding of railroad noise provided by the intervening topography. After accounting for this shielding, it was determined that no noise barriers would be necessary for the lots located along the UPRR tracks to achieve satisfaction with the City of Rocklin 60 dB Len exterior noise level standard.

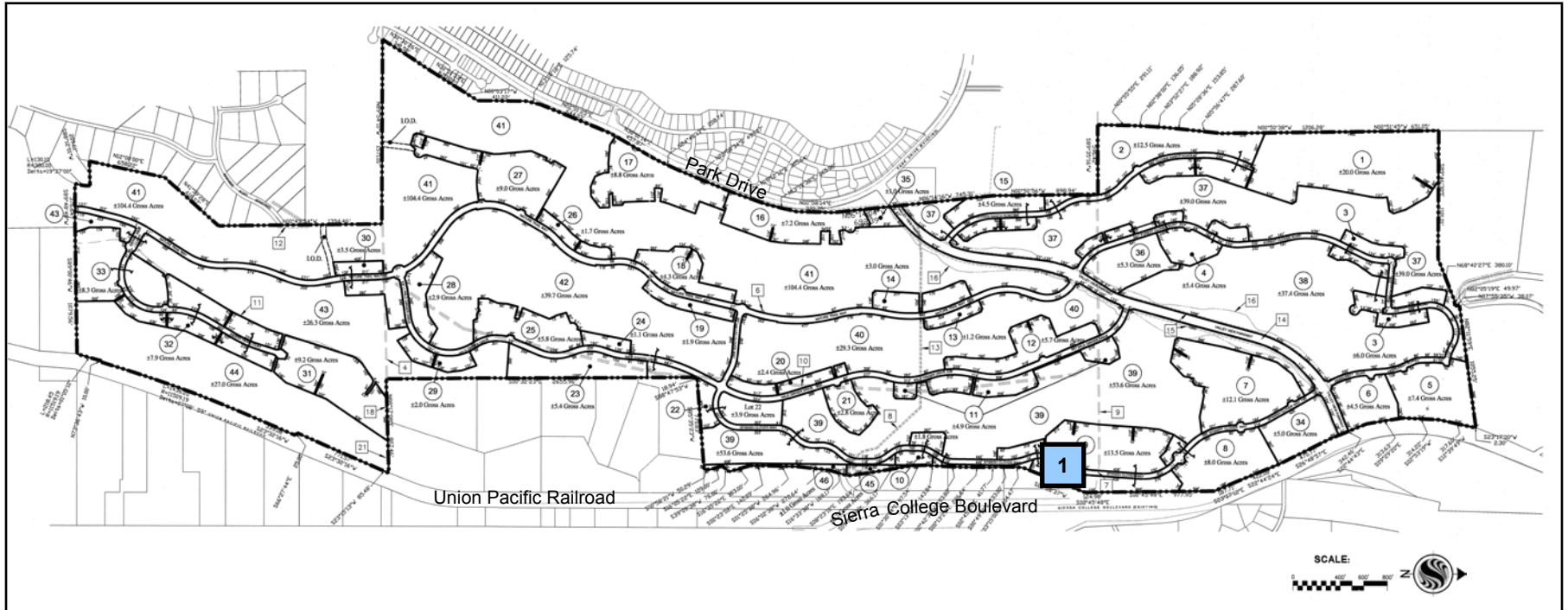
I hope this information is helpful to you. Please call me at (530) 745-0550 if you have further questions.

Sincerely,

A handwritten signature in cursive script that reads "Paul Bollard". The signature is written in black ink and is positioned above the printed name.

Paul Bollard, President

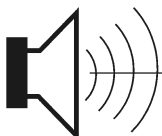
Figure 1
Sierra College Boulevard and Union Pacific Railroad Noise Measurement Location
Clover Valley Lakes – Rocklin, California



: 24-hour Noise Monitoring Location

Appendix A Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
Leq	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
Loudness	A subjective term for the sensation of the magnitude of sound.
Masking	The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.
Noise	Unwanted sound.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the "Maximum" level, which is the highest RMS level.
RT₆₀	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
SEL	A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.



BOLLARD

Acoustical Consultants

Appendix B
Clover Valley Lakes REIR
24hr Continuous Noise Monitoring - (UPRR and Sierra College Boulevard)
Tuesday, April 25, 2006

Hour	Leq	Lmax	L50	L90
0:00	50.1	72.9	36.1	31.3
1:00	45.0	62.8	32.8	31.2
2:00	44.1	61.2	33.2	31.4
3:00	45.0	64.5	35.8	32.1
4:00	47.5	61.3	39.9	33.8
5:00	54.2	72.9	48.6	40.0
6:00	56.5	71.8	55.1	47.7
7:00	56.8	69.5	55.8	48.6
8:00	55.6	70.3	54.0	44.6
9:00	54.3	66.1	52.0	42.6
10:00	52.1	63.0	49.5	40.7
11:00	51.4	65.1	48.4	40.2
12:00	52.0	61.5	49.9	41.5
13:00	52.4	71.5	49.5	41.5
14:00	52.8	66.3	51.4	43.0
15:00	55.0	72.3	53.3	44.3
16:00	55.2	67.6	54.0	46.2
17:00	56.1	71.3	54.5	46.1
18:00	55.9	75.8	53.0	43.4
19:00	54.4	73.7	50.4	39.1
20:00	52.9	65.9	49.1	39.9
21:00	52.3	67.6	47.7	39.1
22:00	50.7	64.0	45.3	36.6
23:00	47.8	65.2	39.7	33.0

Statistical Summary						
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	56.8	51.4	54.3	56.5	44.1	51.0
Lmax (Maximum)	75.8	61.5	68.5	72.9	61.2	66.3
L50 (Median)	55.8	47.7	51.5	55.1	32.8	40.7
L90 (Background)	48.6	39.1	42.7	47.7	31.2	35.2

Computed Ldn, dB	58.0
% Daytime Energy	78%
% Nighttime Energy	22%

Appendix C

**FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Prediction Worksheet**

Project Information:

Job Number: 2005-628
Project Name: Clover Valley Lakes REIR
Roadway Name: Sierra College Boulevard

Traffic Data:

Year: 2025 Proposed General Plan Plus Project
Average Daily Traffic Volume: 28,500
Percent Daytime Traffic: 78
Percent Nighttime Traffic: 22
Percent Medium Trucks (2 axle): 2
Percent Heavy Trucks (3+ axle): 2
Assumed Vehicle Speed (mph): 55
Intervening Ground Type (hard/soft): **Soft**

Traffic Noise Levels:

Lot(s):	Description	Distance	Offset (dB)	-----L _{dn} , dB-----			Total
				Autos	Medium Trucks	Heavy Trucks	
115,116,125,&126	Backyard Areas	197	0	65	55	59	66
133 - 137	Backyard Areas	188	0	65	56	60	67
191 - 197	Backyard Areas	185	0	66	56	60	67
198 - 208	Backyard Areas	447	0	60	50	54	61
209 - 214	Backyard Areas	492	0	59	49	53	61
252 - 254	Backyard Areas	904	0	55	45	49	57

Traffic Noise Contours (No Calibration Offset):

L _{dn} Contour, dB	Distance from Centerline, (ft)
75	53
70	115
65	247
60	533

Notes:



**Appendix D-1
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet**

Project Information: Job Number: 2005-628
Project Name: Clover Valley Lakes REIR
Roadway Name: Sierra College Boulevard
Location(s): 115,116,125,&126

Noise Level Data: Year: 2025 Proposed General
Auto L_{dn}, dB: 65
Medium Truck L_{dn}, dB: 55
Heavy Truck L_{dn}, dB: 59

Site Geometry: Receiver Description: Backyard Areas
Centerline to Barrier Distance (C₁): 159
Barrier to Receiver Distance (C₂): 38
Automobile Elevation: 615
Medium Truck Elevation: 617
Heavy Truck Elevation: 623
Pad/Ground Elevation at Receiver: 590
Receiver Elevation¹: 595
Base of Barrier Elevation: 602
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height ² (ft)	----- L _{dn} , dB -----				Barrier Breaks Line of Sight to...		
		Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
608	6	54	45	50	56	Yes	Yes	Yes
609	7	54	44	49	55	Yes	Yes	Yes
610	8	53	44	48	55	Yes	Yes	Yes
611	9	53	43	48	54	Yes	Yes	Yes
612	10	52	42	47	54	Yes	Yes	Yes
613	11	52	42	47	53	Yes	Yes	Yes
614	12	51	42	46	53	Yes	Yes	Yes
615	13	51	41	46	52	Yes	Yes	Yes
616	14	51	41	45	52	Yes	Yes	Yes

Notes: 1. Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)
2. Barrier effectiveness analyzed with barriers located at the project's property line.



**Appendix D-2
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet**

Project Information: Job Number: 2005-628
Project Name: Clover Valley Lakes REIR
Roadway Name: Sierra College Boulevard
Location(s): 133 - 137

Noise Level Data: Year: 2025 Proposed General
Auto L_{dn} , dB: 65
Medium Truck L_{dn} , dB: 56
Heavy Truck L_{dn} , dB: 60

Site Geometry: Receiver Description: Backyard Areas
Centerline to Barrier Distance (C_1): 173
Barrier to Receiver Distance (C_2): 69
Automobile Elevation: 619
Medium Truck Elevation: 621
Heavy Truck Elevation: 627
Pad/Ground Elevation at Receiver: 609
Receiver Elevation¹: 614
Base of Barrier Elevation: 620
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height ² (ft)	----- L_{dn} , dB -----				Barrier Breaks Line of Sight to...		
		Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
626	6	55	45	50	57	Yes	Yes	Yes
627	7	55	45	50	56	Yes	Yes	Yes
628	8	54	45	49	56	Yes	Yes	Yes
629	9	54	44	49	55	Yes	Yes	Yes
630	10	53	44	49	55	Yes	Yes	Yes
631	11	53	43	48	54	Yes	Yes	Yes
632	12	52	43	48	54	Yes	Yes	Yes
633	13	52	42	47	53	Yes	Yes	Yes
634	14	52	42	47	53	Yes	Yes	Yes

Notes: 1. Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)
2. Barrier effectiveness analyzed with barriers located at the project's property line.



Appendix D-3
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information: Job Number: 2005-628
 Project Name: Clover Valley Lakes REIR
 Roadway Name: Sierra College Boulevard
 Location(s): 191 - 197

Noise Level Data: Year: 2025 Proposed General
 Auto L_{dn} , dB: 66
 Medium Truck L_{dn} , dB: 56
 Heavy Truck L_{dn} , dB: 60

Site Geometry: Receiver Description: Backyard Areas
 Centerline to Barrier Distance (C_1): 170
 Barrier to Receiver Distance (C_2): 15
 Automobile Elevation: 607
 Medium Truck Elevation: 609
 Heavy Truck Elevation: 615
 Pad/Ground Elevation at Receiver: 628
 Receiver Elevation¹: 633
 Base of Barrier Elevation: 628
 Starting Barrier Height 3

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height ² (ft)	----- L_{dn} , dB -----				Barrier Breaks Line of Sight to...		
		Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
631	3	61	51	55	62	Yes	No	No
632	4	60	51	55	62	Yes	Yes	Yes
633	5	59	50	54	61	Yes	Yes	Yes
634	6	58	48	53	59	Yes	Yes	Yes
635	7	57	47	52	58	Yes	Yes	Yes
636	8	56	46	51	57	Yes	Yes	Yes
637	9	55	45	49	56	Yes	Yes	Yes
638	10	54	44	49	55	Yes	Yes	Yes
639	11	53	43	48	54	Yes	Yes	Yes

Notes: 1. Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)
 2. Barrier effectiveness analyzed with barriers located at residential lot property lines.



Appendix D-4
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet

Project Information: Job Number: 2005-628
 Project Name: Clover Valley Lakes REIR
 Roadway Name: Sierra College Boulevard
 Location(s): 198 - 208

Noise Level Data: Year: 2025 Proposed General
 Auto L_{dn}, dB: 60
 Medium Truck L_{dn}, dB: 50
 Heavy Truck L_{dn}, dB: 54

Site Geometry: Receiver Description: Backyard Areas
 Centerline to Barrier Distance (C₁): 273
 Barrier to Receiver Distance (C₂): 174
 Automobile Elevation: 571
 Medium Truck Elevation: 573
 Heavy Truck Elevation: 579
 Pad/Ground Elevation at Receiver: 596
 Receiver Elevation¹: 601
 Base of Barrier Elevation: 587
 Starting Barrier Height 3

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height ² (ft)	----- L _{dn} , dB -----				Barrier Breaks Line of Sight to...		
		Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
590	3	55	45	49	56	Yes	No	No
591	4	55	45	49	56	Yes	Yes	No
592	5	54	45	49	56	Yes	Yes	No
593	6	54	45	49	56	Yes	Yes	Yes
594	7	54	44	49	55	Yes	Yes	Yes
595	8	53	44	49	55	Yes	Yes	Yes
596	9	53	44	48	55	Yes	Yes	Yes
597	10	52	43	48	54	Yes	Yes	Yes
598	11	52	43	48	54	Yes	Yes	Yes

Notes: 1. Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)
 2. Barrier effectiveness analyzed with barriers located at the project's property line.



**Appendix D-5
FHWA Traffic Noise Prediction Model (FHWA-RD-77-108)
Noise Barrier Effectiveness Prediction Worksheet**

Project Information: Job Number: 2005-628
Project Name: Clover Valley Lakes REIR
Roadway Name: Sierra College Boulevard
Location(s): 209 - 214

Noise Level Data: Year: 2025 Proposed General
Auto L_{dn} , dB: 59
Medium Truck L_{dn} , dB: 49
Heavy Truck L_{dn} , dB: 53

Site Geometry: Receiver Description: Backyard Areas
Centerline to Barrier Distance (C_1): 477
Barrier to Receiver Distance (C_2): 15
Automobile Elevation: 514
Medium Truck Elevation: 516
Heavy Truck Elevation: 522
Pad/Ground Elevation at Receiver: 575
Receiver Elevation¹: 580
Base of Barrier Elevation: 575
Starting Barrier Height 3

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height ² (ft)	----- L_{dn} , dB -----				Barrier Breaks Line of Sight to...		
		Autos	Medium Trucks	Heavy Trucks	Total	Autos?	Medium Trucks?	Heavy Trucks?
578	3	54	45	48	56	Yes	No	No
579	4	54	44	48	55	Yes	Yes	Yes
580	5	53	43	47	54	Yes	Yes	Yes
581	6	52	42	46	53	Yes	Yes	Yes
582	7	51	41	45	52	Yes	Yes	Yes
583	8	49	40	44	51	Yes	Yes	Yes
584	9	49	39	43	50	Yes	Yes	Yes
585	10	48	38	42	49	Yes	Yes	Yes
586	11	47	37	41	48	Yes	Yes	Yes

Notes: 1. Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)
2. Barrier effectiveness analyzed with barriers located at residential lot property lines.



Appendix E
Barrier Insertion Loss Calculation

Project Information: Job Number: 2005-628
 Project Name: Clover Valley Lakes REIR
 Location(s): Lots 209-214

Noise Level Data: Source Description: UPRR
 Source Noise Level, dBA: 58
 Source Frequency (Hz): 500
 Source Height (ft): 490

Site Geometry: Receiver Description: Backyard Area
 Source to Barrier Distance (C₁): 341
 Barrier to Receiver Distance (C₂): 15

 Pad/Ground Elevation at Receiver: 575
 Receiver Elevation¹: 580
 Base of Barrier Elevation: 575
 Starting Barrier Height 3

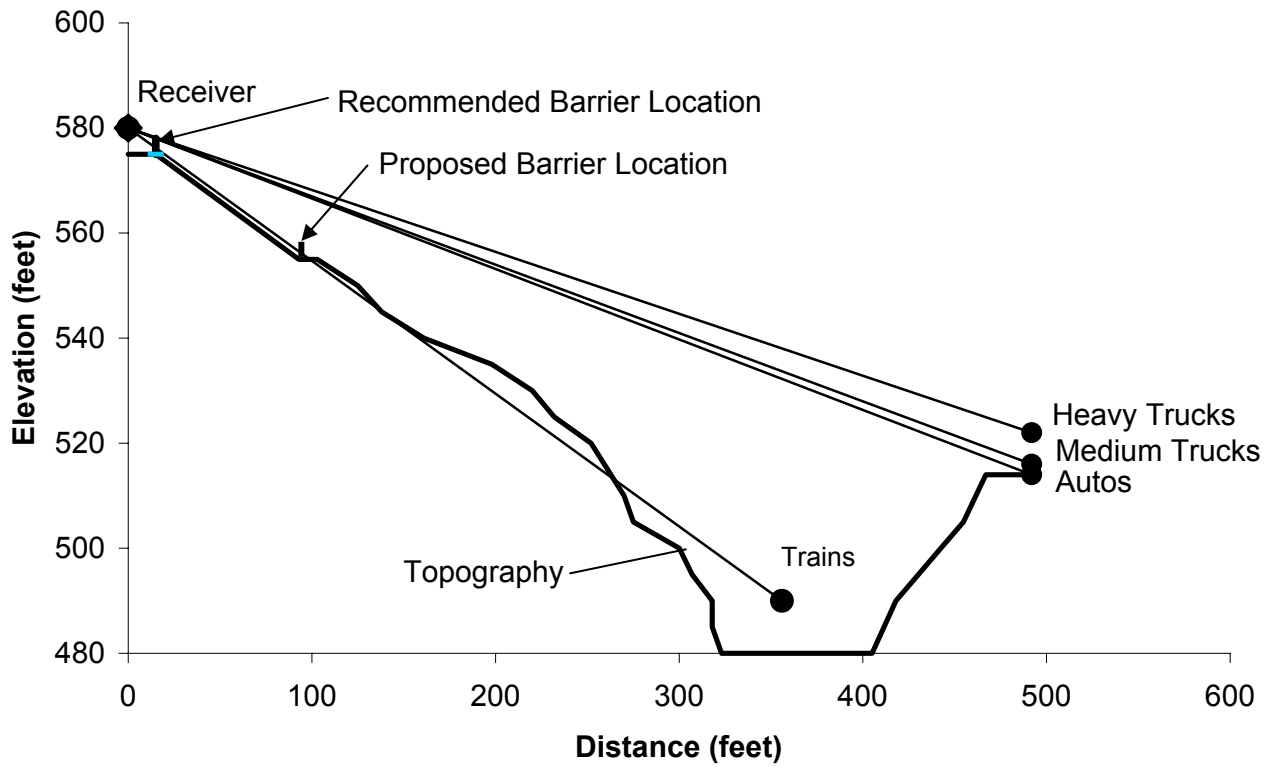
Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
578	3	-5.9	52	Yes
579	4	-6.9	51	Yes
580	5	-8.1	50	Yes
581	6	-9.2	48	Yes
582	7	-10.3	47	Yes
583	8	-10.9	47	Yes
584	9	-11.9	46	Yes
585	10	-12.8	45	Yes
586	11	-13.4	44	Yes
587	12	-14.0	44	Yes
588	13	-14.6	43	Yes

Notes: 1. Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)

**Appendix F
Barrier Insertion Graphic**

Job Number: 2005-628
 Project Name: Clover Valley Lakes REIR
 Roadway Name: Sierra College Boulevard
 Location(s): 209 - 214



Centerline to Barrier Distance (C_1):	477
Barrier to Receiver Distance (C_2):	15
Automobile Elevation:	514
Medium Truck Elevation:	516
Heavy Truck Elevation:	522
Pad/Ground Elevation at Receiver:	575
Receiver Elevation ¹ :	580
Base of Barrier Elevation:	575
Barrier Height ² :	3

Notes: 1. Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s)